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## Strengthening Non-Communicable Disease Research Capacity in Thailand: Leveraging PhD Nurses and other Health Professionals

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### Abstract

The mounting burden of non-communicable disease (NCD) in lower-to-middle income countries (LMIC) was recognized two decades ago by the World Health Organization (WHO). In 2012, the WHO reported that NCDs were responsible for 71% of total deaths in Thailand. Thus, the goal of our ongoing NIH D43 training grant is to increase the quantity and quality of NCD research in Thailand by producing nurse scientists with the capacity to design, implement, guide, and evaluate cutting-edge research projects. The three components of the program are 1) a long-term component to train 10 Thai postdoctoral scholars that includes one year of intensive mentored research training in the US and one year implementing a research project back in Thailand; 2) a short-term component that provides an opportunity for Thai scientists, teachers, administrators and policy makers to take classes in areas relevant to NCD; 3) a yearly two-day NCD workshop to be held in different regions of Thailand. To date, 8 long-term trainees have completed various stages of their training. Eleven short-term trainees have taken courses at the University of Michigan. Two NCD workshops have been held so far under the auspices of the grant with a third planned for 2018. The ability to participate in the in-depth activities provided by the grant have not only expanded knowledge around NCD's, but also has enabled US and Thai investigators to grow in the area of culturally informed research.

### Keywords

research capacity; Thailand; nurses; postdoctoral; non-communicable disease

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### Ethical Aspects

The authors declare that the training program did not engender any ethical issues.

## INTRODUCTION

The mounting burden of non-communicable disease (NCD) in lower-to-middle income countries (LMIC) was recognized two decades ago by the World Health Organization (WHO).<sup>1</sup> In Thailand, for the year 2012, the WHO has reported that NCDs were responsible for 71% of total deaths.<sup>2</sup> As with other countries in Asia, much of this increase in mortality related to NCDs can be traced to increasing urbanization, modernization and the consequent changes in lifestyle.<sup>3</sup>

In response to a call from the Fogarty International Center of the National Institutes of Health for research training programs focused on building research capacity for NCDs in LMICs (D43), we collaborated with our colleagues at the Praboromarajchanok Institute for Health Workforce Development (PBRI), a division of the Ministry of Public Health (MOPH) in Thailand, to submit an associated planning grant (D71). The primary focus of the planning was to determine the feasibility of utilizing PhD prepared nurses and other health professionals to accelerate the pace of NCD research in Thailand.

### Why Focus on PhD nurses and other health professionals?

The development of the professional nursing workforce, distributed throughout the country to the MOPH's lowest administrative unit (the sub-district or tambon of 10,000 people) has been a particularly important component of efforts to overcome healthcare personnel shortages and unequal access to care, and represents a major potential asset in NCD prevention and management.<sup>4</sup>

Our collaborating institution, the PBRI, supports 38 colleges located in different geographic regions across Thailand.<sup>5</sup> There are approximately 300 PBRI collaborating PhD faculty representing the disciplines of nursing, public health, dentistry, and pharmacy. The interplay of the faculty's own research development, the training of students, and the enactment of care in their hospitals and communities, provided a nexus of activity to nurture and accelerate NCD research capacity building and its dissemination and utilization.

### The Planning Activities

A faculty survey indicated that the greatest focus of research was diabetes mellitus and hypertension with lesser emphasis on the growing cardiovascular diseases, cancer and pulmonary disease<sup>6</sup>. Additionally, key stakeholders were interviewed; of these, research administrators expressed a need for more mentored post-doctoral training, an increase in time allocation for research, and a greater emphasis on research funding as a priority.

Using this information, we developed a research training plan with long-term and short-term components for Thai PhD-prepared nurses and other health professionals. This training grant received funding beginning June, 2014. It is the first, and as far as we know, only, LMIC research capacity building grant to have a major focus on doctorally-prepared nurses<sup>7</sup>. The goal of the program is to increase the quantity and quality of NCD research in Thailand by producing nurse scientists with the capacity to design, implement, guide, and evaluate cutting-edge research projects. This paper describes our experience with this program to-date, its impact, and the way forward.

## Methods

An initial survey was performed of PhD-qualified faculty at nursing and public health institutions of the PBRI<sup>6</sup>. The survey was a questionnaire that included questions on preferred characteristics of a post-doctoral training program the results of which were used to design the short and long-term training programs. Participation in this project began in 2014 and remains underway at the time of publication. This is a descriptive report of the program design elements and short and long term outcomes to date. The data reported comes from records of participant research, courses and seminars attended, and self-reported participant research progress including published papers and conference presentations.

The long-term component of the program provides NCD prevention and intervention research training for 10 Thai postdoctoral scholars over the 5 years of the grant, predominantly nurses, from different geographic regions (Figure 1). This two-year program consists of one year of intensive mentored research training and course work at the University of Michigan School of Nursing (UMSN) in Ann Arbor and one year implementing a research project back in Thailand. For the latter, qualified candidates are required to obtain assurances from institution leadership for protected time to perform the research. The short-term component of the grant training program provides an opportunity for Thai scientists, teachers, administrators and policy makers with an interest in NCD research, treatment, and/or policy to come to Ann Arbor for one to two months during the summer to take classes in a variety of areas relevant to NCD research that would allow them to improve and/or expand their understanding of these areas. Our collaboration with PBRI allows for communication with and access to the large cadre of potential candidates for these programs at the educational institutions overseen by this division of the MOPH. A program portal was set up on the internet to provide information about the grant programs and permit the direct submission of applications.

For the long-term program, a primary selection criterion is the existence of an obvious match between the applicant's research interest and background and the research program of a mentor in the area of NCD<sup>8,9</sup>. The two post-doctoral fellows selected each year are expected to be active members of a research team where they learn aspects of research including, but not limited to, project management, advanced statistical methodologies, and use of large national datasets. In addition to conducting research, fellows are required to submit at least one paper for publication, and prepare a grant application to obtain money from the grant for a second-year independent research project in Thailand. The data collected for this project is expected to form the basis of an application for a full-scale grant from a national funding agency, Thai and/or U.S. Trainees are encouraged to continue to collaborate with their primary mentor[s] through the first major full scale research project that follows the fellowship years.

The training program also requires attendance at grant-sponsored monthly seminars on research and methodology related to NCDs. Speakers at the majority of the seminars are from the greater University of Michigan community, however, the grant provides funds to bring in a nationally/internationally known speaker twice each year.

The selection process for the short-term program is less rigorous with a goal of casting a wide net for investigators seeking to shift to NCD. Applicants need only submit a CV and their objectives while in Ann Arbor, e.g., courses they would like to take or finding a mentor for the long-term program. A few of the short term participants do apply for the long-term post doc fellowship.

A third component of the program calls for a yearly two-day workshop to be held in different regions of Thailand. This is a forum for NCD research and policy-related topics as well as an opportunity for program trainees (and others) to present their research results. The workshops are designed to include training in basic research competencies, especially those directed at demonstrated areas of request or gaps identified in the results from the D71 planning grant, e.g., discipline-specific conceptual knowledge, research design, communication skills, professionalism, leadership and management skills, and, responsible conduct of research. The workshops also provide an opportunity for the grant directors to meet with high ranking members of the Thai government to discuss the challenges presented by NCDs and the collaborative means of responding to these challenges.

Guidance for the grant came mainly from the two co-Principal Investigators who also were aided by an advisory group consisting of members from the U.S. and Thailand chosen for their relevant and profound experience with NCD research, mentoring, and their global perspective.

## Results

As of this writing, eight long-term and fifteen short-term trainees from different regions of Thailand (see Fig. 1) have been accepted into the program. The first three long-term trainees have just finished their second-year research project in Thailand. Five others are at different points in the program. NCDs addressed in their research projects have included cancer, diabetes, and chronic illness sequelae of HIV infection. One trainee, a PhD pharmacist, is investigating the geographic and cost discrepancies of prescription medications for adults with multiple chronic conditions. In addition to attending professional conferences in their areas of research interest in the U.S. and internationally, trainees have been writing manuscripts that are at various stages on the road to publication.

Table 1 lists the semester-long or summer courses taken by one or more of the long- and short-term trainees. In addition to taking courses during their stay in Ann Arbor, a number of the short-term trainees have used the opportunity to meet with faculty, both within the School of Nursing and without, to find a suitable mentor for a long-term fellowship. This strategy has yielded two suitable mentor-mentee pairings, thus far.

The monthly seminar series inform the trainees about research on a variety of topics related to NCDs (Table 2) presented by prominent experts in their fields. In addition to the trainees, the seminars have attracted attendees from across the university.

Of the two NCD workshops so far held under the auspices of the grant, the first took place in the summer of 2015 in the city of Nakhon Ratchasima in south central Thailand. The focus was on research methodologies related to NCDs. Nearly 100 scientists and students attended

presentations by Thai nurses, physicians, and public health workers and administrators, as well as two faculty members from the UMSN.

The second NCD workshop took place in Phuket in the south of Thailand in November of 2016. Approximately 400 attendees heard presentations on NCDs from speakers from Thailand, USA, Indonesia and the WHO. Of these, three were presentations of the progress and results of the research projects being carried out by the three D43 post-doctoral trainees during the second year of their fellowship.

## Discussion

Building research capacity among health professionals has long been recognized as a critical component in the effort to redress the inequalities in health between developing and developed countries.<sup>10, 11</sup> However, as Edwards et al. have pointed out, there has been a dearth of programs to build research capacity that specifically target nurses in LMICs.<sup>7</sup> Of the seven applicants accepted into our post-doctoral training program thus far, six have been doctorally-prepared nurses; the seventh was a doctorally-prepared pharmacist. This opportunity to do post-doctoral research, a key component of research training in the U.S. and other developed countries, is not the norm in Thailand. We believe that by providing this background, our trainees will be able to move to the forefront of nurse-directed NCD research in their country. As such, they will provide the scientific expertise necessary to improve the quality of the training and also bring with them external connections which are fundamental to the development and enhancement of an active and productive research program. Case in point, one of our trainees is writing an R21 grant proposal with his mentor in response to a request for proposals from the Fogarty International Center for research projects addressing multiple NCDs and their risk factors in LMICs.

As intended, the short-term program has allowed Thai nurse scientists to renew/acquire NCD-relevant research skills by attending one or more of the many summer courses/institutes/workshops offered at the University of Michigan during the summer months (Table 1). In addition, several of the participants have used the opportunity to meet with faculty within and outside of the School of Nursing to find a suitable mentor for the post-doctoral training program. This strategy has worked for two of our trainees, to-date.

The two yearly regional workshops that have occurred have provided the opportunity for a large and diverse number of nurses and others from related health disciplines to receive training on key topics relevant to local research development, including study design and analysis issues, as well as ethical conduct of human research, paper and grant writing, mentoring, and, health policy. Invited speakers at the second workshop came from the Thai MOPH, the WHO, University of the Philippines, Association of Indonesia Nursing Education Centers (AINEC), various Thai universities, and the UMSN.

### Building an NCD Scientific Network

During the course of several visits by the project directors to Thailand, meetings with individual scientists, small groups of faculty investigators at PBRI and other public universities, research directors, and college deans occurred and focused on developing

capacity for NCD research. These discussions produced important insights into both barriers and facilitators for turning the scientific community efforts toward greater NCD research. Facilitators include the government emphasis on the growing NCD epidemic<sup>12</sup>, the MOPH five-year plan for health and health care research<sup>13</sup>, and the significant interest shown in the NCD research seminars and conferences held. Barriers identified by faculty included time and effort toward research as a priority activity among teaching and clinical responsibilities, need to be more aware of funding sources and data sets available for NCD research, and ability to work with other scientists in pursuit of similar goals. Research directors discussed the need for greater funding opportunities to support NCD research as well as infrastructure to support new directions in research such as methodological, e.g., research design and analyses techniques, and practical, such as grantsmanship.

Several activities of the D43 training program addressed these issues including leveraging facilitators and reducing barriers in order to create capacity building within the Thailand PBRI system at large and by training individual scientists. The ultimate goal is to create a network of scientists, settings and institutions with common and evolving understanding of the need for NCD research, the state of the science, infrastructure needs and methods, and research outcomes. The first two conferences addressed the public health issues related to non-communicable disease in Thailand, the Thai government goals and priorities for public health and NCDs, and the state of the science in NCD research. While the first conference tended to be regional with some national outreach, the second conference was both national and international in scope and attendance. Attendees came from six countries, particularly in the SEAR region. In particular, PBRI reached out to Indonesia with whom the PBRI has an history of ongoing collaborations. Approximately 15% of the attendees were from Indonesia. An important by-product of the second conference in particular was the extensive informal networking. The D43 staff is now developing a social media mechanism to provide a platform for ongoing networking as the grant progresses. The post-doctoral fellows are joining the networking activity particularly as they re-embed in their particular institutions. The mentors in Thailand are part of the network and are contributing to both individual development of the postdoctoral fellows but also to the institutional and regional development of NCD research.

### **Institutional Capacity Building**

In May 2015 leaders of PBRI colleges across Thailand joined program leaders and staff at University of Michigan to discuss infrastructure development for research within their institutions. The dialogue identified several best practices among the colleges and a plan was set forth to advance research support across the PBRI.

Research mentors both at UM and in Thailand work to support overall research capacity building. For example, one of our post docs is using a national data set to understand characteristics of prescription drug use for NCD across Thailand. His mentor is a data scientist who consulted with the MOPH regarding this data set and possible analytical methods.

## Conclusion

In summary, strategies to date have yielded intended outcomes. The grant activities have been embraced and been meaningful to mentors and mentees. The ability to participate in in-depth activities both in the US and in Thailand have not only expanded knowledge around NCD's but also has enabled US and Thai investigators to grow in the area of culturally informed research. As we continue with this grant we will seek ways to further leverage our US-Thai collaborations to potentially do cross country comparison research projects in areas of mutual interest.

## Acknowledgments

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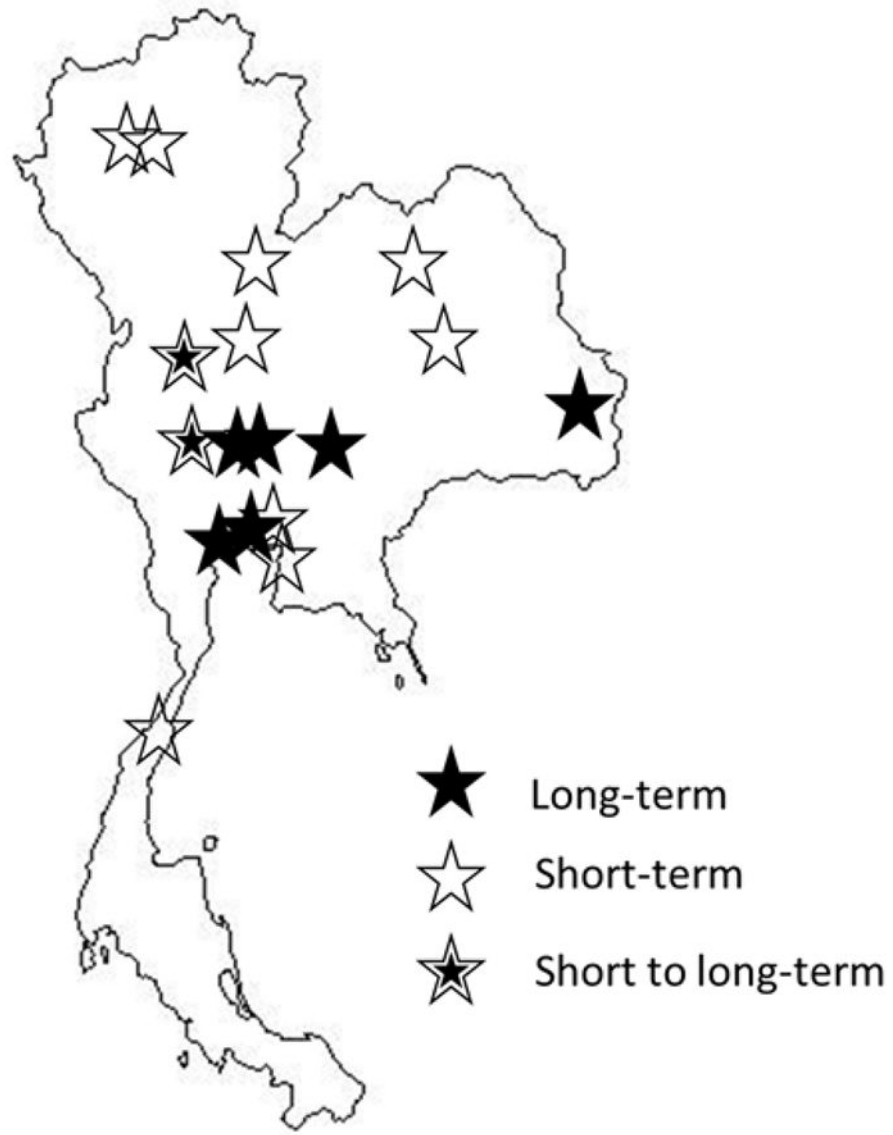
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**Figure 1.**  
Origin of Trainees.

**Table 1**

## Courses Taken by Trainees

<ul style="list-style-type: none"><li>• Complex Systems Modeling for Public Health Research</li><li>• e-Surveillance</li><li>• Fundamentals of Epidemiology</li><li>• Successful Scientific Writing</li><li>• Summer Program in Quantitative Methods of Social Research</li><li>• Mixed Method Research Design and Data Collection</li><li>• An Introduction to Multilevel Analysis in Public Health</li><li>• Nursing Research: Survey Design and Analysis Using Mixed Methods</li><li>• Process tracing in qualitative and mixed methods research</li><li>• Structural equation models and latent variables: an introduction</li><li>• Structural equation modeling with STATA</li><li>• Complex system modeling for public health research</li><li>• R statistics computing environment</li><li>• Longitudinal data analysis, including categorical outcomes</li><li>• Intervention Research</li></ul>
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**Table 2**

## Monthly Seminar Titles

Examining the Impact of Self-Administered Acupressure on Persistent Fatigue in Breast Cancer Survivors
An Example of How the Individual and Family Self-Management Theory Provides the Blueprint for Person Centered Interventional Research
Translational Approaches Provide Mechanistic Insight into Chemotherapy-induced Peripheral Neuropathy
Non-Communicable Disease (NCD) Situation, Trends, and Services in Thailand
Random Subspace Scientific Inference Based on High Dimensional Data
Exploratory Big Data Analytics
Mixing Methods to Capture Complex Phenomena
Patient-centered Technologies: Making a Difference in Cancer Care
Diabetes Self-Management Support Delivered via mHealth
An Integrated Approach to Coordination of Community Resources to Improves Health Outcomes and Satisfaction in Care of Thai patients
Mixed Methods Research Design
Energy Conservation as a Strategy to Manage Cancer-related Fatigue
Psychosocial Distress Screening and Medical Service Utilization: A Report from the Association of Oncology Social Work's Project to Assure Quality Cancer Care
Using Big Data for Healthcare Research
Essential NCD diagnostics for Non-Communicable Disease in Resource-Poor Settings

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