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Establishing a Certificate Program in Noncommunicable Diseases at the Rollins School of Public Health: Planning Phase Results

By

Shawnee Bernstein
MPH

Hubert Department of Global Health

_____ [Chair's signature]
Ghada N. Farhat, MPH, PhD
Committee Chair

_____ [Member's signature]
Felipe Lobelo, MD, PhD, FAHA

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By

Shawnee Bernstein

B.A. in Biocultural Anthropology
Northwestern University
2013

Thesis Committee Chair: Ghada N. Farhat, MPH, PhD

An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
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Abstract

Establishing a Certificate Program in Noncommunicable Diseases at the Rollins School of Public Health: Planning Phase Results
By Shawnee Bernstein

Noncommunicable diseases (NCDs) constitute the largest burden of disease globally, however, there is a lack of workforce capacity building programs to meet the challenge. This paper constitutes formative work at the scholastic and literature review levels for the larger initiative of producing a certificate program in Noncommunicable Diseases (NCDs) for the Rollins School of Public Health (RSPH) at Emory University. The literature reviews pertinent aspects of NCDs workforce competencies, existing trainings and curricula, as well as instructional design methodology. Results from a student interest survey outlining suggested competencies are detailed in addition to a survey of potential partners in the Atlanta area. Introducing a workforce-capacity building program in the form of an NCD certificate at Rollins would both fill a global need and meet student demand and would establish RSPH as the capacity-building hub, both domestically and internationally.

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Chapter I: Introduction & Literature Review

Non-Communicable Disease: Rising Burdens, Compounding Challenges

For this current Spring 2020 moment, our attention is turned toward a global infectious disease pandemic that is devastating health care systems worldwide by its heavy burden and death toll, causing an extreme strain on health worker capacity and revealing wide-ranging shortages in technological capacity. A strong message transmitted by this pandemic is that of the interdependence between infectious and chronic diseases. We are reminded of the extent to which the existing burden of noncommunicable diseases (NCDs) can act as a fertile ground that exacerbates the severity of an infectious disease. This is a unique teaching moment that underscores how critical it is to invest in preventing and controlling NCDs.

Modernity has expedited the epidemiological transition of the global burden of disease from infectious diseases to NCDs. Also known as chronic diseases, NCDs are responsible for 71% of all deaths globally (1). Global Burden of Disease data (2017) indicates that NCDs dominate the top ten causes of mortality worldwide and account for 80% of years lived with disability(2). While there are differences in mortality and morbidity statistics in terms of the demographics of disease burden between high income countries (HICs) and low- and middle-income countries (LMICs), the needs of health care systems serving those afflicted by NCDs remain the same though HICs are [theoretically] better equipped than LMICs to manage the surging morbidity numbers for various reasons. According to Ali, these disparities are derived from a nexus of interdependent factors including, "a low awareness of NCDs, few preventative and early detection services, low availability of essential treatments, and suboptimal organization of care delivery..." recognizing that "...LMICs are not all homogeneous and experience different combinations of these challenges"(3, 4). This observation also extends to communities in HICs that have

fragmented healthcare systems resulting in health inequities surrounding access, availability of care, and cost. To this point, when NCDs contribute to high levels of mortality and morbidity for those considered in "prime economically productive years of life" (25 to 69 years old), poverty is perpetuated as a result of the productivity loss and underdevelopment, regardless of HIC or LMIC status(3).

The current global health funding paradigm still largely emphasizes funneling funding toward vertically-oriented infectious disease programs and maternal and child health approaches. While there is an effort to transfer or adapt the health services associated with these programs and approaches toward the management of noncommunicable and chronic diseases (5), it is fraught with challenges in terms of leadership and funding, particularly in LMICs(3). Without specifically tagged or earmarked funding dedicated toward health system strengthening efforts, like improving NCD surveillance, health workforce and technological capacity, it will not be possible to comprehensibly tackle the mounting NCD burden (3). However, without formidable, strategic leadership in the NCD sector, efforts will continue to be underfunded and largely siloed. The current pipeline of NCD leaders are either emerging from Schools of Public Health or are transitioning from or supplementing a career in health care. Given that most schools of public health rely on "soft money" and that faculty often teach to their interests –which garners funding for their research and the school, many educational opportunities at the schools are related to late 20th century public health problems, like HIV or disease elimination, as opposed to NCDs which have slowly evolved into a global public health leviathan(6). Outside of schools of public health, there has been an increase in demand for NCD related courses, workshops, and conferences among health professionals. As such, much of the NCD curriculum and programmatic content offered globally caters to physicians, nurses, and other forms of health care providers, rather than lower and mid-level public health professionals(7). For example, Couper acknowledges that

for many African health systems, the current training pipeline for mid-level health workers (MLWs) was spawned to address colonial era and post-colonial physician shortages(8). They neither address the neocolonial problems of brain drain nor aid-funded vertical programs, and the curricula for most types of public health training still run off the same, unidimensional and archaic medical model. Couper describes these educational models as "fragmented, outdated, and static curricula that produce 'ill-equipped graduates' characterized by a mismatch of competencies to health needs, poor teamwork, and a narrow focus on technical, individual and hospital-oriented care" (8). Couper's research in East Africa reinforces the notion that mid-level workers are aware of the deficits in their "knowledge, requisite methodologies, and additional training to bring the most up-to-date services to their patients in all settings, though it is felt more acutely settings"(8).

Garnering the financial and political support to grow NCD leadership and workforce capacity is already difficult given the landscape of funding sources and competing priorities; the additional challenge of a non-concrete basic curriculum structure contributes to the slow uptake of political will. While there are existing networks of universities, non-profit organizations, and governmental departments that are poised to delve into the business of an NCD capacity overhaul and upgrade, as Collins' succinctly states, "implementation first requires consensus on the necessary interventions"(7). Collins' observation on the NCD micro-environment that is mental health is easily applicable to the field at large, where junior researchers report differing perceptions on the competencies they deem relevant to effectively propel their research and the sector forward. This is supported by research conducted in Turkey whereby junior researchers were asked to rate level of importance, level of knowledge, familiarity with subject matter and perceived training need for six to ten sub-competencies falling under five overarching discipline skills (Environmental Health, Medical Anthropology & Sociology, Epidemiology, Health Economics, and Health

Policy)(9). Results indicated that junior researchers needed the least training in most sub-competencies related to epidemiology, and the most training in relation to medical anthropology/sociology, environmental health, health policy and economics. Junior researchers, however, reported being very familiar with epidemiology and environmental health (5). Their training needs were better assessed using their importance scores in relation to their knowledge scores, which revealed that epidemiology-related topics which were deemed important were already provided knowledge-wise, whereas nearly all other competencies in the other disciplines were rated as less important and revealed larger knowledge gaps. Given the understanding that each of these disciplines and their corresponding competencies are integral to the global prevention and control of NCDs, Kilic's results demonstrate the lack of consensus around what rising researchers and professionals are being taught and what would otherwise be necessary for a comprehensive approach to prevention and control. These results also demonstrated critical knowledge gaps in areas that directly pertain to competencies that translate to information dissemination, translation, and ultimately funding and political support. *In order to eliminate these gaps, it's imperative to understand the current educational landscape of the NCD field, any major actors, and review opportunities from lessons learned.*

Sustainable Development Goals & Current NCD Strategic Frameworks

The 2030 Sustainable Development Goals (SDG) NCD agenda aims to "reduce premature mortality from NCDs by 1/3, strengthen responses to reduce the harmful use of alcohol, achieve Universal Health Coverage, strengthen the implementation of the WHO Framework Convention on Tobacco Control (FCTC), support research and development of vaccines and medicines for NCDs that primarily affect developing countries and provide access to affordable essential medicines and vaccines for NCDs"(10). These goals were designed to address the gaps in the Millennium Development goals, which completely

neglected NCDs, and were based on the progress of The Global Action Plan for the Prevention and Control of Non-Communicable Diseases (2013-2020). The action plan provided a structure for the 2020 goals by providing objectives and voluntary global targets in addition to a structure for monitoring progress, strategic approaches, and coordination mechanisms(11).

All in all, the current SDG 2030 Development Agenda as it pertains to NCDs is informed by multilateral work from the past decade, such as the framework that stemmed from "Workshop on Building Global Capacity for Non-Communicable Diseases (NCD) Prevention: Defining Direction and Roles" organized by the International Union for Health Promotion and Education (IUHPE) and the U.S. Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia in July 2012(3). This workshop identified existing challenges, recognized competing priorities and identified the most critical steps to focus on. While financing, weak overarching health systems, poor data infrastructure and management, and a generalizable lack of evidence were each highlighted, it was apparent that financial and infrastructural resources would be insufficient in addressing the gaps, thus promoting "human and institutional capacity strengthening" as the obvious and primary focus of NCD programmatic development(3). This approach focuses on the overarching goals of capacity development, data and surveillance and implementation through specific strategies that include assessing capacity needs at the capacity development and data and surveillance levels, planning and implementation across all goals(3). This strategy of capacity building serves as the global consensus for the primary means of reducing NCD morbidity and augmenting NCD prevention. There is not, however, a generalized consensus on who, in terms of trainees and partners, is to be included in capacity building and what the subject of "capacity building" will be. In fact, the "framework suggests actors, working as individual entities or in collaboration across agencies, industries and sectors who would be responsible

for the various outputs for each goal category"(3). For example,
Thailand's Proboromarajchanok Institute for Health Workforce Development (PIHWD) in conjunction with the University of Michigan and partnering college and universities opted to focus on researchers and postdoctoral fellows (12), while Collins' work revolved around identifying competencies in sub-Saharan Africa targeting the following providers: "1) community/lay workers (peers, community health workers, and health extension workers); 2) non-specialized non-prescribing practitioners (pharmacists, social workers, and occupational therapist); 3) non-specialized prescribing practitioners (clinical offers, nurses, and general medical doctors); and 4) specialized practitioners (psychiatric nurses, psychologists, neurologists, and psychiatrists)"(7).

The discrepancies in human-capacity focus are not unusual; each country, each sector, will focus its energy and resources as needed. However, this does highlight the fragmentation within the NCD sector. Collin's defined competencies were extremely diagnostic based (7), while PIHWD's goal was to improve Thailand's capacity to produce translatable NCD research(12). Thailand's framework for tackling NCDs is aggressive seeing as 40% of its population will be over 65 by 2065. The framework calls for dual action focusing on the "implementations of multi-sectorial policies aimed at decreasing population-level risks for NCDs and providing effective and affordable delivery of health sector interventions for patients with NCDs"(12). Thailand's recognition that achieving these goals required an expansion of research capacity producing evidence-based research yielded their programmatic educational focus on Academics, as well as health care professionals interested in training. It's this siloed nature of separating chronic conditions that makes it difficult to produce an overarching NCD curriculum for undergraduate, graduate level, and in some cases mid-level workers.

Statement of Purpose:

The purpose of this project is to propel the Hubert Department of Global Health's initiative to proffer a certificate program in Non-Communicable Diseases (NCD) designed to develop a skilled public health workforce ready to respond to the world's largest cause of death and disability. The certificate program will combine didactic and applied learning to foster inter-disciplinary solutions to global and local NCD challenges. The proposed training program will be implemented in two stages. In stage I, enrollment will be open to Emory students enrolled in the Rollins School of Public Health [RSPH] or any graduate program across the University. In stage II, enrollment will be widened to a broader audience of students and practitioners from domestic and global institutions. Program planning was completed in three phases. Phase I was a formative work phase that included understanding student demand and perspective on competencies they believe they will need to enter the sector productively. Phase II was the holistic program design phase that sought to solidify competencies, understand the target audience, and identify the overall curriculum offerings and instructional design. Phase III was a growth assessment phase aimed at exploring partnerships and potentiating the certificate program to public health students and professionals domestically and internationally. This thesis catered to the three phases of program planning.

This document outlines the results of Phase I, the current literature regarding NCD-related capacity building programs, curriculums, and teaching platforms and the results of the formative work that informs Phase II. Additionally, it reviews the academic institutions that have NCD curriculums or centers of study as well as reexamines current NCD priorities and identifies existing gaps in training. Lastly, this script details the necessary steps to initiate the final phase, program expansion, as well as highlights any opportunities for the certificate and RSPH to distinguish themselves.

Chapter II: Methodology

Methodology

To build out a comprehensive, forward-thinking curriculum for this certificate, there are three program planning phases:

1) Formative research to assess certificate demand and the value that the certificate brings to the Rollins School of Public Health.
2) Program design to identify the target audience, establish competencies, structure the curriculum (courses, applied practice, assessments), and determine instructional design.
3) Assessment of growth potential and partner identification at the local, domestic and global levels.

Phase I - Formative Research & Value to RSPH

Survey of student interest

We conducted an anonymous online survey between April 1-7, 2020 to assess student interest in a NCD-focused certificate. The survey was developed using Google Forms and disseminated via the social media platform Facebook. The form was posted to two private group pages, Rollins School of Public Health Class of 2020 (932 members) and Rollins School of Public Health Class of 2021 (930 members) student page. This convenience sampling methodology was deemed appropriate as pandemic-response circumstances neither permitted administering a survey face-to-face, nor interacting with more than nine students at a time. Both groups received 2 notifications regarding the survey; the first notification was the initial post, the second notification was a reminder on April 5th, 2020.

The survey instrument was adapted from a previous 2017 survey administered to 100 students asking about their willingness to take on a certificate program in NCDs, if offered.

The 2017 survey also asked students about their department and graduation year. The 2020 survey collected data on these same elements (desire to participate in a certificate program focused on NCDs, students' graduation year, and department). Additionally, students were asked about what competencies they thought would be the most helpful in preparing them to work in the NCD sector for both public and private entities (Table 1). The list of competencies was derived from currently accepted competency standards. Students were also queried about their desire to take courses outside of their departmental requirements. Four of the five questions were required; the question regarding the checklist of perceived competencies was left optional to account for survey takers who were not interested in an NCD certificate program and therefore may not be familiar with the landscape of NCDs. A total of 134 students participated between the two groups, with 132 completing the full survey. The survey was distributed exclusively to currently enrolled RSPH students via the Rollins School of Public Health Class of 2020 and Class of 2021 group pages. While these pages would be dual-degree student inclusive, there were no options for dual degree (nursing, medical, etc.) students to distinguish themselves. The survey was not restricted to a single submission per respondent. Limiting the form to one-time submission would have required the participant to sign in, this would have eliminated anonymity for the participant. Considering the low likelihood that a student would want to complete the survey twice and in an effort to facilitate participation, it was decided that participant anonymity superseded restricting the number of submissions.

Phase II - Program design (target audience, competencies, curriculum, and instructional design)

Literature Review

A comprehensive literature review was performed to understand the global consensus regarding professional competencies required to impact the NCD sector, identify existing NCD training materials, courses, certificates and degree-level programs, and the target audiences for said courses and programs, and gather any guidance on instructional design. Table 2 denotes the terms and databases used to conduct the literature search. It is important to note that the number of terms and databases used was informed in part by the lack of results generated by initial exploratory searches. Additionally, we conducted a desk review of existing NCD curricula at domestic and global institutions. This review was built off of a previous review in 2017 which identified six NCD curriculum structures at various global institutions. An internet search of the identified School of Public Health websites confirmed the continued existence of the curricula. An additional internet query searching first for top 15 Council on Education for Public Health accredited Schools of Public Health, and then searches of those school websites produced nine schools with NCD programs, tracks, or curricula. A final general internet query calling for "Non-Communicable Disease courses" yielded course content from the Centers for Disease Control and Prevention, London School of Tropical Medicine and Hygiene. A secondary search using the term "capacity building," as per the literature review, yielded an NCD course specific to capacity building in cancer research through the National Cancer Institute.

Gap Identification and Curriculum Design

The literature review identifying curriculum competencies and the Phase I RSPH student survey were used to draft the scaffolding for RSPH's NCD certificate content. Nearly

all articles regarding curriculum identified successes and failures of each program as well as opportunities for growth. In terms of the student survey, competencies listed in the student survey were derived from currently accepted competency standards and were expanded to include the competency gaps from the literature. Phase I formative research also informed Phase III research on local, domestic and global partnerships.

Current NCD Curricula Focuses & Gaps

In terms of current NCD curricula structures, focuses, strengths, weaknesses and attendees – they come in all shapes and sizes across the globe. Greenberg's 2013 landscape survey yielded 38 of 50 Council on Education for Public Health (CEPH) accredited schools (as of July 1, 2013) that offered a course on chronic disease whereas only 4 schools offered a globally-oriented NCD course. University programming was "evaluated for availability of a global or international health department or track, availability of an NCD track, and the presence of courses on NCD, NCD risk factors, CVD or global NCDs as well as global health infrastructure"(6). While 31 of 50 schools offered a global/international health degree track or certificate, most of the chronic disease courses were offered through the Epidemiology department(6). It is worth noting that schools that offered a global track did not mandate a course on NCDs; however, these institutions were more likely to offer one or more courses on economics, infrastructure or specific global health problems pertaining to "research methods, globalization, trade, policy, healthcare delivery, ethics and anthropological factors"(6). Four schools accounted for aging and mental health concerns in their course work(6).

Outside of traditional University course work, there are supplemental courses and curriculum-based training opportunities for professionals. One such course premiered in 2002 and has since continued to provide training to a variety of professionals across the health sector. The course, titled 'Evidence-Based Public Health (EBPH): A Course in

Noncommunicable Disease Prevention,' "has been taught annually in Europe as a collaboration between the Prevention Research Center in St Louis, the WHO Regional Office for Europe, the Collaboration for Integrated Noncommunicable Diseases (CINDI) and the Centers for Disease Control and Prevention (CDC)" (13). Course participants range from government health department workers to physicians, academic researchers, to managers or specialists(13). The course itself proffered nine modules that touched on aspects of program planning including but not limited to community assessment, economic evaluation, program and policy evaluation, and implementing integrated program interventions(13).

Training Strategies: In-person, Online, Blended

Execution of the curriculum has taken on many forms. Networks, such as Thailand's PIHWD calls for an approach that is less lecture-based; however, in person training is required and far more common than online or virtual training. India, however has a comprehensive model that incorporates a national seminar, 2.5 day intensive interactive training courses on NCD project management from initiation to analysis, several days of workshops that take on various formats and that differ according to audience and location, videoconferences, as well as four to six weeks of short-term training in the US for those that qualify in addition to workshops that specifically call out genetics and genomics(14). Workshops are led by Madras Diabetes Research Staff (MDRF) staff, or a US team and include topics on NCD epidemiology, updates in genomics and proteomics, landmark studies, etc. India's training curriculum is one of the longest and most comprehensive in its use of tools and communication platforms. Mohan reports that the training program has been successful in increasing the capacity of institutions around India to conduct NCD research and implement interventions, support multidisciplinary implementation research, and strengthen the core research capacity for NCDs of the region.

On university campuses, in particular for graduate and undergraduate classes, the lecture-based class is the dominant paradigm. In-person, lecture style teaching is not without its challenges. Participants in the EBPH program reported funding and time constraints, as well as a frustration in availability of the course for their co-workers as limitations to training. Moreover, they also reported that their organizations and leadership within those organizations were not supportive of their efforts(13). With that said, there is a trend toward increasing the amount of content online, which can be a great advantage for low-resource settings. For example, the Africa Centers for Disease Control and Prevention recently launched an online grant-writing course in collaboration with Emory University.
Dodani findings on a comparative assessment of the efficacy of face-to-face versus virtual [synchronous] classroom (VTC) 9-day epidemiological research training in Pakistan suggest that VTC can be an effective way to teach(15). Dodani did not report details of what was expected of participants, only that evaluation was completed via a pre-knowledge questionnaire and a post-knowledge questionnaire(15). Engelen et al., found similar results while tracking progress of an online curriculum designed to improve NCD prevention via physical activity increases in the Middle East and Pacific Islands. Engelen et al. Specifically targeted remote regions, recruiting participants with a digital flyer. All participants had to demonstrate English proficiency and pay a small fee to enroll in the course. The course itself included recorded video lectures, reading and quizzes over six weeks(16). Of those that enrolled in the course, 83% were female, 80% reported having a university degree and 95% reported working for, “different organizations, including government ministries, universities, non-government organizations, local health districts and municipalities, private organizations, WHO, and sport and Olympic committees”(16). Engelen et al report one troubling finding: a quarter of the enrolled individuals made little or no attempt to engage the in the course. There are several possible reasons for this, including unexpected work demands in other areas, a

course design that did not suit all the participants, or other reasons, such as technical limitations (malfunctioning internet connection)(16).

Gaps Assessment

One core issue that was apparent in all regions where countries were attempting to grow NCD capacity was the fluidity of what a "necessary competency" is. Training a competent workforce that spans across the health sector with varying degrees of previous training is difficult, particularly when each health system also has varying needs in terms of focal points. For example, NCD control in the UK will look different than in India, not just in terms of the scope of the burden, but also in terms of current and future workforce capacity and training, available technology, and policy strategies and solutions. Moreover, capacity needs in regions of conflict, or regions that are sheltering refugees, will have elastic needs in most circumstances. At this point, most reviewed curricula have not indicated that they have a course or a specific focus on scale-up strategy, which would include components of mHealth integration, as well as fostering multilateral partnership at all, let alone in times of crisis. The RESCAP-MED program (RESearch CAPacity for Public Health in the MEDiterranean) was one program that took these things into consideration until the program was terminated due to increasing violence in the region. "RESCAP-MED brought together academic institutions in six Mediterranean countries (Jordan, Lebanon, Palestine, Syria, Tunisia and Turkey), alongside academic partners in two EU countries (UK, Ireland) and one international body (WHO-EMRO)"(5). The program was intended to provide a platform for early and mid-level researchers to develop "methodological skills associated with particular disciplines or fields, as well as the skills required for publishing papers in peer-reviewed journals."(5). Until war broke out, this partnership facilitated collaboration and long term network building with the goal of "build[ing] the collective credentials to intensify engagement with health ministries and policymakers about research evidence and

implications, policy options, and emerging research priorities (eg: hold conferences)"(5). Unfortunately as conflict increased and the state health structure failed, the anticipated private sector approaches, like supplemental hospitals, clinics and insurance options that would fill the gap were not viable solutions to the floundering health system.

In terms of gap identification, another emerging theme is the partitioned nature of the NCD field. In contrasting the success of galvanizing support for infectious disease programming, such as HIV/AIDS, Palma notes, "NCDs have been less successful at creating a cohesive voice and to speak as one, and consequently have had limited impact on expanding access to NCD services, despite evidence showing that the engagement of civil society in advocacy, accountability, and NCD service provision can catalyze national action." While there are multi sectoral stakeholders (NCD Alliance, Global Alliance for Chronic Diseases, etc.), disease-specific groups also exist and detract from a centralized leadership structure and organizing power for NCDs. Palma asserts that there are two ways to increase the political will that will drive state action, 1) align NCD advocacy and activism with global goals and agendas and 2) leverage people with living with "transitional infectious diseases" such as HIV or HPV. These populations are living longer and navigating the same risks as the larger populations not living with HIV.

Phase III – Assessment of growth potential and partner identification at the local, domestic, and global levels

Phase I student survey input is critical in curriculum design, but it is also important for identifying local, domestic and global partners who will have work in the competencies that students are interested in as students who are completing the certificate will be expected to complete their Applied Practical Experience in the NCD field, therefore, they would need

to either mine or create opportunities with other academic institutions or organizations in the sector. There are numerous NCD resources at and surrounding Emory University. Emory participates in Georgia's Clinical and Translational Science Alliance with Morehouse School of Medicine (MSM), Georgia Institute of Technology (GA Tech), and the University of Georgia (UGA). Collaborative partners and projects were surveyed by visiting each website, reviewing faculty and primary investigators when appropriate, and reviewing project or program descriptions to determine NCD relevance.

Link to Survey Instrument

Table 1. List of competencies related to noncommunicable diseases included in student survey

Competency	Domains
Program Cycle	Program design, resource mobilization, implementation, monitoring and evaluation
Capacity Building	Workforce development; training health professionals for programmatic and research work)
Communication & Dissemination Strategies	
Implementation (Translational) Research	
Ethics, Justice & NCDs	
Environmental Design & NCDs	Human geography, urbanization, humanitarian crises, etc.
Informatics & NCDs	
Surveillance methods	Surveys, registries, etc.
Policy	Labeling, trade, patent protection, etc.
Health System Financing	
Health Economics	

Table 2. Literature Review Database Search and Mesh Terminology

PubMed	“Noncommunicable Diseases"[Mesh] AND "Education, Professional"[Mesh] AND (training OR fellowship OR workshop OR certificate OR course OR education OR curriculum)
Embase	'Non communicable disease'/exp AND 'capacity building' AND (training OR fellowship OR workshop OR certificate OR course OR education OR curriculum) AND [english]/lim
Web of Science	(("non communicable disease" OR "non communicable diseases" OR "noncommunicable disease" OR "noncommunicable diseases") AND "capacity building" AND (training OR fellowship OR workshop OR certificate OR course OR education OR curriculum))

Chapter III: Results

Phase I - Formative Research & Value to RSPH

Survey results on student interest

A total of 134 Master's degree seeking students from the Rollins School of Public Health completed the NCD Certificate Interest Survey between the 1st and 7th of April, 2020. Nearly 40% of the respondents were from the Hubert Department of Global Health, 23% of the students were in the Epidemiology department, nearly 18% were in the Behavioral, Social and Health Education Sciences (BSHES) department, 13% were in the Health Policy and Management Department, and nearly 7% identified as being in the Gangarosa Environmental Health department. No student studying biostatistics or informatics completed the survey. Approximately 62% of the students who completed the survey expressed interest in enrolling in a certificate in the area of Non-communicable Diseases, if it were offered. Roughly 58% (N= 77) of responding students were 2nd-year Masters candidates seeking graduation in May 2020. Of the 77 2nd-year students, 57.0% students reported themselves as interested in a NCD-based certificate, while 66.7% of the 57 first-year respondents reported interest. As evidenced by Table 3, participant interest in an NCD-based certificate fell between 50 and 67% across all departments, sans Biostatistics, with the highest level of interest in Global Health and Epidemiology (Table 3).

Survey results on competency selection

Table 4 shows respondents' perceived required or desired workforce competency expectations stratified by department. Overall, all departments agreed that Environmental Design & NCDs, Surveillance, Program Cycle, Implementation and Capacity Building are

indispensable skills and knowledge wells for the sector, however, at the departmental level, different priorities emerged.

Students from the BSHES department identified the most competency categories as integral to the certificate. Implementation (85.0%) and Environmental Design & NCDs (79.2%) were the most commonly selected options, followed by Communication & Dissemination strategies (75.0%), Program Cycle (75.0%), then Capacity Building and Surveillance both selected by 66.7% of students in that department. Health system Financing (20.8%) and Informatics for NCDs (25.0%) received the fewest acknowledgements, followed by Policy (33.3%) and Health Economics (33.3%). Ethics, Justice & NCDs was selected by 37.5% of BSHES students.

Health Policy and Management students moderately split interest and selection for most competency categories. Selection of Capacity Building, Ethics, Justice & NCDs, Health Economics, Health System Financing and Surveillance received between 50.0% and 55.5% acknowledgements each, while Informatics (33.3%) and Communication & Dissemination Strategies (27.8%) were selected the least. HPM students selected Policy (83.3%) and Implementation (72.2%) the most, followed Program Cycle (61.1%) and Environmental Design & NCDs (61.1%).

Students from the Global Health department also demonstrated split interest and selection across competency groups. Surveillance was selected by 59.6% of students while Capacity Building and Program Cycle were selected by 57.7% of students. Communication & Dissemination Strategies (55.8%) and Ethics, Justice & NCDs (51.9%) were also acknowledged by more than 50% of Global Health students. Policy (26.3%) and Informatics for NCDs (30.8%) represented the lowest selection for Global Health students, followed by Health Economics (36.5%) and Health System Financing (38.5%).

Epidemiology department students demonstrated a similar lukewarm interest as the Global Health students in Policy, with a selection rate of 22.6%. Health System Financing (29.0%) selection was also low. Surveillance and Implementation showed the highest selectability with 77.4% of epidemiology students acknowledging both, followed by Environmental Design & NCDs (67.7%) and Program Cycle (51.6%). Informatics for NCDs (35.5%), Capacity Building (38.7%), Communications & Dissemination Strategies (38.7%), Health Economics and Ethics (41.9%), Justice & NCDs (45.2%) demonstrated weak-to-moderate selectability for Epidemiology students.

Environmental Health department students represented the smallest proportion of respondents outside of Biostatistics department which had no respondents. Respondents selected Environmental Design & NCDs (88.9%) and Ethics, Justice & NCDs (66.7%) the most and Health Economics (0%), Informatics for NCDs (0%), Communication & Dissemination Strategies (11.1%), Capacity Building (33.3%) and Health System Financing (33.3%) the least. Implementation, Policy, Program Cycle, and Surveillance all demonstrated similar acknowledgement at 55.6%.

There are also discrepancies between interests and priorities within departments between first-year and second-year students. Although Health System Financing was not prioritized by BSHES students, second-year students selected this competency at a rate of 4:1 compared to first-year students. This rate is similar for the competency regarding Policy for Environmental Health Students. Five of the nine Environmental Health student respondents selected Policy as a competency for this certificate, all of which were second-year students. The selection discrepancies from competency to competency between first- and second-year students was not overtly pronounced in the Epidemiology department. In general, second year students proportionally selected more competencies than first years, however, the largest gap between first and second year selection was with Health System Financing, which

was one of the least selected competencies garnering nine of thirty-one selections, seven of which were came from second-year students. The largest gaps between first-and second-year Epidemiology students for the remainder of the competencies was 5 votes, still favoring the second-year students in terms of number of students who acknowledged that competency.

Health Policy & Management students showed similar trends in that second-year students tended to select more competencies. The largest discrepancies between first and second year students were for competency categories Health Economics and Health System Financing, which had 80% second-year response with an 12.5% first year response and 80% second year response with a 20% first-year selection rate, and Capacity Building, which showed that 60.0% of second years acknowledged this as a competency while 37.5% of first years agreed. While first years selected Environmental Design, Ethics Justice & NCDs, Program Cycle and Surveillance more than second-years did, the most notable difference was for Communication and Dissemination strategies to which only one second-year responded and four first-years responded.

The Global Health department had the most respondents in general, but also had some of the largest gaps between first-year and second-year competency selection. Overall, second-years selected the most competencies for the certificate, but for even highly selected competencies like Environmental Design and Implementation, second-years selected the competency at a rate closer to 80% while first years selected them at a rate of 65-70%. The largest discrepancies are between the selections of Health System Financing and Policy, followed by Communication & Dissemination Strategies, Program Cycle and Capacity Building. The first-year selection rates for these competencies are between 13.6% and 45% selection, while second year selection rates are between 43.3% and 70.0% selection. (Table 4)

Review of existing curricula & training programs in NCDs

A review of US based and international public health institutions revealed that many institutions do not have a dedicated course of study directed at addressing the growing burden of NCDs; rather, courses across departments or concentrations that are sub-topics of NCDs. The only US-based institution defined as being a 10-top School of Public Health by US News Report is Boston University School of Public Health (BUSPH). BUSPH offers a 12-credit certificate program available to its students. While Bloomberg School of Public Health at Johns Hopkins University offers an array of NCD related courses, the available certifications are in segments of NCDs such as Aging or Tobacco Control. Similarly, Chan, Havard's School of Public Health, offers NCD-related courses through various departments; however, the sub-Department for NCDs & Aging in Chan's Population Health department does not offer a certificate of its own. Mailman School of Public Health at Columbia University does not have a dedicated sub-department, however it does offer an NCD Policy and Practice Series through the Program for Forced Migrations & Health. Internationally, Oxford University offers a short course on Prevention Strategies for NCDs, but the full course, degree-granting programs are University of Edinburgh, Tehran University of Medical Sciences, and Bangladesh University. Each of these institutions grant an MPH degree focused on NCDs after 11 months to 2 years of study. These programs are unique, as they cover both theory and research practice, unlike many programs which are concerned with imparting research skills. Additionally, the search yielded an entire online trove of NCD-related curricula published by the United States Centers for Disease Control and Prevention. While this course had relevant, useful information, it appears to be more useful as a tool to supplement more comprehensive courses. The National Cancer Institute also offers a course on NCDs focused strictly on cancer. This course runs a few weeks and is geared toward the global cancer workforce. (Table 5)

Value of NCD Program for Emory University

Given the interdepartmental student body interest in a Noncommunicable Disease Certificate program, this program would prove valuable to Emory. The program could serve as a magnet for prospective students looking to enter the NCD field who would otherwise seek out programs like Mailman, or Boston University, who have dedicated NCD programming. By making the certificate program Emory-student inclusive allows for non-MPH students, like medical and nursing students, to gain critical professional skills while giving the added benefit of creating a more interdisciplinary audience. Further expansion of the program to Georgia CTSA partners promotes the Emory name and may provide more opportunities for funding. Lastly, this certificate would be the only one of its kind in the South, so it will be extremely attractive for lower and mid-level public health professionals looking for career development opportunities or to transition fields. Our environmental scan of top-tier schools of public health and global institutions revealed that NCD training programs are scarce not only at the national level, but also internationally. Expanding the certificate program to a global audience presents a valuable opportunity for Emory University to further grow its considerable portfolio of global NCD initiatives.

Phase II – Program Design: Competencies, Curriculum, Instructional Design & Target Audience

Defining NCD Certificate Competencies for Rollins School of Public Health

Withers research on the Pacific Rim Universities, which included input from Universities on the West Coast of the United States, yielded the most up-to-date understanding of what health professionals believe to be appropriate competencies for an NCD curriculum. Unlike other assessments, which favoured categorical domains that

constituted disciplines, like Medical Anthropology or Epidemiology, Withers identified the following overarching "domains": 1) Trends and Determinants of Global Disease Patterns. 2) Cultural Competency 3) Global Health Governance and Diplomacy 4) Program Management and 5) Ethics and human rights. Global health Governance and Diplomacy was specifically called out stating, defining Global health governance and Diplomacy as "A basic understanding of global governance and diplomacy, as well as funding mechanisms for global health programs, trade agreements and the importance of large-scale global cooperation in global health is paramount to under- standing global health systems," citing a direct need for students to be able to "discuss how global health priorities are determined, as well as analyse the large influence that western donors… and multi-lateral partnerships and major governmental treaties and agreements, such as the Framework Convention on Tobacco Control (FCTC) and the Sustainable Development Goals (SGDs)" have on the sector(17). It is pertinent to highlight that Ethics and Human Rights have their own competency category, however it is unclear as to whether this will translate into ethics and human rights as a part of every course in the curriculum, or one or two mandatory courses. Withers' findings are significant because most of these domains align with Rollins School of Public Health student understanding of competencies, however it also highlights important gaps. For example, at the moment there is no direct competencies linked to NCD policy however we know NCD representation in policy is severely lacking, so much so that Mailman (Columbia University) has instituted an entire series on NCD policy. Lastly, Shilton's curriculum work highlights the need to emphasize policy and advocacy. Shilton describes the five types of advocacy as political advocacy, media advocacy, professional mobilization, community mobilization and advocacy from within organizations, stating that there is a general lack of knowledge first and foremost in " academic and non-government organization (NGO) capacity to translate knowledge and the outcomes of studies into salient messages for policy makers and the

general public" (18). He also pointed out that "politicians' skills to recognize research as a tool for effective and fair governance" (18). Rollins' students showed limited interest in Policy and slightly more interest in Communication & Dissemination though the sector needs to invest these competencies in particular to reduce the overall NCD burden.

The overall understanding of what should constitute the competencies for this certificate varied, though more than 60% of all respondents, regardless of department, agreed that Program Cycle and Surveillance should be included. The least acknowledged competency is Informatics. Informatics' low acceptability may be in part due to a lack of understanding as to what Informatics is, how it functions within biostatistics, program planning, research and health systems. This notion is supported by the fact that, though still garnering low competency acknowledgment, nearly all votes were second-year students across all departments suggesting either background knowledge of informatics in various capacities or an understanding of a knowledge gap in applying informatics to the NCD field as a graduating student. Other relatively weakly supported competencies included Health Economics, Health System Financing, and Policy. These competencies, while weakly supported, still showed more support from second-years than first-years across all departments, and proportionally received the least support from BSHES and Environmental Health students. It is worth noting that responses from BSHES students did favor Capacity Building, Communication & Dissemination, Surveillance and Program Cycle, all competencies where students may learn to apply the skills they learn through BSHES directly to NCD related problems. Similarly, Environmental Health student responses supported competencies in Environmental Design & NCDs, Ethics, Justice & NCDs, Program cycle, Implementation, Policy and Surveillance, suggesting that these students also recognize that they have gathered skills in these areas from their departments and seek to learn how to directly apply them in an NCD context. Additionally, it is worth noting that Health Policy

and Management students overwhelmingly support the idea of a Policy-oriented competency, defined as reviewing aspects of labeling, trade, patent protection at a local and global level. This may indicate an area where students may want to learn more or learn to apply their analytical skillsets in new contexts.

The competency Environmental Design & NCDs was selected by 73.5% of all respondents as an essential competency for this certificate. Environmental Design & NCDs was defined as human geography, urbanization, humanitarian crises, etc. Perhaps the overwhelming support was due to the scope of the bin, however, this is the one competency that students across departs expressed interest in and thought to be a core competency for understand and controlling NCDs. With regard to scope, this bin calls on the most interdisciplinary knowledge, which was clearly recognized by students. In reviewing the curriculum at Rollins School of Public Health there are few courses offered that broach the subject matter, and expanding that search to other schools of public health across the globe yielded similar results. This search was limited, however, by an inability to access a course catalogue and requisite syllabi for courses that seemed relevant. This input form students and the existing literature was synthesized to develop a list of priority competencies for the NCD certificate (Table 2), to be further fine-tuned with additional input from RSPH leadership and experts.

Defining NCD Certificate Curriculum for Rollins School of Public Health

Once the core competencies are solidified, a curriculum map will need to be created listing all available courses and how they match up to the competencies. There is a draft of what this would look like given the course catalogue from Rollins School of Public health in 2017. The literature review revealed that many international universities and NCD networks leverage disciplines outside of the standard “public health” disciplines to fill knowledge gaps, such as social anthropology. This may be due to the target audience being health

professionals who may not have prior humanities experience, but it could also be that standard "public health" disciplines, such as epidemiology, do not cover topics otherwise housed in social anthropology well or at all. This latter is very much the case in terms of Rollins students who are calling for an NCD course that heavily emphasizes context (Environmental Design), which does not seem to be addressed in any reviewed curricula or by any competency list. Additionally, courses abroad tend to be heavily research-focused, thus all training methods (defined as: coursework, practicums, research opportunities, mentorship, evaluation (17)) is geared toward research. Given the nature and scope of Emory's NCD certificate's target audience, it will be imperative that there is an appropriate balance between programmatic training and research-related training.

Target Audience & Instructional Design for the NCD Certificate at Rollins School of Public Health

Initially, the intended audience for this certificate program will be Emory University students, with an emphasis on graduate students across all school, however, undergraduate students will have the opportunity to enroll as well. As partnerships and collaborations build in the Atlanta area, it is intended that the certificate will become to students and faculty that participate in the Georgia CTSA exchange and entry and mid-level workers for Centers for Disease Control and Prevention (CDC). The last final growth phase calls for larger domestic and international partnership. The evidence for demand for this certificate internationally is confirmed by the literature, so having teaching platforms that can support distance learning is imperative and highly recommended by Withers who states, "take advantage of available technology to create educational learning environments where students can engage with students and faculty from other universities along with global health practitioners throughout the world"(17). Emory University already has one known platform that is entirely online in conjunction with Africa CDC, and there are examples of other distance-learning programs,

such as Oxford's Short Course on Prevention Strategies for NCDs, that this certificate might learn from.

Phase III – Assessment of growth potential and partner identification at the local, domestic, and global partner levels

Creating partnerships starts at Emory with the expansion of the program across the campus. It will require communication and coordination across schools, departments, and the registrar in order to obtain a desirable student mix in terms of public health students and students in other sectors. Building out the model to GA CTSA, CDC, and later globally, requires more coordination, and possible Emory's legal team. In terms of brokering relationships with interested networks and organizations involved in NCDs, marketing the certificate program is one strategy, however a different approach: placing students for applied field experiences, or partnering for laboratory research, *before* showcasing the certificate program is another method of expansion. It is unclear at this point which method will yield increased enrollment, however the latter option leaves more time to build out the appropriate instructional tools for distance learning if need be.

Table 3. The study population by Rollins School of Public Health Graduation Year, NCD Certificate Student Interest Survey 2020, N=134

	Total	Behavioral, Social & Health Education Sciences	Biostatistics & Informatics	Environmental Health	Epidemiology	Global Health	Health Policy & Management
	100% N=134	17.9% N=24	0% N=0	6.7% N=9	23.1% N=31	38.8% N=52	13.4% N=18
Interested in NCD Certificate	83 (61.9%)	13 (54.2%)	--	5 (55.5%)	19 (61.3%)	35 (67.3%)	9 (50.0%)
Interest in NCD Certificate by program year	-	-	-	-	-	-	-
Second year students	44 (53.0%)	6 (50.0%)	--	1 (20.0%)	11 (57.9%)	19 (54.3%)	5 (55.6%)
First year students	39 (47.0%)	7 (53.8%)	--	4 (80.0%)	8 (42.1%)	16 (45.7%)	4 (44.4%)

Table 4. NCD Certificate Competency Expectations by Department and Graduation Year, NCD Certificate Student Interest Survey, 2020, N=132

	Total (%)	Capacity Building	Communication & Dissemination Strategies	Environmental Design & NCDs	Ethics, Justice & NCDs	Health Economics	Health System Financing	Implementation	Informatics for NCDs	Policy	Program Cycle	Surveillance
Total	100% N=132	53.0% N=70	42.9% N=65	73.5% N=97	42.9% N=65	37.9% N=49	35.6% N=47	77.3% N=102	28% N=37	37.1% N=49	60.6% N=80	64.4% N=85
2020 (2nd Years)	75 (56.8%	45 (60.0%)	38 (50.7%)	56 (74.7%)	37 (49.3%)	37 (49.3%)	38 (50.7%)	58 (77.3%)	23 (30.7%)	32 (42.7%)	46 (61.3%)	44 (58.7%)
2021 (1st Years)	57 (43.2%)	25 (43.9%)	27 (47.4%)	41 (71.9%)	28 (49.1%)	13 (22.8%)	9 (15.8%)	43 (75.4%)	14 (24.6%)	15 (26.3%)	34 (59.7%)	41 (71.9%)
Behavioral, Social & Health Education Sciences	24 (17.9%)	16 (66.7%)	18 (75.0%)	19 (79.2%)	9 (37.5%)	8 (33.3%)	5 (20.8%)	21 (87.5%)	6 (25.0%)	8 (33.3%)	18 (75.0%)	16 (66.7%)
2020	14 (58.3%)	9 (64.3%)	11 (78.6%)	10 (71.4%)	6 (42.9%)	6 (42.9%)	4 (28.6%)	11 (78.6%)	4 (28.6%)	5 (35.7%)	9 (64.3%)	9 (64.3%)
2021	10 (41.7%)	7 (70.0%)	7 (70.0%)	9 (90.0%)	3 (30.0%)	3 (30.0%)	1 (10.0%)	10 (100.0%)	2 (20.0%)	(30.0%)	(90.0%)	(70.0%)
Environmental Health	9 (6.7%)	3 (33.3%)	1 (11.1%)	8 (88.9%)	6 (66.7%)	0 --	3 (33.3%)	5 (55.6%)	0 --	5 (55.6%)	5 (55.6%)	5 (55.6%)
2020	4 (44.4%)	2 (50.0%)	0	4 (100%)	4 (100%)	0	2 (50.0%)	3 (75.0%)	0	3 (75.0%)	3 (75.0%)	2 (50.0%)
2021	5 (55.5%)	1 (20.0%)	1 (20.0%)	4 (80.0%)	2 (40.0%)	0	1 (20.0%)	2 (40.0%)	0	0	2 (40.0%)	3 (60.0%)
Epidemiology	31 (23.1%)	12 (38.7%)	12 (38.7%)	21 (67.7%)	14 (45.2%)	13 (41.9%)	9 (29.0%)	24 (77.4%)	11 (35.5%)	7 (22.6%)	16 (51.6%)	24 (77.4%)
2020	17 (54.8%)	7 (41.2%)	6 (35.3%)	13 (76.5%)	9 (52.9%)	9 (52.9%)	7 (41.2%)	13 (76.5%)	8 (47.1%)	3 (17.7%)	9 (52.9%)	13 (75.5%)
2021	14 (45.2%)	5 (35.7%)	6 (42.9%)	8 (57.1%)	5 (35.7%)	4 (28.6%)	2 (14.3%)	11 (78.57%)	3 (21.43%)	4 (28.6%)	7 (50.0%)	11 (78.6%)
Global Health	52 (38.8%)	30 (57.7%)	29 (55.8%)	38 (73.1%)	27 (51.9%)	19 (36.5%)	20 (38.5%)	39 (75.0%)	14 (26.9%)	16 (30.8%)	30 (57.7%)	31 (59.6%)
2020	30 (57.7%)	21 (70.0%	20 (66.7%)	24 (80.0%)	14 (46.7%)	14 (46.7%)	17 (56.7%)	24 (80.0%)	8 (26.7%)	13 (43.3%)	20 (66.7%)	16 (53.3%)
2021	22 (42.3%)	9 (40.9%)	9 (40.9%)	14 (63.6%)	13 (59.1%)	5 (22.7%)	3 (13.6%)	15 (68.2%)	6 (27.3%)	3 (13.64%)	10 (45.5%)	15 (68.2%)
Health Policy & Management	18 (13.4%)	9 (50.0%)	5 (27.8%)	11 (61.1%)	9 (50.0%)	9 (50.0%)	10 (55.6%)	13 (72.2%)	6 (33.3%)	15 (83.3%)	11 (61.1%)	9 (50.0%)
2020	10	6 (60.0%)	1 (10.0%)	5 (50.0%)	4 (40.0%)	8 (80.0%)	8 (80.0%)	7 (70.0%)	3 (30.0%)	8 (80.0%)	5 (50.0%)	4 (40.0%)
2021	8	3 (37.5%)	4 (50.0%)	6 (75.0%)	5 (62.5%)	1 (12.5%)	2 (25.0%)	6 (75.0%)	3 (37.5%)	7 (87.5%)	6 (75.0%)	5 (62.5%)

Table 5: Existing NCD programs, curricula, and selected courses

Institution	Institution Type	NCD specific focus(es)
Domestic Institutions		
Boston University (Rank: 8)	School of Public Health	NCD Certificate
US Centers for Disease Control and Prevention	Research-driven Institution	NCD Online coursework
Columbia University (Rank: 4)	School of Public Health	NCD Policy & Practice Series
Emory University (Rank: 5)	School of Public Health	Courses in Epidemiology and Global Health on specific chronic diseases, mental health
Harvard University (Rank: 2)	School of Public Health	Sub-Department for NCDs & Aging
Johns Hopkins University (Rank: 1)	School of Public Health	Study Concentration: Aging; Certificates: Aging, Tobacco Control, Mental Health, etc.
National Cancer Institute	Research-driven Institution	Cancer-specific NCD course
University of Michigan (Rank: 5)	School of Public Health	Epidemiology of Aging; Course linking Infectious Disease with NCDs
University of Washington (Rank: 7)	School of Public Health	Certificate for OneHealth
International Institutions		
Bangladesh University	School of Public Health	MPH in NCDs
London School of Hygiene & Tropical Medicine	School of Public Health	Free online courses dealing with Vision Health; short courses on NCDs (Global Non-communicable Diseases);
Oxford University	School of Public Health	Short Course on Prevention Strategies for NCDs
Tehran University of Medical Sciences	School of Medicine	International MPH in NCDs
University of Edinburgh	School of Public Health	2 Online-NCD oriented MPH Degrees

Chapter IV: Discussion

Phase I : Formative work & value to RSPH

There are several limitations regarding the student survey and literature review in terms of curriculum review. First, the literature review was conducted in English and using databases that do not account for grey papers. Perhaps there are more NCD curricula out there that are reviewed in languages other than English, and similarly, there may be other non-profit NCD organizations that offer courseware that is not published. Additionally, the search for and review of existing NCD programs, certificates or courses among CEPH schools was limited to Schools of Public Health and did not include undergraduate institutions that may or may not have NCD-related courses or tracks nor stand-alone public health Master's programs.

Given the time constraints and extenuating circumstances surrounding the CoVid-19 pandemic and subsequent social distancing measures, the NCD certificate interest survey sample size of 134, though not ideal, was sufficient in demonstrating students' desire for an NCD-focused, career-oriented certificate and what they consider as essential competencies for the NCD field. Rollins' School of Public Health enrollment currently stands at 635 individuals. Each Facebook group where the survey was posted included at least 935 individuals, indicating some cross-over population. In terms of overall desirability and interest in an NCD certificate, the previous survey (2017, N=150) suggested a 55% interest rate, while this 2020 survey suggests an interest level of 61.9% among respondents. Moreover, 96.3% of respondents indicated that they actively seek to take courses outside of their departmental requirements. In terms of respondents, although the Epidemiology department is the largest department at Rollins, Global Health students are more represented

in these results, and the biostatistics department is not represented at all. It is alarming that there is no data from the Biostatistics/Informatics department seeing as both biostatistics and informatics are critical components of research development, translational research and information dissemination. This deficit in the survey may be spawned by a general lack of interest in participation on the part of students from the biostatistics department, however it is more likely that the students did not or could not access the platform, therefore the survey, during the data collection timeframe.

Phase II: Next steps in Program Design (target audience, competencies, curriculum, and instructional design)

One of the largest limitations in program design was curriculum development. This was in part limited by an inability to access an Emory-wide course catalogue, and subsequently course syllabi for those courses deemed relevant. After completing a course catalogue appraisal and selecting courses, instructors and departments will need to be contacted to approve participation, especially if curricula will need to be refashioned to accommodate one or more of the NCD competencies. This process will also be required for any GA CTSA affiliate courses that may need to be integrated into the certificate.

Another query worth investigating is the success of the "mixed classroom" in terms of age and experience. There is plenty of literature on interdisciplinary classrooms, however there is not literature on the efficacy of teaching a mix-level group in terms of undergraduates with little to no NCD experience in the same room as an international mid-level public health professional. The success of the program is in part due to the strength of the curriculum but also the satisfaction of the students with their experience. Considerable feedback will be required in order to fine tune the certificate after expansion at each level (locally,

domestically and internationally) as each added layer presents new challenges in terms of instructional design.

With that said, much of the formative work to roll out Phase II of certificate planning and implantation is complete. Departmental review and approval (Global Health) for the competencies is still required, in addition to confirmed buy-in from each department at Rollins School of Public Health. A comprehensive review of available courses from Rollins and Emory's graduate course catalogue will be one of the next steps as formulating acceptable course requirements given the updated understanding of what students believe to be lacking in their education. Leveraging pre-existing courses is ideal from a faculty standpoint and for course mapping, however some courses may need to be adjusted to ensure that NCD certificate competencies are included and retrofitting may not be natural, easy, or well received. Similarly, in order to meet the demands brought out by the student survey, new courses may need to be created. Additionally, in the spirit of progress and forward thinking, envisioning how to move some if not all of this content to an online platform for distance-learning should be considered during course and curriculum development, rather than retroactively.

Phases III – Next steps: Assessment of growth potential and identification at the local, domestic, and global partner levels

Extending the NCD Certificate program across Emory will present its own challenges, though it is considerably easier to advertise within the university. In order to expand the program and leverage resources across Atlanta, a strong, functional relationship with GA CTSA is essential. This would not just be for guest lecture or applied practice experience (APE) opportunities, but in terms of networking, NCD project availability and

even potentially funding. Forging these networks and partnerships will have logistical and even legal challenges between institutions resulting in delays in terms of student exchange and teaching. Perhaps it is more apt to begin partnering by exchanging students through APE before exchanging students in the classroom. There is, however, already a working precedent of student exchange through the Environmental Health department that can be modeled. Additionally, expansion outside the scope of Atlanta will bring its own challenges, however, the literature review revealed some excellent places to start in so much as a few networks are looking to add more academic institutions and organizations to their network. Still, this will take time to broker the relationships. Local expansion could take a year or two, and full domestic and international expansion will no doubt take longer.

V. Conclusion

As the world's population continues to grow and more countries undergo epidemiologic transitions, it is imperative for all health systems to have a non-communicable disease capacity development strategy. This strategy must be rooted in educational and professional advancement, thus schools of public health should be at the fore, collaborating with government entities, research institutions, academic institutions, non-profit organizations and corporate entities. Academic institutions like Emory University have the resources and network to field such partnerships. Rollins School of Public Health is already a leader in public health education and research, however, unlike other top-tier schools of public health that have sub-departments relating to NCDs or have series dedicated to topics to NCDs, Rollins lacks direct educational experiences for its students. This gap manifests in a critical missed learning and collaborative opportunity for students at Rollins and ultimately across Atlanta. Rollins not only has faculty or access to faculty capable of shaping a Noncommunicable Disease Certificate program, but it also has ample student interest across departments.

In terms of immediate action and Phase I implementation for Rollins and Emory-based students, it is important to solidify a set of competencies that reflects the needs of the field not only in terms of research, but in terms of theory, implementation and practical application. Many global strategies have focused on building up programs that cater to healthcare professional-researchers as a means of increasing public health capacity and providing a mechanism for generating much-needed data. What this does, however, is leave blaring gaps in knowledge in terms of implementation and translation, and it also highlights a void in centralized NCD leadership. Most global frameworks also suggest that competencies should correspond to Environmental Health, Medical Anthropology, Sociology, Epidemiology, Health Economics and Health Policy. The Rollins student survey supports this, however less emphasis was placed on both Health Economics and Health Policy by students. In terms of real-world application, research translation into effective policy constitutes a gap in the NCD field, thus ensuring best-practices are passed by means of this certificate, regardless of direct interest, is appropriate. Conversely, rather than incorporating these facets as set competencies in their own right, incorporating these aspects into each course as course objectives could accomplish the same or a similar goal. If this direction is taken, current courses will need to be adapted to incorporate the new material without sacrificing the integrity of their current content, or new courses will need to be developed. There is evidence that online learning and distance learning is an effective means of communicating learning objectives; however, it will need to be determined which new or existing courses this may be appropriate for.

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Appendix A. – Survey Instrument

tudent Survey: NCD Certificate Interest

:Ds are widely accepted by the global community not only as a major health threat, but also as :ritical challenge for sustainable development. I'm working with faculty to create an NCD rtificate program that would be accessible across departments, Emory graduate level schools, d schools that participate in the GA Clinical & Translational Science Alliance. The idea is that s certificate will act as a career development module in terms of mentoring and content which l help learners directly apply what they are learning and have learned through their various partments to specific challenges that they will face at their respective places of work.

:equired

What is your department? *

Mark only one oval.

- ◯ Behavioral Social and Health Education Sciences
- ◯ Biostatistics
- ◯ Epidemiology
- ◯ Environmental Health
- ◯ Global Health
- ◯ Health Policy & Management

What is your graduation year? *

Mark only one oval.

- ◯ 2020
- ◯ 2021

3. If the school offered a certificate program in the area of non-communicable diseases, would you be/have been interested in enrolling in it? *

   Mark only one oval.

   - ◯ Yes
   - ◯ No

4. Do you look for opportunities to take elective courses outside of your departme requirements? *

   Mark only one oval.

   - ◯ Yes
   - ◯ No

5. What aspects of Non-communicable Disease prevention and control do you thir would be the most helpful in preparing you to work in this sector for both public private entities?

   Check all that apply.

   - ☐ Surveillance methods (surveys, registries, etc.)
   - ☐ Informatics for NCDs
   - ☐ Capacity Building (training health professionals for programmatic and research work)
   - ☐ Policy - labeling, trade, patent protection, etc.
   - ☐ Health Economics
   - ☐ Health System Financing
   - ☐ Environmental Design & NCDs (human geography, urbanization, humanitarian crises, et
   - ☐ Ethics, Justice, & NCDs
   - ☐ Program cycle: program design, resource mobilization, implementation, monitoring anc evaluation
   - ☐ Communication and Dissemination Strategies
   - ☐ Implementation (Translational) Research
   - Other: ☐ _____