

# Department of Population Health Sciences

PROPOSAL TO ESTABLISH A NEW DEPARTMENT IN THE SCHOOL OF  
MEDICINE

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## Executive Summary

The science of population health examines health outcomes, underlying determinants of health, and disease states in populations defined by many factors including geography, ethnicity, employment, or the health care systems in which people seek care. Improving the health of a population demands a multi-faceted approach that examines the underlying causes of health, uses data regarding environmental, social, behavioral, physical, and genetic determinants of health to improve health, and informs policies that shape access to, financing and delivery of high quality health care. The challenge of improving population health requires a multidisciplinary effort that includes epidemiology, health services research and policy, clinical informatics, health economics, behavioral science, and implementation science. The importance of multidisciplinary approaches to improving health has been highlighted in the National Institute of Health's (NIH) Precision Medicine Initiative and the White House's Cancer Moonshot 2020. At Duke, the multidisciplinary effort is aligned with the University's strategic plan, *Knowledge in Service of Society*, and with the *Duke Health Strategic Framework*.

**School of Medicine Authorization.** In October, 2015, Nancy Andrews, MD, PhD, Dean of the Duke School of Medicine, authorized a multidisciplinary working group (Appendix 1) to explore the creation of a new basic science department in the School of Medicine composed of non-clinical scholars in epidemiology, health services research and policy, health economics, behavioral science, and implementation science. The working group established guiding principles for its deliberations, met with key leaders and stakeholders from around the University, and presented its report to the Dean on March 1, 2016. With support from the Chancellor, the Dean established the Center for Population Health Sciences as a launching pad for the new department, pending its approval by the Board of Trustees. Please see Appendix 4 for Letters of Support from Chancellor Washington and Dean Andrews.

**Department Structure and Leadership.** The Department of Population Health Sciences will be a basic science department in the School of Medicine, housing tenured, tenure track, and non-tenure track faculty with doctoral training in epidemiology, public health, health services research and policy, implementation science, and related disciplines. Clinical faculty and faculty from other departments in the University may have secondary appointments in the department. When the Department is approved, 32 faculty are expected to transition from clinical departments in the School of Medicine to the new department. Although the Department may be organized in divisions or cores, interdisciplinary work with departments and institutes across the School of Medicine and University will be encouraged. The School of Medicine will undertake a national search for the Chair who will be expected to carefully consider opportunities to maximize cooperation and collaboration to achieve synergy between entities within the University.

**National Model.** Within most universities, a variety of entities conduct population and public health research and teaching, including schools of public health, departments or divisions within a school of medicine, and school or university-wide institutes or centers. Of the schools of medicine ranked in the top 20 by US News and World Report (2015), 18 are housed in universities that operate either a school of public health (n=8), department (n=5), or university-wide institute focused on public health or population health science (n=5). Only Duke and UC-San Diego do not have such entities. The most

recent school of public health (University of Washington) was established in 1970; all others have existed for more than 50 years. Institutes, centers, and departments established in the last 10 years reflect newer terminology, using population health rather than public health.

**Research.** The science of population health examines health outcomes, underlying determinants of health, and disease states in populations defined by geography, ethnicity, employment, or place of health care. The School already has a considerable number of outstanding faculty researchers in population health sciences, defined here to include epidemiology, health services research and policy, health behavior, clinical decision sciences, implementation science, measurement science, and bioethics. Based on our review of Duke's extant strengths and opportunities, we have identified three signature initiatives to be developed: measurement science, implementation science, and scientific engagement with the health system to advance strategic priorities. These initiatives leverage existing but underdeveloped Duke strengths, are at the foundation of population health improvement, and are generalizable beyond Duke. To develop these areas, we propose to support effort for current Duke faculty to lead each initiative, new faculty hires to increase our capacity for work in these areas, and specialized research staff who will form the cores required to conduct the research. To increase the likelihood of external funding to support these initiatives, we have allocated funds to support the necessary preparatory work.

**Education.** The educational programs of the Department of Population Health Sciences will prepare the next generation of scientists and health practitioners to advance the health of populations through the discovery and translation of knowledge into policy and practice. When approved, the Department will propose a Master of Science and Doctor of Philosophy for consideration by the Duke University School of Graduate Studies. Additional educational offerings will include a population health sciences track for 3rd year medical students and post-graduate certificate programs geared toward current and emerging healthcare leaders. These programs will educate participants about the systems and tools required to understand the changing marketplace, develop and evaluate new models of care delivery, and engage patients and providers.

**Service.** Historically, access to electronic health data at Duke for research purposes has been inefficient due to the siloed nature of data and expertise. There is interest across the University to provide a shared resource to easily access electronic data (in particular, Medicare claims data and Duke Health electronic health record data) in a secure, robust environment with uniform approaches to governance and regulatory requirements.

The Center for Population Health Sciences proposes an electronic health data core, housed in PACE (Protected Analytic Computing Environment), that will provide access to Medicare claims and Duke Health electronic health record data for authenticated users conducting health services research and quality improvement. Additionally, the core will provide access to education and regulatory support, technical expertise to process and integrate dataset, and analytical guidance from experienced analysts.

**Impact.** Integration of expertise and development of infrastructure within a single department will accelerate collaboration, create efficiencies, provide an academic home for non-clinical faculty,

establish a more cohesive framework for faculty mentoring, and generate new sources of research and education funding. From a reputational and financial perspective, however, the creation of a new department could negatively impact existing departments and institutes in the short term, as faculty and their funded portfolios are consolidated into the new Department. The anticipated impact on the Departments of Medicine and Psychiatry is modest because the federal funding portfolios of Population Health Sciences faculty are small relative to total federal funding received by Medicine and Psychiatry. The potential impact on the Department of Community and Family Medicine may be more substantial. Approaches to mitigate the potential negative impact are being developed in collaboration with clinical chairs and institute directors.

**Administrative Support.** The Department will need a variety of administrative services that it will build in-house and share with other basic science departments and institutes. These will include: proposal development & grants administration, population research administration, HR/Visa/Effort reporting, finance, educational program coordination, IT, marketing and communications, and business and financial management.

**All Missions Budget.** Based on current projections and reasonable assumptions, the all-missions budget suggests that an investment of approximately \$8.25m over 4 years will be required to establish an operational department. Although the budget represents our best estimate based on current information, uncertainty exists with respect to the timing of faculty transitions and their research portfolios; the speed of faculty recruitment which would appropriately delay initiation of research program; and the timing of the approval of the master's program. As these uncertainties are reduced, the budget will be updated accordingly.

## School of Medicine Authorization

In October, 2015, Nancy Andrews, MD, PhD, Dean of the Duke School of Medicine, authorized a multidisciplinary working group (Appendix 1) to explore the creation of a new basic science department in the School of Medicine composed of non-clinical scholars in epidemiology, health services research and policy, health economics, behavioral science, and implementation science. The working group established guiding principles for its deliberations, met with key leaders and stakeholders from around the University, and presented its report to the Dean on March 1, 2016. With support from the Chancellor, the Dean established the Center for Population Health Sciences as a launching pad for the new department, pending its approval by the Duke University Board of Trustees. The Center for Population Health Sciences is led by Lesley Curtis, PhD, Director, with faculty leadership from Hayden Bosworth, PhD, Adrian Hernandez, MD, MHS, and Kevin Weinfurt, PhD. Ashley Dunham, MSPH, PhD serves as Managing Director, and Suresh Balu, MS, MBA advises the Center regarding strategy and innovation.

## Department Structure and Leadership

The Department of Population Health Sciences will reside in the School of Medicine, and will be a basic science department. It will house tenured, tenure track, and non-tenure track faculty with doctoral training in epidemiology, public health, health services research and policy, implementation science, behavioral health sciences, and related disciplines. Faculty members whose activities include clinical responsibilities will have their primary appointment in a clinical department, and may have a secondary appointment in the Department of Population Health Sciences. The Chair will appoint faculty, with approval from the Dean and the School of Medicine Appointments, Promotion and Tenure Committee.

The leadership team has identified 32 faculty members who could potentially transition from clinical departments in the School of Medicine to the new department (Table 1). Nine faculty are full professors, 12 are associate professors, 7 are assistant professors, and 4 are instructors. Collectively, they bring deep expertise in health services research and policy, epidemiology, implementation science, health measurement, health behavior, and bioethics. Overall, 28 faculty are currently housed in Medicine, 3 are in Community and Family Medicine, and one is in Psychiatry and Behavioral Sciences. The majority of these faculty are clustered within the VA Health Services Research and Development Group (n=10) and the Duke Clinical Research Institute (n=15). Collaborations and interactions within units are strong and activities across units include mentoring, research proposal development, and shared teaching responsibilities. The research foci of proposed faculty are well aligned with the mission of the new department. There is a high level of enthusiasm among the faculty about the proposed department and they have been engaged individually and in small groups to solicit input and refine priorities for the department.

We anticipate recruiting approximately 10 new faculty over a five-year period to accelerate development of the three signature initiatives noted below: measurement science, implementation science, and scientific engagement with the health system around strategic priorities. These initiatives leverage existing but underdeveloped Duke strengths, are at the foundation of population health

**Table 1: Proposed Faculty in the Department of Population Health Sciences**

Name	Areas of Excellence
<i>Professor</i>	
Bosworth, Hayden	Health behavior, Health services research, Implementation science
Curtis, Lesley	Health services research
Maciejewski, Matthew	Health services research
Ostbye, Truls	Epidemiology, Health services research
Pollak, Kathryn	Clinical decision sciences, Health behavior
Reed, Shelby	Clinical decision sciences, Health measurement
Sanders, Gillian	Clinical decision sciences,
Wei, Qingyi	Epidemiology
Weinfurt, Kevin	Bioethics, Health measurement
<i>Associate Professor</i>	
Beskow, Laura	Bioethics
Corneli, Amy	Bioethics, Health behavior
Cowper, Patricia	Health services research
Dupre, Matthew	Health services research
Eisenstein, Eric	Health services research
Gierisch, Jennifer	Health behavior
Haga, Susanne	Health services research
Jackson, George	Epidemiology, Health services research, Implementation science
O'Meara, Wendy	Epidemiology, Health services research
Steinhauser, Karen	Health measurement
VanHoutven, Courtney	Health services research
Wang, Virginia	Health services research
<i>Assistant Professor</i>	
Belsky, Dan	Epidemiology
Bhavsar, Nrupen	Epidemiology, Health services research
Dinan, Michaela	Health services research
O'Brien, Emily	Epidemiology, Health services research
Smith, Valerie	Health services research
Sorensen, Corinna	Health services research
Zullig, Leah	Implementation science
<i>Instructor</i>	
Hammill, Brad	Health services research
Johnson, Reed	Clinical decision sciences, Health measurement
Skinner, Asheley	Health services research, Implementation science
Sperber, Nina	Health services research, Health measurement

improvement, and are generalizable beyond Duke. As we recruit faculty, we will adhere closely to Duke University School of Medicine's faculty diversity and inclusion policies. We will work with Dr. Kevin Thomas, Assistant Dean for Underrepresented Faculty Development, to incorporate initiatives to

promote diversity and to ensure the academic success of underrepresented faculty and staff in the new department.

Although the Department may be subdivided into divisions or cores, interdisciplinary work within the Department, other School of Medicine departments, and the University will be strongly encouraged. Faculty with primary appointments in the Department of Population Health Sciences will share a common space to promote an environment of shared methods, mutual support and a cohesive sense of identity.

The School of Medicine will undertake a national search for the Chair who will be expected to carefully consider opportunities to maximize cooperation and collaboration to achieve synergy between entities within the University. Selecting a Chair with these qualities will be an essential step in the recruitment process, and candidates for the position of Chair will be informed of this expectation.

### National Model

Within most universities, a variety of entities conduct population and public health research and teaching, including schools of public health, departments or divisions within a school of medicine, and school or university-wide institutes or centers. Of the schools of medicine ranked in the top 20 by US News and World Report (2015), 18 are housed in universities that operate either a school of public health (n=8), department (n=5), or university-wide institute focused on public health or population health science (n=5). **Only Duke and UC-San Diego do not have such entities.** The most recent school of public health (University of Washington) was established in 1970; all others have existed for more than 50 years. Institutes, centers, and departments established in the last 10 years reflect newer terminology, using population health rather than public health.

Table 2 summarizes information about population and public health research entities, organization, and graduate programs in top-ranked schools of medicine. Most population/public health programs offered an MS and PhD at the minimum, and some offered research and applied master's degrees in health care management, health administration, and clinical research degrees intended for physicians.

More recently established institutes, centers and departments included emerging fields such as implementation and decision science, comparative effectiveness research, bioethics and mental health. Though relationships between a population health research and education entity of the university and a health care system exist at many schools, examples of a robust symbiotic relationship between the two were scarce.

Public and population health entities are often broad, university-wide endeavors drawing from multiple disciplines, whether housed in a school of medicine or a school of public health. A notable function of the newer entities was to link preexisting numerous institutes and centers who were engaged in this type of research. Moreover, public and population health research is increasingly focusing on applied methods and approaches. Most entities contained between 5-8 subdivisions reflecting priority research areas such as epidemiology, biostatistics, health policy, behavioral health and environmental health. Within more recently established entities, subdivisions were focused on

applied methods and approaches to health research (e.g. implementation and decision science, comparative effectiveness research) and rather than on specific disease groups or populations.

**Table 2: Population and Public Health Research Entities in Top-Ranked Schools of Medicine**

Rank <sup>2</sup>	Institution	School of Public Health	Center/Institute	Department of Public or Pop Health	Start year <sup>1</sup>	Graduate degrees granted		Divisions				
						MS	PhD	Epi	HP	SB	HSR	Other
1	Harvard	•		•	1913	•	•	•	•	•	•	•
2	Stanford		•		2012	•	•	•	•			
3	Johns Hopkins	•			1916	•	•	•	•	•		•
3	UCSF		•		2006	•	•	• SOM			•	•
5	University of Pennsylvania		•	• HP	1993	•	•	•				
6	Washington University in St Louis		•			•	•					•
7	Yale	•		•	1915	•	•	•	•	•		•
8	Columbia	•			1922	•	•		•	•		•
8	Duke					• GH						
10	University of Chicago			•	1993	•	•	• SOM			• SOM	
10	University of Michigan Ann Arbor	•			1941	•	•	•	•	•		•
10	University of Washington	•			1970	•	•	•			•	•
13	UCLA	•			1961	•	•	•	•			•
14	New York University			•	2012	•	•	•		•	•	•
14	Vanderbilt University		•			•					• Inst	• Inst
16	University of Pittsburg	•			1948	•	•	•		•		•
17	UC - San Diego					•	•					
18	Cornell			• <sup>3</sup>	1927	•			• SOM	• SOM	• SOM	• SOM
19	Northwestern			•		•		•				•
20	Icahn			•		•	•	•				•

<sup>1</sup> Start year of primary public or population health entity

<sup>2</sup> SOM Ranking, 2015 US News & World Reports <http://tinyurl.com/dzn9s8>

<sup>3</sup> Cornell University's Department of Healthcare Policy and Research was formerly the Department of Public Health

### *Areas of Excellence*

The field of population health aims to answer complex questions about the drivers of health in a population and requires the integration of contributions from many disciplines. The School already has a considerable number of outstanding faculty researchers in population health sciences, defined here to include epidemiology, health services research and policy, health behavior, clinical decision sciences, implementation science, measurement science, and bioethics.

Currently, the faculty members who pursue the research summarized in Table 3 are housed in Medicine, Psychiatry, Community and Family Medicine, and other departments, and the research infrastructure that supports these faculty spans across multiple unconnected environments. For example, many faculty are members of Cancer Control and Population Sciences in the Duke Cancer Institute (DCI) and have access to DCI shared resources and pilot funds. Other existing resources for research include national databases from the NIH, Veteran's Administration (VA), the Centers for Medicare & Medicaid Services (CMS), and the National Cancer Institute's Surveillance, Epidemiology, and End Results program, national clinical quality improvement registries, and local Duke healthcare system data. Additionally, faculty lead major population health studies covering a wide range of conditions and risk factors sponsored by National Institutes of Health, Patient Centered Outcomes Research Initiative, Agency for Healthcare Research and Quality, Food and Drug Administration, VA, industry partners, and foundations.

### *Landscape for Partnerships*

The landscape for partnerships at Duke for the Department of Population Health Sciences comprises both internal and external groups conducting research in health services, health policy, global health, epidemiology, behavioral science, health economics, and implementation science. Internally, existing institutes and centers actively work in the areas of global health (Duke Global Health Institute), behavioral science (Departments of Community and Family Medicine, Medicine, and Psychiatry), health services research and epidemiology (Duke Clinical Research Institute, Duke Cancer Institute, Departments of Medicine and Psychiatry, VA Center for Health Services Research, Social Science Research Institute [SSRI]), and health policy (Sanford School, Fuqua School of Business, the Robert J. Margolis Center for Health Policy, the Duke Center for Health Policy and Inequalities Research, the Duke University Population Research Institute, Department of Medicine).

The Center for Population Health Sciences has begun to build substantive partnerships with several departments, schools, centers, and institutes. With the Center for Community and Population Health Improvement, we co-sponsor a monthly population health seminar series that highlights innovative studies and initiatives aimed at improving the health of specific populations, and also jointly sponsor a Data & Medicine Colloquium with the Social Science Research Institute. Additionally, with support from the Dean, the Surgical Center for Outcomes Research (SCORES) and the Center for Population

**Table 3: Selected Research Contributions by Proposed Faculty**

<p><b><i>Bioethics</i></b></p> <p>Research on conflicts of interest in clinical research has led to improvements in the disclosure of investigators' financial relationships to participants in research. (Weinfurt)</p> <p>Research incorporating the perspectives of multiple stakeholders has led to the development of a simplified consent form for biobanking research. (Beskow &amp; Weinfurt)</p>
<p><b><i>Clinical Decision Sciences (CDS)</i></b></p> <p>Research on the tradeoffs patients are willing to make between risks and benefits became the basis for recent guidance released by the FDA's Center for Devices. (Johnson)</p>
<p><b><i>Epidemiology</i></b></p> <p>A large study of older adults in the U.S. was the first to show the cumulative impact of unemployment on risks for acute myocardial infarction. (Dupre)</p> <p>New methods for measuring biological aging allowed researchers to observe that, by young adulthood, humans are aging at different rates. Furthermore, faster aging during young adulthood results in impaired physical functioning and early cognitive decline that are already manifest by midlife. (Belsky)</p>
<p><b><i>Health Behavior</i></b></p> <p>Research demonstrated that when physicians use effective communication techniques, overweight patients were more likely to lose weight three months after their visit. (Pollak)</p> <p>In HIV prevention studies, behavioral researchers identified reasons why study participants did not adhere to the study medications. This research has shifted the paradigm of future HIV-prevention trials to better assess and prevent nonadherence. (Corneli)</p> <p>A study of people who migrated from a pacific atoll to New Zealand demonstrated adverse effects of "westernization" on obesity, cardiovascular disease, diabetes and gout. (Ostbye)</p>
<p><b><i>Health Measurement</i></b></p> <p>Researchers developed the most comprehensive system to date for measuring the effects of chronic diseases and their treatments on sexual function. (Weinfurt)</p>
<p><b><i>Health Services Research and Policy</i></b></p> <p>The first experimental study of performance-based incentives in sub-Saharan Africa found that a novel approach to incentives led to better management of fever. (O'Meara)</p> <p>A series of studies in the Veterans Affairs (VA) healthcare system of colorectal cancer care found that, overall, the VA provides care that is consistent with best practices and is similar across racial groups. (Zullig)</p> <p>Research evaluated the first population-based implementation of a value-based insurance design, using BlueCross BlueShield of NC. This work significantly influenced subsequent policy work by the Centers for Medicare and Medicaid Services and the Center for Disease Control. (Maciejewski)</p>
<p><b><i>Implementation Science</i></b></p> <p>Mixed-methods research evaluated one of the first efforts in the U.S. to develop a proactive, population-based program for lung cancer screening. (Jackson)</p>

Health Sciences sponsor a quarterly transdisciplinary research colloquium focused on surgical health services research. The inaugural gathering included more than 50 faculty with representation from Departments of Surgery, Medicine, Psychiatry, Biostatistics & Bioinformatics, the Duke Cancer Institute, the Duke Clinical Research Institute, and the VA Health Services Research group. Joint recruitment of key faculty is under development with the Department of Surgery, the Duke Cancer Institute, and the Duke Clinical Research Institute.

Creating partnerships with campus-based departments, centers, and institutes is a priority as well. Many campus-based faculty conduct health services research, but making connections with potential collaborators and research resources in the School of Medicine can be challenging. The Department will aim to serve as a portal for campus-based health services researchers and facilitate connections to faculty and research resources. Developing strong collaborations with campus-based faculty will, in turn, enhance the interdisciplinarity of the Department's research programs. In addition, building partnerships with institutional entities focused on institutional diversity will facilitate the development of research programs focused on diverse populations. In turn, those research programs might serve to attract diverse faculty.

Externally, the research landscape includes centers and departments of population health sciences at nationally recognized academic institutions. (See National Landscape section and Appendix 3 for more information.) To note a few examples, the Stanford Center for Population Health Sciences research foci include health disparities and special populations, gene-environment interactions, learning health systems, and mobile health, with major data resources including the Stanford Military Data Repository, the Optum Commercial Database, the Women's Health Initiative database, and the Center for Birth Defects Research and Prevention. The New York University Department of Population Health pursues projects in decision science, medical ethics, behavioral economics, and epidemiology/ biostatistics, with data resources including CMS claims, the American Medical Association's physician masterfile, the Healthcare Cost and Utilization Project database, and University Hospital Consortium data, with a focus on disparities in care and vulnerable populations. The Harvard Department of Population Medicine conducts research in product safety, decision science, maternal/child health, electronic health record data for research, and cancer screening/prevention, with specific programs in aging, pediatric healthcare, precision medicine, obesity prevention, and drug policy.

While each of these institutions comprises national leaders in population health research, Duke investigators are similarly at the center of multiple national projects such as the FDA's Sentinel Initiative; PCORI's national clinical research network (PCORnet); the NIH's Healthcare System Collaboratory; the Agency for Healthcare Research and Quality's Evidence-Based Practice program, and the Veterans Administration's evaluation of the VA Lung Cancer Screening Demonstration project requested by the VA Under Secretary for Health (USH) to better understand how the VA may be able to implement low-dose CT lung cancer screening. Additionally, Duke investigators are central to the VA Caregiver Support Program, which seeks to support the needs of informal caregivers of Veterans facing significant health challenges. Creation of a Department of Population Health Sciences will provide the infrastructure for better collaboration among Duke investigators leading these existing efforts as well

as opportunities to pursue additional large scale projects that require engagement of a multidisciplinary research team.

### ***Areas for Development***

For the department to achieve national stature within 5 years, strategic investments will be required in faculty and the research resources on which they rely. Based on our review of Duke's extant strengths and opportunities, we have identified three signature initiatives to be developed: measurement science, implementation science, and scientific engagement with the health system around strategic priorities. These initiatives leverage existing, but underdeveloped Duke strengths, are at the foundation of population health improvement, and are generalizable beyond Duke. To develop these areas, we propose to support effort for current Duke faculty to lead each initiative, new faculty hires to increase our capacity for work in these areas, and specialized research staff who will form the cores required to conduct the research. To increase the likelihood of external funding to support these initiatives, we have allocated funds to support the necessary preparatory work.

*Measurement Science.* Interest in finding better ways to measure health and changes in health has been increasing recently in several ways: (1) growing consensus around the imperative to measure outcomes that matter to all stakeholders, including patients, caregivers, providers, and payers; (2) increasing emphasis on patient- and caregiver-reported outcomes to understand how diseases and their treatments affect day-to-day living; (3) improvements in mobile health technology that allow more intensive, real-time assessments; and (4) rising interest among regulators (e.g., the FDA) in systematically assessing patient preferences to inform policy decisions. These encouraging developments require a sound intellectual foundation to realize their potential for improving population health. Within Duke, there is also a need for greater capacity to respond to funding opportunities from public and private sponsors that require a strong measurement component. Thus, a key departmental initiative will be to develop a Health Measurement Core. Health measures could include biological parameters, symptoms, functional status, general health perceptions, health-related preferences, and satisfaction with care. The vision for the Health Measurement Core is to promote better clinical care and clinical research through advancing the science of health measurement. The mission of the Core will be to design and conduct research studies on critical methodological issues related to measurement, and to serve as a resource for other departments and centers across Duke that have need for measurement expertise.

The Health Measurement Core will be directed by Kevin Weinfurt, Ph.D. We anticipate hiring two additional faculty (one senior, one relatively junior), 2 post-doctoral fellows, as well as core staff needed for the various types of projects. The initial staff would include a senior-level project leader with broad experience in health measurement, a masters-level expert in qualitative methods (e.g., a medical anthropologist), two senior-level staff statisticians (including one with expertise in psychometrics), and a bachelor's-level research assistant. We envision this Core growing as funded projects are brought into the Core. The capabilities of the Core's faculty and staff would include the following: (1) identification and selection of health measures; (2) creation of new health measures; (3) coordination of cultural adaptations/translations of measures; (4) integration of measures into processes of care and research; (5) statistical analyses of patient-, clinician-, and observer-reported

outcomes in clinical research; and (6) design and analysis of patient preference studies (e.g., discrete choice experiments).

*Implementation Science.* On average, it takes 17 years to turn a small fraction of original research findings to the benefit of patient care, and patients only receive about half of recommended evidence-based care for prevention and chronic illness care. Moreover, the vast majority of organizational efforts to implement change fail, and sustainability is difficult to achieve. The science of dissemination and implementation is the systematic study of processes and factors that lead to widespread use of an evidence-based intervention by the target population. The methodological foundation is broad and includes evidence synthesis and meta-analysis, evaluation and quality improvement, practice-based clinical research, pragmatic trial design, qualitative and mixed methods, model simulation, and stated preference research. Accordingly, the content and disciplinary expertise required is broad and includes behavioral intervention; shared and informed decision making; quality improvement and evaluation; stakeholder engagement, community-based participatory research; health policy analysis; and mHealth. The vision for the Dissemination and Implementation Core is to accelerate the uptake of evidence-based interventions by advancing the science of dissemination and implementation. The mission of the Core will be to design and conduct research studies on critical methodological issues related to dissemination and implementation, and to serve as a resource for other departments and centers across Duke that have need for dissemination and implementation expertise.

The Dissemination and Implementation Core will be directed by Hayden Bosworth, PhD. We anticipate hiring two additional faculty and core staff to support the initiative. Initially, the team will include a senior-level project leader with experience in dissemination and implementation and statistical programming support. The Core will grow as funded projects accumulate. Capabilities within the Core include: (1) Study design support (e.g., designing for dissemination, balancing fidelity and adaptation, quasi-experimental design, participatory approaches, policy applications) and (2) methodological support (e.g., measurement and evaluation, pragmatic trials, rapid learning, system dynamic tools, comparative effectiveness research, informatics).

*Scientific Engagement with the Health System.* The Department will develop a unique partnership with the Duke University Health System (DUHS) around significant areas that are of academic interest to the Department and advance DUHS's strategic priorities regarding the health of the population. This synergy between academic interest and health system priorities is a high priority for Chancellor Washington as noted in the launch of the *Duke Health Strategic Framework* (Duke Health, 2016). Examples of mutual interests include prospectively identifying high-risk populations and designing multi-faceted interventions to improve health, examining and intervening upon ways to deliver health care, developing and evaluating new payment models to incentivize clinical approaches associated with improved health, and assessing and intervening upon determinants of avoidable emergency room usage, hospitalization, and readmission. Department faculty will work with DUHS to identify the most compelling questions and population health challenges to address and then leverage the investigative power in the Department to design, implement, and evaluate solutions that could be published in top-tier journals in the field.

## Education

The Institute of Medicine highlighted the need for training in interdisciplinary health science and recommended the development of *“a vision for the production of outstanding scientists who can integrate knowledge, theory, and methods from diverse disciplines and participate effectively in interdisciplinary teams to address complex population health issues.”* (IOM, 2015) The educational programs of the Department of Population Health Sciences will respond to this call by preparing the next generation of scientists and health practitioners to advance the health of populations through the discovery and translation of knowledge into policy and practice. Specifically, the programs will train and prepare students to:

- Integrate population-level thinking in understanding and addressing health and disease
- Critically evaluate scientific evidence and evaluate its potential impact on populations
- Apply population-level strategies in clinical care, research, teaching, and health policy efforts
- Conduct research according to the highest scientifically rigorous and ethical standards and to serve the needs/values of the populations with which they interact.

Population health science is not its own discipline – it is an interdisciplinary field that seeks to integrate knowledge, theory, and tools from multiple disciplines to develop a broad understanding of the multi-factorial pathways that produce health and health disparities so that more effective solutions can be found. While acknowledging a relationship to public health, population health science seeks to extend traditional scholarship and training in public health to incorporate the full range of disciplines that contribute to population health. This implies a deep commitment to inter- and/or trans-disciplinary science, defined as science that combines discipline-based theories, methods, and knowledge to solve scientific questions (IOM, 2015).

Discussion of the educational programs, for this field in general and for the new Department in particular, has considered potential degree and non-degree offerings, core competencies associated with those offerings, and the potential impact of the Department’s educational programs on other programs at Duke. Assessment of the educational landscape included a review of current masters programs at Duke as well as programs in population health sciences broadly elsewhere, both within NC (UNC, Wake Forest) and beyond: Yale University, University of Toronto, and Johns Hopkins University, New York University, and University of Wisconsin. While many of these educational programs are based in medical schools, the majority are based in schools of public health. Most offer Masters of Public Health, Masters of Science, and PhD degrees. (See National Landscape section and Appendix 3 for more information.)

Detailed planning around the academic programs is well underway, led by an academic programs team that is charged with refining the strategy and operational proposal for the new Department’s educational programs. When approved, we anticipate that the Department will propose a Master of Science and Doctor of Philosophy for consideration by the Duke University School of Graduate Studies. The group considered the Masters of Public Health (MPH), a well-recognized professional degree, and concluded that a more rigorous research orientation of a Master of Science degree would align better with the Department’s educational goals. Core competencies for a Master of Science in Population Health Sciences should include mastery of study design and epidemiologic methods, quantitative

methods in population health, and key perspectives on population health, ranging from social and behavioral determinants of health to health economics, health services research, and an understanding of health from a population perspective. Additionally, students will participate in professional development seminars and experiential projects (i.e., practicums) with Duke Health, other healthcare organizations, community agencies, payers, government agencies, and the biomedical industry.

The PhD program will build upon the Master's program and offer concentrations in Epidemiology, Health Services Research and Policy, and Social and Behavioral Determinants of Health. Graduates will be prepared to conduct research analyzing the distribution and determinants of health and disease and to develop, implement and evaluate health policies and healthcare delivery systems to improve the health and quality of life of populations.

Additional educational offerings will include a population health sciences track for 3rd year medical students and post-graduate certificate programs geared toward current and emerging healthcare leaders. These programs will educate participants about the systems and tools required to understand the changing marketplace, develop and evaluate new models of care delivery, and engage patients and providers. In addition, based upon feedback from key leaders and stakeholders around the University and beyond, there is a strong interest in providing a professional degree/certificate in population health directed specifically to healthcare administrators.

The educational programs will leverage the teaching and mentorship expertise of the Department's proposed faculty. Faculty require protected time to develop and teach classes and we have reflected those requirements in our budget. More than two-thirds of proposed faculty have teaching experience in courses and topics including health economics, survey design and instrument development, infectious disease epidemiology, epidemiologic methods, health policy and management, cost-effectiveness analysis, the US healthcare system, and decision modeling. Additionally, many have mentored or are mentoring early career faculty and pre-and post-doctoral students. We will work with Ann Brown, MD, MHS, Vice Dean for Faculty in the School of Medicine, and Mark Dewhirst, DVM, PhD, Associate Dean for Faculty Mentoring, to (1) ensure that our faculty receive training in the National Research Mentoring Network (NRMN) curriculum that Duke has adopted and (2) develop incentives for senior faculty to serve as committed mentors.

### ***Areas of excellence***

Core areas of excellence will include epidemiology, health services research, experimental and quasi-experimental study designs, measurement science, and dissemination and implementation. The educational programs will have unique, distinguishing characteristics including:

- Expert, multidisciplinary faculty
- Funded fieldwork opportunities
- Flexible, tailored curriculum
- Focus on applied, relevant research and skills
- Diverse cohort of students
- Professional development support

## ***Landscape for Partnerships***

### Internal

After extensive discussion with various stakeholders and leaders at Duke, we have concluded that adequately resourced educational programs within the Department of Population Health Sciences will support strong university-wide partnerships, particularly with the Duke Global Health Institute, the Duke Clinical Research Institute, the School of Nursing, the Duke Margolis Center for Health Policy, the Duke Social Science Research Institute, the Duke Initiative in Science and Society as well as with other departments in the School of Medicine. These partnerships could include co-listing of courses and joint predoctoral and post-doctoral fellowships. Although a new master's degree in Population Health Sciences has potential to expand the course offerings available to students in existing programs, concerns have arisen, however, about the potential for competition over students, teaching faculty, and tuition revenue flows. Development of the educational program and proposal will continue over the coming months with engagement from the Duke Global Health Institute and Biostatistics & Bioinformatics, among others. Opportunities for partnership may also exist with the Data Science Master's program, a new interdisciplinary degree proposed by the Duke Social Science Research Institute and the Information Initiative at Duke (iiD), as well as the Bioethics Master's Program run by the Duke Initiative in Science and Society.

### External

There are a limited number of departments of population health in the United States as indicated by a recent Institute of Medicine report. However, the committee reviewed current masters programs at Duke as well as programs in population health sciences broadly elsewhere, both within NC (UNC, Wake Forest) and beyond: Yale University, University of Toronto, and Johns Hopkins University, New York University, and University of Wisconsin. Given the growth in the area and clear need for a program, we do not anticipate at this time a high level of competition with other medical schools. However, many related programs (including MSc epidemiology, MSc health services research, MPH, Masters in health management, and Health policy degrees) are based in schools of public health and it is important to differentiate any new programs or modifications of existing programs from these, especially those that exist within the UNC system.

## **Service**

Historically, access to electronic health data at Duke for research purposes has been inefficient due to the siloed nature of data and relevant expertise. There is interest across the University to provide a shared resource to easily access electronic data (in particular, Medicare claims data and Duke Health electronic health record data) in a secure, robust environment with uniform approaches to governance and regulatory requirements.

The Department proposes an electronic health data core to be housed in PACE (Protected Analytic Computing Environment), an environment operated by Duke Health Technology Solutions and the Office of Research Informatics. The core will provide authenticated users with access to Medicare claims and Duke Health electronic health record data for the purpose of conducting health services

research and quality improvement. We initially propose to place the existing Medicare all claims 5% sample (1991-2013), the Medicare inpatient claims 100% sample (2000-2014), and special cohorts created in conjunction with the Duke-Margolis Center for Health Policy, the Duke Clinical Research Institute, and the Duke Institute for Healthcare Innovation in this environment. These data represent a highly unique resource available in only a few organizations in the U.S.; the present value of the data alone exceed \$2M. During this start-up phase, we will enrich available data by refreshing these datasets and purchasing new claims data to be matched with Duke electronic health record data.

This core will provide:

1. Access to electronic health data (Medicare claims and Duke electronic health record data) via PACE;
2. access to education and regulatory support to request use of the data from the Center for Medicare and Medicaid Services (Medicare Claims Data) and Duke Health Technology Solutions (Duke electronic health record data);
3. processing and integration into appropriate datasets by an informatics analyst; and
4. analytical support and troubleshooting from experienced analysts and data scientists.

### ***Landscape for Partnerships***

There is tremendous interest across the University in the creation of the PHS electronic health data core, the ability to leverage institutional investments in existing data, and the ability to extend the core with new data sources. We have existing partnerships with the Duke Clinical Research Institute, the Duke Cancer Institute, and the Duke Margolis Center for Health Policy, and are developing similar partnerships with SCORES and the School of Nursing. Additionally, we have presented the vision for the core at the Duke Data & Medicine Colloquium, jointly sponsored by SSRI and the Center, and many campus-based investigators are keenly interested. We have met with the operational team at SSRI to discuss our plans and have identified opportunities to jointly develop and share resources related to Medicare data governance and management. Although our initial focus is on internal partnerships, we will cultivate external partnerships as well given the uniqueness of the resource in the state and region.

To accelerate partnerships and expand the analytic workforce, the Center for Population Health Sciences is hosting the Center for Medicaid and Medicare Services' Research Data Assistance Center (ResDAC) for a 2.5-day training workshop in late February, 2017. The workshop, "CMS 101: Introduction to the Use of Medicare Data for Research," is open to the public but 25 seats have been reserved for Duke designees. The training workshops are typically offered annually at the University of Minnesota, the institutional home of ResDAC. The February workshop was fully subscribed within hours of distributing the announcement.

## **Impact**

### ***Anticipated benefits to the University, School, and member faculty***

Integration of expertise and development of infrastructure within a single department will accelerate collaboration, create efficiencies, and generate new sources of research and education funding. In the

long-term, the Department will attract faculty from other institutions and successfully retain promising investigators, thereby growing the research portfolio, increasing NIH revenues for the School of Medicine, and expanding the bandwidth to partner with clinical departments around population health science. The proposed collaborative model will enable clinical departments to expand their research portfolios as well. For proposed faculty, the provision of a tenure-able academic home for non-clinical faculty, the co-location of faculty working in related areas, and a more cohesive framework for faculty mentoring will bring significant advantages.

***Potential unintended consequences for other Departments, Centers, and Institutes***

From a reputational and financial perspective, however, the creation of a new department could negatively impact existing departments and institutes in the short term, as faculty and their funded portfolios are consolidated into the new Department. To assess this potential negative reputational and financial impact on existing departments, we summarized current annual NIH funding for proposed faculty, summarized funding by current departmental home, and calculated the proportion of total NIH funding accounted for by those faculty. We estimated potential change to NIH ranking by subtracting the estimated NIH funding for those faculty from 2014 NIH funding for their current department, and assessed how the ranking would have changed.

**Table 4: Potential impact of consolidating faculty and their funded portfolios into the new department**

Entity	Federal funding FY16 (in \$ mill)	Federal funding of DPHS faculty (in \$mill, % of department FY16)	NIH ranking <sup>4</sup>	Potential change to ranking
Medicine	\$158.9	\$5.7 (3.6)	7	-1
Psychiatry	37.2	0.4 (1.1)	10	-1
CFM	4.4	1.7 (38.1)	36	-5

As shown in Table 2, the anticipated impact on the Departments of Medicine and Psychiatry is likely to be modest. In this worst-case scenario analysis, moreover, we assume that the creation of the new department does not generate benefit to current departments. In reality, we expect that the new Department will create synergies and collaborations that will help bring additional funding to current departments. The potential impact on the Department of Community and Family Medicine may be more substantial, and options to mitigate the potential negative impact should be explored.

The scenario presented above is very conservative. Because one of the determinants of rankings is funding per faculty, the transition of faculty into the new department might have a positive impact on department rankings. Additionally, clinical departments may choose to bring in new faculty whose research funding could offset some of the impact faculty transitions the new department

Using the same cohort faculty, we also estimated the potential impact on the School of Medicine of the increased rate of indirect return associated with moving those faculty members from a clinical department to a basic science department. For the analysis, we assumed that federal funding supports approximately 70% of fully loaded salaries for those individuals (20% commercial, 10%

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<sup>4</sup> Based on 2014 data

unfunded) and that the indirect return rate would increase from 40% to 72%. The annual cost to the School of Medicine of the change in indirect return rate based on retaining ongoing studies in their owning departments, would be approximately \$217,000 in year 1. This estimate increases to \$507,000 by year 2 when all new studies will be under Department of Population Health Sciences.

We expect that faculty affiliated with the Duke Clinical Research Institute, the Duke Cancer Institute, the Duke Global Health Institute, and others will continue those affiliations and that projects that benefit from those infrastructures would stay with those organizations.

After extensive discussion with various stakeholders and leaders at Duke, we expect that the Department of Population Health Sciences is likely to have strong university-wide partnerships, particularly with the Department of Biostatistics and Bioinformatics and clinical departments in the School of Medicine, Duke School of Nursing, Duke Global Health Institute, Duke Clinical Research Institute, and the Duke Margolis Center for Health Policy among others. These partnerships could include potential joint hires, co-listing of courses and training, and multidisciplinary research opportunities. We will also work to establish and enhance partnerships with other basic science departments. The applications of the new Department's research and aspects of the education programs may appear to be more closely aligned with the interests of clinical departments than those of basic science departments. However, at a fundamental level, the new Department shares with its fellow basic science departments a commitment to understanding basic mechanisms, developing new scientific methods and tools, and growing the next generation of scientists devoted to the principled study of nature. In addition to establishing partnerships with other basic science departments, we believe the new Department will serve to reinforce the value and identity of the basic sciences in School of Medicine and the health system in general.

Although Biostatistics & Bioinformatics has a distinct disciplinary focus from the new department, we anticipate robust collaborations around education and faculty recruitment. Steve Grambow, PhD, Vice Chair of Education and Director of the Clinical Research Training Program in B&B, is a member of the working group tasked with developing the masters and PhD educational programs. With respect to faculty recruitment, we expect to share recruitment of methodologically oriented population health scientists and biostatisticians and bioinformaticists deep population health interests.

Letters of support from Drs. Boulware, Merson, and McClellan are included in Appendix 5, and letters from Michener and DeLong are forthcoming.

### ***Plan for moving faculty and approach to mitigating unintended consequences for existing departments***

Over the next 15 months, we intend to transition faculty and funded projects in a measured fashion so as not to pull resources abruptly away from clinical departments. With the Department of Medicine, we have reached agreement about the flow of indirect returns for grants held by faculty who will transition from Medicine to Population Health Sciences. Specifically, indirects on grants that end in FY18 will remain with the department and funded grants with more than a year of funding will

transition to the new Department over a one-year period that begins July 1, 2017. New grants will be submitted through the Department and management responsibilities for those grants will rest with the new Department. Memoranda of understanding between centers, institutes, and departments that describe institutional commitments to individual faculty will be established between those entities and the new department.

We are committed to solutions that create synergies and foster collaborations and will operationalize that commitment through open dialogue, transparency, and direct engagement of entities with shared interests.

### ***Indicators of success***

We have identified a preliminary set of 7 indicators of success for the proposed department:

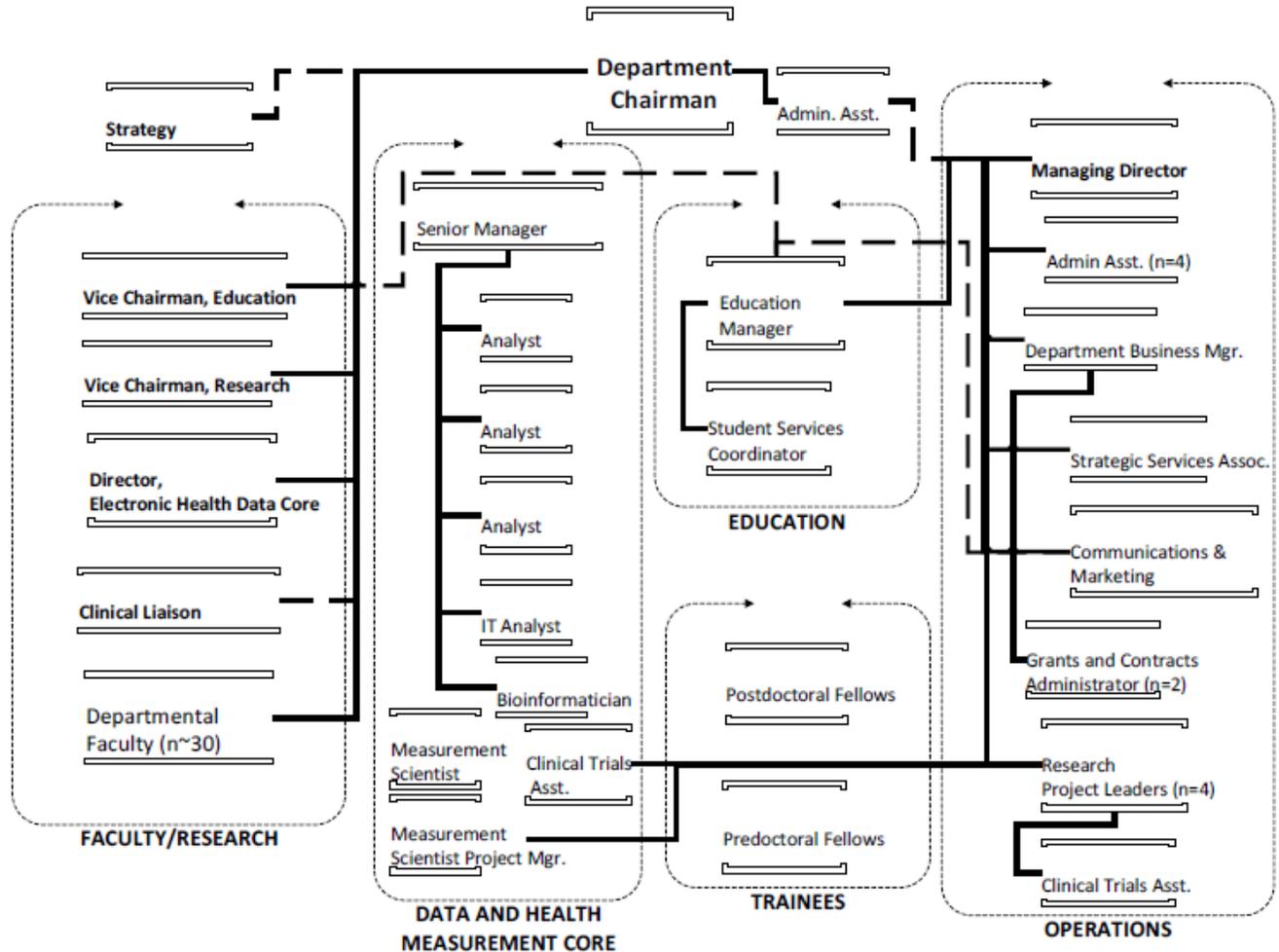
1. recruitment and retention of a diverse, productive, renowned faculty;
2. research funding and quality;
3. successful creation of high-quality academic programs and products;
4. ability to serve as a portal for health-related collaborations for scholars and researchers across the University;
5. operation of a sustainable infrastructure that supports secure access to research-identifiable electronic health data
6. operation of a sustainable health measurement core that serves as a resource across the University for selection, creation, and analysis of health measures; and
7. educational products/programs and quality of the programs.

Over the coming months, we will engage Department faculty and partners across the institution to vet these indicators and develop specific metrics.

### **Administrative Support and Space**

In the conversion from Center to Department, Population Health Sciences will need a variety of administrative services, which it will build in-house and share with other basic science departments and institutes. These will include: proposal development & grants administration, population research administration, HR/Visa/Effort reporting, finance, educational program coordination, IT, marketing and communications, and business and financial management. The managing director of the Center is currently meeting with all potential faculty to assess what infrastructure is needed to maximize research productivity.

A proposed organizational structure for the new Department is shown below:



We have worked with Moria Montalbano, Associate Dean for Administration, to identify short-term space in Erwin Square that will house approximately 60% of the faculty, new recruits, and operational/administrative staff to manage the research and service missions of the Department for the first 24 months. VA and some DCRI faculty will remain in their current office space until a permanent location has been identified. Within 24 months, permanent space will house the entire department (including a majority of faculty), accommodating all missions of the department, including space for students and teaching.

## Duke Health - Department of Population Health Sciences P&amp;L

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<b>Sponsored Research Revenue Model</b>						
	<b>FY-18</b>	<b>FY-19</b>	<b>FY-20</b>	<b>FY-21</b>	<b>FY-22</b>	<b>FY-23</b>
<b>Net Program Sources</b>						
Sponsored Research	\$8,564,372	\$9,678,542	\$10,909,609	\$11,955,619	\$13,279,194	\$13,614,456
Education Programs	\$0	\$401,490	\$1,447,371	\$2,342,674	\$2,851,673	\$3,163,164
Other						
<b>Total Net Program Sources</b>	<b>\$8,564,372</b>	<b>\$10,080,032</b>	<b>\$12,356,980</b>	<b>\$14,298,293</b>	<b>\$16,130,867</b>	<b>\$16,777,620</b>
<b>Expenses</b>						
<i>Faculty</i>						
Administrative	\$103,261	\$105,842	\$108,488	\$111,201	\$113,981	\$116,830
Education	\$157,340	\$481,353	\$493,387	\$505,722	\$518,365	\$531,324
Research Studies	\$5,863,049	\$6,160,681	\$7,084,522	\$7,878,722	\$8,892,365	\$9,114,674
Data Core	\$104,360	\$106,969	\$109,643	\$112,384	\$115,194	\$118,074
Unallocated	\$512,080	\$599,153	\$400,635	\$366,322	\$418,463	\$428,925
<i>Staff</i>						
Total staff costs	\$2,834,256	\$2,837,422	\$2,886,126	\$2,948,784	\$3,022,504	\$3,098,067
<b>Total Labor</b>	<b>\$9,574,346</b>	<b>\$10,291,421</b>	<b>\$11,082,802</b>	<b>\$11,923,136</b>	<b>\$13,080,872</b>	<b>\$13,407,894</b>
<b>Other Expenses</b>	<b>\$1,825,133</b>	<b>\$2,750,406</b>	<b>\$2,937,126</b>	<b>\$3,161,027</b>	<b>\$3,389,868</b>	<b>\$3,588,325</b>
<b>Total Expenses</b>	<b>\$11,399,479</b>	<b>\$13,041,827</b>	<b>\$14,019,928</b>	<b>\$15,084,163</b>	<b>\$16,470,740</b>	<b>\$16,996,219</b>
<b>Program Surplus/Deficit</b>	<b>(2,835,107)</b>	<b>(2,961,795)</b>	<b>(1,662,948)</b>	<b>(785,870)</b>	<b>(339,874)</b>	<b>(218,599)</b>

Financial support for the Department will be received from the Dean of the School of Medicine, the Chancellor of the Duke Health System, research awards, indirect cost recovery, and tuition revenue from the educational programs. As described above, an equitable and transparent approach to transitioning faculty and their funded projects is being developed with current chairs. If the Department's educational programs share teaching responsibilities with other Duke degree programs, then the Chair, the leader of the other Duke degree program, the Dean of the School of Medicine, and the Provost must negotiate a tuition-sharing formula.

Based on current projections and conservative assumptions, the all-missions budget suggests that an investment of approximately \$8.25 million over 4 years will be required to establish an operational department. Although the budget represents our best estimate based on current information, uncertainty exists with respect around the timing of faculty transitions and their research portfolios, the speed of faculty recruitment which would appropriately delay initiation of research program, and the timing of the approval of the master's program. As these uncertainties are reduced, the budget will be updated accordingly; we will be iterating the budget and operating model closely with School of Medicine Finance leadership to optimize and develop risk mitigation plans.

## **Appendix 1**

### **Population Health Sciences New Department Working Group Membership**

#### **Theodore Pappas, MD**

Distinguished Professor and Vice Chairman for Administration, Department of Surgery  
Vice Dean for Medical Affairs, SOM

#### **Lesley Curtis, PhD**

Professor in Medicine  
Duke Clinical Research Institute  
General Internal Medicine, SOM

#### **Cynthia Gordon, RN**

Admin Director, Patient Safety Office, DUHS  
Office of Vice Dean of Medical Affairs

### **WORKING GROUP MEMBERS**

#### **Suresh Balu, MBA**

Director, Strategy & Innovation and Program  
Director, Duke Institute for Health Innovation  
Duke Translational Medicine Institute

#### **John A. Bartlett, MD**

Professor, Medicine and Global Health  
Co-Director, Duke University Center for AIDS Research  
Associate Director for Research, DGHI  
Infectious Diseases, SOM

#### **Hayden Bosworth, PhD**

Professor in Medicine  
Professor in Psychiatry and Behavioral Sciences  
Senior Fellow in the Center for Study of Aging  
General Internal Medicine, SOM

#### **L. Ebony Boulware, MD**

Professor of Medicine  
Professor, Dept of Community and Family Med  
Chief, Division of General Internal Medicine  
Associate Dean for Clinical and Translational Science; Director, Duke Clinical and Translational Science Award

**Dennis Clements, MD, PhD**

Professor, Pediatrics, Community and Family Medicine,  
Global Health Senior Advisor, Director of Global Health Third Year Study Program and Director  
of Medical School Programs, Duke Global Health Institute

**Adrian Hernandez, MD**

Professor of Medicine  
Associate Director, Duke Clinical Research Institute  
Cardiology, SOM

**Emily O'Brien, PhD**

Assistant Professor in Medicine  
Duke Clinical Research Institute  
Clinical Pharmacology, SOM

**Truls Østbye, MD, MPH, MBA, PhD, FFPH (UK)**

Professor in Community and Family Medicine  
Director of Global Health in Community and Family Medicine  
Professor in Health Services Research  
Duke-NUS Singapore

**Kathryn (Kath) Pollak, PhD**

Professor in Community and Family Medicine  
Duke Cancer Institute  
Community and Family Medicine, SOM

**Sudha Raman, PhD**

Postdoctoral Fellow  
Duke Clinical Research Institute

**Julie Ann Sosa, MD**

Professor of Surgery  
Professor of Medicine  
Chief, Section of Endocrine Surgery  
Leader, Endocrine Neoplasia Diseases Group, Duke Cancer Center  
Director, Health Services Research, Dept of Surgery  
Division of Advanced Oncologic and GI Surgery

**Kevin Sowers, RN, MSN**

President, Duke University Hospital

**Donald H. (Don) Taylor, PhD**

Professor, Sanford School of Public Policy  
Associate Professor, School of Nursing  
Assistant Professor of Community and Family Medicine  
Affiliate, Duke Initiative for Science & Society

**Virginia Wang, PhD**

Assistant Professor in Medicine  
General Internal Medicine, SOM

**Kevin Weinfurt, PhD**

Professor of Psychiatry and Behavioral Sciences  
Professor of Dept of Psychology and Neuroscience

## Appendix 2 Duke University Stakeholders

Stakeholders	Representative	Working Group (WG) Contact	In-person meeting with WG
<b>Duke Medicine</b>	Washington	Curtis	Yes
<b>DIHI</b>	Balu		Yes
<b>PDC</b>	Mark Newman	Pappas	
<b>Duke Connected Care</b>	Dev Sangvai	Balu	
<b>SoM</b>	Andrews	Pappas	Yes
<b>Medicine</b>	Klotman	Curtis	Yes
<b>MMcl</b>	Schulman	Curtis	
<b>Surgery</b>	Kirk	Sosa	Yes
<b>Psychiatry</b>	Lisanby	Weinfurt	
<b>Community and Family Medicine</b>	Michener	Curtis	Yes
<b>B&amp;B</b>	Delong	Curtis	Yes
<b>Clinical Research Training Program</b>	Grambow	Weinfurt	
<b>Durham VA HSR&amp;D</b>	Oddone	Bosworth	
<b>Center for Community and Population Health Improvement</b>	Boulware	Curtis	
<b>Duke Cancer Institute</b>	Patierno	Pollack	
<b>Duke Clinical Research Institute</b>	Peterson	Hernandez	
<b>SOM Finance</b>	Billy Newton	Curtis	
<b>Vice Dean for Basic Sciences</b>	Raphael Vildavia	Curtis	
<b>School of Nursing</b>	Broome	Sowers	Yes
<b>Duke Global Health Institute</b>	Merson	Bartlett	Yes
<b>Margolis Center for Health Policy</b>	McClellan	Curtis	Yes
<b>Sanford School</b>	Brownell	Taylor	
<b>Vice Provost for Research</b>	Carin	Curtis	Yes
<b>Duke-NUS</b>	Coffman	Curtis	

Specific questions posed to stakeholders:

- What do you see as the potential opportunities for the department? How could the department add value to the School of Medicine and University?
- What are the potential challenges for the department? Are there potential risks to the School and University?
- How could the department add value to (your center/department/institute)?
- What concerns do you have about the potential impact of the department on (your center/department/institute') research and education programs?

## **Appendix 3 National Landscape Assessment**

### **Background**

An assessment of the national landscape of university-based public and population health entities was undertaken to inform the working group's goal: to develop an academic resource at Duke to address the challenge of improving population health. Particular focus was given to the exploring how the public and population health entities (for example, school, department, institute or center) are structured within the university and/or the school of medicine, how the entities were subdivided, and how each entity addressed novel and emerging areas of population health research, especially with respect to the link between population health sciences and the clinical health care systems.

### **Objective**

To understand the national landscape based on the characteristics of the top-ranked university based public or population health sciences departments, with particular focus on universities with a population health entity within a school of medicine (SOM) as compared to a well-established, freestanding school of public health (SPH) and with strong education and research programs.

### **Methods**

- i. To develop a list of university-based population health academic entities to study further, we compiled a list of top ranked medical schools and schools of public health within the US (based on the US News and World Report 2015, using the top 20 academic medical schools, Research category (<http://grad-schools.usnews.rankingsandreviews.com/best-graduate-schools/top-medical-schools/research-rankings>) and adding additional schools from the 20 top ranked School of Public Health (SPH)).
- ii. Additional schools with health care/clinical research focus (University of Wisconsin–Madison, Dartmouth College), a recently formed school of medicine (University of Texas Austin) and additional international and local programs with relevance were added.
- iii. Publically available information was compiled for the above universities.
- iv. Characteristics noted included rank (as per US News and World Report) of academic SOM, entities' location within and/or outside of the SOM, rank of SPH if present, start year, graduate degree programs and divisions.

### **Results**

The program characteristics and are detailed in Table A. We profiled 20 universities based on rankings. Additional schools were included: 3 were added due to expertise in population health or clinical research, 6 schools within NC or SC for regional comparison, and 2 schools outside the US were included for international context.

## Overall Observations:

- Location of entity within university – Of the US News and World Report 2015 ranking of the top 20 schools of medicine (SOM) (research category), 18 universities had either a school of public health (SPH), department, or university wide institute focused on public health or population health science. Eight universities had a SPH, 5 universities had a university-wide institute or center of public or population health science. Of the remaining universities without an SPH or similar entity, 5 housed a department of public health or population health sciences within the SOM (including Cornell University's Department of Healthcare Policy and Research within the SOM that was formerly the Department of Public Health). The remaining university, other than Duke, was UC – San Diego; the UC-SD SOM houses a Division of Global Public Health within the Department of Medicine. After evaluating the population and public health activities of several additional institutions, eight universities were identified as being nationally comparable peer institutions to Duke, based on the presence of a public or population health department within the SOM: Harvard University, University of Chicago, Cornell University, New York University, Northwestern University, Icahn University, University of Wisconsin-Madison, and the University of Texas – Austin. Within the SOM at each school, almost all universities with and without a SPH had a non-clinical department or subdivision that focused on epidemiology, biostatistics or clinical/translational research.
- Size – For schools that indicated the number of primary faculty in the population health entity, the size of the faculty group ranged from as few as 8 primary faculty to over 100+ (data not shown).
- History - Many of the schools of public health were established more than 50 years ago. Newer schools, institutes and centers established in the last 10 years reflect new terminology, using population health rather than public health.
- Education – In terms of degree programs, most population or public health entities offered an MPH, MS, PhD at the minimum, with <5 also offering various other degrees including research and applied masters in health care management, health administration and clinical research degrees intended for physicians, as well as doctorates in public health.
- Research – As reflected in the subdivisions within each department, school or institutes, the research focus, most had between 5-8 subdivisions. The most common were epidemiology, biostatistics, health policy, behavioral health, environmental health. Institutes, centers and departments formed in the last 10 years included emerging fields such as implementation and decision science, comparative effectiveness research, medical bioethics and mental health. The full list of subdivisions are included in Table B. Each school had multitudes of smaller organizational units (such as centers) that focused on specific methods or disease topics.
- Programs with established links to clinical research with/within a health system – Many schools had active and very visible research programs that evaluated the health care system, often focusing on national or state health care data (e.g. include Dartmouth's Institute for Health Policy and Clinical Practice), however finding a strong example of a

- symbiotic relationship between a population health research and education entity of the university and a health care system was difficult.
- Local findings – Of the NC universities with public or population health entities, UNC is the most well established, with large departments within the SPH, as well as population health tracks in the SOM and the School of Pharmacy and the Cecil G. Sheps Center for Health Services Research (a unit of the University of North Carolina Division of Health Affairs). Notable educational offering at other state universities included Wake Forest University’s Clinical and Population Translational Sciences (CPTS) program (granting degrees (MS) or certificates) and UNC Charlotte’s PhD in health services research (established 2005) within the Department of Public Health Sciences.
  - International findings –Notable features of the London School of Hygiene and Tropical Medicine (UK) were its well-developed distance learning and continued professional development for public health professionals. Notable features of the entities at the University of Toronto (Canada) were its established, large health policy, management and evaluation department/institute, including clinical epidemiology education and research programs, as well as a relatively new SPH. Population and clinical sciences are well represented in the institutes divisions (for example: clinical epidemiology, health services research, quality improvement and patient safety).

## Conclusions

Public and population health entities are broad cross university endeavors.

- a. Eight universities were identified as being nationally comparable peer institutions to Duke: Harvard University, University of Chicago, Cornell University, New York University, Northwestern University, Icahn University, University of Wisconsin-Madison, and the University of Texas – Austin. These universities all focused public and population health science research and educational activities within a department within the school of medicine.
- b. Examining recently established population and public health entities may give a better indication of the current trends in structure and academic focus. Entities were often broad cross-cutting university endeavors drawing from multiple disciplines, whether housed in a SOM or SPH. A notable function of the newer entities was to link preexisting numerous institutes and centers who were engaged in this type of research.

Public and population health research is increasingly focusing on applied methods and approaches

- c. Sub-divisions within a new department reflect both established perspectives and techniques of scientific inquiry as well as emerging methodological approaches. Within more recently established entities, subdivisions were focused on applied methods and approaches to health research (e.g. implementation and decision science, comparative effectiveness research) and less often on specific disease groups or populations (such as mental health).

Opportunities exist to maximize the link between health care system and academic population health activities.

- d. Though relationships between a population health research and education entity of the university and health care system exist at many schools, building a symbiotic relationship between a population health research and education entity of the university and a health care system would be an area that a new Department of Population Health Sciences department would excel.

Appendix 3: Table A National Landscape assessment – Results – (peer institutions in bold)																			
School of Medicine (SOM) <sup>1</sup>		SPH <sup>2</sup>		Other entity <sup>3</sup>	SOM - department		Start yr <sup>5</sup>	Graduate degrees granted					Formal subdivisions within SPH or entity						
SOM rank		SPH	rank		Pop /PH	Other <sup>4</sup>		MPH	MS	PhD	DrPH	MHA	Bios	Epi	HP	SB	GH	HSR	Other
1	<b>Harvard</b>	•	2		•		1913	•	•	•	•	•	• <sup>(SPH)</sup>	•	•	•	•	•	•
2	Stanford			•		•	2012		•	•			•	•	•				
3	Johns Hopkins	•	1			•	1916	•	•	•	•		•	•	•	•	•		•
3	University of California – SF			•		•	2006		•	•			• (SOM)	• (SOM)				•	•
5	University of Pennsylvania			•		•	1993		•	•			•	•					
6	Washington University at St Louis			•		•		•	•	•			•				•		•
7	Yale	•	14		•		1915	•	•	•			• <sup>(SPH)</sup>	•	•	•			•
8	Columbia	•	5			•	1922	•	•	•		•			•	•			•
8	Duke					•			• (GH)	• (Bios)			• (SOM)						•
10	<b>University of Chicago</b>				•		1993		•	•			• (SOM)	• (SOM)				• (SOM)	
10	University of Michigan Ann Arbor	•	4			•	1941	•	•	•		•	•	•	•	•			•
10	University of Washington	•	6			•	1970	•	•	•		•	•	•			•	•	•
13	UC – LA	•	10				1961	•	•	•	•		•	•	•				•
14	<b>New York University</b>			<sup>6</sup>	•		2012	•	•	•			•	•		•		•	•
14	Vanderbilt University			•		•			•									• (Inst)	• (Inst)
16	University of Pittsburg	•	13			•	1948	•	•	•		•	•			•			•
17	UC - San Diego					• <sup>7</sup>		•	•	•							•		
18	<b>Cornell University</b>				• <sup>8</sup>		1927		•				• (SOM)		• (SOM)	• (SOM)		• (SOM)	• (SOM)
19	<b>Northwestern</b>				•			•	•				•	•					•
20	<b>Icahn</b>				•			•	•	•			•	•					•

Appendix 3: Table A National Landscape assessment - Results – (peer institutions in bold) (page 2)																			
		SPH <sup>2</sup>		Other entity	SOM - department		Start yr <sup>3</sup>	Graduate degrees granted					Formal subdivisions within SPH or entity						
Other		SPH	rank		Pop/PH	Other <sup>4</sup>		MPH	MS	PhD	DrPH	MHA	Bios	Epi	HP	SB	GH	HSR	Other
	<b>University of Wisconsin–Madison</b>	•			•		1984	•	•	•			•	•	•			•	
	Dartmouth College			•			1988	•	•	•				•	•			•	•
	<b>University of Texas - Austin</b>				•		2012										•	•	•
<b>Local</b>																			
	University of North Carolina -Chapel Hill	•	<b>2</b>			•	1940	•	•	•	•	•	•	•	•	•	•		•
	NC State					•	1999		•	•									
	Wake Forest				•		2007		•				•	•	•				•
	East Carolina				•			•											
	UNC Charlotte				•		2002		•	•		•						•	•
	Medical University South Carolina				•				•				•	•					
<b>International</b>																			
	London School of Hygiene and Tropical Medicine	•					1890		•	•			•	•	•	•	•	•	•
	University of Toronto	•		•			2008	•	•	•		•	•	•	•	•	•	•	•

### Appendix 3 Table A Footnotes

<sup>1</sup>SOM Ranking – source - <http://grad-schools.usnews.rankingsandreviews.com/best-graduate-schools/top-medical-schools/research-rankings>

<sup>2</sup>SPH Ranking – source - <http://grad-schools.usnews.rankingsandreviews.com/best-graduate-schools/top-health-schools/public-health-rankings>

<sup>3</sup> Such as a center or institute

<sup>4</sup>Departments within a SOM such as Epidemiology, Biostatistics or Health Services Research

<sup>5</sup> Start year of primary public or population health entity

<sup>6</sup>NYU’s College of Global Public Health is a university-wide entity.

<sup>7</sup>UC-SD’s Division of Global Public Health is within the Department of Medicine in the SOM

<sup>8</sup>Cornell University’s Department of Healthcare Policy and Research was formerly the Department of Public Health

### Abbreviations

Bios – Biostatistics and/or Bioinformatics

MPH - masters in public health

PH - public health

CER - Comparative effectiveness research

MS - masters of science

Pop - Population

GH - Global health/international health

PhD - doctor of philosophy

Epi – Epidemiology (all types)

DrPH - doctorate in public health

HP - Health policy

MHA - masters in health administration

HP - Health policy and management

HSR - Health services research, comparative effectiveness research,  
health care delivery research

SB – Social/behavioral research

**Table B – Subdivisions within population and public health entities**

bioinformatics  
biostatistics  
chronic disease epidemiology  
clinical epidemiology  
community health  
comparative effectiveness research  
decision science  
delivery science  
environmental health  
epidemiology  
global health/international health  
health behavior  
health care analytics  
health care redesign and research  
health communication  
health policy  
health policy and management  
health services research  
human genetics  
infectious disease  
maternal and child health  
medical ethics  
mental health  
nutrition  
occupational health  
primary care

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