The Design of a Master of Science Program In Learning Health System Science at Wake Forest University

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A new program in Translational and Health System Science will launch in Fall 2020

MS Program Mission

To provide translational scientists with the methodological and professional skills to implement rigorous research in health care systems and in populations and to disseminate the findings to improve human health.

Needs Assessment

- The Graduate School of Arts and Sciences at Wake Forest University currently administers a Master of Science (MS) program in Clinical and Population Translational Science (CPTS), which trains clinician scientists to conduct translational research.
- There is demand not only for translational research, but research to continuously improve healthcare delivery and promote a learning health system (LHS).
- The Clinical and Translational Sciences Institute (CTSI) recently received a TL1 award to establish the LHS Scholars program, which necessitated the development of formal training in LHS science (LHSS).
- Due to overlap in student populations and complementary missions of CPTS and the LHS TL1, a MS program in Translational and Health System Science (THSS) with two tracks, Clinical and Translational Investigation (CTI) and LHSS, was developed, adding 8 courses to the curriculum.

MS Program Development Process

- Key Stakeholders included: TL1 Program Director and Core Faculty, Public Health Sciences Education Committee, CPTS Course Directors, CTSI Education and Evaluation Staff, and Graduate School Administration
- Stakeholders provided input on the development of the Program Competencies and provided feedback on the development of the new LHSS courses at a retreat held in August 2019.
- Course objectives were developed using a Competency Matrix to indicate introduction, reinforcement, assessment, and mastery of program competencies

MS Program Competencies

Shared Competencies	Develop meaningful and feasible research questions based on literature review, conceptual frameworks, and relevant stakeholders.
	Critically review and appraise the scientific literature, including evaluation of rigor and reproducibility, and methodological quality.
	Design and execute studies to answer research questions, applying appropriate study design, sampling, informatics, measurement, while minimizing threats to validity.
	Perform and interpret statistical analyses based on a foundation of basic statistical literacy, with graduates able to perform basic analyses on their own and prepared to collaborate with statisticians for more complex analyses.
	Ensure that research or quality improvement in healthcare settings adhere to the highest ethical and regulatory standards.
	Communicate scientific concepts orally and in writing, including through grant applications, protocols, manuscripts, abstracts, and presentations to scientific audiences and to lay audiences.
	Collaborate productively in multidisciplinary scientific teams comprised of basic, clinical, population scientists, and relevant stakeholders.
	Implement innovations in community or clinical health care settings to ensure the systematic uptake of research findings in a health system or population.
LHSS Competencies	Understand how health systems are financed and operate.
	Apply systems theory to research and implementation.
	Conduct research in real-world systems using appropriate study designs and analytic methods to assess outcomes of interest to health system stakeholders.
	Effectively lead and manage multidisciplinary scientific teams comprised of basic, clinical, population scientists, and relevant stakeholders.
CTI Competencies	Perform and interpret simple and multiple linear and logistic regression models, and understand the complexities of repeated measures data analysis.
	Design and implement clinical trials

Program Courses by Track

Course	credits	CTI	LHSS
Ethics & Responsibility 1 & 2	1 x 2	C	C
Introduction to Biostatistics	4	C	C
Translational Research Methods I	2	C	C
Translational Research Methods II	3	C	C
Epidemiology	4	C	C
*Introduction to Biomedical Informatics for the LHS	2	C	C
*Principles of Implementation Science	2	C	C
**Scientific Writing for Papers and Proposals (capstone)	2	C	C
**Research Grant Preparation (capstone)	1	C^	C
*Research Paper (capstone)	3	C	CC[1]
*Training Grant Application (capstone)	3	E	CC[1]
Clinical Trial Methods	3	C	E
Statistical Modeling	4	C	E
*Building Successful Teams	0.5	E	C
*Leading Successful Teams	0.5	E	C
*Learning Health System Colloquium	0.5 x 4	E	C
*Organizational Change in Health Systems	2	E	C
LHS Team Science Practicum	1 x 2	E	C
Global Health Seminar	1	E	E
Antimicrobial Stewardship	3	E	E
Infection Prevention and Health System Epidemiology	3	E	E

CTI: Clinical and Translational Investigation Track; LHSS: Learning Health System Science Track
C=Core (required); E=Elective; CC=Core choice [1] take either Research Paper (3) or Training Grant Application (3)
*New course for 2020-21; **Current course split into 2 parts

Evaluation and Assessment

- Program directors will evaluate each course yearly and recommend improvements.
- Adherence to program mission will be maintained by support of faculty development, meetings with students, training program faculty, and review of syllabi, and periodic self-study at the request of the Graduate School.
- The LHS TL1 program evaluation will also include a review of the THSS program.

Conclusions

- A comprehensive curriculum was developed utilizing a rigorous systematic approach with stakeholder involvement.
- We will strive to be a "learning curriculum," using the process of a learning system to improve our curriculum, policies, and procedures.