The Clinical and Translational Science Collaborative (CTSC) of Cleveland

MISSION: To improve human health by streamlining science, transforming training environments, and improving the conduct, quality, and dissemination of clinical and translational research

The Clinical and Translational Science Collaborative (CTSC) of Cleveland, administratively based at the Case Western Reserve University (CWRU) School of Medicine, provides resources and innovative programs to accelerate the translation of observations made in the laboratory, clinic, and community into interventions that benefit human health locally (Cleveland and Northeast Ohio), statewide, and nationally; and is training the next generation of clinical and translational researchers. The CTSC, a collaborative among CWRU schools and the Cleveland-based hospital systems (Cleveland Clinic, MetroHealth, University Hospitals, and the Louis Stokes Veterans Administration Medical Center), is one of nearly 60 Clinical and Translational Science Award (CTSA) Programs funded by the National Center for Advancing Translational Sciences (NCATS), part of the National Institutes of Health (NIH).

Established in 2007, the CTSC is currently funded by a $46M award (the largest NIH grant at CWRU) and is now in its third 5-year funding cycle (2018-2023). Although the majority of the funding is programmatic, the grant also provides salary support for faculty, TL1 trainees, KL2 scholars, and staff across the university and its hospital affiliates. Numerous other faculty, trainees, and staff are supported through its Core Utilization, Annual Pilot, and Translational Fellows programs. Grace McComsey, MD, has led the CTSC since March 2022, prior to which she served as Associate PI and lead of Hub Research Capacity.

Recently, a 7-year funding request for $70M was submitted for 2023-2030 with the addition of the University of Toledo and Northeast Ohio Medical University as partners, making it the **CTSC of Northern Ohio**, stretching across Ohio's northern tier. Heightened focus is on reducing health disparities, promoting C/T workforce diversity, and engaging the community as research partners.

The CTSC has **six clinical/translational research components** that provide resources to investigators and trainees throughout Cleveland to facilitate clinical and translational research.

1) **Informatics.** The informatics needs of CTSC investigators include the translation of data into information and then into knowledge by combining basic research (e.g. proteomic profiles, biomarkers, genome sequences), clinical research (e.g. clinical trials, EHRs), and population research (e.g. community interventions). Our goal is to provide a stable, flexible, comprehensive, and user-friendly biomedical informatics infrastructure (tools, processes, people, and training) that enables and enhances all aspects of translational research and enables collaborative research and data sharing within the CTSC and across the nation.

2) **Community and Collaboration.** The CTSC Community and Collaboration (C&C) component fosters effective multidisciplinary investigative teams enriched by our diversity of stakeholder communities to address the health and health care priorities of our population. Stakeholders include non-profit or industry entities engaged in translational research, disease advocacy groups, local health providers, community-based organizations, and other national or local partners connected to clinical and translational research, such as NCATS. The CTSC C&C seeks to institutionalize team science with community and stakeholder engagement as a normative approach to research across CWRU and its health system partners.

3) **Translational Endeavors.** With the dual aims of enhancing and integrating education and workforce development programs across CWRU and hospital partners and extending and enhancing the pilot funding program through streamlined review processes and funding of novel

methodologies that advance translational science, the Translational Endeavors component helps the CTSC equip tomorrow's healthcare leaders with the skills necessary to be effective research clinicians. The Office of Translational Workforce Development (TWD) and its programs are responsive to workforce training needs by expanding and integrating the office across the CTSC community, linking the workforce to available resources using novel tools including web-based content solutions and mobile devices, and providing training in innovation, product development, effective interventions to promote health, and entrepreneurship. Pilot funding and a streamlined review process spurs development of novel methodologies and promising projects responsive to high-level CTSC goals such as health disparities, special populations, and/or lifespan associated research areas. The InfoReady grant application supports quick turnaround and effective, informative review of proposals.

4) **Research Methods.** Comprising the Biostatistics, Epidemiology, and Research Design (BERD) and Regulatory Knowledge and Support (RKS) subcomponents, the overarching goal of the Research Methods (RM) component is to lay the foundation for high quality research through the promotion and use of state-of-the-art biostatistics, epidemiology and regulatory support, including streamlined data capture systems for clinical translational studies on a local and national level. The BERD provides expertise and guidance to CTSC investigators to ensure optimal study design and analysis plans that lead to transparent and reproducible research. The RKS provides support to assist investigators in achieving and maintaining compliance with local, state, and federal regulations specific to the responsible and ethical conduct of clinical and translational research. The RM fosters collaboration with other CTSC components, as well as with other CTSA hubs and the Trial Innovation Network (TIN) and its Trial Innovation Centers (TICs) and Recruitment Innovation Center (RIC) to develop, leverage, and disseminate knowledge and tools for enhancing clinical translational research. The RM component focuses on the full spectrum of the clinical research process, from inception and design (via the BERD) through study implementation (via the RKS) to advance team science and research in an efficient and ethical manner. These activities ultimately shorten the time for translating research findings from bench to bedside and impact best practices to improve patient outcomes.

5) **Hub Research Capacity.** The overarching goal of this component is to proactively assist investigators to identify and resolve bottlenecks and challenges encountered during the planning, execution, and completion of their human research studies. Use of HRC resources enables investigators to 1) access diverse study populations and experienced research personnel; 2) utilize dedicated and standardized research facilities and environments, and 3) implement continuous and purposeful quality improvement processes for their research studies. The objective is to lead projects from conception through to completion and to effectively disseminate key findings through responsible and reproducible research.

6) **Network Capacity.** Multiple obstacles currently interfere with the successful conduct and completion of multicenter clinical research, ranging from administrative delays in trial initiation to slow subject recruitment. The goal of the Network Capacity component is to fully develop a local Trial Innovation Unit (TIU) and a local Recruitment Innovation Unit (RIU), while delineating a framework for the interaction of these "local" structures with their "national" counterparts developed by NCATS, including the TIN. Network Capacity personnel also serve as the Cleveland CTSA TIN Hub Liaison Team, where they build on their experience with streamlining regulatory aspects of study conduct (e.g. reliant IRB, centralized contracting), interfacing with the electronic health records and using digital media for successful recruitment for multi-site clinical trials while streamlining and solidifying processes of collaboration with other components within the CTSC to ensure adequate outreach to the community of special populations. Overall, this helps to improve trial conduct and recruitment in the CTSC institutions while facilitating interaction with the national TICs and RIC, and allowing for exchange of best practices with others.

The CTSC operates **two formal clinical/translational training cores**: an Institutional Career Development Core (for MD and PhD KL2 scholars) and a NRSA Training Core (for TL1 predoctoral and postdoctoral trainees).

Institutional Career Development KL2 Program. This innovative, flexible program prepares a cadre of experts in clinical and translational (C/T) research to address the lack of optimal management strategies for hundreds of diseases and conditions and for special approaches across the entire population, including special and vulnerable populations of all ages. The KL2 program provides an educational curriculum that meets the special needs of emerging, talented investigators across all disciplines. This program addresses unmet educational and career development needs of clinical research scholars of all professions in the rapidly evolving field of C/T science by educating leaders in multidisciplinary clinical and translational research; introducing clinical research education earlier in the life cycle of scholars from diverse disciplines (nursing, bioinformatics, social work, engineering, pharmacology, psychology, etc.); tailoring programs to the preferences, special interests, research plans, strengths, and weaknesses of each scholar with appropriate modifications, as required, for each discipline; and setting the standards and developing innovative approaches to C/T career development. The program builds on lessons learned from prior experience in operating a highly successful KL2 program, proven strategies from published national studies on mentorship, collaboration with other CTSA Hub KL2 sites, new and innovative programs to reenforce the strengths of scholars in a broad and deep spectrum of capabilities, and a robust education and career development program that utilizes all resources within the CTSC and synergizes with the TL1 predoctoral and postdoctoral programs.

NRSA Training TL1 Program. Unique skill sets are needed for cutting edge biomedical research that achieves “bench to bedside to curbside” impact to address critical unmet health needs. Critical factors for success are proficiency in transdisciplinary work, ability to work across the spectrum of laboratory science to clinical and public health research, and the ability to envision and design implementation of advances in clinical and community settings. The CWRU Clinical and Translational Scientist Training Program (CTSTP) supports C/T research training in both predoctoral and postdoctoral phases in coordination with our KL2 program to share training in team science, professional development activities, and mentorship models. Together these programs provide a complete pipeline for training and development of C/T scientists. Building on established predoctoral training programs (including physician-scientist MD-PhD training, a nurse-scientist DNP-PhD training, and PhD programs in Clinical Translational Science, Systems Biology and Bioinformatics, and dual-degree training in Epidemiology, Biomedical Engineering, Nursing and other C/T areas), the CTSTP has developed predoctoral programs and added a new post-doctoral research training program that covers a broad range of clinical and research fields and encompass several applicant streams (post-doctoral training in the CTSTP PhD program in Clinical Translational Science, C/T research fellowships, and trainees participating in research-track residencies/fellowships). Predoctoral and postdoctoral trainees participate in a core CTSTP curriculum with team science training, professional development activities, and a rich set of C/T research training activities (including RCR and IDPs). Criteria for acceptance to the CTSTP include a strong academic record, commitment to a research-intensive career, and evidence of skills for research. The program is governed by an Advisory Board and a Steering Committee, including representatives of all participating institutions and programs. The CTSTP’s robust mentor pool includes mentors with established training records and funding from NIH or other research grants. Participating institutions include CWRU, Cleveland Clinic, University Hospitals Cleveland Medical Center, MetroHealth Medical Center and the Louis Stokes Veteran’s Administration Medical Center—all sites well equipped for cutting edge C/T research.