SCHOOL OF MEDICINE
CASE WESTERN RESERVE UNIVERSITY

CTSC
Clinical and Translational Science Collaborative

CTSC 2018-2023

COMPONENT PROGRESS REPORTS – YEAR 1

1. **Informatics**
2. **Community and Collaboration**
3. **Translational Endeavors**
4. **Research Methods**
5. **Hub Research Capacity**
6. **Network Capacity / TIN**
7. **KL2 Clinical Research Scholar Program**
8. **TL1 Clinical and Translational Scientist Training Program**

CTSC Informatics Component

Lead: Jonathan Haines, PhD (CWRU)
Co- Leads: David Kaelber, MD, PhD (MH); Jeffrey Sunshine, MD (UH)

Accomplishments

Education

- The CWRU Clinical Informatics Fellowship was re-accredited by the ACGME and continues to have two fellows per year.
- The Certificate in Biomedical and Health Informatics (BHI) and MS and PhD in BHI programs are fully established. Two PhD students have first-year funding from the Dean of the CWRU School of Medicine. Four students have graduated with BHI Certificates and 8 students are currently enrolled in this program.
- 18 Informatics studios were held by the end of June, 2019, with a total of 114 attendees, primarily at the Cleveland Clinic (CC).

Tools

- TriNetX is live at MetroHealth (MH) and University Hospitals (UH).
- Slice-Dicer is active at MetroHealth. We now have 10 data models and continue to significantly increase use of this reporting tool.
- MetroHealth was first healthcare system to start contributing data to the Epic COSMOS Data Network and is now an alpha tester. COSMOS now has over 40 Epic customers, and the data mart is growing at 1 million patients per month. COSMOS is expected to be live for data contributors by Q1 2020.
- We are beginning the process of consolidating the technical support for REDCap. UH and MetroHealth are now both supported by CWRU (reducing different individual support for REDCap).

Adoption of the Assemble, Integrate, Create model as a framework for the Biomedical Informatics Team (BIT)

- In collaboration with the Cleveland Institute for Computational Biology (CICB), UH has been mapping its EHR data to the OMOP common data model, which will make these data more accessible for research informatics activities. Validation of the mapping is underway and this research data warehouse should be live by Q4 2019.
- Implementation of TriNetX at MetroHealth is completed and real-world testing is being undertaken. Implementating TrinNetX is enabling the MetroHealth Epic electornic health record (EHR) data to be mapped to OMOP, which will make it more accessible for other research informatics activities as well. The Cleveland Clinic EHR data has been mapped to a different, related common data model (UMLS) and discussions are underway to determine the comparability of these two common data models. UH has recently installed TriNetX to help with clinical trials cohort development, and usage numbers should be available by Q4 2019.
- SHED (the Safely Held Electronic Data) platform in the CICB continues to increase with 159,196 individual subjects managed in LabMatrix, with data on 330,572 samples (end of June 2019).

Data governance maturity is occurring at each institution, and there have been some initial conversations around how a multi-institutional data governance board would be structured. We envision that these talks will continue with the goal of developing a multi-institutional board.

Services Provided to CTSC Investigators

The best measure of assistance to CTSC investigators can be seen in the continuing use of the tools and resources of the BIT. These include over 3,000 users of REDCap, 600 users of Explorys, nearly 500 users of Slicer-Dicer, and over 1,000 users of the SHED. We will start tracking the users of TriNetX now that it is installed at MetroHealth and UH.

In addition, we continue to have a steady number of Research Informatics Consults: 1,897 in year 1 and 418 in the first quarter of year 2. The number of trainees (detailed above) is increasing, as have the number of

abstracts and publications: there have been 15 informatics related research abstracts and 5 informatics related research publications since May 2018. In addition, there are 10 informatics related grants that are currently active.

Accomplishments/Solutions Scalable for Dissemination to the CTSA Consortium

- The paper "A step closer to nationwide electronic health record-based chronic disease surveillance: characterizing asthma prevalence and emergency department utilization from 100 million patient records through a novel multisite collaboration" was just published in *Journal of the American Medical Informatics Association* (PMID: 31592525, Kaelber, DC, senior author). This paper is the precursor to Epic's COSMOS Data Network (to which we should have access in Q1 2020). Given that Epic is used at the majority of academic medical centers, this project may provide guidance for the development of informatics infrastructures nationally.

- The SHED at CWRU provides a controlled and harmonized secure environment for the storage of clinical data for research studies. The SHED is HIPPA, FISMA and SANS/ISO compliant and houses our LabMatrix and OnCore applications. These applications are used by all of the Cleveland CTSC institutions. In addition, the SHED provides Oracle Application Express (APEX), which is a framework for designing custom interactive applications tailored to the specific needs of a project. The concept of the SHED should be scalable for use at other CTSA consortia members.

- We have initiated the integration of electronic health records across the Cleveland CTSC institutions using the OMOP common data model (CDM). This effort also has the potential to be scalable. CTSC BIT faculty and staff were essential to the release of *The Book of OHDSI* (the 1st edition of the textbook for the OMOP CDM), representing 17 of the 56 international collaborators.

Integration with other CTSC Components and CTSA HUBS

- We have monthly CTSC BIT leadership meetings with BIT leaders invited from all the participating institutions
- We provide regular coordination with the TIN when CTSC queries are submitted and when TriNetX queries are requested
- The numbers of projects using standardized tools, such as TriNetX, continues to increase
- CWRU is collaborating with the University of Washington CTSA to install and test their LEAF front-end software for the OMOP data warehouse.

CTSC Community and Collaboration Component: Team Science with Stakeholder Engagement

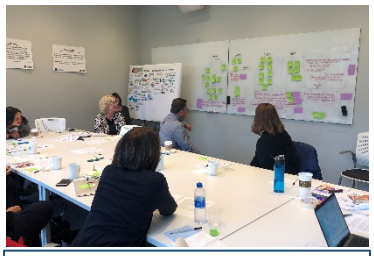
Lead: Elaine Borawski, PhD (CWRU)

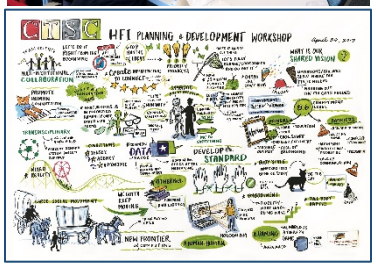
Accomplishments

In many ways, the C&C Component is an entirely new component for us, expanding what was a highly successful, albeit somewhat disconnected, Community Engagement Core into a more integrated resource. The C&C embraces *both* the goal of increasing interdisciplinary team science across our institutions but working to ensure that stakeholder engagement (e.g., residents, patients, clinical and industry partners) is an integral part of new team development and collaborative science.

We have developed detailed action plans around our four aims: new team development, developing team science resources for both investigators and stakeholders, and exploring ways to institutionalize (promote, incentivize, reward) interdisciplinary, translational team science with stakeholder engagement. Our most significant accomplishments to date include:

- Brought in national team science expert, Dr. Maritza Salazar to provide a seminar on the science of team science, offer two of her team science module to 8 teams, and provide consultation on our approach and plan.
- Developed and launched a resource package for new/developing investigative teams that includes a uniquely tailored facilitated retreat and administrative support (Jan-April 2019).
- Conducted 6 team development retreats that included 81 investigators (representing 4 of our 5 institutional partners and all schools of the university) and 28 external stakeholders. We are continuing to track them using our "team progression pipeline" metric. Team topics included:
  - Human Fusions Initiative
  - Reinventing Health Surveillance to Leverage Developing Technology for Health Improvement
  - Team Science for Interprofessional Education
  - Building a Translational Research Agenda to Promote Environmental Health in NE Ohio
  - Achieving Health Equity through Cross-Sector Collaboration Focused on Systems Change
  - Addressing Tobacco Use Disparities in Cleveland





- Funded two $30k innovative stakeholder engaged translational team science pilot projects (July 2019).
  - Virtual Assistant System to Enhance Patient Self-Medication Outcomes
  - Translating A Product That Prevents Surgical Adhesions into a Large Animal Model

- Funded Better Health Partnership to develop a training and business plan for establishing a community health worker hub for Northeast Ohio. BHP is a multi-stakeholder collaborative that brings health care providers and other stakeholders together to share best practices and accelerate data-informed improvements in equitable population and community health.
- Supported the Expanding Research Together: A Team Building Experience in Global Biomedical Innovation and Entrepreneurship, an International Symposium held with collaborators from Taipei Medical University.
- Began connecting with existing collaboratives across the city/institutional partners that have already brought together investigators and stakeholders; working with them to form investigative teams to develop translational science projects. Examples: Health Improvement Partnership-Cuyahoga County, First Year Cleveland, BreatheFree in Cleveland, Better Health Partnerships.
- Developed a four component (see below) consultation service to support (and then track) new and existing teams.

Services Provided to CTSC Investigators

Our goal is to offer a broad range of support and resources to investigators and their teams. Some examples:

- Providing consultation, support and resources for team science with stakeholder engagement to four types of investigators:
  - New Investigator (newly funded early investigators)
  - Collaborative Working Retreats (investigators on nascent teams, brainstorming, team development)
  - Stakeholder Engagement (user can be investigator OR stakeholder)
  - Strategies for Successful Teams (existing investigator teams that need help)
- Offering tailored retreats
- Offering pilot funding to team science oriented researchers with engaged stakeholders
- Developing localized video resources to support successful team practices
- Linking and connecting to resources at all CTSC institutions

Accomplishments/Solutions Scalable for Dissemination to the CTSA Consortium

- Framework for defining and redefining what a stakeholder is for researchers
- Tailored retreat packages: pre-work, consult, retreat, feedback, tracking
- Tracking interdisciplinary collaboration and stakeholder engagement through the grant submission process (i.e., SPARTA)
- Tool for tracking team progression over time.

Integration with other CTSC Components and CTSA Hubs

As one might guess, our biggest challenge as an "umbrella component" (i.e., serving all institutional partners) is looking for ways to support team science with stakeholder engagement both within and across each of the five partner institutions. Our initial focus has been simply learning "the lay of the land", identifying the structure, resources and contacts for both team science development and stakeholder engagement within each of the five partner institutions. This effort includes:

- Face to face meetings with leaders of Hub Capacity, Training (KL2, TL1), Trial Innovation Network.
- Developing a contact list within each institution for
- Providing presentations on translational team science, stakeholder engagement, the value of collaboration, and the importance of translational products that impact the community's health (e.g. seminar speakers, departmental faculty meetings/retreats, trainee meetings, etc.).

With other CTSA hubs:

- Co-authored a manuscript on collaboration metrics: Tigges BB, Miller D, Dudding KM, Balls-Berry JE, **Borawski EA,** Dave G, Hafer NS, Kimminau KS, Kost RG, Littlefield K, Shannon J, Menon U, and The Measures of Collaboration Workgroup of the Collaboration and Engagement Domain Task Force, National Center for Advancing Translational Sciences, National Institutes of Health. **Measuring quality and outcomes of research collaborations: An integrative review.** *Journal of Clinical and Translational Science,* pp 1-29. doi: 10.1017/cts.2019.402
- Active participation on the Community and Collaboration DTF (now Enterprise Group) and two of its working groups (Health Disparities and Measuring Collaborations).
- Active members of the Fostering Team Science in Academia Special Interest Group (SIG) in INSciTS (International Network for the Science of Team Science). Primary focus of group is to gather, evaluate and disseminate P&T policies that support team science/collaborations.
- Attended both the Science of Team Science Conference (INSciTS, May 2019), Translational Science meeting (March, 2019). We intend to submit abstracts for both of these meetings in 2020.

CTSC Translational Endeavors Component: Translational Workforce Development and Pilot Grant Program

Lead: Mark Chance, PhD (CWRU) TWD
Co-Lead: Ofer Reizes, PhD (CC) TWD
Lead: Kingman Strohl, MD (CWRU/UH) PTC
Co-Leads: Mark Aronica, MD (CC) and John Chae, MD (MH) PTC

Accomplishments

Translational Workforce Development

- Hired workforce manager – Dr. Tessianna Misko was hired as the Program Manager for TWD to support the CWRU Venture Mentor Program (CVMP) and the research internship program (EnRICH), and other innovation and entrepreneurship programming
- CWRU Venture Mentor Program expansion – after 1 year pilot, program expanded to include 11 entrepreneurs and a total of 23 mentors from northeast Ohio
- CVMP opened to include all residents and fellows at affiliate hospitals, especially those enrolled in KL2/TL1 and other programs. Information sessions held for all stakeholders.
- Created and launched biomedical innovation and entrepreneurship club to support other interested students, post-docs, fellows and faculty – club provides intimate and personal interaction with local entrepreneurs, combining teaching and networking activities. Monthly meetings since 1/2019.
- Coordinated activities with new medical student innovation and entrepreneurship club.
- Coordinating with the Community and Collaboration Core to develop better innovation teams and build lasting relationships with stakeholders
- Opened up Online learning community initiative: asked faculty to submit proposals for developing and delivering on line resources. Five “slots” funded, course completion and delivery by 6/2020.

Pilot Program

- Updated RFA for the annual pilot to focus proposals on translational projects and developing technologies towards the market. Included boot camp and other training experiences for applicants.
- Updated and streamlined RFA and review process to align with other translational funding programs across ecosystem
- Launched “big data” program to match faculty with translational opportunities; faculty selected and analysis ongoing.

Services Provided to CTSC Investigators

- Providing non-curricular opportunities for innovation and entrepreneurship training and education
    - Hosted 10 biomedical innovation and entrepreneurship club meetings so far in 2019, with attendance ranging from 20-100 faculty, staff, students and hospital personnel
    - Hosted an innovation symposium in May 2019 with attendance of 85, including 2 workshops, 2 keynote speakers, and collaboration through our Taipei Medical University partnership
    - Hosted 3 networking events for the EnRICH internship program in 2019, bringing graduate students, faculty, and staff together with local industry to develop relationships and collaborations
- Preparing investigators for interaction with industry, through development of communication skills and I&E topics – including hosting “Pitchcraft” workshops and working one-on-one with investigators to develop their skills
- Streamlining the Annual Pilot application process to provide clear directives and guide the investigators to translational outcomes
- Offering and encouraging investigators to attend boot camp training for I&E topics

A**ccomplishments/Solutions Scalable for Dissemination to the CTSA Consortium**

The CVMP mentor program, boot camps, and club are all scalable opportunities for the consortium. Each program provides opportunities for faculty, staff, and students to learn more about I&E through non-curricular events. Seminars, half-day retreats, monthly open networking events, and structured mentor meetings are all parts of a larger process to educate and prepare our community for working in translational science, especially biotech, corporate, small business, and non-academic settings.

The changes to the Pilot application are also scalable, and are used across campus in various internal translational research programs such as the Coulter and TMU-CTSC programs

I**ntegration with other CTSC Components and CTSA Hubs**

- Sharing best practices – conversations with CTSAs from Cincinnati, St. Louis
- Using the resources of C&C to teach workshops – specifically, Dr. Shirley Moore hosted a Team Building workshop at our Innovation symposium in May 2019
- Additionally we will use the C&C team building videos to work with our collaborative research teams to develop their skills and increase their potential for success
- Interacting with KL2 scholars program to disseminate TWD I&E opportunities, determine if any KL2 scholars would be a good fit for the CVMP mentor program
- Providing support for any hubs interested in themed pilots or internal funding opportunities, specifically we supported the C&C team developing their themed pilot in 2019

CTSC Research Methods Component: Biostatistics and Epidemiology Research Design (BERD) and Regulatory Knowledge Support (RKS)

Lead: Gerald Beck, PhD (CC) (BERD)
Co-Lead: Philip A. Cola, PhD (CWRU) (RKS)

Accomplishments

BERD: During Year 1 the BERD provided support for 147 research studies developed by 128 investigators at one of the CTSC institutions (48 at CC, 41 at CWRU, 58 at MHS). In Year 2 Quarter 1, BERD provided support for 101 research studies by 76 investigators (27 at CC, 53 at CWRU, 21 at MHS). The majority of these protocols required help with study design and led to grant applications. Some protocols included assistance with observational studies, the use of mixed methods (quantitative and qualitative) designs, health services and outcomes research in public health, medical decision-making, behavioral health, structural equation modeling, and electronic health records-based clinical research.

Of the protocols that BERD supported members have assisted on in previous years, 15 have received funding (over $28 million) including some major awards. Two notable examples are:

NIH/NIAMS 1R01AR074131 (Kurt Spindler, PI) 8/1/18-7/31/23
BEAR-MOON: A Two Arm Non-inferiority Blinded Randomized Clinical Trial Comparing ACL Repair with BEAR Device vs. Standard of Care Autograft Patellar Tendon ACL Reconstruction
Goals: Conduct a multicenter non-inferiority RCT in which subjects between 18 and 40 years of age with a complete ACL tear are randomized to either 1) ACL Reconstruction with patellar tendon autograft (ACLR) or 2) Bridge-Enhanced ACL Repair (BEAR). Evaluate and compare between the two treatments several secondary efficacy outcome measures that contribute to patients' health-related quality of life as well as safety endpoints
Total award $6,065,905
Co-Investigators: Beck and Imrey

CHC (Angela Ciccia PI), 9/1/19-8/31/23
School transition after traumatic brain injury (STATBI): evaluating the impact of participation in a formal return-to-school program for K-12 students
Goal: To study academic, social and health outcomes for students with TBI and to establish the effectiveness of a school-based program.
Total award $2,302,258
Co-investigator: Tatsuoka

RKS: CWRU and UH implemented a shared electronic IRB system from the Click Huron platform called Sparta IRB. Current status is "open for business" with data from old systems used for reference only. Investigator workload in the new system has been dramatically reduced and eased through the use of downloadable templates and reduced field-by-field data entry. Investigator workload is also beginning to benefit from reduced or eliminated annual continuing reviews for expedited and less than minimal risk studies as a result of implementing the new Common Rule at all institutions. The RKS group held a full team in person meeting in August 2019 and now meets quarterly via conference call to update metrics.

CC instituted notifications in its electronic medical record system (EPIC) to study teams when research subjects are admitted to the hospital and/or emergency department. This provides real-time data to investigators to assess for adverse events or serious adverse events, which greatly improves reporting timeframes. Additionally, EPIC will also issue notification to study teams when a research subject cancels and appointment, which prevents protocol deviations so they can efficiently reschedule visits within the approved study timeframe. The CC, CWRU and UH IRB Policies and Standard Operating Procedures (SOPs) were updated along with revising the information on the CWRU and UH IRB websites related to the changes in the Common Rule. UH completed a policy overhaul combing 45 separate policies into a single, concise, indexed and searchable manual. An article "The Revised Common Rule: What Happens Now After the Compliance Date?" was published in the June, 2019

CTSC Newsletter and this material was presented by Dr. Cola as part of a presentation for the April 2019 Midwest/Northeast Section meeting of the Society for Research Administrators International.

Services Provided to CTSC Investigators

BERD: As noted above, BERD collaborates with CTSC investigators to ensure use of optimal study designs and appropriate development of statistical analysis plans. After a study is funded, BERD members that are supported by the grant are actively involved to ensure the success of the study and help in the analyses and preparation of study results for publication. In Year 1, there were 36 published papers with BERD supported authors from studies previously assisted upon. BERD also assists investigators by giving many courses and seminars on statistical/epidemiological methods and research methods. Also, BERD members help mentor students and researchers, including KL-2 scholars.

RKS: The FDA/Regulatory Core provided initial and ongoing FDA regulatory support for investigators across the CTSC with new project requests coming into the Hub from all CTSC affiliates in 2018 and 2019. This increases the amount of investigator-initiated translational work. Data over time has shown an increase in total number of projects accepted by the FDA and a decrease in number of applications denied by the FDA. A complete overhaul of processes in 2017 and 2018 has led to increased efficiency for investigators during the application building phase; which lead to fewer post approval amendments and translated into a lower number of submission totals for investigators overall. CC added a Project Manager to the IND/IDE office and improved tools to assist Investigator/Sponsor with FDA submissions.

Utilization of CTSA-based FDA Regulatory Core for IND/IDE Support	CC	CWRU/Metro/UH
Total # New IND/IDE Applications Submitted FDA	6	4
Total # Accepted Outright FDA Applications	0	1
Total # Additional Info. Requests from FDA (Later Accepted)	5	3
Total # Additional Info. Requests from FDA (Accept. Pending)	1	0
Total # Denied FDA Applications	0	0
Total # Withdrawn Applications	0	0

RKS members train clinical investigators at both the pre- and post-doctoral levels. KL2 scholars and Clinical Research Scholars at the CWRU School of Medicine included semester long courses taught by Dr. Cola in Physician Scientist Leadership (CRSP 502). Dr. Cola, also teaches qualitative (EDMP 641) and quantitative (EDMP 649) research methods to doctoral level management scholars and action research (MGMT 497) to Healthcare Master's students. Dr. Rivera, VP for Research at CWRU and Associate Professor of Bioethics, teaches the Research Ethics Practicum for Bioethics Master's Students (BETH 421) in order to place graduate students in meaningful research ethics internships, often in a regulatory setting.

CWRU Course Names				
BETH 421	CRSP 502	EDMP 641	EDMP 649	MGMT 497
3	3	12	14	21

Accomplishments/Solutions Scalable for Dissemination to the CTSA Consortium

BERD: Members train clinical investigators at both the pre- and post-doctoral level as well as medical students at CWRU and the Cleveland Clinic Lerner College of Medicine of CWRU. Courses and seminars are no doubt similar to those given at other CTSA hubs. Also, approaches to reaching out to and assisting investigators can be shared with other BERDs.

RKS: RKS members participated in scientific review committee (SRC) grant pilot at UH from 2016-2017 along with 9 other CTSA hubs. This was intended to improve regulatory quality and simplify the process for investigators. In 2019, data from this pilot was written up for publication to Clinical Translational Science

(submitted, Dr. Cola co-author). Results indicate that facilitators of successful SRC implementation included broad-based communication, an external motivator, senior-level support, and committed SRC reviewers. Barriers included limited resources and staffing, variable local mandates, limited SRC authority, lack of anticipated benefit, and operational challenges.

Integration with other CTSC Components and CTSA Hubs

BERD: To date, we have not collaborated with other CTSC components directly, nor with other CTSA hubs. However, we are open to doing so. BERD Co-leads are members of the ACTS BERD SIG which has monthly calls that discuss common issues and share best practices, and organizes sessions at the annual Association for Clinical and Translational Science meetings.

RKS: There is 1 study at UH and MHS, sites selected through the TIN site-selection process, which is the DOSE study, a Phase 1b study of the dexmedetomidine opioid sparing effect in mechanically ventilated children, Lead study PI is at Duke, recruitment began in September 2019. CC involved the CTSC in the Clinical Trials Transformation Initiative (CTTI) organized by Duke University's CTSA. CTTI was established in 2007 through a partnership between the FDA and Duke, and is administered through the Duke Translational Medicine Institute. CTTI evaluates novel projects and infrastructure to improve access to research. CWRU joined collaborative efforts for improving human research protections and advancing human research: 1) The Multi-Regional Clinical Trials Center (MCTC) of Brigham and Women's Hospital and Harvard, whose mission is to identify challenges and deliver ethical, actionable, and practical solutions for global clinical trials. Dr. Rivera is a member of the workgroup dedicated to addressing racial and ethnic disparities in trial participation; and 2) The Consortium to Advance Effective Research Ethics Oversight (AEREO), established at the University of Pennsylvania to improve effectiveness of IRBs and Human Research Protection Programs (HRPPs) in fulfilling their purpose of appropriately protecting rights and welfare of research participants and achieving other ethical goals.

CTSC Hub Research Capacity Component

Leads: Wilson Tang, MD (CC)
Co-Leads: Grace McComsey, MD (UH); Nora Singer, MD (MH)

Accomplishments

Creation of an actively engaged Participant Recruitment Specialist (PRS) Core across the consortium: Team members were hired, trained and are actively providing services to study teams: recruitment guidance (recruitment plans/logistics, toolkits, targeted recruitment using social media, radio, TV, YouTube). PRS services have been advertised by presentations to Department Medical Directors and Research Administrators, KL2 scholars, via research newsletters and by research center leadership. The PRS teams and their institutions have created:

- System-wide policies of research study feasibility assessment,
- Use of REDCap to capture internal PRS service requests/tracking
- Creation of site-specific research subject registry; >450 subjects. PRS manually matches registry subjects with difficult to recruit trials/follow-up to evaluate recruitment success.
- Directing study teams to utilization of recruitment feasibility assessment tools (TriNetX, EPIC Slicer/Dicer and Explorys
- 10 Community engagement events with 4 targeted to minority recruitment: CEDI Annual Diversity Health Fair, PRIDE in the CLE-LGBTQ, Minority Mental Health Awareness, National Women's Health WK
- Website clinical trial finders for easy access by both patients and physicians to find trials (more than 400 studies listed on institutional websites)
- Annual minority recruitment goals as institutional metrics
- Studies served include: rare disease pediatric study, women's health study/rare disease, minority/pediatric healthy control, underserved population, IND children, minority/women healthy control

For Year 02 (through Sept 30):

- # PIs/studies using PRS = 39
- # Presentations promoting services = 18

Expansion of digital tools to aid investigators in study feasibility assessment and recruitment

- Two sites have implemented and are using TriNetX = more than 126 queries in Yr02
- Two sites use EPIC Slicer/Dicer
- Also being used are Best Practice Alerts, MyChart (for recruitment)
- Deep6 (queries EMR notes using AI and Natural language processing) is in final testing/rollout for oncology clinical trial recruitment and hard-to-recruit studies.
- A new "alert" system for Allscripts EMR is being tested for studies that need to recruit/consented patient readmits through the Emergency Department is being tested; automatic pages and emails are sent to study teams when potential research subjects area identified in the ED (Currrent study: sickle cell).

Expanding research into the community

- Two Cores are expanding research into the community:
    - Support Core – Experienced Clinical Research Nurses are targeting recruitment of participants at community sites
    - Community Outreach – Creating a culture of research at community sites
        - Lunch and Learn sessions with community physicians: educating them in how to conduct research
        - Research Kiosks in community physician offices for patients to learn about research studies
    - Conducted community physician survey to assess barriers to research in the community: Space, Investigational Drug Services, Lab pricing and sample processing capability. Result: approval of a mobile research unit with backup generator. Anticipated rollout

2020Qtr01. Will be equipped with centrifuge, specimen freezer, fridge, PBMC Isolator, table and phlebotomy chair. Experienced coordinators will staff and have laptops and tablets to recruit and conduct patient research visits.

- Website trial finders

Oversee and assure quality environments (personnel, facilities and equipment) for conduct of funded research. Research quality managers, along with their research navigators for nursing, bionutrition, lab sample processing and lab analytics continue to provide quality fee-for-service research environments.

- Investigators were trained in Preparatory to Research: concepts and implementation, protecting the privacy and security of PHI
- Using RAMP Project Management for study implementation and long-term management to support KL2 scholars, CTSC Pilot Awardees, TIN EOI requests and implemented studies, High Risk/Complex trials.
- Addition of regulatory specialist to build regulatory SOP infrastructure for improved protocol compliance/CQI

For Year 02 (through Sept 30):

- Investigators with new projects: N =77
- New projects assisted: N = 92
- Research visits: N = 2,402

Services Provided to CTSC Investigators

These teams have a long history of supporting investigative study teams in the conduct of clinical research studies in a clinical research unit (CRU) environment. That support is now extended to services outside the CRU with a primary focus on recruitment. Soon it will include supporting investigators in the community. We are aligning our services with the institutional emphasis on supporting early career investigations in implementing their first research protocol; guide investigators through the process so their first research experience is a good one.

Accomplishments/Solutions Scalable for Dissemination to the CTSA Consortium

- Job descriptions created for Participant Recruitment Specialists and Project Managers
- New protocol implementation REDCap project management database

Integration with other CTSC Components and CTSA Hubs

Collaborating with other CTSA Hubs:

- On June 12, 2019 PRS and Project Managers from CCF, MH and UH traveled to The Ohio State University (OSU) CTTS to learn recruitment and retention 'best practices' from the longstanding OSU Office of Recruitment + Retention. The OSU team shared best practices for Study Outreach, Recruitment Intake & Consults, Educational Opportunities and the Use of Tools and Social Media in promoting research participation and recruitment.
- HRC members routinely attend the CTSA Methods and Processes DTF webinars.
- HRC members are participating in a state-wide Ohio CTSA team planning an August 2020 workforce development educational seminar targeted to research coordinators and focusing on “beyond the basics” advanced education (hot trends and technologies)
- All PRS and HRC Research Managers are members of the RIC Zoho working group and attend the webinars
- HRC members attend the DCRI NIH collaborative webinars
- HRC PRS utilize Research match liaison training
- HRC members attend the SC-CTSI forums

Collaborating with other CTSC Hub Components:

- **HRC** participates in the monthly CTSC TIN meetings to increase participation in national TIN EOI's, and in that role is responsible for completion of EOIs at each site (16 EOIs in Yr02)
- **HRC** attends quarterly Regulatory Knowledge and Support Core component meetings to maintain current knowledge in

CTSC Network Capacity Component

Lead: Kristie Ross, MD (UH)
Co-Lead: Lara Jehi, MD (CC)

Accomplishments

Formation, Growth and Adaption of the CTSC Trial Innovation Network (TIN) Hub Liaison Team: We have formed and grown a Trial Innovation Unit (Aim 1) - our **CTSC Hub Liaison Team** quickly adapts and responds to the changing needs of the national TIN (TICs and RIC) and facilitate efficiencies in study onboarding and support. As the national TIN grows and evolves in their processes, we are using Continuous Quality Improvement (CQI) to enhance and expedite local communications to TINs for Expression of Interests (EOIs) requests and replies.

- TIN Hub Liaison Team met -monthly throughout Y1 and Y2 Q1, to identify, define and refine TIN study processes and TIN EOI efficiencies.

- The Hub Liaison Team was expanded to include: a Case Contract Negotiator, CTSA PI, a Regulatory Director, CTSA Affiliate Institutional Points of Contact, and IT representatives. Other representatives on the Hub Liaison Team include the Research Quality Managers and the CTSA Executive Director.

- A TIN Point of Contact was onboarded to assist with the Case CTSC-wide organization of Hub Liaison Team, EOI requests and organization, metrics and to serve as a Liaison to the national TICs and RIC and as our CTSC.

- In the first 15 months, the Local TIN Hub Liaison team met fifteen (15) times and responded to 16 TIN Expressions of Interest (EOI) and 3 HEAL initiatives in 5 areas of interest (Cardiovascular Diseases, Neurology and Infectious Disease, Pediatrics and Internal Medicine. (See Table 1.)

Formation, Education and Growth of the Recruitment Innovation Unit:

- We have formed a multi-faceted Recruitment Innovation Unit (RIU) by onboarding and training 4 Participant Recruitment Specialists (PRS) in recruitment services and tools across the 3 CTSC affiliate institutions (CCF, MH, UH). The PRS in the Recruitment Innovation Unit connect with investigators and study teams to provide local direction regarding best practices and the latest tools for feasibility assessments, recruitment plans, cohort identifications, study participant outreach, social media and community engagement and awareness of research trials.
- The full RIU (cross-city) met most recently in September, 2019 to discuss top level goals, processes and streamlining services to investigators.
- Participant Recruitment Specialists are engaging with KL2 scholars, pilot awardees, investigators with multi-center and complex studies.
- Research toolkits have been established by PRS at each CTSC affiliate, describing access to and support for the various local recruitment tools and services.

Utilized new technological platforms to enhance trial participation: We have expanded our CTSC's ability to conduct feasibility assessments by onboarding the TriNetX platform at both UH (Y1and establishing processes for requests via the TriNetX platform at 2 affiliates, MH (Y2Q1) and UH (Y1). At UH, TriNetX requests are submitted using REDCap surveys. TriNetX now used for all TIN feasibility requests with usually a 48-hour response. Additional tool: Deep6 AI (queries EMR notes using AI and Natural language processing) is in testing phase for oncology clinical trial recruitment and being used by Coordinator Core for pediatric and hard-to-recruit trials.

New RedCap Tools for the TIN:

- We have created efficiencies by building a descriptive and interactive ***CTSC website page*** for the Trial Innovation Network. Included in this webpage is and a new ***RedCap Response Capture link*** - any investigator interested in submitting a multi-center trial to the TIN may click on this link, complete the brief survey, and the information will be store in a RedCap Database and routed to the TIN POCs for further review by the CTSA Executive Director and PI.
- We have completed ***Phase I build of a Case RedCap Database*** for the Trial Innovation Network to track, store and report the information provided with the TIN Expressions of Interest (EOI) and progress on studies that are supported by the TIN. We are in process of the ***Phase II build of the RedCap database*** that will allow us to capture in real time, the responses, dates and progress through the life cycle of the TIN study at our CTSA, if one of our affiliates are selected as a site. This customizable RedCap database for TIN information, data storage and reporting will enable us to provide faster turn-around to the TIN, just-in-time data for dashboards, monthly, quarterly, and annual reports, and will allow us to clearly capture and report the corresponding efficiencies over time.

Developed a Site-Specific Research Registry: Participant Recruitment Specialists (PRS) have created a site-specific research subject registry that currently contains more than 450 subjects. PRS manually matches registry subjects with difficult to recruit trials and follows up with study teams to evaluate success of match.

Table 1.	**Y1**	**Y2Q1**	**TOTAL**
# of TIN/HEAL Studies Evaluated	15	4	19
# of Responses to the TIN (breakdown below)	52	26	78
# PIs Identified as interested	19	2	21
Electronic Cohort Responses	8	8	16
Budget Reviews	2	2	4
Feasibility Questionnaires	8	2	10
Protocol Reviews	15	12	27
# TIN studies started	3	0	3
# TIN studies in process	3	1	4
# TIN studies pending notification			5
# TIN Studies Submitted	1	0	1
# services received from the TIN	2	0	2

Services Provided to CTSC Investigators

New Pipeline for CTSC Investigators: Access to TIN studies allows local CTSC investigators to:

- participate in new multi-center clinical trials not previously known/available in the Hub research pipeline
- access the support and services of the local TIN Hub Liaison Team for stream-lined contracting and study start-up
- connects investigators with the Recruitment Innovation Unit's Participant Recruitment Specialists and Hub Research Capacity's Project Managers for recruitment and retention support and Project Management services throughout the life cycle of the study

Springboard for Investigators with ideas for multi-center studies: Investigators with ideas for novel, multi-center studies can apply for national TIN services with support from the local TIN Point-Of-Contact (POC). The TIN POC coordinates communication with the national TIN over a series of phone consultations and through any TIN services. The Case affiliate investigator, Dr. Nora Singer has recently applied and received two national TIN services - Central IRB and Contracting services – for her Phase I study: "Cell Based Therapy in Systemic Onset Juvenile Idiopathic Arthritis."

Accomplishments/Solutions Scalable for Dissemination to the CTSA Consortium

The ***custom Case CTSC TIN RedCap Database***, developed by the TIN POC, is being utilized and is in continued development. This database is a modifiable and scalable tool with the potential to be disseminated to the CTSA Hubs, consortium-wide. The RedCap Database tool is not only useful for single site-CTSA hubs, it can provide significant efficiencies for other CTSA Hubs with one or more affiliates who need to capture real-time responses from multiple institutional/affiliate POCs or contacts.

Integration with other CTSC Components and CTSA Hubs

Collaborating with other CTSA Hubs:

- On June 12, 2019 PRS and Project Managers from CCF, MH and UH traveled to The Ohio State University (OSU) CTTS to learn recruitment and retention 'best practices' from the longstanding OSU Office of Recruitment + Retention. Ohio State University Office of Recruitment + Retention personnel shared their best practices for Study Outreach, Recruitment Intake & Consults, Educational Opportunities and the Use of Tools and Social Media in promoting research participation and recruitment. The Case TIN Point of Contact (POC) met with the OSU POC to share TIN practices and support. The Participant Recruitment Specialists from the Recruitment Innovation Unit (RIU) have already begun to utilize ideas and suggestions from this shared meeting in their engagement with study teams. We plan to continue our rapport with Ohio State University and potentially expand shared engagements to include the Cincinnati CTSA Hub.
- The CTSC TIN POCs regularly interact and engage on the monthly National TIN meeting webinars, TIN Open Forum webinars and surveys from the National TIN.

Collaborating with other CTSA Hub components: The TIN provides CTSC-wide newsletter updates and regularly interacts with ***Hub Research Capacity*** and the ***Administrative Core*** in monthly TIN meetings. The TIN POC attended a recent ***Regulatory Knowledge and Support*** component meeting for an update on TIN services and support for investigators and will update **RKS** monthly. The TIN regularly interacts with the ***Informatics Component*** to coordinate data pulls for feasibility. The TIN and POC will continue to provide quarterly updates and information to RKS and other Components.

CTSC KL2 Clinical Research Scholar Program

PI: Raed Dweik, MD (CC)

Accomplishments

The KL2 Scholar selection process remains highly competitive as we received 25 applications for 7 slots. Scholars are becoming increasingly comfortable presenting to colleagues from alternate disciplines, fostering their ability to collaborate and productively contribute to multidisciplinary teams. They are experiencing how to remain adaptable in terms of their research direction and when selecting funding opportunities. Providing tailored programming to each Scholar in regard to preferences, special interests, research plans, and strengths and weaknesses is a continual goal of the program. Scholars are active within their discipline, holding leadership positions, earning funded awards and submitting multiple grants.

Based on scholar feedback, leadership is implementing several enhancements including an R01 boot camp. Scholars' continued focus on the timeline for their individual R01 application contributes to planning and success.

Seminars were re-engineered to discuss specific aims of Scholar individual projects, and scholars are offered to have their grant proposals reviewed by seasoned NIH-funded investigators for improvement and clarity. Senior Scholars serve as reviewers for their junior colleagues within the KL2 and also assist with providing specific feedback during monthly update sessions.

The seminar series attendee list was expanded to include a K23 awardee and internally-funded career development scholars and the TL1 post-doctoral Scholars. Guest speakers and relevant topical discussions are added. In addition, senior leadership has a larger presence at seminars providing feedback and expert knowledge.

Services Provided to CTSC Investigators

We have created a single mentor roster encompassing all participating institutions and disciplines. We have standardized qualifications for mentorship and developed plans to expand the roster with special focus on bringing in junior mentors, who will be paired with more senior colleagues. This structure will enable junior faculty to gain experience mentoring while under the guidance of a more experienced mentor.

Throughout the year, Scholar success stories are highlighted in the monthly CTSC Newsletter. This public face of our program enables networking and collaboration.

Accomplishments/Solutions Scalable for Dissemination to the CTSA Consortium

Annually our Scholars are expected to submit a career development plan (CDP). This plan includes a mission/vision statement of the direction in which the Scholar wants to go and/or sees him/herself going. In addition, five year career goals, a two year timeline and an indication of how their perspective has changed since joining the KL2. The CDP should also include an update on Scholars' percent effort committed to the program and the external funding to which they are applying. These plans require approval from both Scholar research and career mentors. CDPs are reviewed by a member of the Mentorship Committee and then discussed during an annual Mentorship Committee meeting. Feedback is then provided face to face to each Scholar. Additional meetings with Scholars and/or Scholars and their mentors are scheduled as needed. Scholars receive mentoring in the form of in-person feedback on their career development plans, with follow-up meetings to ensure they are on track. Research project mentoring is ongoing.

Scholars receive "study section" experience by participating in the incoming scholar review and selection process. This prepares them to be future reviewers for NIH study sections.

A KL2 Scholar and Alumni reunion was held in May 2019 to bring together current, former and incoming scholars. We said goodbye to exiting Scholars, welcomed incoming Scholars and embraced our Alumni. This annual event is highly anticipated and provides a great venue for interaction, collaboration and networking.

Integration with other CTSC Components and CTSA Hubs

Several Scholars attended the annual ACTS Conference held annually in Bethesda, MD. This conference provided the opportunity for Scholars to tour NIH, the FDA or Capitol Hill. In addition, Scholars had the opportunity to meet with NIH Program Officers and interface and network with Scholars and leadership from across the CTSC Consortium.

CLIC programming and CTSC/NIH news are regularly shared with Scholars. Scholars are encouraged to subscribe to the NIH Extramural News Open Mike as well as The Cutting Edge, a weekly e-newsletter from edgeforscholars.org.

In addition, the CC Institute Chair of the Quantitative Health Sciences Department reviews and consults with all KL2 Scholars regarding their research projects before they are approved. He also serves and has served as a mentor to several Scholars. He has been heavily involved with the CTSC since its inception.

CTSC TL1 Clinical and Translational Scientist Training Program (CTSTP)

PI: Clifford Harding, MD, PhD (CWRU)

Accomplishments

- Predoc training:
  - Supporting combined degree training in clinical/translational areas
  - Develop new C/T training programs: Launched new PhD programs (Clinical Translational Science (2015), Systems Biology and Bioinformatics (2011), Biomedical and Health Informatics in 2019), expand Epidemiology & BME, support translational extensions of basic PhD programs (e.g. Genetics, Pathology/Cancer/Immunology)
  - DNP-PhD (with PhD in Nursing). New combined degree program launched 2010

- Postdoc training strategies: New 2019
  - 3 applicant/trainee types:
    - Advanced degree holders entering Clinical Translational Research PhD program.
    - Research track residents/fellows.
    - C/T postdoctoral research fellowships for broad range of trainee backgrounds.

TL1 trainee track record:
- 69 total TL1-supported trainees since 2007
  - 67 predocs (5 DNP-PhD, 62 MD-PhD)
  - 2 postdocs
  - 12/69 URM (>17%)
- Currently appointed to the grant: 8 predocs (4 URM), 2 postdocs (first year of postdoc program)
- Previously appointed to the grant:
  - 24 predocs still in training, currently on other sources of support
  - 2 predocs currently on leave of absence
  - 5 predocs left program
  - 28 predoc alumni

Strong publication record (numbers as of last renewal application):
- Of 17 MD-PhD students and 2 DNP-PhD students supported by the TL1 who completed program, all but one (DNP-PhD) have at least one first-authored publication from the training period.
- Mean of 2.3 first-authored and 4.4 total publications from the training period.
- Application included Plan for Improvement for the DNP-PhD program publication outcomes).

Collaboration with KL2
- Align CTSTP/TL1 with KL2, particularly postdoc trainees in KL2 curriculum
- Foster interdisciplinary, team-based C/T research training.
- Shared elements:
  - Mentor pool (with sub-designations for predoc vs postdoc training based on qualfications/track record; postdoc mentor pool = KL2 mentor pool)
  - Leadership
  - Team science curriculum, research training components, and professional development activities
  - Applicant referral from KL2 (applicants too junior for KL2) in addition to TL1 RFA
- SHARED GOAL: A full pipeline of training across predoctoral, postdoctoral and KL2 scholar stages to train successful C/T research leaders.

Services Provided to CTSC Investigators

- Providing trainees to work with mentors on C/T research projects
- Training future C/T research workforce

Accomplishments/Solutions Scalable for Dissemination to the CTSA Consortium

- Develop synergies between TL1 postdoc and KL2 program
- Develop synergies between TL1 predoc and other predoc programs
    - Developing new PhD programs
    - Developing new combined degree programs
    - Synergy with existing combined degree programs

Integration with other CTSC Components and CTSA Hubs

- Very close collaboration with KL2, integrate some components and functions
- Trainees intersect with many C/T programs
- Trainees at all participating institutions