Welcome

It is our pleasure to share The Ohio State University Center for Clinical and Translational Science (CCTS) 2012 Research Progress Report. This report is a snapshot of how we address the challenges of clinical and translational researchers to improve efficiency in order to translate rapidly evolving knowledge created through biomedical research into treatments to improve people’s lives.

We are honored to be a member of the Clinical and Translational Science Award (CTSA) Consortium within the new National Center for Advancing Translational Sciences (NCATS) at the National Institutes of Health (NIH). The CCTS is committed to strengthening our relationship with the translational community at Ohio State as well as our partners at other CTSA institutions, the NIH and industry collaborators, as we rededicate ourselves to our mission of advancing translational sciences.

We hope you will continue to visit our website (ccts.osu.edu) for a virtual window into our collaborative and innovative culture, and clinical and translational infrastructure to support scientific discovery.

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Facts About Ohio State’s CCTS

The CCTS is the academic home for clinical and translational science at The Ohio State University. It includes 1,420 members across 18 colleges and also Nationwide Children’s Hospital with 168 disciplines represented.

Every month the CCTS welcomes more than 3,000 unique visitors to its site resources for researchers, information on programs and clinical trials and how translational research at Ohio State is improving people’s lives. Visit the newly redesigned site at ccts.osu.edu.

The CCTS continues to provide support for externally funded researchers. Since 2008, 154 unique grants have been supported with 77 new grants supported in the last fiscal year alone.

The CCTS continues to be a catalyst for transformational research by funding 101 research projects with 18 funded in the last fiscal year creating new research teams across seven universities, 14 colleges, 11 institutes and centers and one industry partner. The CCTS has been mentioned in 158 publications in the last fiscal year and has been listed on three patents and nine technology transfers.
CER Program to Fuel Focus on Improved Patient Outcomes

A new web-based training program — Comparative Effectiveness Research (CER) Online Learning Center — is helping healthcare providers translate studies into better patient care. In collaboration with Ohio State’s College of Public Health and Nationwide Children's Hospital, CCTS aims to teach providers how CER studies, which compare new and old data, can help identify best practices on everything from surgical approaches to drug therapies.

Impending changes to the healthcare system may make CER even more relevant and necessary; it can fundamentally improve and change the way medicine is practiced as the widely held notion that only large-scale, randomized trials — as opposed to observational data — can provide solid information on outcomes.

To integrate this thinking into the mindset of current and future healthcare providers, Ohio State’s College of Medicine is revising its current medical school curriculum to include CER fundamentals. Thomas Wickizer, PhD, director of the Division of Health Services Management and Policy at Ohio State, is among key developers of the online center.

CER HIGHLIGHTS:
• 61 people attended the 2011 CER conference
• 33 enrollees from multiple institutions completed CER training

New Treatment for Muscular Dystrophy Studied

A potential new treatment strategy for autosomal dominant forms of muscular dystrophy — a group of inherited, sometimes life-threatening disorders — is being studied by Scott Harper, PhD, principal investigator, Center for Gene Therapy at The Research Institute at Nationwide Children's Hospital.

His initial study, “A translational approach toward RNAi therapy for facioscapulohumeral muscular dystrophy,” was made possible through a CCTS KL2 award, proved that RNAi (which has been successfully used to suppress dominant genes in HIV and Huntington’s disease) could also be a potential therapy for muscle disease.

Data gathered in that study opened a new arm of research, enabling Harper and his team to secure an Exploratory/Developmental Research Grant Award (R21) from the National Institutes of Health (NIH).

PhenoLIMS has Potential to Create Tools to Predict Outcomes in Wound Healing

Raghu Machiraju, PhD, associate professor, College of Computer Science and Engineering, associate professor, Biomedical Informatics, College of Medicine, with Kun Huang, PhD, associate professor, Biomedical Informatics, College of Medicine, have developed a comprehensive Laboratory Information Management System (LIMS) that catalogs 3D images of endothelial (skin) cells into a computerized image database that allows investigators to digitally compare tissue and vascular networks at the cellular level.

Funded in part by the CCTS, the project, “PhenoLIMS — a Laboratory Information Management System (LIMS) for Gleaning Molecular and Morphological Phenotypes in Clinical Outcomes,” has been fully realized as a porcine model for integrating, analyzing and visualizing microscopic phenotypic data. The study will now be extended to accommodate human tissue samples, creating a database that will one day allow scientists to consider ischemic and non-ischemic wounds, and healing and non-healing wounds, observing associations between outcomes and phenotypes to create predictive tools for outcome prognosis.
The Efficacy of Vitamin D Supplementation to Reduce Recurrence of BV Investigated

Abigail Norris Turner, PhD, assistant professor, Internal Medicine, College of Medicine, who has spent more than a decade working in the area of women’s reproductive health, focusing primarily on prevention of human immunodeficiency virus (HIV) in women, is completing a pilot study, “Vitamin D Supplementation and Bacterial Vaginosis (BV) in an STD clinic population.”

Her research, funded by a CCTS KL2 grant, seeks to show the role of vitamin D — a safe, inexpensive, stable supplement with many known health benefits for women — in reducing the recurrence of BV. A female reproductive tract infection resulting from an imbalance of specific vaginal bacteria, rather than an STD (sexually transmitted disease), BV increases the risk of HIV acquisition by about 60 percent. Although about a third of women of reproductive age worldwide have BV at any given time, it is a relatively neglected area of research.

KL2 AWARD HIGHLIGHTS:

Since 2008, KL2 career development awards have been received by CCTS members:

• 17 KL2 total awards
• 7 current scholars

NeuroNEXT Fosters Collaboration, Facilitates Trials and Lowers Costs

The Network of Excellence in Neuroscience Clinical Trials (NeuroNEXT), created through a seven-year NIH grant, supports clinical trials for neurological disorders affecting adult and/or pediatric populations.

The Ohio State University Wexner Medical Center and Nationwide Children’s Hospital together will serve as one of 25 national CTSA clinical sites utilizing CCTS-provided research support services such as recruitment of research study participants and increasing collaborative opportunities. NeuroNEXT creates a robust, standardized and accessible infrastructure that allows investigators studying the same diseases at different institutions to easily share information, thereby leading to rapid development and implementation of innovative protocols for timely trials. NeuroNEXT will utilize a central Institutional Review Board (IRB) rather than each institution obtaining approval from its own IRB to participate in nationwide clinical trials.

John Kissel, MD, program director in the Division of Neuromuscular Medicine, College of Medicine, is principal investigator for the project; co-principal investigators include Ali Rezai, MD, chair, Neurosurgery, College of Medicine, and Steve Roach, MD, chief of Neurosurgery, Nationwide Children’s Hospital.

CLINICAL TRIAL RECRUITMENT HIGHLIGHTS:

CCTS developed and/or adopted these tools for recruitment:

• StudySearch (online research study repository found at studysearch.osumc.edu) — 175 listed trials; 1,562 website hits per month.
• Netwellness Research Home Page (netwellness.org/healthtopics/research) — 1,277 visits per month in the first six months.
• ResearchMatch (an online matching tool for researchers enrolling in clinical trials and interested participants around the country can be found at researchmatch.org) — 125 Ohio State investigators using this tool last year resulted in 1,260 participants enrolled in studies.
**OMEGA-3 Shown to Reduce Anxiety and Inflammation**

A new study by a team that has spent more than three decades investigating links between psychological stress and immunity shows a marked reduction in both inflammation and anxiety among a cohort of healthy young people who ingested fish oil. The study was conducted using Bionutrition, Nursing and Laboratory Cores at the CCTS Clinical Research Center (CRC).

The team’s earlier research suggested that certain compounds in omega-3 polyunsaturated fatty acids might play a role in reducing the level of cytokines, which promote inflammation in the body. This study demonstrated that subjects receiving omega-3 showed a 20-percent reduction in anxiety and a 14-percent reduction in the amounts of cytokines in the blood serum (specifically interleukin-6) compared to the placebo group.

Janice Kiecolt-Glaser, PhD, professor of Psychiatry, College of Medicine, and Martha Ann Belury, PhD, professor, Human Nutrition, College of Education and Human Ecology, are co-authors of the study, funded in part by the NIH National Center for Complementary and Alternative Medicine and published in *Brain, Behavior and Immunity*.

**PATIENT-ORIENTED RESEARCH HIGHLIGHTS:**

The CCTS supported conduct of patient-oriented research last year as follows:

- 3,481 subject visits at the CRC at Ohio State
- 2,238 subject visits at the Clinical Research Services at Nationwide Children’s Hospital

**MENTORSHIP HIGHLIGHTS:**

- 10 Ohio State mentor-mentee groups participated in a CTSA mentorship trial
- 21 mentors attended the consortium-based curriculum mentorship training
Multi-Family Psychoeducational Psychotherapy Evaluated in Community Settings

Heather MacPherson, PhD candidate in clinical psychology, College of Arts and Sciences, is evaluating the implementation and effectiveness of Multi-Family Psychoeducational Psychotherapy (MF-PeP) in community settings.

Funded by a CCTS TL1 award and supervised by Mary Fristad, PhD, MacPherson’s initial research results suggest MF-PeP is acceptable to community therapists and families presenting for treatment at the Nationwide Children’s Hospital’s Close to Home Centers and may lead to improved clinical outcomes, though more data is needed. Children who completed treatment demonstrated improved mood symptom severity over time.

In addition, their parents were more knowledgeable about mood disorders and appropriate treatments, and subsequently accessed higher-quality services for their children. Randomized controlled trials demonstrated that MF-PeP, a group-based psychotherapy for children ages 8 to 12 and their parents, is an efficacious treatment when compared to a control group.

Nutritionist Applies Observations from Osteoporosis to Oncology

Tonya Orchard, PhD, visiting assistant professor in the Department of Nutrition at Ohio State, along with Maryam Lustberg, MD, assistant professor, Internal Medicine, College of Medicine, recently completed a pilot study to determine whether omega-3 fatty acids could reduce joint pain in women taking aromatase inhibitors — a medication that lowers breast cancer recurrences by reducing circulating estrogen levels. Lustberg had found that up to a third of her patients on aromatase inhibitor therapy reported joint symptoms that impacted quality of life to the point that some had to stop the medication, possibly allowing breast cancer to gain a foothold.

Orchard, then a doctoral student in Nutrition, had been working on a CCTS-funded study with post-menopausal women and the consumption of fatty acids, a nutrient essential to human health that had also been linked to reducing joint pain related to osteoarthritis and rheumatoid arthritis. Orchard reviewed her knowledge of omega-3’s positive effects on osteoporosis with respect to how it might also help patients undergoing breast cancer treatment.

Orchard and Lustberg together had previously received a CCTS TL1 award; this recent joint effort, funded by a grant award from the Cancer and Leukemia Group B, is one example of how CCTS helps researchers find synergies for their work.

AWARD HIGHLIGHTS:

Since 2008, TL1 career development awards have been received by CCTS members:

- 38 CCTS TL1 total awards
- 7 current trainees
Studies Focus on Improving Appalachian Health: Cross-consortium Partnerships

Since creation of the Appalachian Translational Research Network (ATRN)* last year, a number of new pilot studies have been supported in Appalachia — a geographic region identified as having residents who suffer cancer deaths, obesity, diabetes and smoking at a higher rate than the national level.

According to Kelly Kelleher, MD, director of the CCTS Community Engagement Program, the causes of health issues in this region are multifactoral and include poverty and lack of education and access to health care. The geographic challenge of rural Appalachia, such as the mountainous range, makes it difficult to conduct outreach and research there.

Further, research groups working in these communities tend to have limited sharing of resources or information, making effective long-term improvements elusive, something ATRN experts are confident they can change.

Examples of studies with this aim include: web-based smoking cessation programs that can be completed from home by adolescent smokers; home-based smoking cessation programs for pregnant smokers; interventions to address obesity as cancer preventatives from participating church communities; a public health literacy-building program; and identification of MRSA outbreaks through the use of molecular genotyping and social network analysis.

ATRN members believe that what is learned in Appalachia can be reapplied to other underserved or rural communities in the nation and are therefore looking for solutions that can impact everyone, everywhere.

*Collaborating members of ATRN include the University of Kentucky, The Ohio State University, University of Cincinnati, West Virginia University, Ohio University, Marshall University, Morehead State University, University of Pikeville and the Appalachian Regional Commission.

ATRN HIGHLIGHTS:

- **Partnerships:**
  - 3 CTSAAs
  - 5 additional academic partners
  - 5 community-based partners
CCTS Instrumental in the Expansion of State-wide Research Networks

In the first three years of the CCTS, the focus on enhancing collaborations was aimed at leveraging the diversity of expertise across Ohio State to develop interdisciplinary cross-college scientific teams to address complex translational science issues. This year the focus was extended to include the support of multidisciplinary collaborations to drive scientific advancement of networks and cross-CTSA efforts. For example, the “3C Ohio CTSA Biomedical Corridor Initiative” is being developed to leverage and integrate the unique capacities in target identification at the Cleveland CTSA, medicinal chemistry for lead optimization at the Ohio State CTSA and drug screening at the Cincinnati CTSA combined with the animal models expertise at Ohio State and toxicology and regulatory science at Battelle, to serve as an integrated network for drug development of novel compounds.

TRIAD System Allows Improved Sharing of Large Medical Datasets

The field of informatics has been rapidly changing over the past decade. New technologies, such as grid computing and knowledge anchored data, are combined with major funding and growing community thrusts designed to break down institutional boundaries in order to create a richer research and clinical environment.

The TRIAD system was developed as the middleware system enabling Ohio State’s CCTS to create a scalable, secure and knowledge anchored data sharing environment.

The recently completed openMDR is a federated metadata management system, meaning it is comprised of a community of users that is capable of enabling syntactic and semantic interoperability among a variety of enterprises and research information systems, while anchoring common data element definitions in both locally and nationally maintained terminologies and ontologies.

BIOMEDICAL INFORMATICS HIGHLIGHTS:

- 18 TRIAD adopter sites
- 30+ TRIAD user accounts
- 2 TRIAD multi-center trials
- 87 REDCap (Research Electronic Data Capture) projects
- 100 investigators served