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Welcome to the 2008 Mayo Clinic Department of Psychiatry and Psychology Research Report.

Our department is committed to pursuing outstanding biomedical and behavioral research that enhances patient care, decreases the burden of human neuropsychiatric diseases and mental illness and leads to the development of new diagnostic, therapeutic and preventive measures. A strong commitment to institutional collaboration, mentorship and research education also is vital to our success.

Many of our faculty and trainees regularly present their research at national meetings and coauthor scientific papers in peer-reviewed journals and scholarly book chapters. Many of these investigators have been successful in obtaining National Institutes of Health and other extramural funding.

If you are interested in contacting any of the investigators highlighted in this report, please contact our department at 507-266-5100.

David A. Mrazek, MD, FRC Psych
Chair, Department of Psychiatry Psychology

Mark A. Frye, MD
Chair, Department Research Committee

Matthew M. Clark, PhD, LP
Vice Chair, Department Research Committee
Career Development in Individualized Medicine

Samuel C. Johnson Genomics of Addiction Program

Investigators
Joanna Biernacka, PhD, Doo-Sup, Choi PhD, Mark A. Frye, MD, Daniel Hall-Flavin, MD, Victor Karpyak, MD, PhD, Barbara Koenig, PhD, Larissa Loukianova, MD, PhD, Terry Schneekloth, MD, David M. Mrazek, MD, FRC Psych and Eric D. Wieben, MD

The main focus of this multidisciplinary integrated group of clinicians, addiction specialists, clinical researchers, molecular pharmacologists, statistical geneticists, and an ethicist is to advance the neurobiological underpinnings of and genetic vulnerability to addictions. With this background, our mission is to further develop individualized pharmacogenomics and behavioral treatment interventions to maximize the impact of addiction treatments.

Grants
National Institute of Alcohol Abuse and Alcoholism R01 AA015164; CREB, Alcohol Reward and Consumption in ENT1 Null Mice. Funding period: 03/2006 - 02/2011; PI: Choi

Korea Research Foundation KRF-2008-356-C000088, Post doctoral training award. Funding period: 09/2008 - 08/2009; PI: Nam, Mentor: Choi

S.C. Johnson Genomics of Addiction; MPDZ polymorphisms and alcohol withdrawal with seizures. Funding period: 2005 - 2010; PI: Karpyak

Mayo Clinic Departmental Small Grant Program; Hippocampal glutamate levels in subjects with a history of alcohol withdrawal. Funding period: 2008 - 2009; PI: Karpyak

S.C. Johnson Genomics of Addiction; Developing a DNA Repository for Genomic Studies of Addiction; PI: Mrazek

S.C. Johnson Genomics of Addiction; Clinical Correlates of Addiction. Funding period: 2008 - 2009 PI: Frye

Mayo Clinic Departmental Small Grant Award; Adjunctive Varenicline for Smoking Cessation in Bipolar Depressed Patients: An Open-label 12-week Feasibility Trial. Funding period: 08/2008 - 8/2010; PI: Frye and Patten

S.C. Johnson Genomics of Addiction; MR Spectroscopy in Recently Detoxified Patients with Alcoholism: A Acamprosate Probe study. Funding period: 01/2009 - 08/2011; PI: Frye

S.C. Johnson Genomics of Addiction; A Pilot Probe Study of Acamprosate: Genes associated with response. Funding period: 2008-2010; PI: Mrazek

Mayo Clinic Center for Individualized Medicine; Ethical, Legal, Social, and Policy Challenges in DNA Biobanking. Funding period: 07/2006 - 12/2011; PI: Koenig


Key Publications & Presentations

Biernacka JM, Cordell HJ. A composite-likelihood approach for identifying polymorphisms that are potentially directly associated with disease. Eur J Hum Genet 2008 [Epub ahead of print]


The “Pharmacokinetics and Pharmacodynamics of Selective Serotonin Inhibitors” is a component of the Mayo Clinic Pharmacogenomics Research Network. David Mrazek, MD is the principal investigator of the project which is fully funded by the National Institute of General Medical Sciences (NIGMS). The study is the largest research effort to date that has been designed to examine the relationship between genetic variation and both antidepressant response and adverse effects. Additionally, the metabolic signature of a subset of subjects in this project will be obtained in order to identify an alternative biological marker to predict selective serotonin inhibitor response.

**Grants**
National Institute of General Medical Sciences (NIGMS); Pharmacokinetics and Pharmacodynamics of Selective Serotonin Inhibitors. Funding period: 07/2005 - 06/2010; PI: Mrazek

**INDIVIDUALIZED MEDICINE BIOPAN FOR BIPOLAR DISORDER**

Researchers will establish a large-scale biobank for Bipolar Type I Disorder, collecting both biologic samples and clinical data from 2,000 individuals. This is a multi-site endeavor, with Mayo Clinic in Minnesota serving as the primary project site. Other sites that will assist in the recruitment of participants include Mayo Clinic in Florida, Mayo Clinic in Arizona, Austin Medical Center - Mayo Health System, The Lindner Center of HOPE, and the University of Minnesota. By establishing the infrastructure of this data-rich biobank, researchers hope to facilitate studies on disease risk and pharmacogenomic probes utilizing state-of-the-art research technology. The identification of genetic risk factors associated with disease onset can potentially lead to early interventional treatment in at-risk patients. This is particularly important in bipolar disorder, as the onset of any treatment is often delayed by more than a decade. Additionally, identification of pharmacogenomic predictors of treatment response could provide greater selectivity to treatment recommendations, as well as help prevent such serious adverse events as antidepressant-induced mania.

**Grants**
Development Award (private benefactor)
Co-Principal Investigators: Mark A. Frye, MD; Joanna M. Biernacka, PhD
Funding period: 12/2008 – 12/2011
**Psychogenomics Laboratory**

**Investigators**
John Logan Black III, MD and David Mrazek, MD, FRC Psych

The core effort of the Psychogenomics Laboratory is to analyze genes for mutations, polymorphisms, and gene expression with the goal of characterizing genomic determinants of drug treatment responsiveness in psychiatric and cancer patients. Our lab has a particular focus on the cytochrome P450 enzymes, but we have also studied drug response associated with variability in the serotonin transporter, dopamine D3 and D4 receptor, and serotonin receptor 2A. An important aspect of this research has been our involvement in the development of new clinical genetic tests that are now available through the Mayo Medical Laboratories. Finally, this laboratory functions as a “classroom” for trainees and faculty in psychiatry and psychology who are interested in learning how to do benchtop research. Several of these individuals have gone on to develop their own research careers in the area of psychiatric genetics.

**Grants**
CR Award; CYP2D6: A Clinical Challenge and Model for Genomic Copy Number Variation. Funding period: 06/2008 – 05/2010; PI: Black

CR20 Award by the Center for Translational Research Activities; Search for Cytochrome P450 2D6 Gene Instability in Cell Cultures, Somatic Cells, and Human Pedigrees. Funding Period: 09/2008 – 09/2010; PI: Black

Mayo Clinic Cancer Center; Effect of CYP2C19*17 Genotype on Breast Cancer Response to Tamoxifen. Funding period: 07/2008 – 6/2009; PI: Goetz

Mayo Clinic Department of Laboratory Medicine and Pathology; Effect of CYP2B6 Genotype on Outcomes in Patients Receiving Cyclophosphamide Before Bone Marrow Transplantation. Funding period: 03/2008 – 02/2010; PI: Black

Department of Psychiatry and Psychology; Correlation of CYP2C19*17 genotype and treatment response in STAR*D samples. Funding period: 03/2008 – 02/2010; PI: Mrazek

**Key Publications**


McAlpine DE, O’Kane DJ, Black JL, Mrazek DA. Cytochrome P450 2D6 genotype variation and venlafaxine dosage. Mayo Clin Proc 2007; 82(9):1065-1068

**Shawna L. Ehlers, PhD**

Shawna L. Ehlers, PhD, focuses on psychological and behavioral factors affecting medical conditions, such as cancer and transplant outcomes. Her overarching career objective is to aid the integration of behavioral medicine into transplant medicine from an evidence-based perspective. Her career development research is to investigate behavioral factors of transplant outcomes such as the impact of tobacco on patient immune recovery, infection rates, hospitalization days, and overall survival.

**Clinical Research Mentors**
Christi Patten, PhD, Dennis Gastineau, MD and Jim Cerhan, MD, PhD

**Grants**
- National Institute of Health - National Center for Research Resources KL2; The role of health behaviors in hematopoietic stem cell transplantation. Funding period: 07/2008 – 06/2013; PI: Ehlers
- Small Grant Program; Mayo Clinic Department of Psychiatry and Psychology; The role of tobacco in hematopoietic cell transplantation outcomes for leukemia survivors. Funding period: 04/2007 – 04/2009; PI: Ehlers
- Fraternal Order of the Eagles Cancer Research Fund - Career Development; The role of health behaviors in hematopoietic stem cell transplantation. supplement award to NIH/NCRR 1KL2 RRO24151. Funding period: 2009 – 2011; PI: Ehlers

**Key Publications**
- Ehlers SL. Ethical analysis and consideration of health behaviors in organ allocation: Focus on tobacco. Transplant Rev 2008; 22(3):171-177 (Special Issue on Transplantation Ethics)

**S. Solay Unal, MD**

In her career development research study, Dr Unal and her colleagues are utilizing novel brain methodology and potential peripheral biomarkers to study pediatric bipolar disorder, before and after 12-week, randomized, placebo-controlled trial of adjunctive omega 3-fatty acids. The goal of this translational study is to better understand the neurobiology of pediatric presentations of bipolar disorder and identify clinical correlates of treatment response.

**Clinical Research Mentors**
Elliott Richelson MD, PhD and Joel Felmlee PhD

**Grants**
- National Institute of Mental Health/KL2; Proton and Phosphorus Magnetic Resonance Spectroscopic Correlates of Omega-3 Fatty Acid Treatment in Early-Onset Pediatric Bipolar Disorder. Funding period: 2007-2011; PI: Unal
- Proton Magnetic Resonance Spectroscopic Correlates of Omega-3 Fatty Acid Treatment in Early-Onset Bipolar Disorder; National Institute Health and Mayo Clinic Career development Supplement Award. Funding period: 2007-2010; PI: Unal

**Recent Publications**

**Awards**
- National Institute of Mental Health Pediatric Bipolar Disorder Conference “Excellence in research” Award Bethesda, 2007
JOHN E. SCHMIDT, PhD

John E. Schmidt, PhD, focuses his research on the study of central and peripheral mechanisms by which behavioral change through self-regulatory training techniques leads to improvements in pain severity and long-term health in chronic pain patients. His current research is investigating specific psychological and physiological characteristics and mechanisms associated with autonomic change in chronic pain patients during laboratory stressors and after training in self-regulatory interventions. Dr Schmidt’s overall career objective is to develop evidence-based interventions for patients with chronic medical conditions designed to enhance self-regulation and behavioral change, leading to long-term improvements in symptoms, overall health, and quality of life.

Clinical Research Mentors
Michael Joyner, MD, Christi Patten, PhD, W. Michael Hooten, MD, Charles R. Carlson, PhD, and Leslie J. Crofford, MD

Grants
National Institutes of Health / Mayo Clinic KL2; A Controlled Comparison of Self-Regulation in Orofacial Pain and Fibromyalgia. Funding period: 8/2008 – 7/2011; PI: Schmidt

Saint Mary’s Sponsorship Board; Religious Importance, Spiritual Coping, and Treatment Outcomes in Chronic Pain Patients. Funding period: 7/2007; PI: Schmidt

Mayo Clinic Departmental Small Grants Award; Emotional and Physiological Self-regulation in Chronic Pain. Funding period: 11/2006; PI: Schmidt

National Institute of Dental & Craniofacial Research (F32 De017834-01); Self-Regulation in Orofacial Pain and Fibromyalgia. Funding period: 2006–2008; PI: Schmidt

Key Publications


Awards/Leadership
2008 Howard P. Rome Grand Rounds Award, Mayo Clinic
R. Robert Auger, MD

Dr R. Robert Auger’s interest in clinical research is facilitated by his unique clinical exposure to adolescents, many of whom suffer from delayed sleep phase disorder (DSPD). Dr Auger was awarded a CR20 in 2007, which funds an ongoing case-control study that explores light exposure patterns among afflicted adolescents with this condition. A future goal is to dedicate a substantial portion of his practice to investigating a variety of untapped areas relating to the treatment, pathophysiology, and psychiatric comorbidity of DSPD and other circadian rhythm sleep disorders.

Clinical Research Mentor
Helen J. Burgess, PhD, Rush University Medical Center

Grants
Mayo Clinic Clinical Research Award (CR 20); Delayed Sleep Phase Disorder and Association with Evening Light Exposure: A Pilot Study. Funding period: 11/2007 - 10/2009; PI: Auger

Key Publications

Auger RR, Morgenthaler TI. Jet lag and other sleep disorders relevant to the traveler. Travel Med Infect Dis, 2009; 7:60-68


Thomas Bergquist, PhD, LP

The Telerehabilitation Study continues research originally supported by the National Institute on Disability and Rehabilitation Research (NIDRR) funded Mayo TBI (Traumatic Brain Injury) Model System. Initial research demonstrated that with appropriate training and technology, individuals with profound memory impairments after brain injury are able to effectively use distance communication to receive rehabilitation. Subsequent studies have demonstrated the effectiveness of telerehabilitation at helping individuals improve their level of functioning and develop strategies to help them compensate for cognitive impairments. Current research involves a crossover randomized control design in which an active telerehabilitation condition is compared with a waiting-list control. Success from this research has lead to a commitment to advocate for the use of this technology to enable persons unable to directly access specialized rehabilitation services due to personal circumstances or geographic isolation.

Grants
Mayo Clinic Clinical Research Award (CR 20); Telehealth with Acquired Brain Injury. Funding period: 07/2008 – 06/2010; PI: Bergquist

Key Publications

Christopher L. Sola, DO

Christopher L. Sola, DO, is primarily interested in improving the delivery of clinical treatment options and clarifying our understanding of the interplay between psychiatric symptoms and “organic” issues. Dr Sola was awarded a CR20 grant to examine the psychoendocrinological question of whether electroconvulsive antidepressant response can be accelerated with triiodothyronine. In pursuit of this project, several other interesting questions have arisen, some regarding the economics of health-care delivery, others involving issues surrounding informed consent, and still others regarding the psychogenomic aspects of how polymorphisms in thyroid deiodinases may allow us to predict who will best benefit from the use of triiodothyronine. Dr Sola’s aspiration is that these lines of research will translate to real changes in the delivery of care and will eventually exert a benefit in the efficiency of the treatment of depression.

Clinical Research Mentors
Teresa Rummans, MD and Mark A. Frye, MD

Grants
Mayo Clinic Clinical Research Award (CR 20); Acceleration and Relapse Prevention with Triiodothyronine as an Adjunct to ECT. Funding period: 01/2008 – 01/2010; PI: Sola

Richard F. Emslander Career Development Award
Deiodonase I/II Functional Polymorphisms and Treatment Response in Patients with Major Depression who Receive Triiodothyronine as an Adjunct to ECT. Funding period: 02/2009 – 02/2012; PI: Sola

Key Publications

Brownlowe K, Sola C. Clozapine toxicity in smoking cessation and with ciprofloxacin. Psychosomatics 2008; 49(2):176

Otto Pedraza, PhD

Otto Pedraza, PhD, is a clinical neuropsychologist interested in the cognitive neuroscience of memory, the development and validation of psychometric tests, and the study of disparities in the prevalence and incidence of mild cognitive impairment (MCI) and dementia among ethnic/racial minorities. In 2006, he was awarded a career development grant (K-01) from NIH/NINDS to conduct a population-based study of MCI heterogeneity among African American adults in Jacksonville, Florida. Data collection for that project is currently in progress. The overarching goal of that project is to shed light on the medical, genetic, and psychosocial factors associated with the higher prevalence of MCI and dementia in African American adults. He also has been pursuing training and didactic opportunities in advanced psychometrics and fMRI data acquisition and analysis.

Clinical Research Mentors
Neill R. Graff-Radford, MD, and Glenn E. Smith, PhD

Key Publications


Awards
Diplomate, American Board of Clinical Neuropsychology
University of Florida 2009 Outstanding Young Alumnus Award
Yonas E. Geda, MD

The Harold Amos Medical Faculty Development Program is a Robert Wood Johnson Foundation award that recognizes research excellence and leadership in academic medicine. Dr. Geda, his mentor Dr. Ronald Petersen, and colleagues will use this award to conduct neuropsychiatric investigation of mild cognitive impairment (MCI) and pre-MCI in geographically and ethnically diverse populations in Minnesota, Florida, and Arizona.

Clinical Research Mentor
Ronald C. Petersen, MD, PhD

Grants
National Institute of Mental Health/National Institutes of Health (K01 MH68351)
Mentored Research Scientist Development Award for New Minority Faculty
Title: Prevalence of neuropsychiatric symptoms in mild cognitive impairment.
Funding period: 01/2004 – 01/2009; PI: Geda

Robert Wood Johnson Foundation; Harold Amos Medical Faculty Development Award; Neuropsychiatric Symptoms in Mild Cognitive Impairment (MCI) & Pre MCI in Geographically and Ethnically Diverse Populations. Funding period: 01/2008 – 01/2012; PI: Geda

Key Publications


SCi e nCe o f he a l t h Ca r e de l i v e r y a n d mo d e lS o f Co l l aBo r a t i o n w i t h Pr i m a r y Ca r e

Investigators
Kristin S. Vickers Douglas, PhD, Mark D. Williams, MD, Kurt B. Angstman, MD, Ramona S. DeJesus, MD, Pamela J. Nelson, CNS, PhD, Gabrielle Melin, MD, James M. Naessens, ScD, Nilay D. Shah, PhD, and Robert Stroebel, MD

This clinical research group is exploring new methods of care that help practitioners look for ways to sustain positive improvements in health care delivery and optimal patient care. We are currently involved with an application of the DIAMOND depression model as designed by the Institute for Clinical Systems Improvement (ICSI). The goals are to translate a collaborative model to treat depression in primary care into two Mayo Clinic primary care locations and study aspects of that model aimed at understanding and improving outcomes. Over a two to three year period, we hope to demonstrate to what extent this model improves outcomes, returns patients to work, and saves money as compared to what is currently published and to use that information to help Mayo Clinic decide about effective spread.

Grants
Mayo Clinic Diamond Award
Care Management of Depression (CMOD), Employee and Community Health and the Department of Psychiatry and Psychology Funding period: 2008 - 2009; PI: Williams

Mayo Clinic Quality Innovations Program Award (QIPA); Practical and Reliable Measure of Patient Self-Confidence in Primary Care. Funding period: 2008 - 2009; PI: Stroebel

Key Publications & Presentations


Williams MD, Shah N, Wagié A, Frye MA, Wood, D. Specialty care costs in continuously enrolled individuals with bipolar disorder are higher than those with individuals with depression or diabetes.

Research abstract to be presented at the May 2009 Annual Meeting of the American Psychiatric Association, San Francisco, CA

Williams MA. Translation of collaborative care for depression into over 20 different healthcare practices. Workshop with Wilkinson J. World Psychiatric Association Annual Meeting, September 21, 2008, Prague, Czech Republic

Vickers KS, Kircher KJ, Hathaway JC, Olson BJ. Home blood pressure monitoring and secure emailing with primary care provider for patients with hypertension. 2008 AAFP Annual Conference on Practice Improvement, Savannah, Georgia


Awards/Leadership
Mark Williams, MD, Chair, Mayo Clinic Quality Committee for the Department of Psychiatry and Psychology
MOOD CLINIC AND MOOD DISORDER UNIT

Investigators
Simon Kung, MD, Renato D. Alarcón, MD, David Mrázek, MD, FRC Psych, Mark A. Frye, MD, Christopher L. Sola, MD, Mark D. Williams, MD, and Joel Winner MD

The main focus of the integrated mood program, the Mayo Mood Clinic and the Mood Disorders Inpatient Unit, is to conduct clinically relevant research in treatment resistant depression and bipolar disorder. Our current research projects aim to build on our comprehensive and multidisciplinary treatment program.

Grants
Mayo Departmental Funds; Cytochrome P-450 2D6, 2C19, and 2C9, and Serotonin Receptor and Transporter Gene Profiles in Hospitalized Patients with Depression. Funding period: 12/2007 – 11/2009; PI: Kung

National Alliance for Research in Depression and Schizophrenia Independent Investigator Award. High Field Proton MRS of Anterior Cingulate in Bipolar vs Unipolar and Melancholic vs Atypical Depression. Funding period: 09/2006 – 03/2009; PI: Frye

Cooper Family Foundation Grant for the Study of the Genomics of Mood Disorders. Funding period: 04/2003 – 04/2008; PI: Mrázek

Key Publications & Presentations


Kung S, Winner JC, Drews M, Alarcon RD, Mrázek DA. Cytochrome P-450 2D6, 2C19, and Serotonin transporter genotyping for depressed inpatients at Mayo Clinic Mood Disorders Unit. Presented as part of the Symposium “Emerging clinical applications of genotype-guided psychotropics for depressive disorders” at the May 2009 Annual Meeting of the American Psychiatric Association, San Francisco, CA


Awards/Leadership
Renato Alarcón MD, Chair, New Research Sub-committee, American Psychiatric Association Annual Meeting

Renato Alarcón MD, Co-Editor, Archivos de Psiquiatría, Madrid, Spain

Mark Frye MD, Vice President Global Outreach, International Society of Bipolar Disorders
The suicide research group focuses on improving suicide risk assessment and management through identifying risk factors and warning signs in high-risk clinical groups. Dr Bostwick is investigating whether abnormalities in the HPA stress axis can predict eventual suicide. He has also launched a project looking at suicide scripts in attempted suicide and whether they correlate with eventual death by suicide. In collaboration with David Jobes, PhD, at Catholic University, Dr Lineberry has validated the Suicide Status Form (SSF) to systematize the assessment of suicidal risk in inpatients and introduced it into routine clinical care in Mayo Clinic’s psychiatric hospital. Present efforts explore whether SSF changes during hospitalization correlate with shifting suicide risk.

**Grants**
Mayo Clinic Clinical Research Award (CR20); An Historical Cohort Study of the Dexamethasone Suppression Test and Subsequent Suicide Funding period: 07/2006 – 12/2008; PI: Bostwick

American Foundation for Suicide Prevention; Resurrecting the dexamethasone suppression test: Does an abnormal DST warn of elevated lifetime suicide risk? An historical cohort study; Funding period: 09/2005 – 12/2008; PI: Bostwick

**Key Publications**


**Awards/Leadership**
Dr Lineberry, secretary, American Association of Suicidology

Dr Lineberry, subject matter expert on suicide prevention, United State Army

Dr. Bostwick, President, American Foundation for Suicide Prevention, Minnesota Chapter
**Elliott Richelson, MD**

Dr Richelson’s laboratory has focused research on pharmaceutical development for mood disorder treatments. Most recently, a licensing agreement for the triple re-uptake inhibitors, which are potential antidepressants, was finalized with Astra Zeneca. The agreement will include laboratory funding to continue structure-activity studies on other compounds that Dr Richelson and colleagues have designed. Currently, Phase 1 clinical testing is planned for early 2010 for the lead triple re-uptake inhibitor. Also in 2008, Dr Richelson’s laboratory began a new line of research that has led to a novel hypothesis about the mechanism of action of mood stabilizers, namely, that mood stabilizers facilitate the transport of mitochondria to the synapse. Additionally, he was co-inventor on two issued international patents and co-inventor on several US and international patent applications.

**Grants**

- National Institutes of Health Supplement for R01-MH071241-03S1 NT69L; A Potential, Novel Antischizophrenic Drug. Funding period: 08/2008 - 03/2009; PI: Richelson
- National Institute of Mental Health Supplement for R01 MH071241. Funding period: 08/2008 - 03/2009; PI: Richelson

**Key Publications**

Deep Brain Stimulation

Investigators
Mark A. Frye, MD, Shirlene Sampson, MD, Glenn A. Smith, PhD, Kendall H. Lee, MD, PhD, Joseph V. Matsumoto, MD, Paula Sandroni, MD, Andrea C. Adams, MD, Squire M. (Matt) Stead, MD, PhD, and Susannah Tye, PhD

Functional neuromodulation such as deep brain stimulation (DBS) offers immense opportunity for surgical treatment of refractory psychiatric disorders. Several therapeutic trials have been conducted to investigate the effectiveness of DBS in the treatment of refractory depression, obsessive compulsive disorder, and Tourette’s syndrome. This highly collaborative clinical research group is focusing their efforts on identifying potential mechanisms of action (i.e. neural circuitry, neurotransmission, synaptic plasticity) of DBS given its broad neuropsychiatric potential and neuropsychologic and psychiatric clinical outcomes in Parkinson’s disease patients implanted with DBS.

Grants
National Alliance for Research in Schizophrenia and Depression (NARSAD) Young Investigator Program; Mechanism of Action of Deep Brain Stimulation in Neuropsychiatric Conditions: Neural Circuitry, Neurotransmission and Synaptic Plasticity. Funding period: 07/2009 - 06/2011; PI: Tye (mentors Kendall Lee and Helen Mayberg)

Mayo Clinic Clinical Research Award (CR20)
Deep Brain Stimulation and Mood in Parkinson’s Disease: A Prospective Follow-up Study. Funding period: 07/2008 – 06/2010; PI: Frye and Smith

National Institutes of Health. (K08 NS 52232); Mechanism of Action of Deep Brain Stimulation. Funding period: 07/2008 – 06/2013; PI: Lee

Key Publications


Lee KH, Kristic K, van Hoff R, Hitti FL, Blaha C, Harris B, Roberts DW, Leiter JC. High-frequency stimulation of the subthalamic nucleus increases glutamate in the subthalamic nucleus of rats as demonstrated by in vivo enzyme-linked glutamate sensor. Brain Res 2007; 1162:121-129
**Electroconvulsive Therapy**

**Investigators**  
Keith Rasmussen, MD, Christopher Sola, DO, Maria Lapid, MD, Simon Kung, MD, Donald McAlpine, MD, and Shirlene Sampson, MD

The ECT research group at Mayo Clinic in Minnesota has been active in performing large multicenter randomized controlled trials funded by NIMH for over ten years. As a member of the Consortium for Research in ECT (CORE), our research goal is to better understand how to maintain remission of depression after a successful acute series of ECT.

**Grants**  
- National Institute of Mental Health Collaborative RO1; Prolonging Remission in Depressed Elderly (PRIDE). Funding period: 07/2009 – 06/2011; Mayo site PI: Sampson
- Mayo Clinical Research Award (CR20) Acceleration and Relapse Prevention with Triiodothyronine as an Adjunct to Electroconvulsive Therapy. Funding period: 01/2008 - 12/2009; PI: Sola
- Richard F. Emslander Career Development Award Deiodonase I/II Functional Polymorphisms and Treatment Response in Patients with Major Depression who Receive Triiodothyronine (T3) as an Adjunct to Electroconvulsive Therapy. Funding Period: 02/2009 – 02/2012 ; PI: Sola

**Key Publications**  


**Awards/Leadership**  
Dr Shirlene Sampson, President, Association for Convulsive Therapy (ACT) 2008-2010
Transcranial magnetic stimulation (TMS) is a novel, non-invasive brain stimulation that is effective in treating depression. Our TMS research group laboratory was involved in the multi-center trial that lead to the FDA approval for clinical use of TMS in treating depression. We are now involved in research using TMS in additional areas such as adolescent treatment resistant depression, fibromyalgia, neuropathic pain, and chronic headaches.

Investigators
Shirlene M. Sampson, MD, MS, Simon Kung, MD, Donald McAlpine, MD, and Christopher Wall, MD

Grants
American Academy of Child & Adolescent Psychiatry Pilot Research Award
An Evaluation of Safety and Feasibility using rTMS in Adolescents with Depression.
Funding period: 1/2007 – 1/2009; PI: Wall

Mayo Department of Psychiatry and Psychology Small Grants Award
An Evaluation of Safety and Feasibility using rTMS in Adolescents with Depression.

Key Publications and Presentations


The primary aim of the multidisciplinary Psychiatric Imaging Research Group is to develop and use imaging techniques to diagnose and guide treatment in psychiatric disease. For the past several years, the team focused primarily on the technique of MR spectroscopy. Recently, the team has turned to the field of multinuclear imaging of phosphorus and lithium, and PET imaging.

**Grants**
National Alliance for Research in Schizophrenia and Depression (NARSAD) Young Investigator Program; Lithium Magnetic Resonance Brain Imaging for Bipolar Disorder. Funding period is 07/2009 – 06/2011; PI: Edmonson (mentors Mark Frye, MD, and Clifford Jack, MD)

Minnesota Partnership for Biotechnology and Medical Genomics Grants; Advanced Molecular Neuroimaging Infrastructure Grant for Programatic Study of Neuroscience Themes. Funding period: 2009 – 2012; PI: Unal and Lowe

NIH KL2; Proton Magnetic Resonance Spectroscopic Correlates of Omega-3 Fatty Acid Treatment in Early-Onset Bipolar Disorder. Funding period: 2007 – 2011; PI: Unal

Mayo Small Grants Program; Development of Lithium Imaging on a 3T MRI System. Funding period: 2007 – 2011; PI: Port

The Obsessive Compulsive Foundation; The Neurochemical Effects of Cognitive Behavioral Treatment in Pediatric OCD. Funding period: 2005 -2009; PI: Whiteside

National Alliance for Research in Depression and Schizophrenia (NARSAD) Independent Investigator Award; High Field Proton MRS of Anterior Cingulate in Bipolar vs Unipolar and Melancholic vs Atypical Depression. Funding period 09/2006 – 03/2009; PI: Frye

**Key Publications & Presentations**


Port JD, Unal SS, Mrazek DA, Marcus SM. Metabolic alterations in medication-free patients with bipolar disorder: A 3T CSF-corrected magnetic resonance spectroscopic imaging study. Psychiatry Res 2008; 162(2):113-121


Port JD. The future role of MR in the diagnosis and management of psychiatric diseases. Presented at the MR Spectroscopy and Neurotransmitter Function in Neuropsychiatric Disorders: Focus on Glutamate and GABA ISMRM Workshop, Quebec City, Canada, 2008
Anxiety Disorders

Investigators
Stephen P Whiteside, PhD, Mark W Olsen, MD, and Katherine M. Moore, MD

This multidisciplinary research team is involved in several clinical projects and two funded studies using magnetic resonance spectroscopy to assess the neural effects of cognitive behavioral therapy (CBT) for obsessive compulsive disorder (OCD) in children and adults. Our team is also involved in several clinical outcome projects evaluating the relative effectiveness of different components of CBT; developing intensive treatments for pediatric OCD, and developing new assessment measures for anxiety and related symptoms. The adult arm of the group is working to develop a clinical, teaching, and research program. Through our clinical work and investigations we hope to improve the treatment of children and adults with anxiety disorders including OCD.

Grants


Key Publications


PEDIATRIC MOOD DISORDERS

S. Solay Unal, MD, Elliott Richelson, MD, John D. Port, MD, PhD, Joel Felmlee, PhD, Val Lowe, MD, Doo-Sup Choi, PhD, and Nina Kraguljac, MD

This group is currently investigating potential new treatment options for pediatric bipolar disorder. We have conducted several longitudinal studies to identify the biological markers of disease progression and treatment response in pediatric mood disorders. We are currently participating in a FDA registrational study of lamotrigine in children and adolescents with bipolar disorder. A second clinical study is a novel weight management program for bipolar youth who have gained significant weight from their medications. We also are launching a study utilizing PET imaging to examine the alterations in receptor biology with a novel drug candidate. This multidisciplinary research team including investigators from radiology, nuclear medicine, molecular pharmacology and experimental therapeutics is building a strong foundation for biomarker and drug development research at Mayo Clinic.

Grants


Glaxo Smith Kline

Mayo Clinic CTSA; Antidepressant induced Neurometabolic changes in adolescents with MDD before and after 12-week open label trial with Fluoxetine. Funding period: 2008 – 2010; PI: Unal

Mayo Clinic CTSA; Non medication management of psychotropic induced weight gain and metabolic syndrome in children with bipolar disorder. Funding period: 2009 – 2011; PI: Unal

Key Publications


The Pain Rehabilitation Center’s continued research infrastructure development has facilitated the ongoing assessment of clinical outcomes. These efforts resulted in the publication of our 6-month longitudinal treatment outcomes. Further secondary analyses are underway to identify long-term predictors of opioid resumption, recurrence of depressive symptoms and sustained reductions in pain severity. Our outcomes research efforts also have facilitated investigations related to the effects of smoking on treatment outcomes and identification of the clinical correlates of vitamin D inadequacy among patients with chronic pain. The research infrastructure has provided the opportunity to investigate the physiologic correlates of pain severity using methods to assess heat pain response and measures of muscle strength. Finally, an interdisciplinary effort led by the Department of Psychiatry and Psychology, which includes investigators from anesthesiology, neurology and radiology, has resulted in a genomics program for chronic pain.

**Grants**
Mayo Clinic Clinical Research Award (CR20) Randomized trial of strength training vs. aerobic conditioning in patients with fibromyalgia. Funding period: 12/2006–12/2008; PI: Hooten


**Key Publications**


**Awards / Leadership**
W. Michael Hooten, MD, Chair, Research Committee, Division of Pain Anesthesia

Cynthia Townsend, MD, Chair, Pain Rehabilitation Special Interest Group, American Pain Society, 2008-present
Brain Rehabilitation

Investigators
Allen W. Brown, MD and Thomas Bergquist, PhD

The brain rehabilitation research group is composed of a multidisciplinary team including members from the Departments of Nursing, Physical Medicine and Rehabilitation, Neurology, Social Services, and Psychiatry and Psychology. Current research studies include contribution of cases to the traumatic brain injury TBI Model System national database, validation of a first of its kind outcome measure to assess the effectiveness of cognitive rehabilitation, interventions on the ability of individuals with brain injury to advocate for themselves and their communities, and assessing the effectiveness of telemedicine to deliver cognitive rehabilitation. Collaborative studies with other institutions include examining post-traumatic headaches, changes in sexuality following traumatic brain injury (TBI), the effect of environment on outcome after TBI, and teaching coping skills to family members. The group networks with a variety of other academic institutions and agencies doing similar research, including the Brain Injury Associations of Minnesota, Iowa, and Wisconsin; University of Wisconsin; Rehabilitation Hospital of Indiana; Brooks Rehabilitation Hospital in Jacksonville, Florida; and other NIDRR funded TBI Model Systems.

Grants
Mayo Clinic Clinical Research Award (CR20); Telehealth with Acquired Brain Injury. Funding period: 07/2008 – 06/2010; PI: Bergquist

National Institute on Disability and Rehabilitation Research (NIDRR); Mayo TBI Model System. Funding period: 10/2007 – 09/2012; PI: Brown

Key Publications


Behavioral Health

Investigators
Christi Patten, PhD, Pamela S. Sinicrope, PhD, and Shawna Ehlers, PhD

Christi Ann Patten, PhD, Professor of Psychology and Career Scientist, leads the Behavioral Health Research Program in the Mayo Clinic Cancer Center and focuses her research on developing novel, theory-based behavioral interventions for tobacco cessation. Contributions have included tobacco cessation interventions for adolescents and smokers with psychiatric comorbidity, and social support and smoking cessation. A large clinical trial is underway to examine the efficacy of a support-person intervention to enhance smoker utilization of the Minnesota QUITPLAN Helpline. A focus of research for other group members targets cancer survivors and their family members for lifestyle intervention and other basic behavioral research with the goal of cancer risk reduction. Dr Sinicrope received pilot funding from Mayo Clinic Cancer Center to assess interest in lifestyle behavioral interventions for family members of colorectal, pancreatic, and lung cancer survivors. The team is currently engaged in a study of the health behaviors of survivors of Lymphoma/Leukemia through collaboration with Dr Jim Cerhan, the principal investigator of the Mayo Clinic/Iowa Lymphoma/Leukemia NIH funded Spore Grant.

Another area of focus is a commitment to reducing cancer health disparities among Native Americans. During the past seven years, the team has established a successful partnership with the Alaska Native community in Western Alaska. A long-term goal of the partnership is to establish the research infrastructure and develop evidence-based programs to reduce tobacco-related health disparities among Alaska natives. In addition, with funding through an NCI P20 grant, the team is developing programs to train Dine’ College (Navajo) undergraduates in cancer prevention research. A long-term goal of the partnership is to create a research infrastructure and develop evidence-based programs to reduce tobacco-related health disparities among Alaska natives.
Grants
National Cancer Institute
Dine’ College/Mayo Clinic: Developing Cancer Researchers.
Funding period: 2006 – 2010
PI: Patten

ClearWay Minnesota
Standard Research Award Enhancing Smoker Utilization of the Minnesota Quitline through Support Persons.
Funding period: 2006 – 2009
PI: Patten

National Cancer Institute and National Institute on Drug Abuse.
Tobacco Cessation Treatment for Pregnant Alaska Natives. Funding period: 2007 – 2009
PI: Patten

Key Publications


Sinicrope PS, Vernon SW, Diamond PM, Patten CA, Kelder SH, Rabe KG, Petersen GM. Development and preliminary validation of the cancer family impact scale for colorectal cancer. Genet Test 2008; 12, 161-169


Awards/Leadership
Christi Patten PhD Panel Expert at National Institute of Health for tobacco cessation and reducing cancer health disparities.

Christi Patten PhD Standing study section member of the National Institute on Drug Abuse Treatment Research Subcommittee (NIDA-E).
The population-based Mayo Clinic Study of Aging serves as a research infrastructure for the K01 funded Neuropsychiatric research. The primary goal of the K01 project is to determine the prevalence of neuropsychiatric symptoms in normal cognitive aging and mild cognitive impairment.

**Grants**
- National Institute of Mental Health/National Institutes of Health Mentored Research Scientist Development Award for New Minority Faculty; Psychiatric Characterization of Mild Cognitive Impairment. Funding period: 01/2004 – 01/2009 PI: Geda

**Key Publications**
**NEURO-PsYCHIATRIC RESeArCH**  
**Mayo Clinic in SCOTTsdaLe/PHoEnix, ARiZoNA**

**Investigators**  
Cynthia Stonnington, MD, Dona Locke, PhD, David Osborne, PhD, Richard Caselli, MD, and Bryan Woodruff, MD

The main goal of this research program is to determine the correlation between genetic risk for Alzheimer’s Disease (apolipoprotein E [apoe] genotype) and the effect of normal aging on certain measures of cognitive function, brain volume, and brain metabolism.

**Grants**
- Mayo Clinic Scholarly Opportunity Award; Fibrillar Amyloid and Structural Correlates of Cognitive Decline among Cognitively Normal Pre-MCI Individuals. Funding period: 2009 to present; PI: Stonnington,
- PET, APOE & the Preclinical Course of Alzheimer Disease. Funded by National Institute on Aging. (R01 AG031581). Funding period: 04/2008 – 03/2013; PI: Caselli

**Key Publications**
Investigators
Robert Ivnik, PhD, Mary Machulda, PhD, Glenn Smith, PhD, Yonas Geda, MD, Tanis Ferman PhD, John Lucas, PhD, Otto Pedraza PhD, and Dona Locke, PhD

The aging and cognition group’s research focus is the early detection of and early intervention with dementing illness. Neuropsychologists and neuropsychiatrists are key collaborators in major aging and dementia projects at all three Mayo Clinic campuses. Such collaborations include research that has promulgated the concept of mild cognitive impairment as a pre-dementia risk state for all dementias, including Alzheimer’s disease and Lewy Body dementia. The group also has helped develop the neuropsychological norms necessary to identify the pre-dementia cognitive, clinical, and sleep profiles for the early detection of Alzheimer’s and Lewy Body disease. Group members are actively engaged in studies regarding behavioral interventions that can mitigate normal cognitive aging and compensate for the deficits present in mild cognitive impairment. This group includes colleagues in neurology, neuroimaging, neuropathology, molecular biology, pharmacology and others. The Study on Aging and Alzheimer’s Disease Center is one of Mayo Clinic’s most multidisciplinary and translational research programs.

Grants
National Institute on Aging; Mayo Clinic Alzheimer’s Disease Research Center. Funding Period: 05/2004 – 04/2014; PI (Information Transfer Core): Smith

National Institute on Aging; Neuropsychology of Dementia with Lewy Bodies. Funding Period: 10/2005 – 09/2010; PI: Ferman


Alzheimer’s Association; Treatment of Obstructive Sleep Apnea in Patients with MCI or AD. Funding period: 05/2004 - 04/2014; PI: Boeve

Key Publications


Transplant Psychiatry and Transplant Addictions Psychiatry

Investigators
Sheila Jowsey, MD, Terry Schneekloth, MD, Katherine Moore, MD, Christina Wichman, MD, Dahlia Saad Pendergrass, MD, Gen Shinozaki, MD, and Victoria Passov, MD

This multidisciplinary group is involved in a number of IRB approved research protocols and National Institute of Health or Mayo Clinic funded clinical trials related to understanding the relationship between psychiatric factors and outcomes following transplantation. The group also is interested in the outcomes of living donor surgery including long-term psychiatric outcomes. They have begun exploring the role of genomics in determining psychiatric outcomes following transplantation. Members of this research group have collaborated with colleagues in geriatric psychiatry to learn more about the experience of geriatric patients post transplant. In 2009, the group will pursue further research addressing psychosocial factors leading to neurotoxicity and delirium post transplant.

Grants
NIH/NIAID
Renal and Lung Living Donors Evaluation Study (RELIVE)
Funding Period: 07/2006 - 06/2011
PI: Taler

Mayo Small Grant Program
Exploring the Relationship between Selected Genetic Polymorphisms of Transplant Patients and Depression.
Funding Period: 07/2006 - 06/2011
PI: Shinozaki and Jowsey

Key Publications
Cancer

Investigators
Steve C. Ames, PhD, Matthew M. Clark, PhD, Dona E.C. Locke, PhD, Pamela J. Netzel, MD, Jarret W. Richardson, MD, and Teresa A. Rummans, MD

By first assessing and treating psychiatric difficulties, and then teaching skills for coping with cancer we strive to improve the quality of life for cancer patients and their caregivers, which is the primary goal of the cancer research team. This multidisciplinary team, across the three Mayo sites, is involved in several studies that have either sought to identify predictors of quality of life in cancer survivors, or have offered tailored multidisciplinary interventions designed to improve the quality of life of cancer patients.

Grants
Mayo Clinic Clinical Research Award (CR 20); Motivational Interviewing to Enhance Smoking Cessation in Radiation Oncology Patients. Funding period: 01/2007 – 12/2009; PI: Garces (Radiation Oncology)

Lance Armstrong Foundation; Quality of Life Intervention for Biochemical Recurrence of Prostate Cancer. Funding period: 01/2005 – 12/2008; PI: Ames

James and Esther King Biomedical Research Program; Quality of Life of Patients with Renal Cell Carcinoma. Funding period: 01/2008 – 12/2010; PI: Ames, S

Linse Bock Foundation; A Structured Multidisciplinary Intervention to Improve Quality of Life of Patients Receiving Active Oncological Treatment: A Randomized Trial. Funding period: 03/2004 – 02/2010; PI: Clark

National Cancer Institute; Health and Quality of Life Among Long-Term Lung Cancer Survivors. Funding period: 01/2006 – 12/2011; PI: Yang, P (Cancer Center, Epidemiology)

Key Publications


OBESITY

Investigators
Matthew M. Clark, PhD, Karen Grothe, PhD, and Donald E. McAlpine, MD

This multidisciplinary research team is involved in several clinical projects and two National Institutes of Health funded clinical trials which are seeking to examine the role of how psychiatric and psychological functioning impacts outcome from obesity or eating disorder treatment programs, and to learn more about how psychiatric or psychological functioning may change following weight loss. We are involved in two National Institute of Diabetes and Digestive and Kidney Diseases funded studies. The primary aim of one study is to examine the role of 24 hour energy expenditure in obesity, and the other is a randomized clinical trial that is exploring the role of genomics in predicting outcome to a pharmacologic and behavioral weight loss program. Through our investigations we hope to improve the selection of participants for weight loss programs, and to enhance the long term psychosocial functioning of patients who have lost weight.

Grants
National Institute of Diabetes and Digestive Diseases
Pharmacogenomics of Gastric Function and Weight in Obesity.
Funding period: 03/2004 – 02/2010; PI: Camilleri (GI)

National Institute of Diabetes and Digestive Diseases
Nutritional Restriction and Activity Thermogenesis.
Funding period: 01/2003 – 12/2009; PI: Levine (Endocrinology)

Key Publications


Eating Disorders

Donald E. McAlpine, MD, Leslie A. Sim, PhD, and Matthew M. Clark, PhD

This multidisciplinary research team is involved in several clinical projects which are seeking to understand the neurobiology and treatment of eating disorders. This research team is aware of the emerging interests in the biological dimensions of eating disorders and is in the early stages of using neuroimaging technology to understand neurobiological aspects of anorexia and bulimia nervosa. They also seek to examine the role of family functioning in adolescent eating disorders. The question of how athletes with eating disorders differ from non-athletes presenting for help with eating disorders is currently under study. The application of non-exercise activity thermogeneses (NEAT) to anorexia nervosa is a novel way to try and understand and monitor weight regulation. The team also is involved in several clinical outcome projects including a study evaluating family based inpatient treatment. Through the investigations, the team hopes to enhance the outcomes for individuals suffering from eating disorders.

Key Publications & Presentation:


The Psychosomatics Research Group investigates outcomes of consultation and interventions in patients at the interface between medical and psychiatric conditions. Target areas include health anxiety, management of unexplained physical symptoms, depression and anxiety in the medically ill, resilience, and healthcare utilization.

Grants
Arizona Institute for Mental Health Research
Deficits in Mental Representation of Emotion in Somatizing Patients. Funded by Institute for Mental Health Research.
Funding period: 03/2008 - 03/2009
PI: Stonnington

Key Publications & Presentation
Krahn LE, Bostwick JM, Stonnington CM. Looking toward DSM-V: Should factitious disorder become a subtype of somatoform disorder? Psychosomatics 2008; 49(4):277-282


Passov V, Rundell JR. Analysis of transfers from a medical-psychiatry inpatient unit to a medical-surgical unit within 48 hours of admission. Psychosomatics 2008; 49(6):535-537


Rundell JR. Antipsychotic practice patterns among psychiatrically consulted medical-surgical inpatients at a tertiary care medical center. Oral presentation at the Annual Meeting of the Academy of Psychosomatic Medicine, Miami FL, November 22, 2008

SMALL GRANT HIGHLIGHTS

2008

• Adjunctive Varenicline for Smoking Cessation in Bipolar Depressed Patients: An Open-Label 12-week Feasibility Trial - Mark Frye, MD, Christi Patten, PhD., Courtney Price, MBBS

• Exploring the Relationship Between Selected Genetic Polymorphisms of Transplant Patients and Depression - Sheila Jowsey, MD, Gen Shinonazki, MP

• Hippocampal Glutamate Levels in Alcoholics - Victor Karpyak, MD, PhD

2007

• The Role of Tobacco in Hematopoietic Cell Transplantation (HCT) Outcomes for Leukemia Survivors - Shawna Ehlers, PhD

• Deliberate Self-harm in Adolescents: A Longitudinal Study - Leslie Sim, PhD

• The Effects of Cognitive Behavioral Treatment on Neurochemical Compounds in Patients with OCD - Evaluation of proton magnetic resonance spectroscopy: project extension - Stephen Whiteside, PhD
DEPARTMENT FACTS

Staffing
- 52 psychiatrists
- 24 doctorate-level psychologists
- 60 counselors and therapists
- 62 residents and fellows

Inpatient Programs — 108 licensed beds
- Psychiatry Acute Care Program
- Mood Disorders Unit
- Child, Adolescent and Family Treatment Program and Eating Disorders Program
- Geriatric/Medical Psychiatry Program
- Intensive Addiction Program (residential)

Outpatient Programs
- Consultation/Liaison Psychiatry Program
- Assessment and consultation
- Comprehensive second opinion
- Intensive Adult Outpatient Program
- Comprehensive Pain Rehabilitation Program
- Adult, Child and Adolescent Programs
- Anxiety Disorder
- Mood Disorder Clinic
- Addiction

Specialized Services
- Psychological and neuropsychological testing
- Pharmacogenomics testing
- Electroconvulsive therapy and Transcranial Magnetic Stimulation
- Neuroimaging

Clinical Education
- College of Medicine at Mayo Clinic
- Mayo School of Graduate Medical Education
- American Psychological Association Accredited
  Mayo Medical Psychology Post-Doctoral Fellowship Program:
  – Clinical Health Psychology
  – Clinical Child Psychology
  – Clinical Neuropsychology
- Accreditation Council for Graduate Medical Education
  – Addiction Psychiatry Fellowship Program
  – Child and Adolescent Psychiatry Residency Program
  – Psychosomatic Medicine Fellowship Program
  – Adult Psychiatry Residency
  – Geriatric Psychiatry Fellowship Program
  – Sleep Medicine Fellowship Program

Scientific Research
- Psychogenomics and the genomics of addiction
- Alzheimer’s/cognitive disorders
- Anxiety disorders
- Electroconvulsive therapy and Transcranial Magnetic Stimulation
- Mood Disorders and Neuroimaging

Affiliated Programs
- Executive Health Program
- Department of Neurology (including Section of Behavioral Neurology)
- General Internal Medicine
- Mayo Medical Laboratories
- Center for Sleep Medicine
- Nicotine Dependence Center (Residential)
- Patient Education Center
- Transplant Center
- Bariatric surgery