

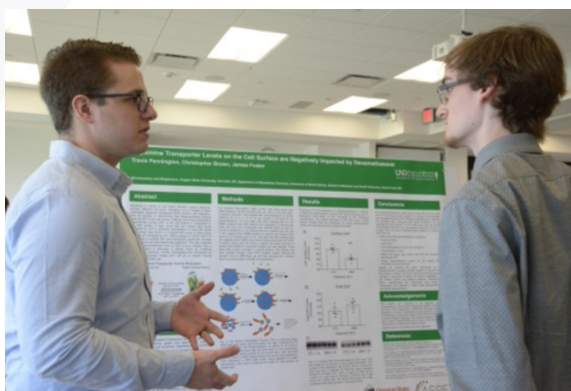
Frank N. Low Research Day

43rd Annual

Frank Low Research Day

April 13, 2023

University of North Dakota
School of Medicine & Health Sciences



Frank N. Low, PhD

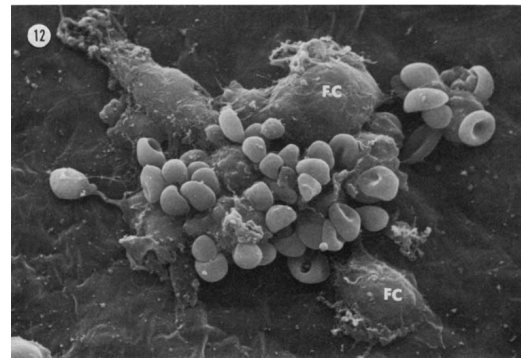
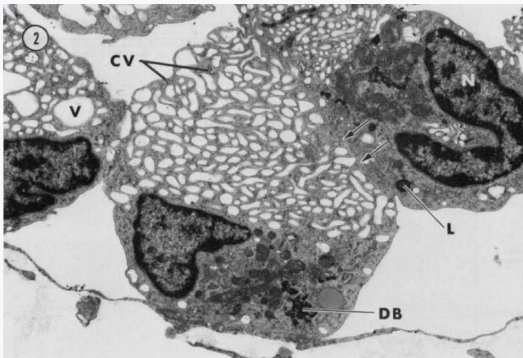


Frank N. Low was born in Brooklyn, New York in 1911 and received an undergraduate degree in 1932 and a PhD in Histology and Embryology in 1936 from Cornell University. Dr. Low held positions at Tufts College of Medicine, the University of West Virginia, and the Johns Hopkins University School of Medicine before beginning a 15-year tenure at Louisiana State University Medical Center in New Orleans. In 1964, Low was appointed Hill Research Professor of Anatomy at the University of North Dakota (UND) School of Medicine, a position he held until his retirement in 1981.

Dr. Low became internationally known for electron microscopy and the superb quality of his micrographs. He developed a state-of-the-art electron microscopy lab at UND. During this time, he trained 23 Masters and 19 PhD students, many of whom have developed distinguished careers in teaching and research. He worked tirelessly with his students in the laboratory and in the classroom. Dr. Low was awarded a Chester Fritz Distinguished Professorship from UND in 1975 and upon his retirement 1981 the school honored his accomplishments and service to UND by designating an annual Frank N. Low Research Day to bring together faculty, staff and student researchers in the biomedical, clinical, and translational sciences. Dr. Low died on April 28, 1998.

(Edward C. Carlson, PhD, The Anatomical Record (New ANAT.) 257:48-49, 1999)

Frank Low Research Day is the culminating event of the academic year for many area researchers working in the biomedical and health sciences. At this year's Frank Low Day event, over 200 faculty members, post-doctoral fellows, medical residents and students will participate in the celebration of the gathering and dissemination of knowledge.



Malloy, JJ and Low, FN. 1976 Scanning electron microscopy of the subarachnoid space in the dog. IV. Subarachnoid macrophages. J Comp Neurol. 167:257-283.

Schedule

FRANK LOW RESEARCH DAY Thursday, April 13, 2023 - 8:00 AM - 5:00 PM

Poster / Video Sessions I and II

7:00 AM – 5:00PM	All recorded presentations available for viewing throughout the day (See Website for list - https://med.und.edu/research/frank-low.html)
9:00-10:15 AM	Live Q&A Session I: Basic Sciences and Occupational Therapy Research
10:15-11:30 AM	Live Q&A Session II: Basic Sciences, Occupational Therapy and Undergraduate Research

Lunch

11:30 AM - 12:30 PM	Lunch Served - East Atrium, First Floor Meet-and-greet with Keynote Speaker for students interested in Dermatology - E226
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Keynote Lecture:

Mentorship and Collaboration: The Power of Partnerships in Squamous Cell Carcinoma Research

Zoom Link: <https://und.zoom.us/j/94149660288?pwd=ZGdaMXNLMWtLRGVHbERJUWNlQ2luZz09>

Room UNDSMHS - E101

1:00 - 1:05 PM	Welcome Remarks: Joshua Wynne, MD, MBA, MPH, UND Vice President for Health Sciences, Dean, School of Medicine & Health Sciences
1:05 - 1:10 PM	Introduction: Kathryn Shahwan, MD, UND School of Medicine & Health Sciences
1:10 - 2:15 PM	Keynote Speaker: David Carr, MD, MPH - Clinical Associate Professor of Dermatology, The Ohio State University, Wexner Medical Center

Poster / Video Sessions III and IV

2:15-3:30 PM	Live Q&A Session III: Medical Science Research / Indigenous Health
3:30-4:45 PM	Live Q&A Session IV: Medical Sciences / Population Health / Public Health / Rural Health



Keynote Speaker

David R. Carr, MD, MPH

Clinical Associate Professor of Dermatology
Ohio State University, Wexner Medical Center.

Mentorship and Collaboration: The Power of Partnerships in Squamous Cell Carcinoma Research

Biography

David R. Carr, MD MPH specializes in Mohs micrographic surgery, cutaneous reconstructive surgery, cutaneous oncology, and high-risk skin cancer groups (solid organ transplant and other immunosuppressed patients). He is the Program Director of the Micrographic Surgery and Dermatologic Oncology Fellowship and serves as the Vice Chair of Academic Affairs within the Department of Dermatology. Dr. Carr's research interests primarily concentrate on cutaneous oncology and outcomes-based research, particularly in cutaneous squamous cell carcinoma



Basic Sciences

1. Understanding Nanog's role in cell differentiation.

Oluwatobiloba Aminu, Junguk Hur, Bony De Kumar

Biomedical Sciences Graduate Student Basic Science Research

Background: Pluripotency and differentiation are crucial cellular states for normal development and disease control. They are regulated by both intrinsic and extrinsic factors. Master transcription factors, such as Nanog, Sox2, and Oct4, play a critical role in pluripotency, but their function in differentiation is not entirely clear. This study aims to investigate Nanog's role in differentiation using mouse embryonic stem cells as a model.

Methods: An integrative analysis was carried out using gene expression and chromatin immunoprecipitation sequencing data to determine the impact of Nanog binding on downstream gene expression. Target genes were identified as those whose expression was altered by Nanog binding, and a GSEA analysis was performed to identify shared biological processes. Additionally, Homer was utilized to conduct motif enrichment analysis at each time point.

Results: Within 24 hours of retinoic acid treatment, Nanog is recruited to newly identified sites. These sites are primarily located in intergenic regions and the genes associated with them are mainly involved in development and differentiation, specifically mesodermal and mesenchymal development. Furthermore, these recently identified sites possess enriched motifs, such as LHX1 and FLI1, which play a significant role in mesodermal differentiation, in addition to the known pluripotent and developmental transcription factors.

Conclusion: This study provides insight into the complex regulation of pluripotency and differentiation and highlights the potential role of Nanog in regulating mesodermal differentiation. It also suggests that Nanog may prefer mesodermal differentiation through indirect recruitment by factors involved in mesodermal transcription factors. Further research is needed to understand the exact mechanism of Nanog's involvement in differentiation." **Traditional Poster**

2. Focal Adhesion Patterns in Neural Crest Cell Differentiation

Anna M. Lambertz, Amanda Haage

Basic Science Research

During cell migration, protrusions anchored by focal adhesions (FA) allow for cells to move across a surface. FAs consist of similar proteins across cell types, organized into multi-layer hubs that mediate connection to the intracellular cytoskeleton and various signaling pathways. Neural Crest Cells (NCC) represent the most migratory cells in development, capable of differentiation and contributing to the entire peripheral nervous system. With their high capacity for movement in vivo and functional importance, NCCs are the ideal subject to study FAs. Talin (TLN1) is an essential FA protein. Staining for TLN1 using Immunofluorescence provides a pattern of FA localization, which can be correlated to movement potential and function. Here we will use the immortalized NCC O9-1 line for studying TLN1 in NCC FAs as they are differentiated into various cell types. We have tested growing O9-1 cells in media with and without basic fibroblast growth factor as a mediator for multipotency and conducted differentiation protocols for osteoblasts, chondrocytes, smooth muscle, and glial cells. The glial and chondrocyte conditions lost viability with our original protocol, but we were able to successfully distinguish osteoblasts and smooth muscle cells after 10 days. We went on to stain the differentiated cells for TLN1 and compared them to non-differentiated O9-1 cells. We are pursuing quantitative measurements to observe

Basic Sciences

changes in FA patterns. It is hypothesized that TLN1 localization will be different between NCC-differentiated smooth muscle cells and osteoblasts. **Traditional Poster**

3. Histamine H3 receptor antagonism mitigates food-hypersensitivity-associated depressive behavior and neuropathology in a mouse model of cow's milk allergy

Danielle Germundson-Hermanson and Kumi Nagamoto-Combs

Clinical & Translational Science Graduate Student Basic Science Research

While histamine is best known for its role in allergic reactions, it also functions as a neuromodulator and regulator of blood-brain barrier permeability. Thus, brain histamine is tightly controlled, as imbalances in its level can disturb central nervous system homeostasis and function. Interestingly, food allergies are often associated with neuropsychiatric disorders, but the causal involvement of allergy-induced histamine in behavioral symptom manifestation is unclear. Previously, we demonstrated that brain histamine and histamine H3 receptor (H3R) levels were elevated in a mouse model of cow's milk allergy (CMA) in association with cortical demyelination and depression-like behavior. We hypothesized that elevated brain histamine leads to central histaminergic dysfunction through H3R, ultimately resulting in cortical demyelination and aberrant behaviors. To investigate the role of H3R, CMA mice were treated daily with thioperamide, a selective blood-brain barrier permeable H3R antagonist, to block the action of histamine through this receptor. The thioperamide treatment did not affect the hypersensitivity status of mice, as increased serum IgE, histamine, and intracranial mast cell activation were observed in both saline and thioperamide-treated CMA mice. However, thioperamide effectively prevented depression-like behaviors in CMA mice. Furthermore, thioperamide ameliorated CMA-associated cortical demyelination and axonal loss compared to saline-treated CMA mice. Our findings strongly suggested that increased H3R signaling contributed to cortical demyelination and the development of depression-like behaviors in our CMA mice. Targeting histamine production or signaling may be a therapeutic strategy to reduce the risk of neurodegeneration and associated brain dysfunction in susceptible individuals. **Traditional Poster**

4. Schlafen Family Member Intra-Regulation during IFN- α Decreases TNBC Cell Proliferation

Savannah Brown (Corradi), Emilie E. Vomhof-DeKrey, Sarmad Al-Marsoummi, Marc D. Basson

Biomedical Sciences Graduate Student Basic Science Research

Triple negative breast cancer (TNBC) has a poor prognosis and no targeted therapy for treatment. Recently, a family of genes termed Schlafens, particularly SLFN12, has been shown to be critical in TNBC biology. Higher expression of SLFN12 correlates with chemosensitivity and better survival, yet no treatment is known to upregulate SLFN12 in TNBC. Our aim is to identify whether clinically used Interferon- α (IFN- α) can upregulate SLFN12 in TNBC and subsequently reduce proliferation. Understanding this relationship may provide insight into delivering targeted therapy for TNBC patients. We utilized a hairpin adenovirus to knockout SLFN12 (AdvShSLFN12) in MDA-MB-231, HS-578T, and BT-549 TNBC cell lines. Cells were treated with AdvShSLFN12

Basic Sciences

and IFN- α , alone and in combination. After treatment we analyzed viable cell numbers utilizing a colorimetric crystal violet assay and mRNA expression by RT-qPCR. Additionally, siRNA was used to knockdown additional SLFN family members. Treating TNBC cells with IFN- α significantly increased SLFN12 expression and reduced cell proliferation. However, when SLFN12 was knocked down with the hairpin adenovirus, TNBC proliferation was still reduced. We investigated the expression of other Schlafen family members in the absence of SLFN12 (AdvShSLFN12) and found that IFN- α significantly increased SLFN5, SLFN12L, and SLFN14 expression but not SLFN11 and SLFN13. Utilizing siRNA to SLFN5, SLFN12-Like, and SLFN14 in the presence of IFN- α has led to a complex IFN- α signaling cascade that must be further investigated. Taken together, we have concluded that IFN- α signaling decreases TNBC proliferation and the loss of SLFN12 does not block the mitogenic effect of IFN- α even though IFN- α can upregulate SLFN12, indicating that IFN- α is acting by multiple SLFNs and not SLFN12 alone. Additionally, SLFN5, SLFN12-Like, and SLFN14 expressions are induced with IFN- α signaling and are further induced with the loss of SLFN12. This data indicates a complex and novel intra-regulation signaling cascade between SLFN family members. **Traditional Poster**

5. Amyloid beta protein (A β 1-42)-induced endolysosome iron dyshomeostasis cause increases in reactive oxygen species, mitochondrial depolarization, and neurotoxicity

Darius N.K. Quansah, Peter W. Halcrow, Nirmal Kumar, Braelyn Liang, and Jonathan D. Geiger

Biomedical Sciences Graduate Student Basic Science Research

Alzheimer's disease (AD) is a widely prevalent age-associated neurodegenerative disease that is characterized clinically by decreased cognitive abilities and dementia as well as pathologically by the presence of amyloid beta plaques and intraneuronal accumulations of the highly fibrillogenic amyloid beta 1-42 (A β 1-42) protein and hyperphosphorylated tau protein. Implicated as well in the pathogenesis of AD are increased levels of reactive oxygen species (ROS) and iron dyshomeostasis. Amyloidogenesis is well known to occur in endolysosomes; acidic organelles that amongst other things contain high levels of divalent cations and these cations are released from endolysosomes when de-acidified. Endolysosomes are considered "master regulators of iron homeostasis", and neuronal cell death and neurodegenerative disorders continue to be linked to ferrous iron (Fe²⁺) induced ROS generation via Fenton-like chemical reactions. Because endolysosome de-acidification can induce lysosome stress responses that cause Fe²⁺ to be released from endolysosomes it was important for us to determine the extent to which and mechanisms by which A β (1-42) affect endolysosomes and induce neuronal cell death. Recently, the endolysosome-specific iron chelator deferoxamine (DFO) was found to reduce the amyloid beta burden in AD but by unclear mechanisms. We reported previously that DFO is endocytosed and by chelating endolysosome stores of ferric iron (Fe³⁺) it prevented the efflux of the readily releasable endolysosome stores of Fe²⁺ into the cytosol and other organelles. Thus, it was important for us to determine the effects of A β (1-42) on the endolysosome iron pool that might lead to an iron imbalance and increased ROS. Here, using SH-SY5Y neuroblastoma cells we show that A β (1-42) de-acidified endolysosomes, decreased endolysosome Fe²⁺ levels, increased cytosolic Fe²⁺ and ROS levels, increased mitochondria Fe²⁺ and ROS levels, depolarized mitochondrial membrane potentials, and increased cell death; effects all blocked by DFO. Therefore, an increased understanding of A β (1-42)-induced endolysosome iron disruption may provide novel insight into the A β (1-42) burden of AD and possibly new therapeutic targets.

Traditional Poster

6. Adenylate Cyclase and Cyclic AMP Mediate Ghrelin-Induced Increases in the Neuronal Excitability of the Dentate Gyrus Neurons

Chidiebele S. Oraegbuna, and Saobo Lei

Biomedical Sciences Graduate Student Basic Science Research

Ghrelin is an orexigenic hormone involved in a variety of bodily functions including stimulating growth hormone release, suppressing insulin release and it is also associated with chronic stress conditions. The ghrelin receptors are G protein coupled receptors that are widely expressed in different parts of the brain including the dentate gyrus of the hippocampus. The ghrelin receptors dimerize with the dopamine D1 receptors in the hippocampus that noncanonically signal through the adenylate cyclase intracellular signaling pathway. Although the ghrelin receptors are robustly expressed within the dentate gyrus, the signaling and ionic mechanism through which ghrelin affects the neurons of the dentate gyrus remains undetermined. Using whole cell patch clamp electrophysiology, we demonstrate that the application of ghrelin produced significant depolarization and increased action potential firing in the dentate gyrus neurons. Ghrelin-mediated depolarization was dependent on the activation of adenylate cyclase enzyme and cyclic AMP, whereas the inhibition of phospholipase C beta enzyme did not affect ghrelin-mediated excitation of dentate gyrus neurons. Evidence from this study suggests that ghrelin increases the excitability of the dentate gyrus neurons via a signaling and ionic mechanism similar to the dopamine D1 receptor signaling. Understanding how ghrelin affects the brain neurons would be valuable in formulating therapies for neurological diseases, such as anxiety disorders, epilepsy and schizophrenia. **Traditional Poster**

7. β -Melanocyte stimulating hormone excites dentate gyrus granule cells by EPAC-mediated depression of ATP sensitive K^+ channels

Phani Kumar Kola and Saobo Lei

Post-Doctoral Fellow Basic Science Research

Melanocortin 4 receptors (MC4Rs) are implicated in homeostatic function, obesity, and memory. Likewise, MC4Rs are expressed in the dentate gyrus granule cell (DG-GCs), which play a role in hippocampal memory formation. Whereas β -melanocyte stimulating hormone (β -MSH) selectively activates MC4Rs, the ionic and signaling mechanisms whereby β -MSH modulates the activity of DG-GCs remains unknown. Using whole-cell patch-clamp recordings, we showed that application of β -MSH (150 nM) depolarized DG-GCs and increased the frequency of action potential firing. Activation of MC4Rs in DG-GCs depressed an inwardly rectified K^+ (Kir) channel which was sensitive to micromolar concentration of Ba^{2+} . β -MSH-mediated depolarization was insensitive to ML418, Kir 7.1 channel blocker and SCH23390, a GIRK channel blocker, whereas Glibenclamide attenuated the β -MSH-mediated depolarization, suggesting that MC4R-elicited excitation of DG-GCs is mediated by inhibition of the ATP-sensitive K^+ channels. We further found that G proteins and exchange protein activated by cAMP (Epac) are required for β -MSH-elicited excitation of DG-GCs, whereas cAMP and PKA are not involved. Our results may provide a novel mechanism to explain the role of MC4Rs in learning and memory. **Traditional Poster**

8. Enhanced palmitoylation and activity of autism-associated human serotonin transporters are sensitive to downregulation by Escitalopram

Christopher R. Brown and James D. Foster

Medical Student Basic Science Research

Autism spectrum disorder (ASD) is a developmental disorder of the nervous system characterized by a deficiency in interpersonal communication skills and a pathologic tendency for repetitive behaviors and highly restrictive interests. The spectrum is a gradient-based construct used to classify individuals based upon the widely varying degrees of ASD phenotypes. In 25% of cases ASD has been linked to a genetic etiology. Additionally, 30% of patients exhibit hyperserotonemia or severely elevated whole blood serotonin (5HT). Subsequent studies on ASD have uncovered proband patients with rare mutations in the serotonin transporter (SERT) that manifest enhanced surface expression and 5HT transport capacity, suggesting that a disturbance in SERT function may be involved in the pathogenesis of ASD. Here, we confirm previous reports of enhanced kinetic activity and surface expression of the ASD SERT coding variant F465L and reveal that palmitoylation may be the responsible mechanism. We've identified that F465L SERT exhibits enhanced palmitoylation, transport capacity, and surface expression and is sensitive to inhibition with the irreversible palmitoyl acyl-transferase inhibitor, 2-bromopalmitate. Escitalopram is a selective-serotonin reuptake inhibitor demonstrated to be effective in modulating abnormal brain activation and undesired symptoms associated with ASD. When treated with escitalopram, previously enhanced F465L SERT palmitoylation, surface expression, and transport capacity were reduced to basal WT levels. Ultimately, these results implicate palmitoylation as a component in the mechanism of ASD pathogenesis and that escitalopram may function to rectify this process by inhibiting palmitoylation and subsequent functional enhancement of SERT.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/4c7d1cefadea479e8cd2bb8f931b9b2b1d>

9. Palmitoylation regulates norepinephrine transporter trafficking and expression and may be involved in the pathogenesis of orthostatic intolerance

Christopher R. Brown and James D. Foster

Medical Student Basic Science Research

Postural orthostatic tachycardia syndrome or orthostatic intolerance (OI) is an adrenergic disorder characterized by excessive plasma norepinephrine, postural tachycardia, and syncope. The norepinephrine transporter (NET) is the primary mechanism in controlling adrenergic homeostasis via reuptake of extracellular norepinephrine. Dysregulation of NET has been implicated in the pathogenesis of neuro-cognitive and autonomic disorders, making NET a target of interest for research and therapeutic intervention. Several lines of evidence indicate that regulation of NET activity and trafficking occur via reversible post-translational modifications like phosphorylation and ubiquitylation. S-Palmitoylation is a dynamic post-translational modification that controls protein localization, trafficking, and activity. In this study, we reveal that NET is a target for palmitoylation, and using the palmitoyl acyltransferase inhibitor, 2-bromopalmitate, we have uncovered several functional consequences. Within 90 minutes of 2BP treatment, NET palmitoylation was inhibited, decreasing transport capacity, cell surface and total NET expression

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within 120 minutes. Greater 2BP concentrations for longer time intervals revealed massive losses in total NET protein without changes in β -actin expression. The OI NET coding variant, A457P, has reduced transport capacity, cell surface and total expression compared to WT NET. Here we confirm that A457P hNET total protein is decreased and that transient co-expression with DHHC1 enhanced fragmentation of A457P. These results reveal a novel mechanism in the post-translational regulation of NET, and suggest that dysregulation of this process may contribute to the pathogenesis of orthostatic intolerance.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/a327dd321f1e46dbb1ccdfc5b7d2f19f1d>

10. Leukocytes as mediators of gut-brain communication

Dilini Ekanayake, Suba Nookala, Kumi Nagamoto-Combs

Biomedical Sciences Graduate Student Basic Science Research

Cow's milk allergy (CMA) tends to manifest with milder reactions, often associated with delayed behavioral problems. We have previously established that C57BL/6J mice sensitized to a bovine whey allergen, β -lactoglobulin (BLG, Bos d 5), produce BLG-specific IgE and develop behavioral abnormalities without severe allergic responses. Using BLG-sensitized mice as a mouse model of subclinical CMA, we previously demonstrated that cortical demyelination and neuroinflammation develop with prolonged allergen exposure from consuming a whey protein (WP) diet for 2 weeks. These observations led us to hypothesize that repeated allergen consumption by individuals with mild food hypersensitivities promotes immune cell migration to the central nervous system (CNS), leading to neuroinflammatory pathologies and subsequent behavioral changes. To test this hypothesis, we compared the number of leukocytes in the brains of sham and BLG-sensitized mice by flow cytometry and determined the immunophenotypes of these central leukocytes. When compared to naïve mice that were never exposed to WP, both sham and BLG-sensitized mice showed significant increases in the number of cells expressing the common leukocyte markers CD45, pan T cell markers CD3, cytotoxic T cell markers CD8, integrin CD11b, myeloid cell markers CD14, and co-stimulatory markers CD86. This finding indicated that consumption of the allergenic dietary protein alone stimulated the trafficking of leukocytes to the CNS as mediators of gut-brain communication, regardless of the sensitization status of the mice. Further characterization of CNS leukocyte phenotypes is underway as a step for elucidating the mechanism of CMA-associated behavioral and neuropathologies.

Traditional Poster

11. Withdrawn

12. Continuous consumption of whey protein maintains neuroinflammation in a mouse model of asymptomatic cow's milk allergy

Geetika Verma and Kumi Nagamoto-Combs

Post-Doctoral Fellow Basic Science Research

Asymptomatic sensitization refers to hypersensitization to food where an offending food is tolerated without immediate allergic reactions. Using mice asymptotically sensitized to a bovine whey allergen, β -lactoglobulin (BLG, Bos d 5), we have previously shown that chronic exposure to the allergen results in behavior changes with increased neuroinflammation and cortical demyelination. However, whether allergen avoidance can resolve these pathologies is unknown. Thus, we examined whether the immune responses and behavior changes observed in whey-fed BLG-sensitized mice would be resolved if the allergen was avoided. To model allergen avoidance, we placed the mice on a whey-free control (CTL) diet for additional 2 weeks following the initial allergen exposure with a whey-protein (WP) diet. Other groups remained on the WP diet for the 2-week "recovery phase." The grip-strength test indicated that BLG-sensitized mice on either diet and sham mice on the WP diet showed a decline in limb strengths, suggesting that WP consumption alone affected their motor strengths regardless of the sensitization status. In addition, there was significant improvement in spatial memory in sham and BLG-sensitized mice after their diet was switched from WP diet to CTL diet. Furthermore, significant increases in various inflammatory cytokines and chemokines were observed in the midbrain region of BLG-sensitized mice that stayed on the WP diet. In contrast, removing WP from their diet decreased these inflammatory markers. Moreover, CD45 immunopositivity in thalamus was significantly increased in BLG-sensitized mice that stayed on WP diet. These results suggested that continuous exposure to a dietary allergen influenced motor function and maintained neuroinflammation, underscoring the importance of allergen avoidance even in the absence of severe reactions. **Traditional Poster**

13. Predicting Cancer from Cell-Free DNA : A Machine Learning Approach

Sakuntha D. Gunarathna, Nazim Belabbaci, Regina Nguyen, Aerica Nagornyuk and Motoki Takaku

Biomedical Sciences Graduate Student Basic Science Research

Cell-free DNA (cfDNA) is a promising biomarker for non-invasive cancer patient screening as it carries genetic and epigenetic information of the cell origin. In cancer patients, certain populations of cfDNA are released from cancer cells, making it an attractive tool for predicting cancer patient outcomes. In this study, plasma samples from the Sanford Biobank were used to purify cfDNA and identify differences between breast cancer patients and healthy donors at active gene regions. To confirm these enrichment patterns, we looked at publicly available cfDNA data. However, the large variations and low signal-to-noise ratios in the public data prompted us to establish our own machine learning-based pipeline. The developed model successfully distinguished cancer patients from healthy donors with high accuracy (Validation: 94%; AUC: 92%). The results suggest that the established method has the potential for clinical study, highlighting the utility of machine learning algorithms in predicting cancer patient outcomes. The use of cfDNA as a non-invasive biomarker for cancer patient screening has gained significant attention, and this study provides important insights into how machine learning algorithms can be

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used to predict cancer patient outcomes using cfDNA data. The findings may pave the way for the development of more accurate and reliable non-invasive screening methods for cancer patients, ultimately improving patient outcomes. **Traditional Poster**

14. PARP-1 and PR-Set7/H4K20me1 collaborate in regulating gene expression programs during development and heat stress response

Gbolahan Bamgbose and Alexei Tulin

Biomedical Sciences Graduate Student Basic Science Research

Histone modifications are critical for the regulation of gene expression, as they alter chromatin structure and modulate the accessibility of DNA to transcription factors. In addition, histone modifications can also serve as binding sites for protein effectors, such as transcriptional activators and repressors, that modulate gene expression. PARP-1, a poly(ADP-ribose)polymerase associated with chromatin, regulates gene expression in response to developmental changes and environmental cues such as heat stress. Although previous studies have reported that PARP-1 plays a role in regulating gene expression, the underlying mechanisms are poorly understood. We used a histone peptide array, chromatin immunoprecipitation sequencing (ChIP-Seq), and RNA sequencing (RNA-Seq) to examine how PARP-1 interacts with various histone modifications during transcriptional regulation. We employed *Drosophila* third-instar larvae as a model, which undergo notable transcriptional changes during development and in response to heat stress. Our findings showed that PARP-1 binds specifically to certain histone modifications, including H4K20me1, H3K4me1, H3K36me1, and H3K9me1 marks. Interestingly, PARP-1 binding may be inhibited by H3K9me2/3 marks. PR-Set7, the sole methylase of H4K20, and PARP-1 mutant animals undergo developmental arrest during the larval to pupal transition. Further analysis revealed that PR-Set7- and PARP-1-dependent gene expression programs are positively correlated, suggesting that PR-Set7/H4K20me1 and PARP-1 may regulate similar gene expression programs to facilitate development. During heat stress, PARP-1 and PR-Set7 are required to activate heat shock genes, and we also showed that H4K20me1 enrichment is dynamically regulated during this process. Overall, our findings suggest that PARP-1 controls gene expression through specific interactions with histone modifications, particularly H4K20me1. H4K20me1 may be crucial for PARP-1 binding at both developmentally regulated and heat shock genes during heat stress. Furthermore, the dynamic regulation of H4K20me1 may play a significant role in regulating these genes. This study provides important insights into the molecular mechanisms of PARP-1-mediated transcriptional regulation during development and in response to external stimuli.

Traditional Poster

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15. Electrophysiological Analysis of Protease Activated Receptor 1's activation in the Lateral Amygdala

Sean K Pollack and Saobo Lei

Biomedical Sciences Graduate Student Basic Science Research

The Lateral Amygdala (LA) is a known regulator of fear and anxiety that receives inputs from both the thalamus and cortical regions. With recent studies showing the presence of Protease Activated Receptor 1 (PAR1) on LA neurons, our research aims to further the understanding of PAR1's significance as it pertains to LA neurons. Our initial results indicate that PAR1 activation by a PAR1 specific agonist causes activation of Voltage Gated AMPA channels in LA neurons on the pre-synaptic side. This was discovered utilizing an electrophysiology technique known as Paired Pulse (PP), where pre-synaptic neurons were stimulated from either the Thalamus (T-LA) or Cortical (C-LA) regions, which innervate the LA. We then focused on how PAR1 activation effected the soma of LA pyramidal cells. This was performed via IV curve and holding current analysis on Te3 neurons which innervate the LA. Our results suggest induction of an inward current following PAR1 agonist application. These results, paired with future experiments, will allow for a furthered understanding of how PAR1 activation contributes to fear and anxiety.

Traditional Poster

16. SLFN12 Expression Increases from 1st to 2nd Trimester of Gestation but then Decreases with a One-Carbon Metabolite Diet in Cow Mammary Tissue

Odele K. Rajpathy, Dr. Emilie E. Vomhof-DeKrey, Elizabeth Prezler, Dr. Alison Ward, Dr. Joel Caton, Dr. Marc D. Basson

Undergraduate - MPH Graduate Student-

Basic Science Research

Introduction: The Schlafen (SLFN) family proteins are critical regulators of cell proliferation, differentiation, self-restoration, and cell cycle progression. Human SLFN12 is known to decrease cell viability in triple-negative breast cancer cells. In this study, we sought to investigate the developmental expression of Slfn12 in cow mammary tissue, which is the most analogous to human mammary tissue. Additionally, we investigated the effect of a one-carbon metabolite diet (OCM) diet and a restricted (RES) diet on Slfn12 mRNA expression. The OCM supplementation diet provides the universal methyl donor group necessary for the methylation of promoter CpG islands and downregulation of gene expression.

Methodology: A restricted diet has a decrease in calorie intake compared to control (Ctrl) while OCM diet includes methylation-promoting dietary supplementation such as those found in dark green leafy vegetables and cruciferous vegetables. RNA was isolated from fetal and maternal mammary tissue on days 63 and 161 of gestation. cDNA was synthesized and then Slfn12 mRNA expression was measured by quantitative PCR analysis between diets, tissue types, and gestational periods.

Results: In maternal mammary, there is a greater expression of Slfn12 in comparison to fetal mammary at both days 63 and 161 of gestation and both fetal and maternal mammary had more Slfn12 at day 161 compared to day 63. There was a significant decrease in Slfn12 expression in the maternal mammary between control (Ctrl) and Ctrl + OCM diet at day 63 and 161, suggesting Slfn12 expression may be regulated by methylation. There was a significant increase in Slfn12

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expression in maternal mammary tissue on RES + OCM compared to the Ctrl + OCM diet, suggesting a partial rescue of Slfn12 expression when the cow's diet was calorie restricted.

Conclusions: Slfn12 is more greatly expressed in maternal mammary tissue in comparison to fetal mammary tissue. Slfn12 expression is decreased with OCM supplementation but rescued with a restricted diet.

Significance: The changes observed with OCM supplementation suggest a possible methylation regulation on Slfn12 mRNA expression in cow mammary tissue. Investigation of the relationship between dietary and genetic factors such as the OCM diet and Slfn12 expression, analogous to the human SLFN12, could help target breast cancer development. **Traditional Poster**

17. Disseminated Histoplasmosis due to Previously Undiagnosed Hairy Cell Leukemia

Hannah Ganzel, Riley Madigan, and Dr. Avish Nagpal

Medical Student Clinical Science Case Report

Histoplasmosis is a common endemic fungal infection in the United States. Although a lower respiratory tract infection is the most common clinical manifestation of an infection with *Histoplasma capsulatum*, in immunocompromised patients it can lead to a widely disseminated disease. In this report, we describe the case of a 58-year-old male who presented with a three-week history of fever and dry cough. Chest x-ray and computed tomography (CT) scan of the chest, abdomen, and pelvis revealed the presence of a large lung mass with multiple liver lesions suspicious for a metastatic disease. Biopsy of the liver lesions revealed fungal yeast forms. Further workup revealed significantly elevated urine *Histoplasma* antigen levels. Liposomal Amphotericin B was initiated, but was subsequently transitioned to Itraconazole due to decline in renal function. The patient's hospital course was complicated by refractory fever and leukopenia despite appropriate treatment. A bone marrow biopsy was pursued that revealed the presence of hairy cell leukemia. Patient was successfully treated with cladribine and rituximab. This case highlights the importance of maintaining a high index of suspicion for an underlying undiagnosed hematological malignancy or other forms of immunosuppression in patients presenting with disseminated endemic fungal infections.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/3a063036ec334624a658f8d39a367b4f1d>

18. Superior Mesenteric and Portal Vein Thrombosis Secondary to COVID-19 Infection

Aishwarya Sharma MS3, Avish Nagpal MD

Medical Student Clinical Science Case Report

Background: Infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which causes COVID-19, induces a prothrombotic and proinflammatory state which increases the risk of serious thrombotic disorders such as deep vein thrombosis and pulmonary embolism. Acute superior mesenteric and portal vein thrombosis represents a less common type of venous thromboembolism, even among the prothrombotic complications of COVID-19.

Case: A 59-year-old female with ongoing tobacco use but no active medical conditions presented to the clinic with fever, chills and fatigue of 3 days duration. Her initial evaluation at an outside facility revealed the presence of leukocytosis, elevated C-reactive protein as well as elevated liver enzymes. Imaging of the abdomen was performed for further evaluation in the form of computed tomography which revealed the presence of venous thrombosis in the superior mesenteric vein and portal vein. Additionally, numerous small low-attenuation lesions were noticed in the right hepatic lobe which were concerning for micro abscesses. She had no personal or family history of any clotting disorder. Her usual work-up for thrombophilia was negative but a SARS-CoV-2 real-time reverse transcriptase polymerase chain reaction test was positive. No other pathology was found in the vicinity to explain her unusual location of vascular thrombosis. Therefore, it was determined that the patient had a hypercoagulable state due to COVID-19 infection resulting in thrombosis of portal venous system complicated by septic thrombophlebitis leading to multifocal

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liver abscesses. She was treated with appropriate intravenous antibiotics with quick resolution of symptoms. She was also started on anticoagulation for deep venous thrombosis.

Conclusion: This case adds further evidence to previously published literature that suggests that COVID-19 can lead to a hypercoagulable state with insight into rare thrombotic complications of superior mesenteric and portal vein thrombosis occurring in a relatively mild COVID-19 infection. We recommend that COVID-19 testing be performed as part of any work-up for thrombophilia.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/81f2169923e2442d9c7a9882e8a6bc871d>

19. Case of Pituitary Macroadenoma with Apoplexy Requiring Transsphenoidal Resection in the Third Trimester of Pregnancy

Megan Corn MSIII, Austin Nickell MSIII, Adam Jackson MD, and Collette Lessard MD

Medical Student Clinical Science Case Report

Introduction: Prolactinomas resulting in pituitary apoplexy are an uncommon obstetrical complication. The purpose of this case report is to describe a case of sudden onset of apoplexy from a pituitary macroadenoma in the third trimester of pregnancy, which required a transsphenoidal resection during pregnancy.

Case: A 35-year-old G0 presented for an infertility and oligomenorrhea consult with a prior diagnosis of polycystic ovarian syndrome. Repeat evaluation for oligomenorrhea found an elevated prolactin level of 69.76 ng/mL, along with elevated DHEA-S of 524, and HgbA1c of 5.7%. Repeat fasting prolactin was 59 ng/mL. The patient denied any visual or neurological symptoms. MRI of the pituitary was recommended and ordered, and infertility treatment started. The patient decided to forego imaging. Within a few months, the patient was pregnant. At 27 weeks gestation, the patient developed sudden onset, partial visual field loss to the right eye and presented to her optometrist. MRI of the pituitary was completed and identified a sellar mass with suprasellar extension measuring 2 x 1.3 x 2.1 cm and findings consistent with a recently hemorrhaged pituitary macroadenoma or pituitary apoplexy. There was also associated superior displacement of the optic chiasm. Neurosurgery and maternal fetal medicine consults were obtained. Due to the risks of permanent optic nerve damage without treatment, the patient underwent endoscopic endonasal transsphenoidal hypophysectomy with continuous intraoperative fetal monitoring at 30 weeks 1 day gestation. A cesarean section was advised for delivery due to this recent procedure. A primary low transverse cesarean section was performed at 39 weeks. Her delivery and postpartum period were without complications.

Discussion: Pituitary apoplexy presenting in pregnancy is a rare and potentially life-threatening disorder due to an acute ischemic infarction or hemorrhage of the pituitary gland. Surgical management of the pituitary gland in pregnancy is rarely recommended, except in cases of severe visual disturbance and uncontrolled Cushing's disease. We present a case of transsphenoidal resection of a pituitary macroadenoma in the third trimester of pregnancy with intraoperative fetal monitoring to add to the medical literature of this rare event.

Traditional Poster

20. Infectious Endocarditis Leading to Multiple Aorto-Cavitary Fistulas

Ellen A. Erie, BS, Abhishek Matta, MD

Medical Student Clinical Science Case Report

Infectious endocarditis (IE) is an infection of native or prosthetic heart valves, the endocardium, or an intracardiac device. IE can rarely lead to the development of multiple aortocavitary fistulas which require surgical intervention. This report describes the case of a 34-year-old male, with a history of intravenous (IV) methamphetamine use, that presented to the emergency department with acute pleuritic chest pain. Chest computed tomography angiography (CTA) showed lung nodules consistent with septic emboli and aortic root dilation at the sinus of Valsalva. Blood cultures grew *Streptococcus mitis*. Transesophageal echocardiogram (TEE) demonstrated fistulous communications from the non-coronary cusp of the sinus of Valsalva to the right atrium and right ventricle. The patient underwent Bio-Bentall aortic root replacement with tissue aortic valve replacement and has made a successful recovery. This case highlights the importance of a comprehensive cardiac workup in patients that are at high risk of IE and its ensuing complications.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/3f81a732aa9e4581820e8b3cb167d7351d>

21. Withdrawn

22. A 60 year-old Patient with Progressive Shortness of Breath: Unusual Presentation of a Rare Disease

Julia C. Dworsky

Medical Student Clinical Science Case Report

Background: Primary cardiac lymphoma (PCL) is an exceedingly rare condition, with a prevalence varying from 1% to 2% of primary cardiac tumors. In this paper, a 60-year-old male who died during cardiac surgery and was later diagnosed with PCL is described. This paper aims to show an unusual presentation of a rare disease and demonstrate the importance of system-based history taking, even in the absence of an initial high degree of suspicion, that could potentially have led to early diagnosis of PCL.

Case description: A 60-year-old male patient with no prior cardiac history was initiated on an outpatient cardiac evaluation following shortness of breath and symptoms that were felt to be related to atrial fibrillation, sinus node dysfunction, and bradycardia. He subsequently underwent an uncomplicated dual chamber pacemaker placement for the progression of his symptoms. Two weeks following pacemaker implantation, he required admission to the intensive care unit due to increased shortness of breath, pericardial effusion, and bilateral pleural effusions. An echocardiogram revealed a mass in the right atrium that was not observed on his initial echocardiogram five months ago. As the patient deteriorated over four days, urgent surgical intervention was deemed necessary to evacuate the pericardial effusion and excise the cardiac mass. Intraoperatively, the patient was found to have an intracardiac lymphoma with extensive

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mediastinal metastases. He ultimately could not be weaned from cardiopulmonary bypass. The final pathology report revealed diffuse large B-cell lymphoma of the heart.

Conclusion: Primary cardiac lymphoma is a rare and rapidly progressing tumor with a poor prognosis. The discovery of PCL poses several challenges as symptomatic presentations can mimic many common cardiac conditions, contributing to its often too-late diagnosis. A question remains if a system based detailed history at the time of his initial presentation could have led to clues towards an earlier diagnosis of PCL, accelerating the initiation of treatment modalities and potentially improved outcomes. Learning about the varied presentations this disease can manifest will aid clinicians in raising a high degree of suspicion for PCL in a cardiac evaluation.

Traditional Poster

23. Scleredema in the Setting of Monoclonal Gammopathy of Unknown Significance with new onset Raynaud's Phenomenon

Nickell L. Austin, Megan C. Corn, Mannuru R. Devendranath, Alicia M. Hinz

Medical Student Clinical Science Case Report

Introduction: Scleredema is a rare and progressive connective tissue disorder characterized by chronic and diffuse induration of the skin. It begins at the upper back and neck and progresses proximal to distal to involve the shoulders, trunk, and arms. Type 2 scleredema is associated with hematological findings including multiple myeloma and monoclonal gammopathy of undetermined significance. The disease can be complicated by myelodysplastic syndrome, diabetic vascular complications, and pleural or pericardial effusions.

Case: A 40-year-old male with a 3 year history of MGUS, progressive skin thickening, Raynaud's phenomenon, dysphagia, dyspnea and peripheral neuropathy presented to clinic. Cutaneous thickening of the face and neck began at the age of 30 and progressed to involve his shoulders, back, chest, torso, and arms. A monoclonal gammopathy test revealed an M-spike increase to 0.8 g/dL IgG kappa and bone marrow biopsy showed 5-9% kappa light chain-restricted plasma cells. Biopsies performed of the neck, chest, and forearm were diagnostic for scleredema. Antinuclear antibody (ANA), Hep2, anti-scleroderma 70 antibody, anti-centromere antibody, ribonucleic acid polymerase III antibody, and vascular endothelial growth factor labs were all negative. Renal function tests were within normal limits and no light chains were detected in his urine. The patient declined treatment at this time. At the age of 42 the patient presented with a 60 pound weight loss. Workup revealed a 3.5 x 3.6 cm lytic lesion in his L5 vertebral body, splenomegaly, and external iliac and pelvic adenopathy. Radiation with curative intent to the L5 plasmacytoma was pursued and systemic chemotherapy was initiated.

Discussion: Scleredema's insidious onset can hinder a timely diagnosis and its symptoms can readily be mistaken for other sclerosing skin conditions. Features that help distinguish scleredema from other skin conditions include negative antibodies to ANA by Hep2, anti-Scl-70, ACA, and anti-RNA polymerase III, nailfold capillary testing, and the characteristic skin thickening of the face, neck, and upper back and later involves the shoulders, trunk, and arms with sparing of the hands. Histopathology of affected skin shows increased interstitial mucin. Scleredema with MGUS has been shown to improve with systemic chemotherapy, notably with cyclophosphamide, vincristine, melphalan thalidomide, or bortezomib; this therapy can also be coupled with steroids for further benefit. **Traditional Poster**

24. A novel therapy for a rare condition: continuous anakinra infusion for a patient with adult onset stills disease and macrophage activation syndrome

Mitchell Gullickson, Laura Nichols MD, Meghan Scheibe MD

Medical Student Clinical Science Case Report

Case: A 41-year-old female presented with synovitis to the bilateral wrists, knees and right ankle. She was noted to have anemia, elevated inflammatory markers and negative rheumatoid factor and anti-CCP antibodies. Additional autoimmune workup was negative. She was diagnosed with presumed seronegative rheumatoid arthritis and started on corticosteroids. Her symptoms progressed in spite of appropriate treatment with methotrexate and adalimumab, with eventual development of bilateral thigh rash concerning for adult-onset still's disease (AOSD). She subsequently presented to the ER with worsening rash, joint pain and odynophagia. During her admission she experienced fever to 101 oF, ferritin 4,072 ng/mL, AST 413 U/L, fibrinogen 150 mg/dL and pancytopenia as well as mild hepatosplenomegaly. She underwent upper endoscopy due to odynophagia, which revealed rare viral inclusions on CMV staining. CMV viral load was below 35 IU/mL. There was concern for macrophage activation syndrome given significantly elevated ferritin in the context of AOSD. The patient was started on high dose steroids and anakinra. She was discharged without treatment for CMV given negligible viral load and pending biopsy results. In spite of initial improvement, she worsened and presented again for care. CMV viral load was 66,500 IU/mL, with ferritin elevated to > 33,500 mg/mL. Bone marrow biopsy showed increased hemophagocytic histiocytes and megakaryocytic hyperplasia. The patient was started on ganciclovir for CMV esophagitis and solumedrol with continuous infusion of anakinra, titrated up to a maximum of 1.6 mg/kg/hr with gradual improvement in ferritin, cytopenias, liver enzymes and inflammatory markers. She was discharged with subcutaneous anakinra and oral valganciclovir.

Discussion/Conclusion: The presentation demonstrates a complex case of macrophage activation syndrome in a patient with AOSD, likely worsened by subsequent immunosuppression related CMV esophagitis. Traditionally, treatment has consisted of corticosteroids with etoposide and/or cyclosporine, therapies with significant cytotoxic effects. Therefore, newer therapies directed at inflammatory cytokines are being utilized including the IL-1 inhibitor, anakinra. Currently, there have been only a few case series demonstrating successful treatment with anakinra infusion in MAS. Our current case adds to the literature and increases awareness of a novel therapy with less cytotoxicity. **Traditional Poster**

25. Devils in the Details: A Case Report of Amphipod Anthropophagy

Cole E. Rokke, Susan J. Roe, MD

Medical Student Clinical Science Case Report

Anthropophagy, destructive changes on a body due to prey or scavenger animals, can result in perplexing injuries and may be caused by land or aquatic animals, including amphipods. Because of this, it is important to be able to differentiate between antemortem and postmortem trauma. We report a case of a death due to drowning with evidence of anthropophagy.

A 62-year-old male, last known to be fishing from a dock on Devils Lake in North Dakota, was found floating near the lake shore. The most common amphipods inhabiting Devils Lake are *Gammarus lacustris* and *Hyaella azteca*.

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Autopsy examination revealed pulmonary congestion and edema, brown fluid in the stomach, a few scattered ecchymoses, and atherosclerotic coronary artery disease. Superficial pink-tan abrasions with irregular borders were located on the scalp, face, and in bandlike distributions on the anterior neck and sacral region. Small amphipods were present adjacent to the sacral abrasions. The cause of death was listed as drowning, and the manner of death was classified as an accident.

This case report will illustrate the importance of differentiating antemortem from postmortem injuries caused by amphipod anthropophagy, through the analysis of abrasions on the body of a man who accidentally drowned.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/9b7eab9a1c504842a1711edf308f45de1d>

26. Endovascular Management of External Iliac “Snowplowing” Using “Reverse Snowplow” Technique During Transcatheter Aortic Valve Replacement

Anyamaria Edwards, John Beaudrie

Medical Student

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An 84-yo female presented to the clinic with progressive dyspnea. Echo demonstrated severe aortic stenosis. Evaluation deemed her a suitable candidate for TAVR. The patient's anatomy was evaluated using 3D CTA analysis. Vessel stenosis, skin to femoral artery distance, and tortuosity of the CFA access site were evaluated retrospectively to identify risk factors for complications. Iliofemoral tortuosity scores were calculated using the iliofemoral assessment protocol. The true length of the vessel was measured by tracing the 3D path from the aortic bifurcation to the femoral bifurcation. Aortoiliac and infrainguinal PAD was assessed using the TASC system. Skin to femoral artery distance was measured perpendicularly from common artery to skin. Through the right CFA, a pigtail catheter was placed into the left ventricle using a straight wire. The wire was replaced with an Amplatz extra stiff wire and advanced into the ventricular apex without difficulty. A CoreValve delivery system was then inserted over the Amplatz wire but was unable to advance beyond the proximal external iliac artery. The CoreValve delivery system was withdrawn, and the capsule was noted to be overdriven and flared over the tip. The Amplatz wire was replaced with a Lunderquist wire, and the sheath was again, unsuccessfully advanced past the point of stenosis. Endovascular imaging noted retrograde “snowplowing” and complete occlusion of the external iliac artery. An EverCross balloon was placed proximally to the common iliac artery and retracted distally, reversing the snowplowed intima, relieving the occlusion. This segment was then stented with an EverCross stent. Pre-op evaluation helps identify anatomical features specific to anticipated access location that would preclude patients from safely undergoing TAVR. Further investigation to determine patients at risk for these complications should be evaluated. On retrospective analysis our patient did have anatomic risk factors for vascular injury in terms of iliofemoral tortuosity score during TAVR. In this patient, overdriving the delivery device created an edge capable of lifting and “snowplowing” the intima, resulting in occlusion of the external iliac artery. Repair of this intimal injury with a balloon to “reverse snowplow” the intima and restore flow is a novel method of endovascular repair. This major vascular complication, as defined by a VARC III classification, was successfully used to restore flow and obtain hemostasis.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/a921daf7a1a244359d3d5e4770daa63d1d>

27. A Case of Pituitary Apoplexy Masquerading as Meningitis

Carter Schimke, Nikitha Sathish Kumar, DO and Niyutchai Chaithongdi, MD

Medical Student Clinical Science Case Report

Pituitary macroadenoma is a relatively rare condition with an incidence of 3.23 per 100,000 males per year.¹ Presentation is highly variable and depends on adenoma size, level of endocrine activity, and presence of a complication called apoplexy. Among people with pituitary adenomas, approximately 2-12% develop apoplexy, increasing diagnostic difficulty. A case of a healthy 18-year-old male with meningeal signs that failed to improve despite antimicrobial therapy demonstrates the nuances involved in pituitary apoplexy diagnosis and management. Following a 5-day history of fevers (T_{\max} 104.7 F) and meningismus, a young man was brought to a medical facility where initial work up showed mild leukocytosis (11.7) and severe hyponatremia (122). CT of the head was negative. Lumbar puncture (LP) yielded WBC: 4.0, RBC: 168, Glucose: 52, and Protein: 176. These LP findings were not strongly indicative of meningitis; however, the patient was initiated on empiric coverage with ceftriaxone, vancomycin, and acyclovir pending meningitis/encephalitis panel. This panel returned negative, and the patient failed to improve prompting MRI of the brain and subsequent sellar-specific MRI. This showed a pituitary macroadenoma (2.6 x 2.1 x 1.7 cm) with peripheral enhancement suggestive of hemorrhage, illustrating the complication of pituitary apoplexy. Additionally, the patient had flattening of the optic chiasm. Given the need for neurosurgery and endocrinology services, the patient was transferred to higher level care where he was hypotensive and marginally responsive to fluids/pressors. Endocrine evaluation indicated concomitant panhypopituitarism and arginine vasopressin resistance. With emergent supplementation with IV steroids and levothyroxine, the patient's hypotension and lethargy resolved. On interval assessment, the patient's pituitary apoplexy did not progress. However, due to the size of pituitary adenoma and his apoplexy, he required non-urgent transsphenoidal resection following endocrinologic optimization. He also required visual field testing to due to optic chiasm flattening. This case is highly instructive in identifying pituitary apoplexy as a complication of pituitary macroadenoma. In this situation, while meningitis was firstly considered, the patient did not improve and further work up was delayed; therefore clinicians should always initially consider a wide differential diagnosis. While hoof beats are usually horses, we should not forget the zebras.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/6f0f5e40ea0f40cfac6789a5d98198b61d>

28. Cisplatin Induced Nephrotoxicity in Renal Progenitor cells (CD133⁺/CD24⁺) and CD24⁺ cells

Eloho Ighofose, Sarmad Al-Marsoummi, Scott Garrett, Donald Sens, Aaron Mehus, Seema Somji

Clinical & Translational Science Graduate Student Clinical Science Research

The proximal tubule segment of the kidney is sensitive to damage by drugs and toxicants. Cisplatin is an antineoplastic drug used to treat solid-organ cancers and is a severe cause of nephrotoxicity in patient treatment. Previously, our lab isolated two different populations of cells (CD133⁺/CD24⁺ and CD24⁺) from the human proximal tubular cell line RPTEC/TERT1. The CD133⁺/CD24⁺ cells displayed stem-like characteristics, whereas the CD24⁺ cells were more

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differentiated and lacked stem-like features. This study aimed to understand the difference between the two cell lines in response to the effects of cisplatin toxicity. The CD133⁺/CD24⁺ and CD24⁺ cells were exposed to three different concentrations of cisplatin and went through six serial passages. After passaging, these cells were grown in media without cisplatin to see if they would return to their normal phenotype and genotype. The results of this study show that the CD133⁺/CD24⁺, which represents the renal progenitor/stem cells of the proximal tubule, when exposed to cisplatin, were more resistant to the effects of cisplatin compared with the differentiated CD24⁺ as evidenced by morphological changes. Gene expression analysis for KRT7, KRT19, and Fibronectin1 (markers of renal damage) showed increased expression in both cell populations. However, the CD133⁺/CD24⁺ cells showed a reversal in morphology when cisplatin was removed from the growth media, whereas the CD24⁺ cells did not revert to their original morphology. The double positive cells regained their ability to form domes indicative of vectorial active transport, whereas the single positive cells did not regain their ability to create domes. In conclusion, our data show that the stem cell population in the proximal tubular cells is more resistant to cisplatin's cytotoxic effects than CD24⁺ differentiated cells. These differences may have implications in the treatment of cancer patients that develop acute and chronic kidney disease due to treatment with cisplatin and other cytotoxic drugs. **Traditional Poster**

29. Outcomes in Spine Trauma with a dedicated Spine Surgeon versus General Neurosurgeon on-call: A Retrospective Review

Mathies A, Floyd E, Ahmeti M, Sang T, Baird R

Medical Student Clinical Science Research

In many regional hospitals in the U.S. and globally, availability of spine surgeons may vary, and the medical safety net may include fellowship-trained spine surgeons of orthopedic or neurosurgical background, or general neurosurgeons without fellowship training. This report investigates whether management of acute spinal injuries may differ based on the training of the on-call spine team.

This study was a retrospective cohort reviewing patients over 18 years old with acute cervical or thoracolumbar trauma presenting to a Level-I trauma center in the Upper Midwestern United States. Age, sex, race, BMI, and comorbidities were collected. Outcomes examined included 30-day mortality and readmission, complications (constipation, ileus, deep vein thrombosis/pulmonary embolism, infection, skin breakdown), and length of time from presentation to operating room, consult to charted final plan, and length of surgery. These were compared between patients seen by an on-call general neurosurgeon versus those seen by a fellowship-trained spine surgeon.

447 patient charts were examined. Of the outcomes examined, time to operating room and time to charted final plan were significantly longer ($p > 0.05$) for patients seen by a general neurosurgeon than by a fellowship-trained spine surgeon. Mean time to surgery was 58.39 versus 48.88 hours, and time to charted plan was 34.83 versus 21.36 hours for general versus spine fellowship trained, respectively. The number of complications was not sufficient to detect a difference by provider type. Length of hospital and intensive care stay were not significantly different by type of provider. Interestingly, this study also detected a significant increase in 30-day mortality by age (> 65), coexisting diabetes, congestive heart failure (CHF), and hypertension. This study examined the effect of type of provider, whether general neurosurgeon or fellowship-trained spine surgeon, on several factors, including time to intervention, length of stay, and 30-day mortality in spine trauma patients. Similar demographics were observed in both groups of

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patients. We also found worsened 30-day mortality in patients with preexisting conditions including diabetes, CHF and hypertension. These results suggest that improved patient outcomes may be obtained by retaining spine-fellowship trained providers to consult on and triage acute spinal trauma patients. They may also reinforce the benefits of medical co-management for these patients.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/8daa2bb52af44d1c995baec89dac98551d>

30. Population-Based Evaluation of Total Protein in the Cerebrospinal Fluid

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Medical Student Clinical Science Research

Introduction: Elevated cerebrospinal fluid (CSF) protein is an important biomarker for detecting blood-CSF barrier and blood-brain barrier dysfunction associated with numerous neurologic disorders. Worldwide, the upper limits of normal CSF protein levels range widely (mean, 46 mg/dL; range, 20-79 mg/dL), but have not been defined in a large community-based population.

Methods: The goal of this study was to establish the normal range of CSF protein in a community-based population using the Mayo Clinic Study of Aging (MCSA) and to evaluate factors that contribute to CSF protein variability. CSF protein was obtained from participants aged 32 to 95 years between 11/1/07 and 10/1/17, as part of routine data collection for the MCSA, a longitudinal, population-based study of residents of Olmsted County, Minnesota. CSF protein was recorded along with variables that could possibly influence its variability including age, gender, and diabetes.

Results: 633 participants (58.1% male, 99.1% white) underwent LP with recorded CSF protein; average age was 70.9 years (SD: 11.6). Mean CSF protein was 52.2 mg/dL (SD: 18.5) with a 95% reference interval of 24.0 – 93.4 mg/dL (range 14.0 – 148.0). Spinal stenosis and hypertension were associated with higher CSF protein on single variable analysis ($p < 0.001$). Increasing age, male gender, and diabetes were all independently associated with higher CSF protein ($p < 0.001$) on multivariable analysis. 83.9% ($N=531$) of our sample had CSF protein greater than 35 mg/dL, the Mayo Clinic upper limit of normal. Individuals with CSF protein above 35 mg/dL were more likely to be male ($p < 0.001$), older ($p < 0.001$), or have a diagnosis of cerebrovascular disease ($p = 0.006$), diabetes ($p = 0.009$), or hypertension ($p < 0.001$). Among the 66 participants with repeat LPs within 2.5 years, the coefficient of reliability was 26.72 mg/dL. 12 (17.9%) had a CSF protein difference of ≥ 20 mg/dL between serial LPs and 4 (5.97%) had a difference ≥ 25 mg/dL. Spinal stenosis was associated with a higher difference in CSF protein between LPs ($p = 0.049$).

Conclusions: This large population-based study showed that CSF protein can vary significantly among individuals and between repeat lumbar punctures. Elevated CSF protein was independently associated with older age, male gender, and diabetes. Our findings emphasize the necessity of evidence-based reevaluation and standardization of CSF protein metrics, especially for age.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/784ffd51788848ed8b174520b6c9c2041d>

31. Determination of an arsenite-induced EMT-like phenotype in a human proximal tubule cell line with progenitor-like properties

Md Ehsanul Haque, Sarmad Al-Marsoum, Aaron Mehus, Seema Somji, Scott Garrett, and Donald Sens

Clinical & Translational Science Graduate Student

Clinical Science Research

The proximal tubule of the human kidney serves as the location for the energy-intensive reabsorption of nutrients, sodium chloride, sodium bicarbonate, and water (60–70%). Drugs and environmental toxicants, including heavy metals, can cause various injuries to this renal segment. Arsenic is the number one toxicant on the Agency for Toxic Substances Disease Registry (ATSDR) due to its high prevalence in the environment and adverse exposure outcomes. Furthermore, it is unclear how arsenic-induced nephrotoxicity leads to epithelial-to-mesenchymal transition (EMT) and renal fibrosis. As of now, there are no drugs found to be effective against renal fibrosis. Heavy metal-induced nephrotoxicity has previously been studied using the immortalized human kidney (HK2) proximal tubule cell line which exhibits minimal vectorial active transport and epithelial characteristics. In recent years, the renal proximal tubular epithelial cell line (RPTEC/TERT) derived from renal cortical tissue has been used as the model to study the potential damage caused by cadmium (Cd) exposure. Gene expression data show that the immortalized RPTEC/TERT1 and HK-2 cell lines exhibit similar gene expression patterns. Notably, a greater number of stem or progenitor cells are found in RPTEC/TERT1 cell lines in comparison with HK-2 cells. A type of progenitor cell, which express both CD24 and CD133, has been isolated from RPTEC/TERT1 in this lab by flow cytometry. They are termed HRTPT or Human Renal Tubular Precursor TERT (HRTPT). These cells can regenerate and differentiate into tubules, but the RPTEC/TERT1 cells that do not express CD133, referred to as single positive or HREC24T, have little regeneration capacity. Our preliminary results from microarrays suggested several fibroblast growth factor receptors and ligands (FGFRs/FGFs) were expressed in HRTPT, exposed to inorganic arsenic (I-As). There is very little information available regarding the FGFR/FGF pathways involved in As-induced EMT and renal fibrosis. It is therefore of great interest to us to identify the function of FGFRs/FGFs in signal transduction pathways and validate FGFR/FGF expression. The purpose of this work is to determine whether HRTPT cells that express CD133 and CD24 have the capacity to either initiate the EMT process which can potentially result in fibrosis or repair injured nephrons as renal epithelial cells. **Traditional Poster**

32. Impact of supplemental PO feeding and gastric feeding tube use on body mass index of infants admitted to the intensive feeding disorders program

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Medical Student Clinical Science Research

Background: A pediatric feeding disorder affects nearly 25% of all children in one form or another, with that number growing to 80% in children who have developmental delays. The nutritional management of feeding disorders occasionally include the use of supplemental nutrition and feeding tubes. The treatment for these feeding disorders typically includes a multidisciplinary approach that varies on the severity of the condition.

Objective: To assess the changes in BMI of children admitted to the intensive feeding disorders program before admission, at admission, at discharge, and one year following discharge from the program. We compared BMI changes by gastric-tube use and supplemental PO feeding.

Methods: We conducted a hospital-based longitudinal study at Sanford Health North Dakota. Data were abstracted from pediatric medical charts between March 1st, 2016 and June 1st, 2022. We used repeated measures ANOVA to determine if the mean BMI differs between the four period of measurements. All p-values were two-sided, and p-value < .05 considered significant. Analyses were performed using SAS V9.4. The study was approved by the Institutional Review Boards of Sanford and UND.

Results: This study included 214 children who completed an admission at the intensive feeding disorders program. One-way within-subjects ANOVA showed that BMI means were significantly different at each measurement, $F(3, 378) = 3.81$; $p = .021$ and there is a significant interaction between BMI changes and supplemental PO feeding $F(3, 378) = 7.53$; $p = .001$. The effect of supplemental PO feeding use on BMI is significantly different between the infant groups $F(1, 126) = 12.09$; $p = .001$. One-way within-subjects ANOVA showed a significant interaction between BMI changes and gastric feeding tube use $F(3, 387) = 7.20$; $p = .001$. The effect of gastric tube use on BMI is not significantly different between the infant groups $F(1, 129) = 0.22$; $p = .639$.

Conclusions: We found an increase in BMI in patients who did not require supplemental feeding intervention prior to admission. However, these children did not maintain those increased changes in BMI at the 6 month follow-up. We also found that those children who received supplemental nutrition either orally or through enteral tube, had decreased BMI scores at discharge. Additionally, unlike the children who did not receive supplemental or enteral tube nutrition at admission, these children had an overall increase in BMI at 6 months follow-up.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/56aedae1d4bb4ed290841e1c934d770e1d>

33. Association of Vaccination Status and Severity of SARS-CoV-2 Infections

Thomas Baker, Sean Keup, Li Cao, Dubert Guerrero

Medical Student Clinical Science Research

Background: Vaccines to prevent severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection are considered the most promising approach for addressing the Coronavirus 2019 infection (COVID-19) pandemic. However, even fully vaccinated people remain at risk of COVID-19. We examined association between different levels of vaccination and clinical outcomes in patients with COVID-19

Methods: We conducted a series of observational retrospective analyses using the electronic health records (EHRs) of admitted adult COVID-19 patients at Sanford Health Fargo on January 2022. We estimated odds ratios (ORs) and 95% confidence intervals (95% CIs) for 30-day mortality, ventilatory support, ICU stay and vaccination status using logistic regression models. Poisson regression model was applied to the outcome variable length of inpatient days.

Results: Of 484 patients, 256 (53%) were unvaccinated, 15 (3%) were partially vaccinated, 131(27%) were fully vaccinated, and 82 (17%) were up to date. Table 1 describes the patient characteristics. Regarding severity of infection, fully vaccinated ($OR=0.49$, $p=.001$) and updated patients ($OR=0.46$, $p=.004$) had significantly lower probability of critical severity compared to unvaccinated. Vaccination status is significantly related with 30-day mortality ($p=0.005$) but not significantly associated with need for respiratory support or ICU stay. Mean length of stay (LOS)

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of 6.6 days among boosted patients is significantly lower than patients with no vaccination status (10.7 d, $p < 0.001$).

Conclusions: Our study findings provide real-world evidence that full and updated booster vaccinations substantially increase protection against critical infection and death in hospitalized patients with COVID-19 infection.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/74b7e173509c497885985650432bca431d>

34. Association Between Statin Use and Myasthenia Gravis Exacerbation

Sean Montgomery MD, Brock Ashmore MD, James Fowler MD, Abe Sahmoun PhD, Dubert Guerrero MD

Medical Resident/Fellow/Transitional Clinical Science Research

Background: Myasthenia gravis (MG) is the most common type of neuromuscular transmission disease and is most commonly caused by autoantibodies against acetylcholine receptors (AChRs) in the neuromuscular junction or their adjacent proteins. MG is characterized by fatigue and fluctuating ptosis, diplopia, weakness of facial muscles, arms, legs, truncal and respiratory muscles. Fluctuation of the weakness is the hallmark of MG. There is accumulating evidence suggesting that statins may cause MG-like symptoms, MG exacerbation, and induction of de novo MG. The mechanisms of MG exacerbation or induction of de novo MG by statins is still unknown. There have been a few case-reports of worsening of MG in patients treated with statins.

Objectives: 1) To examine the association between statins use and MG exacerbation; and 2) To assess whether a statin class is associated with MG exacerbation.

Methods: We performed a retrospective analysis of patient medical charts in order to obtain information on MG exacerbation between 2012 and 2022. MG exacerbation is defined as worsening or relapse of any MG symptoms. When worsening of MG symptoms developed clearly within 3 months following statin treatment, no other possible cause was found, and clinical improvement occurred either with or without modification of treatment after discontinuation of the statin, we considered these symptoms to be statin-induced. Analyses were performed using SAS software V9.4. All p-values are two-sided and $P < .05$ considered significant.

Results: This study included 81 patients, 34 (42%) were diagnosed with MG exacerbation. The median age (IQR) was 71.5 (62-81) years for patients with MG exacerbation and 75 (65-81) years for patients without MG exacerbation ($p = .46$). There was no association between gender or race and MG exacerbation ($p = .32$ and $p = .42$; respectively). Statin use was associated with MG exacerbation ($p = .05$). Hydrophobic statin users were significantly more likely to be diagnosed with MG exacerbation than hydrophilic users (41.7% vs. 0%; $p = .03$). The median statin dose (IQR) was 40 mg/day (20-80) for patients with MG exacerbation and 20 mg/day (10-40) for controls ($p = .11$).

Conclusions: This pilot study showed that almost half of the patients diagnosed with MG progressed to MG exacerbation state. Hydrophobic statins use appear to increase the risk for MG exacerbation. Large observational studies are warranted to confirm these preliminary findings.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/49859b0ca4c34de4913bce9884258ea81d>

35. Adherence to Prediabetes and Type 2 Diabetes USPTF Guidelines in a National Dataset

Mathew Gerving, MD, Mitchell Keena, MD, Praneeth Thadi, MD, Andrew Sefain, MD, Dubert Guerrero, MD, Abe E Sahmoun PhD

Medical Resident/Fellow/Transitional Clinical Science Research

Background: Thirteen (13%) of US adults have diabetes and 34.5% meet criteria for prediabetes. In a large cohort of individuals with prediabetes, the risk of developing diabetes increased with increasing hemoglobin A1c (HbA1c) and with increasing body mass index. Screening asymptomatic adults for prediabetes and Type 2 diabetes may allow earlier diagnosis and treatment and thereby prevent disease progression and better quality of life. Limited data exist on primary care physicians screening asymptomatic adults for prediabetes and type 2 diabetes.

Objective: 1) To assess the prevalence of HbA1c test use for prediabetes and Type 2 diabetes in overweight and obese asymptomatic individuals during an annual physical exam; and 2) Examine whether diet/nutritional, weight reduction, and exercise counseling were provided during the visit.

Methods: We combined datasets from the 2016 and 2018 National Ambulatory Medical Care Survey regarding individuals who came for an annual physical exam. We studied overweight and obese individuals, without diabetes, aged between 40 and 70 consistent with the 2015 United States preventive Services Task Force recommendations for prediabetes screening. We included results of HbA1c tests ordered during the visit or within the past 12 months. Prediabetes was defined as HbA1c within the range of 5.7% to 6.4% and for Type 2 diabetes ($> 6.4\%$). We examined patient demographic and clinical characteristics, comorbidities, exercise education, weight reduction, and diet/nutrition counseling during the visit. All analyses used sample weights to account for differential probabilities of selection into the sample, nonresponse, and noncoverage.

Results: Of the estimated 24 million (unweighted $n=415$) visits, 16% documented HbA1c test ordered during the visit or within the past 12 months. 52% had a normal HbA1c value and 41% had prediabetes. 27% received diet or nutrition education, 11% weight reduction counseling, and 23% were recommended exercise activity. The average time spent with a physician was 24 ± 0.6 minutes. 32% of patients had documented hypertension and 34% had hyperlipidemia.

Conclusions: The prevalence of HbA1c testing is low and almost half of the individuals had HbA1c values consistent with prediabetes. The majority of the individuals were not provided with diet/nutrition, exercise, and weight reduction counseling. Awareness campaigns of the potential effect of weight reduction and exercise in reducing diabetes risk are needed.

Traditional Poster

36. Comparison of Clinical and Radiographic and Demographic Characteristics of Patients with Covid-19 Associated Pulmonary Aspergillosis (CAPA) versus Covid-19

Andrew Pritchard DO, Sean Keup, Thomas Baker, Wyatt Lautt, Abe Sahmoun PhD, Dubert Guerrero MD

Medical Resident/Fellow/Transitional Clinical Science Research

Introduction: There have been many reports of pulmonary aspergillosis in patients infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Susceptibility is thought to be due to direct viral damage to the airway epithelium. Coronavirus disease 2019 (COVID-19)

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associated pulmonary aspergillosis (CAPA) was reported in as many as 33% of hospitalized patients. In this study, we compared the clinical and radiographic findings at baseline of patients with known CAPA and patients with Covid 19 infections without aspergillosis.

Methods: Patients were identified retrospectively to have proven, probable, or possible CAPA based on the consensus case definition published by the European Confederation for Medical Mycology and International Society for Human and Animal Mycology at Sanford Health Fargo. These were compared against a control group of COVID-19 patients without aspergillosis confirmed by bronchoscopy. Clinical characteristics as well as radiographic data was collected and compared using Wilcoxon signed-rank test for non-normally distributed continuous variable and Chi-square or Fisher's exact tests for categorical variables. Statistics were performed using SAS (SAS Institute, Cary; Version 9.4 Users Guide). All statistical tests were two-tailed with $p < 0.05$ considered to be significant.

Results: There were 45 patients identified with CAPA and 73 control patients with known COVID-19 infection but no superimposed pulmonary aspergillosis. The group median age is 63 years old for both groups. There was no statistically significant difference between groups for sex, race, obesity, history of cancer, chronic kidney disease, chronic obstructive pulmonary disease, diabetes and immunocompromised state (Table 1). More patients with CAPA were vaccinated (29% versus 5%, $p=0.0004$) and had history of smoking (71% versus 41%, $p=0.0015$). On imaging, more patients with CAPA had presence of cavitation on the CT scan of the chest (16% vs 2%, $p=0.0134$).

Conclusion: The study showed that vaccination and smoking status along with presence of cavitation on chest imaging were higher among patients with CAPA. Pulmonary invasive aspergillosis is an important potentially unrecognized complication of COVID-19 infection. There is a wide range of clinical and radiologic features that overlap between COVID-19 pneumonia and pulmonary aspergillosis in patients with CAPA as lesions suggestive of invasive fungal infections may be hidden or mimicked by COVID-19. **Traditional Poster**

37. Does the Cholinergic System Play a Role in Fatigue in Parkinson's Disease?

TJ Pottinger, Whitney Carriveau, Asenath Huether, Rabie Fadil, Sarah Matcha, Tanya Harlow, Amber Stutz, Jau-Shin Lou

Clinical Science Research

Background: Fatigue is a common complaint in subjects with Parkinson's Disease (PD), defined as a general tiredness that may involve difficulty in initiating or maintaining physical or mental activity. The pathophysiology of fatigue in PD is poorly understood. Fatigue in PD is associated with mild cognitive impairment (MCI). Short latency afferent inhibition (SAI) is reduced in PD patients with MCI. SAI arises from an inhibitory cholinergic pathway from the sensory cortex to the motor cortex. SAI is a non-invasive way to test central cholinergic activity in vivo. Because fatigue in PD patients is associated with MCI, we hypothesize that cholinergic deficiency may play a role in fatigue.

Objective: We used SAI to determine if fatigue in PD is mediated by the cholinergic system.

Methods: We recruited 15 PD patients (8F & 7M; age 70.1 ± 7.5 y, H&Y $1.8 \pm .41$, PD duration 4.9 ± 2.9 y). All were assessed with the Montreal Cognitive Assessment (MOCA), Multidimensional Fatigue Inventory (MFI), Fatigue Severity Scale (FSS), Center for Epidemiologic Studies Depression Scale (CES-D), and McGill Quality of Life Part A (QOL).

TMS was delivered at N20 +1, 3, or 5 ms after the median nerve sensory stimulation at the wrist. N20 is a negative response over the primary somatosensory cortex at around 20 ms post

stimulation. We calculated the average compound muscle action potential (CMAP) amplitude of 10 TMS trials at TMS only, N20 +1, +3, +5 average for a total of 40 TMS trials. We then calculated the relative TMS response at each interval relative to the TMS only, represented as a percentage.

Results: The mean inhibition was $30.4\% \pm 19.7$; 24.2 ± 27.0 ; 21.7 ± 31.7 ; and 25.4 ± 24.2 respectively for N20 + 1, N20 + 3, N20 + 5, and average of N20 + 1, 3, 5. The mean MFI score was 47 ± 19.4 and 8.47 ± 3.9 respectively for MFI total score and MFI Mental fatigue subscore). There was no significant correlation between SAI and MFI scores across all three latencies and the average of all three latencies ($p=.27, .62, .58, .47$ respectively). There was also no significant correlation between SAI and MFI mental subscores across all three latencies and the average of all three latencies ($p=.34, .36, .48, \text{ and } .36$ respectively).

Discussion: The findings of this study suggest that PD patients with higher MFI scores do not show less inhibition, suggesting fatigue is not mediated by an underlying pathophysiology of a dysfunctional cholinergic system. **Traditional Poster**

38. The Effect of Biological Sex on Double-Legged Drop Vertical-Jump Axial And Shear Tibiofemoral Joint Forces: Implications for Non-Contact Knee Injury Risk

Benjiman Wilebski, ATC; Colin W. Bond, PhD, MBA; Benjamin C. Noonan, MD, MS

Medical Student Clinical Science Research

Introduction: Non-contact knee injuries are often sustained during deceleration and pivoting athletic maneuvers when the knee is in relative extension. This results in high joint compression and shear forces. Females are at a higher relative risk for non-contact knee injury compared to males, which may be partially driven by differences in joint forces during athletic maneuvers. The purpose of this study is to compare the axial and anterior-posterior shear tibiofemoral joint forces during a double-legged drop-vertical jump in male and female athletes. It was hypothesized that females will have higher axial and shear forces compared to males.

Methods: This cross-sectional study was approved by the IRB and all athletes provided written, informed, voluntary consent. 42 male and 39 female athletes (18.0 ± 3.3 y, 1.77 ± 0.13 m, 74.4 ± 18.5 kg) participated. Athletes performed a double-legged drop vertical-jump off a 12-in box. Three-dimensional markerless motion capture and side-by-side force plates were used to ascertain kinematic and ground reaction force data. This data was used to compute axial and anterior-posterior tibiofemoral joint reaction forces for the right leg during the attenuation phase from initial contact to peak knee flexion of the first landing. The independent variable of this study was biological sex. The dependent variables were axial and anterior-posterior shear force normalized to the athlete's body weight (%BW). Statistical parametric mapping was used to conduct a two-sample t-test to compare male and female athletes. Significance was set to $p < 0.05$.

Results: For axial tibiofemoral joint force, mean peak compression forces of approximately 100% BW were observed, but there was no evidence of a difference between females and males during the attenuation phase ($p > 0.05$). For anterior-posterior shear force, mean peak anterior directed forces applied by the femur on the tibia of approximately 60% BW were observed, but there was also no evidence of a difference between females and males ($p > 0.05$).

Conclusion: Findings indicate females do not exhibit greater joint forces compared to males, suggesting that the disparity in the incidence of non-contact knee injuries between sexes may be driven by other biomechanical and anatomical factors. **Traditional Poster**

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39. Relation Between Knee Extension Strength Limb Symmetry Index and Absolute Strength: Implications for Anterior Cruciate Ligament Reconstruction Return to Play Testing

Benjiman Wilebski, ATC; Colin W. Bond, PhD, MBA; Lisa N. MacFadden, PhD, Nathan Wm. Skelley, MD; Benjamin C. Noonan, MD, MS

Medical Student Clinical Science Research

Introduction: Isokinetic peak torque is routinely used to evaluate knee extension strength and readiness to return to play (RTP) following anterior cruciate ligament reconstruction (ACLR). Frequently, a limb symmetry index (LSI) greater than 90% is used as a passing threshold in RTP determination. The purpose of this study is to evaluate the relation between knee extension LSI and absolute strength (AS) for patients with hamstring (HAM) and bone-patellar tendon-bone (BTB) autografts. It was hypothesized that fewer patients with a BTB would exceed 90% LSI compared to HAM at RTP.

Methods: An honest broker provided anonymous data from our institution's ACLR clinical data repository, which contains isokinetic strength assessments conducted as standard patient care. Patients were included if they were 12-30 years old at the time of primary ACLR, received a HAM or BTB autograft, and completed a 60°·s⁻¹ isokinetic strength assessment between 6 and 12 months post-ACLR. LSI was calculated as the ratio of involved leg peak torque (lb·ft) to uninvolved leg peak torque. AS was calculated as the mean peak torque for both legs normalized to the patient's body weight (lb·ft·lb⁻¹). The independent variables of this study were LSI, using 90% LSI to stratify patients into FAIL (<90%) and PASS (>90%), and AS, where a k-means cluster analysis stratified patients into STRONG and WEAK using AS. Pearson correlation explored the relation between LSI and AS and contingency tables compared HAM and BTB. Significance was set to $p < 0.05$.

Results: The final dataset contained 85 male and 84 female HAM patients, and 26 male and 34 female BTB patients. LSI and AS were significantly positively correlated ($R = 0.32$, $p < 0.001$). 40% of HAM patients achieved an LSI > 90% whereas only 4% of BTB patients achieved an LSI > 90%. K-means cluster analysis identified an AS cut-off score of 79 lb·ft·lb⁻¹ to stratify patients into STRONG and WEAK.

Discussion: At the time of RTP, LSI and AS were weakly correlated and the low degree of shared variance ($R^2 = 0.10$) suggests that LSI and AS explain different constructs related to muscular function. 96% of BTB patients did not achieve an LSI > 90%, while 50% of HAM patients and 40% of BTB patients were stratified as STRONG.

Clinical Relevance: LSI criteria alone in clinical decision making may delay BTB patient advancement in rehabilitation and RTP. Factors such as AS should be taken into consideration when characterizing ACLR patients' muscular function. **Traditional Poster**

40. Inequity, workload, noise and other factors: examining factors affecting statin prescriptions for patients with clinical cardiovascular disease and high risk for cardiovascular disease

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Jean Marie McGowan, M.D., Laura Nichols, M.D. "*

Medical Student Clinical Science Research

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Introduction: Despite guidelines for use of statins to reduce atherosclerotic cardiovascular disease (ASCVD) from the American College of Cardiology and American Heart Association (ACC/AHA) and quality measures from the Centers for Medicare and Medicaid Services (CMS), inconsistencies in guideline adherence persist. While there are studies examining associations of individual factors with statin prescriptions, there is a paucity of literature considering multiple factors. The objective is to identify the extent to which guideline-based statin prescription is associated with patient demographics and other factors.

Methodology: A cross-sectional retrospective review of patients aged 40 to 75 years seen within our regional healthcare system by clinicians in ND and MN diagnosed with ASCVD, LDL-c \geq 190, or ASCVD risk $>$ 20% between May 2021 and April 2022 was performed to determine rate of statin prescription and association with demographic and other factors. We compared continuous variables using Wilcoxon signed-rank test and χ^2 or Fisher's exact tests for categorical variables. All statistical tests were two-tailed with $p < 0.05$ considered significant. This study was approved by UND and Sanford IRBs.

Results: The study included 20,923 patients 40 to 75 years old. Mean age was 66. 70% were male and 95% were white. High-intensity statins, any statin and no statin were prescribed in 33.7%, 67.2%, and 32.8% of patients, respectively. Women were less likely to be prescribed high-intensity statins ($p < 0.0001$). Race was associated with receipt of any statin ($p=0.0074$). Patients living in urban regions were more likely to be prescribed both high intensity and any statin compared to rural areas ($p= 0.0056$, $p=0.0002$). Number of appointments completed with the patient's primary care provider (PCP) positively correlated with statin prescriptions ($p=0.0001$).

Conclusions: The study demonstrates that adherence to ACC/AHA and CMS guidelines remains incomplete and highlights several factors contributing to lower likelihood of statin prescription such as sex, race, rural location, and contact with the patient's PCP.

Significance: This study showed low rates of high-intensity statin prescribing as well as specific inequities based on patient demographic factors, which can be utilized to initiate quality improvement measures to increase rates of statin prescription for CVD.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/e293265de32e4aab9dca787951d35a671d>

41. Knockdown of SOX2 in UROtsa Cells Transformed with Arsenite (As³⁺) Decreases the Expression of KRT6

Madison Jones, Kaija Kinnunen, Kaitlyn Berwald, Becker Lindner, Danping Guo, Aaron Mehus, Seema Somji

Department of Pathology Clinical Science Research

Exposure to inorganic arsenite (As³⁺) has been linked to urothelial carcinoma (UC) development. Muscle-invasive urothelial carcinoma (MIUC) can be molecularly sub-typed as being luminal or basal based on gene expression signatures. The basal subtype is generally more aggressive and portrays squamous features with elevated expression of certain keratins. The level of squamous differentiation correlates to patient prognosis and response to chemotherapy, but the underlying mechanism driving squamous differentiation has not been elucidated. This lab has previously identified that both SRY-box transcription factor 2 (SOX2) and keratin 6A (KRT6A) localize to squamous areas of tumor heterotransplants derived from As³⁺-transformed (As-T) urothelial cells.

We hypothesized that the transcription factor, SOX2, may regulate the expression of genes associated with the basal subtype of MIUC with squamous differentiation, such as KRT6A, KRT1,

and DSG3. Small interfering RNA (siRNA) targeting SOX2 was used on two separate As-T cell lines (As2D and As6D) to knock down or reduce the expression of this transcription factor. Western blotting and qPCR were used to measure protein and gene expression, respectively. Immunofluorescence was used to assess KRT6A protein localization in the As-T cells. Western blot and qPCR results demonstrated effective knockdown of SOX2 within both As-T cell lines. Furthermore, the knockdown of SOX2 resulted in decreased protein and mRNA expression of KRT6A. The gene expression of DSG3 and KRT1 were unchanged. These results indicate that SOX2 regulates KRT6A expression in As-T cells. Further in vivo studies are needed to address whether knocking down SOX2 can decrease squamous differentiation in tumors and increase sensitivity to chemotherapy treatment. **Traditional Poster**

42. Developmental Outcomes of Neonates following Therapeutic Hypothermia for Hypoxic Ischemic Encephalopathy

Brenna Hanson, Brailyn Weber and Steffany Moen, MD MS

Medical Student

Clinical Science Research

Background: Hypoxic ischemic encephalopathy (HIE) is the most common form of neonatal encephalopathy, occurring in approximately 1.5 per 1,000 full-term live births. This diagnosis is made when the primary cause of neonatal neurologic dysfunction is perinatal asphyxia, resulting in an overall lack of oxygen to the brain. Recent clinical trials and meta-analyses have proven therapeutic hypothermia to be the only treatment that provides beneficial neurologic and developmental outcomes for neonates with HIE. Its benefits are postulated to stem from its ability to reduce metabolic demand, mitochondrial dysfunction, and free radical damage.

Study Aims: Our study evaluated short-term developmental outcomes of infants treated with therapeutic hypothermia for neonatal HIE. We wanted to explore if developmental outcomes at approximately 6 months of age differed based on the following variables: perinatal event, 10 minute Apgar score, degree of metabolic acidosis on blood gas, history of seizure, and brain MRI evidence of hypoxic ischemic injury following therapeutic hypothermia. Our study aims to review our local data for infants treated with therapeutic hypothermia to investigate their short-term outcomes.

Methods: We performed a retrospective chart review of 29 infants treated with therapeutic hypothermia and cared for at Sanford Children's Neonatal Intensive Care Unit (NICU) in Fargo. Data for developmental outcomes at 6 months of age was gathered from questionnaires already collected for clinical care through the Sanford NICU Developmental Follow-Up Clinic, Sanford Coordinated Treatment Center visits, and well-child visits with the infant's primary care provider(s).

Results: Using the Chi-squared test, there were no statistically significant differences found on Bayley scores for any of the measured variables.

Conclusions: Continued longitudinal developmental surveillance is important for these patients to detect developmental delays that may emerge throughout childhood. Further research could compare results from standardized assessments to parent-reported questionnaires as delays may be under-reported by parents.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/3131c4482b25435db0d8b2183d1564201d>

43. The role of sentinel lymph node biopsy in extramammary Paget disease: a systematic review of the literature

Connor Sheridan BS, Kathryn T Shahwan MD, Lena Faisel BS, Trent Walker BS, David R Carr MD MPH

Medical Student Clinical Science Research

Introduction & Objectives: Extramammary Paget disease (EMPD) is a rare malignancy primarily affecting the apocrine-rich skin of the axillae, genitals, and perianal region. A minority of cases are secondary to an underlying visceral malignancy. Although primary EMPD arises in the epidermis, dermal invasion can develop and is strongly associated with poor outcomes.¹ Retrospective studies have demonstrated a role for sentinel lymph node biopsy (SLNB) in invasive EMPD,² however the literature lacks a comprehensive systematic review on this topic.

Methods: The study was registered with PROSPERO and conducted according to PRISMA guidelines. Five databases were searched for English articles reporting primary data on 1 or more subjects with EMPD undergoing SLNB in the absence of known metastatic disease or lymphadenopathy. Mammary and ectopic extramammary Paget disease were excluded. The Oxford 2011 Levels of Evidence Table³ was used to assess the quality of the evidence.

Results: Twenty-eight articles were included in the analysis, with 11 case reports, 4 case series (level 4 evidence on the Oxford scale), 7 retrospective cohorts, and 6 prospective cohorts (level 3 evidence). Most (71.4%) were from Japan. A total of 366 subjects with EMPD who underwent SLNB were described, 104 of which were female. Five tumors were axillary; the rest were anogenital.

There was a 4.6% SLNB failure rate. Seventy-seven SLNB (22.1%) were positive, including 12 in which the primary tumor had microinvasion (17.6%) and 56 in which the primary tumor had deep invasion (82.4%). None of the *in situ* tumors had a positive SLNB. Of those with a positive SLNB, 11 subjects (16.9%) did not have any further treatment, 54 (83.1%) underwent lymph node dissection, 4 (6.2%) were treated with systemic agents, and 1 (1.5%) had radiation. After a mean follow up of 24 months, 9 subjects with a positive SLNB experienced nodal recurrence (11.7%), 15 had distant metastases (19.5%), and 13 died of EMPD (16.9%). In the negative SLNB group, 10 subjects (3.7%) had nodal metastases, 2 had distant metastases (0.7%), and none died of EMPD.

Conclusion: EMPD with dermal invasion is strongly associated with poor outcomes including nodal metastasis, distant metastasis, and disease specific death. SLNB is a useful tool to screen for subclinical nodal metastases in invasive EMPD, and should be used to help guide clinical decisions such as the need for adjuvant treatment.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/6632c00bffb045d88029b33adce0aad61d>

44. Life Skills Training Resource for Individuals Aging out of the Foster Care System

Stephanie Coauette, OTDS

Occupational Therapy Graduate Student

Occupational Therapy / Health Research

Purpose: The purpose of this project was to create a training resource for foster families regarding life skills for the population of individuals aging out of the foster care system. Aging out of the foster system means that an individual has turned 18 years old without a legal adoptive family taking responsibility for them (Scannapieco et al., 2007). There is an identified need for resources for individuals who age out of the foster system for life skills training and basic activities of daily living (ADL) training (Paul-Ward & Lambdin-Pattavina, 2016). Many individuals who are aging out of the system do not know how to navigate social systems as they do not have biological or legal support system to offer guidance (Scannapieco et al., 2007). There are numerous ways occupational therapy can support individuals aging out of the foster care system, including provision of a resource designed specifically for this population and their families.

Methodology: A literature review on the needs of individuals aging out of the foster system was completed as a precursor to an embedded experience at an agency that services foster youth who are preparing to age out and who have aged out of the foster system. The occupation-based Person Environment Occupation (PEO) model was used as a lens to guide and interpret the literature review and resulting population needs (Law et al., 1996). Development of this scholarly project occurred alongside a doctoral experiential placement that further informed the project development.

Results: This project outcome is an occupational therapy practice guide for leading life skills training sessions and/or providing resources for individuals who are aging out or have aged out of the foster system without legal guardianship or adoption happening prior to aging out. The topics included are transportation, money management and grocery shopping, employment, education, home management, and motivation and self-care. The method of assessment was developed using measurable objectives that are in alignment with Bloom's Taxonomy and measured (Bastable et al., 2020). At the conclusion of this guide is a resource that can be developed for local social service agencies to provide to individuals and families of those who are preparing to age out of the foster system.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/54e3eac9aa4c4ea19582a2d6c9a5c15f1d>

45. Improving Transitions for IndThe How To's for Engaging with Medically Complex Children: A Resource Guide

Allyson Bourque and Dr. Scilinda Janssen

Occupational Therapy Graduate Student

Occupational Therapy / Health Research

Purpose: The purpose of this scholarly project is to identify and address the factors that serve as barriers to engagement in valued occupations for children with serious or life-threatening illness.

Background: Children with serious or life-threatening illness are at great risk for occupational deprivation due to their complex medical needs as well as the inhibiting physical symptomology that may accompany their diagnoses (Doukkali et al., 2013; Kasven-Gonzales & Miale, 2010). Individuals working with this population have reported a need for more specialized education for working with children with medically complex needs (Gysels et al., 2005; Whiteford et al., 2020).

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It is essential to address the barriers to occupational engagement for this population, as occupational deprivation has been shown to decrease quality of life, and increase the feelings of depression, isolation, and risk of suicide (Doukkali et al., 2013; Miralles et al., 2016).

Methods: Methods for this scholarly project included a literature review, clinical needs assessment, and use of the Person Environment & Occupation model as a conceptual framework (Law et al., 1996). This population was clinically assessed at a pediatric hospice and respite home in the Midwest, USA.

Results: There is a need for further education pertaining to non-verbal communication, activity and environmental modification, and behavioral response protocol for individuals working with medically complex children. The findings from the literature review and population assessment informed the development of an educational resource to serve as an all-encompassing guide to understanding the occupational needs of this population. Topics within this educational guide include differentiation between palliative care, respite care, and hospice care, an overview of common diagnoses, medical equipment and devices used by this population, education on behavior identification and response, non-verbal communication strategies, activity and environmental modifications as well as a guide on how to use various piece of adaptive equipment for occupational engagement.

Conclusion: There is a need to address occupational deprivation among children with medically complex conditions. This educational guide will enhance providers' skill set, knowledge, and confidence to facilitate occupational engagement that promotes a sense of competence, control, and normalcy in the lives of this population. (Budash, 2022; Hammil et al., 2014).

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/694df118e5bb4689b60b976103ed02611d>

46. Program Structure for Children and Adolescents with Disabilities to Increase Participation in Physical Activity

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Occupational Therapy / Health Research

Children and adolescents with disabilities face barriers and are often excluded from engaging in daily activities such as physical activity and social participation (Bundy & Du Toit, 2019; Hocking, 2019). Activities such as physical activity and social participation increase children's and adolescents' sense of belonging, mental health, and quality of life and also impact the development of skills needed to fully engage in society (Bundy & Du Toit, 2019). Opportunities for children and adolescents with disabilities to engage in physical activity and social participation are often seen in the form of programs supported by nonprofit organizations. These programs emphasize the benefits physical activity, and social interaction has on quality of life, mental health, academic performance, and more for children and adolescents with disabilities (te Velde et al., 2018).

The purpose of the product for this scholarly project is to provide program structure to increase participation in physical activity and social participation as well as increase the quality of life and well-being of children and adolescents with disabilities.

A literature review and needs assessment were conducted to initiate this product. The focus of the literature review included barriers children and adolescents with disabilities may face with physical activity or social participation and best practices to support engagement in these occupations. Online databases such as CINAHL, PubMed, the University of North Dakota Scholarly Commons, and governmental websites were utilized as sources for the development of

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this product. Through the research, it was determined that there is a need for program structure that incorporates best practices to increase the participation in physical activity and social participation for children and adolescents with disabilities. Concepts from the Ecology of Human Performance (EHP) model (Dunn, 2017) were utilized throughout the development of this product.

Participation in physical activity and social participation for children and adolescents is necessary and greatly impacts psychosocial health, physical health, overall well-being, and quality of life. The product was developed for occupational therapy, interprofessional, and stakeholder use. The program manual will increase awareness, provide education and structure, and promote engagement and quality experiences with physical activity and social participation for children and adolescents with disabilities.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/a4404d53b493495db6948e3eecd346241d>

47. The Newly Arrived Client: Applying Culturally Responsive Occupational Therapy Approaches to the Refugee Population to Promote Occupational Justice

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Occupational Therapy / Health Research

Purpose: At the end of 2021, there were 836,300 Somali refugees and asylum seekers worldwide; in Minnesota alone, there are more than 70,000 Somali refugees, which is the largest concentration in the United States (Culture Care Connection, 2022; The UN Refugee Agency, n.d.). As with many refugee populations, Somali refugees experience many healthcare inequities including limited understanding of the resettled nation's healthcare system, poor functional health literacy, provider and/or interpreter gender preferences, discrimination, and limited cultural competence of providers (Eklöf et al., 2019; Fang et al., 2015; Gele et al., 2016; Houston et al., 2021; Njenga, 2022; Wångdahl et al., 2018). This negatively affects Somali refugees during healthcare encounters and has detrimental impacts on health and well-being during and following discharge from a healthcare setting.

Methods: A literature review needs assessment was conducted on topics related to the issues faced by the Somali refugee population when seeking services and their experiences within the healthcare system in their country of resettlement. The literature supported the need, and provided a foundation, for the development of a comprehensive reflective resource guide for occupational therapy personnel working with Somali refugees in a U.S. healthcare setting.

Results: The reflective resource guide was created to promote occupational therapy practitioners' knowledge of Somali refugees' history, culture, and occupational preferences and how that may alter the occupational therapy process. The reflective resource guide also includes tools for special consideration in healthcare settings and opportunities for users to reflect on their own culture and biases to determine how that may impact interactions with the Somali refugee population.

Conclusions: This reflective guide is intended to increase occupational justice for Somali refugees by expanding the knowledge and culturally specific tools used by occupational therapy personnel with the population. It is recommended that the reflective guide be used when working with Somali refugees across all healthcare settings, but it is more specifically related to healthcare encounters related to physical impairments.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/ffc9bcc6bb4749efae04a65f50b91d5a1d>

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48. The Effects of Sensory Exposures on Pre-Term Infants within the Neonatal Intensive Care Unit

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Occupational Therapy / Health Research

Introduction: The neonatal intensive care unit (NICU) setting is a very dynamic, complex environment that can greatly affect the well-being and physical development of pre-term infants. AOTA (2018) stated that a pre-term infant does not have the self-regulatory tools to adapt to the complex and highly stressful NICU environment. When infants are unable to manage environmental sensory exposures appropriately due to their undeveloped regulatory systems, their neurodevelopment can be compromised causing cognitive, social, emotional, and physical deficits that limit attainment of important occupational milestones. Authors explained that it is crucial to skillfully modulate sensory environments to match infants' sensory processing abilities to promote optimal neural and overall development (Parham & Mailloux, 2020).

Methodology: To address the over exposure of adverse sensory experiences in the NICU, a thorough literature review was completed examining the topics relating to pre-term infants, neonatal intensive care units, occupational therapy, sensory exposure, evaluations, and interventions to improve sensory exposures. The Ecology of Human Performance (EHP) (Dunn, 2017), VARK (Fleming & Mills, 1992) and Andragogy (Knowles, 1990), were used in the creation of the product.

Results: The purpose of this scholarly project is to determine the importance of implementing the Supporting and Enhancing NICU Sensory Experiences (SENSE) program into the NICU to promote positive, timed and age-appropriate sensory exposures (Pineda et al., 2022). With the implementation of the program, it is crucial to promote IP involvement to ensure proper and successful implementation; therefore, educational materials were created which are universally designed, and multimodal for interprofessional (IP) teams within the NICU entitled Making Sense of the SENSE Program with Multi-Sensory Learning.

Conclusion: Multi-Sensory Learning was used to educate interprofessional (IP) teams on the importance of implementing the SENSE program (Pineda et al., 2019) into the NICU. The SENSE program will create a positive sensory context in the NICU which will assist in positive neurodevelopment to achieve occupational attainment in children born pre-maturely (Parham & Mailloux, 2020, Pineda et al., 2019).

Significance: The creation of this scholarly project is significant as it is evidence-based, model-driven, occupation-based, and culturally relevant.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/e7ab837299cb42479d43664e0520d8301d>

49. How Adaptive Sports Promote Occupational Engagement and Quality of Life for Individuals with Disabilities in a Rural Community

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Occupational Therapy / Health Research

Health management, play, leisure, and social participation are all valued occupations related to sports. However, individuals with physical disabilities face many barriers that inhibit them from engaging in sports, depriving them of these occupations. Some of these barriers include a lack of

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adaptive sports resources, adaptive equipment, adaptive sports programs in rural communities, and knowledge of how to include individuals with disabilities (Obradovic et al., 2021). The purpose of this scholarly project was to address these barriers through the development of adaptive sports programs; hereby, increasing occupational engagement, quality of life (QOL), and life satisfaction for individuals with disabilities. To fulfill this purpose, an adaptive sports manual was developed to guide the implementation of adaptive sports programs at rural community facilities. The author of the scholarly project partnered with a YMCA in rural Minnesota to develop this manual and accomplish this goal. Through this partnership, an extensive literature review, community outreach efforts, and interprofessional collaboration were completed to create the current product of an adaptive sports manual. The final manual includes descriptions of three adaptive sports, modified rules, space for each sport, equipment needed, safety precautions, adaptive exercise recommendations, coach/officials training information, funding sources, an athlete registration form, a consent and release form, a program evaluation survey, advertisement poster templates, and a brief handout including adaptive sports resources and links. It is anticipated that the manual will increase adaptive sports opportunities to help improve occupational engagement, QOL, and life satisfaction for individuals with physical disabilities.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/292f0cb18e5e46ba9b24da4fab2966261d>

50. An Occupation-based Approach to Chronic Pain in Rural Alaska

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Occupational Therapy / Health Research

Background: Adults with chronic pain living in rural communities experience occupational deprivation due to a lack of access to healthcare resources. While chronic pain is multifaceted and treated by multiple professions, occupational therapy (OT) can have a significant role in treating adults experiencing chronic pain with occupation-based interventions to improve their daily complications (Lagueux et al., 2018).

The role of OT with chronic pain management is reflected in the evidence-based program entitled Lifestyle Redesign®, which offers effective strategies to improve quality of life, self-efficacy, and daily functioning for those who experience chronic pain (Uyeshiro Simon & Collins, 2017). However, there are limited resources by which to implement similar programs with people in rural communities who have chronic pain.

Purpose: The purpose of this scholarly project is to advocate for the profession of occupational therapy within rural Alaskan areas as well as develop an evidence-based, model-driven, culturally relevant resource guide for OT practitioners. The guide entitled Occupational Therapy Guide to Interprofessional Chronic Pain Management in Rural Alaska, provides occupation-based interventions for chronic pain management with clients in rural communities and will improve interprofessional collaboration in a culturally relevant manner that supports the functional abilities in people who have chronic pain.

Methodology: A thorough literature review was completed through the following databases: PubMed, CINAHL, SAGE, EBSCO Host, Google Scholar, the Centers for Disease Control and Prevention (CDC), the American Journal of Occupational Therapy (AJOT), and the American Occupational Therapy Association (AOTA). To guide development of product design and intervention ideas, the Ecology of Human Performance (EHP) model was used (Dunn, 2017).

Conclusion: The Occupational Therapy Guide to Interprofessional Chronic Pain Management in Rural Alaska was created to fill a gap in the healthcare field for adults who experience chronic

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pain and their lack of access to resources in rural communities. The projected outcome of the product is an increased presence of OT in rural Alaska, greater interprofessional collaboration, and an increase in occupational engagement and quality of life for adults experiencing chronic pain.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/f9d2224dcc7d46ebb547827afeb939051d>

51. Addressing Adherence to Home Exercise Programs in a Hand Therapy Setting

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Occupational Therapy / Health Research

Background: Roughly 1,100 per 100,000 persons experience an upper-extremity injury per year including burns, fractures, or amputations (Ootes et al., 2012). Clients with these upper-extremity injuries can impact a person's physical function, activities of daily living (ADL), social, psychological, and financial aspects in life (Che Daud et al., 2016). These statistics warrant the need for occupational therapy practitioners specializing in hand therapy, and other hand therapists to address these areas of client's lives that have been affected by their upper extremity injury.

Purpose: The purpose of this scholarly project was to increase the rates of adherence to home exercise programs in order to improve the effectiveness of rehabilitation. The intended audience for this product is the clients receiving the home exercise programs and for therapists working in a hand therapy setting.

Methodology: The product was developed following a review of literature that showed the need to increase adherence to home exercise programs. The literature showed that the rates of non-adherence to home exercise programs can be as high as 50-65 percent (Wright et al., 2014). To address this issue, the student and site mentor created Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-researchs> and handouts demonstrating exercises commonly given to clients as a home exercise program. The product materials were organized based on the Ecological of Human Performance framework (Dunn et al., 1994).

Conclusion: The results of the literature review and feedback from the site mentor guided the development of this product. The product contains a series of short Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-researchs> demonstrating common home exercise programs that this facility regularly prescribes, along with handouts demonstrating the exercises. This product assists with promoting adherence to home exercise programs by addressing the client's learning style and preference to the type of home exercise program they will receive.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/229c17aefc4748ec8a4adefac9bb97f21d>

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52. The Missing Piece: A Sensory Toolkit for Parents, Educators, Healthcare Professionals, and Caregivers of Children with Autism Spectrum Disorder (ASD) and Sensory Processing Disorder (SPD)

Jennavive M. Holm

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Occupational Therapy / Health Research

Purpose: The purpose of this project is to create educational material pertaining to sensory processing for families, caregivers, teachers, and other healthcare professionals who treat and/or care for individuals diagnosed with Autism Spectrum Disorder (ASD) and/or Sensory Processing Disorder (SPD). This sensory toolkit is unique as it was designed using the expertise of the occupational therapy profession to enhance parent's and caregiver education on ASD and SPD diagnoses to increase both the child's and the caregiver's quality of life. It is hoped that this sensory toolkit will provide caregivers with invaluable resources and tools to use outside of the clinic.

Background: A high percentage of individuals living with ASD and/or SPD experience difficulties when it comes to participation in their meaningful occupations. Not only does a lack of participation in these meaningful everyday activities decrease quality of life, it can also increase the prevalence of serious mental health issues such as depression, social isolation, anxiety, and even suicidal ideation (Wong, 2022). Not only does this create problems for these individuals, but it can also lead to challenges within the family unit. Caring for children with ASD and/or SPD can cause both physical and mental frustration leading to a decreased quality of life, especially when the child's participation in various occupations is not functional for the family.

Methods: An in-depth literature review and needs assessment was conducted to assess the gap between educational material provided, sensory needs that are being met for individuals with ASD and SPD, as well as the competence that families feel when providing care for their loved ones. Publications and databases such as PsycINFO, PubMed, OTSearch, OTseeker, CINAHL, AJOT, various OT textbooks, experts in the field, Cochrane Library, and google scholar were utilized.

Conclusion: Providing education and factual information is often a missing piece of the puzzle when it comes to ASD and SPD diagnoses. This lack of education often leaves caregivers feeling lost and hopeless when caring for their loved ones which often leads to a decrease in quality of life for both the child and the caregivers (Wong, 2022). Providing educational material pertaining to sensory integration and training can help maximize outcomes for these children as well as increase caregiver confidence to be able to provide appropriate care for their loved ones (Rutledge & Cathcart, 2019).

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/d3ab70974b5f4c92941c5229dbc763b71d>

53. An Occupational Therapy Perspective on Health and Wellness: A Step Towards Prevention

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Occupational Therapy / Health Research

Introduction: The American Occupational Therapy Association (2015) has addressed health and wellness as an emerging area of practice within the field of occupational therapy (OT) due to the impact lifestyle has on an individual's ability to complete daily occupations. Obesity, which

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impacts 41.9% of adults in the U.S., is a serious health concern because of the cost of declining health and the possibility of occupational deprivation (Barclay & Forwell, 2018; Centers for Disease Control and Prevention [CDC], 2022a). This is partly because of comorbidities that often accompany obesity, such as type 2 diabetes, coronary heart disease, and sleep apnea all having a detrimental impact on the client's ability to engage in valued occupations (CDC, 2022b).

An occupational perspective on this health concern allows for a holistic evaluation of contributing factors and possible intervention options. OT is currently underutilized in preventative care regarding obesity, and the aim of this project is to explore OT's role in the primary prevention of obesity within the community setting.

Methodology: This group protocol was developed after completing a comprehensive literature review with most research produced no later than 2018. The evidence-base for this project was gathered using the electronic databases of CINAHL Complete and Google Scholar, as well as publications, such as OT Practice and the American Journal of Occupational Therapy. Informal interviews were conducted to determine cultural perspectives on health and wellness within the community agency. These methods were then synthesized to develop the group protocol for weight management techniques within the community agency.

Results: The result of this project was the development of the group protocol. It is anticipated that the group protocol will result in more OT involvement in community preventative healthcare teams to better manage community health and obesity prevention.

Conclusion: This project was created for adults as a primary prevention OT intervention for obesity through occupational lifestyle change. The value of OT within the community setting was addressed through a group protocol on weight management.

Significance: This project highlighted OT's role in the primary prevention of obesity within the community setting. This project demonstrated the importance of interprofessional collaboration to improve quality care from clinical settings to community engagement.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/e447c5fad076459cad728a3b8db4c5001d>

54. Reading the Warning Signs: Preventive Mental Health Youth Education Program

Cammy Robertson, OTDS, Breann Lamborn Ed.D, M.P.A., & Jessa Hulteng Ph.D., MOT

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Occupational Therapy / Health Research

Problem: Wyoming is the third leading state in suicide related death (Centers for Disease Control and Prevention [CDC], 2018; Wyoming Department of Health, n.d.). According to the National Institute of Mental Health (2022), suicide is the second leading cause of death in individuals aged 10-14. One in six youth experiences a mental health disorder yearly, while 50% of individuals aged 14 begin to have lifelong mental health concerns (Kessler et al., 2005; Whitney & Peterson, 2010). Students who experience depression are twice as likely to drop out of school, and students with mental, emotional, or behavioral concerns are three times more likely to repeat a grade (Data Resource Center for Child and Adolescent Health, n.d.; Dupere et al., 2018). Mental health disorders affect the way children learn, behave, regulate emotions, and function throughout the day (CDC, 2022).

Product: The project is a school-based preventative mental health youth education program that provides lifelong skills focusing on coping strategies to reduce anxiety, supportive mental health awareness, recognition of suicidal behaviors, and resources that provides students with tools to reduce mental health concerns. The product aims to establish or increase self-regulation, self-efficacy, and self-esteem. Analysis of the evidence base determined that students with these skills

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were more likely to have help-seeking behavior, strong social supports, and resilience creating positive mental health outcomes.

Methodology: An extensive literature review needs assessment was completed to create an effective preventive mental health program by identifying supports and barriers youth face that contribute to mental health outcomes. The two theories that supported the development of this program were the model of human occupation and cognitive behavioral therapy (Cole & Tufano, 2020; Kielhofner & O'Brien, 2017).

Results: The result of the school-based preventative mental health youth education program encourages early mental health treatment, reduces stigma surrounding mental health concerns and mental illness, and increases mental health literacy. The implementation of this preventive program will provide students and teachers with mental health knowledge with the intent to decrease death by suicide and implement preventive mental health outcomes.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/c4af55caddea446aa25cd3fbfcc3e97b1d>

55. The Impact of Trauma on Occupational Performance for People Experiencing Homelessness

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Occupational Therapy / Health Research

Background: People transitioning from homelessness experience trauma at three times the risk than the general population (McCurry, 2021). Occupational therapy can provide trauma-informed services that helps people that have experienced homelessness transition to supported housing by addressing occupational competence and identity formation through meaningful activity (McCurry, 2021). Occupational therapy can address this area by educating staff and students that work with this population to be more trauma informed. It is important to utilize a trauma-informed approach to avoid re-traumatization to people that have experienced homelessness (AOTA, 2021).

There were two purposes of this project: a) develop advanced knowledge in trauma-informed care, and b) develop a product to assist in providing trauma-informed care practices. The desired result from an increased awareness of trauma-informed care within staff and students at the agency is that it will positively impact people who have experienced homelessness and therefore, improve their quality of life.

Methodology: The process that was used to evaluate the literature on trauma and analyze stakeholder feedback was guided by the Model of Human Occupation. The author conducted a literature review and used student and stakeholder feedback from the agency to better understand how trauma-informed care is being implemented at the agency. The Model of Human Occupation was utilized to inform the product as well as describe the process of how the product was developed. The author also utilized three theories to develop the products: the Biopsychosocial model, Constructivism learning theory, and the Sanctuary model. Through the processes mentioned, a series of products was designed.

Results: It was determined that there was a need for trauma-informed care education for staff and students at the agency based on the literature review and informal and formal needs assessment procedures. The result was the development of a series of products for the agency staff and students. Products included a student toolkit, and trauma-informed presentation with a handout for staff as well as an educational in-service for staff.

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Conclusions and Significance: The implication of this scholarly project and doctoral experience is that the need for trauma-informed care in the community setting with people who have experienced homelessness is evident. By providing educational products, the author was able to address the need for the agency." **Traditional Poster**

56. Let's Groove: A Dance Program Designed for Children with Disabilities "

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Occupational Therapy / Health Research

Background: Children with disabilities face limited opportunities to participate in the occupation of dance when compared to opportunities available for their non-disabled peers. Barriers to their participation include lack of class opportunities, cost, and knowledge about programs (Carrion et al., 2018). Many dance studios offer integrated or non-specialized classes, but participation by a child with a disability in this type of class is sometimes limited by parental or child fears, or other barriers such as lack of accommodations (Lucas, 2017).

Purpose: This program aims to provide an opportunity for children with disabilities to engage in dance with appropriate accommodations that the child may need. The purpose of this program is to increase participation in the occupation of dance to provide leisure and social participation benefits, and enhance overall well-being. The product of the scholarly project is a set of lesson plans for group-based implementation of a specialized program. This program will increase opportunities for children with disabilities to be able to participate in dance classes designed specifically for them, decreasing barriers and increasing accessibility for participation.

Methodology: A thorough literature review was completed to explore the supports and barriers to engaging in dance, as well as the leisure and social benefits that may come from participation in dance programs. The literature search included exploration of the online databases of CINAHL, PubMed, and Google Scholar, as well as the American Occupational Therapy Association (AOTA). Interviews with experts in the field were also conducted. The Ecology of Human Performance model was used to guide the development of the program and scholarly project (Dunn et al., 1994).

Conclusion: Let's Groove was created to provide children with disabilities an opportunity to engage in dance. The overarching goal of the program was to provide an opportunity to participate in dance in a safe space with appropriate accommodations, while other benefits such as leisure and social participation engagement, as well as physical activity were also present. Occupational therapy has a unique role in a program such as Let's Groove by using activity analysis skills and the ability to adapt the environment and tasks to allow for optimal participation for each child and their specific needs.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/207ca5e33faf40bd8358a00ed5b3d3e91d>

57. The Ambassador Program: Improving Functional Community Participation for Individuals with Intellectual and Developmental Disabilities

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Occupational Therapy / Health Research

Introduction: This scholarly project aims to create more functional engagement opportunities for individuals with intellectual and developmental disabilities (ID/DD) in a community setting. Individuals with ID/DD experience a multitude of barriers when attempting to become active members of the community and engage in meaningful opportunities and social interactions (Doeringhaus et al., 2022). These barriers can include a lack of individualized support, low self-esteem, difficulty finding valuable volunteer experiences, and a prejudice in community settings (Milot et al., 2020; Trembath et al., 2010).

Methodology: An in-depth literature review was completed to understand the needs of this population, as well as the supports and barriers that they may face. This review included utilizing databases such as CINAHL, PubMed, Google Scholar, and EBSCO. Additionally, the author utilized the American Journal of Occupational Therapy, the American Occupational Therapy Association, the Centers for Disease Control and Prevention, and an interview with an expert in the field. A variety of search terms were used, including “intellectual AND developmental disability”, “social participation”, “community participation”, and “occupational therapy”. The author used the Ecology of Human Performance (EHP) model as a theoretical framework to guide the development of this program (Dunn et al., 1994).

Results: An existing Ambassador Program was initially created by St. John Christian Preschool in Fargo, North Dakota. A product manual for this program was published in 2021 by occupational therapy students obtaining their master's degrees from the University of North Dakota (Pitcher & Wendel, 2021). With this scholarly project, the author strives to produce a revised product manual that promotes the carryover of this product to new preschool programs across the United States. This new product manual contains resources from the previous manual (Pitcher & Wendel, 2021), program start-up templates, group sessions, and program evaluation tools. This program was enhanced by utilizing terminology and intervention approaches from EHP.

Conclusion: The intention of the Ambassador Program is to enhance the experience for all individuals with ID/DD who would welcome meaningful opportunities for functional engagement in their community. This product manual was created to support the success of individuals with ID/DD while assisting this population in achieving a higher quality of life.

Video -

<https://capture.med.und.edu/Mediasite/MyMediasite/presentations/87eb7fe1c5d64624ab90e0855849f67b1d>

58. Addressing Interoceptive Awareness in Elementary School Students Affected by Childhood Trauma to Improve Emotional Regulation

Alison O'Sadnick and Mandy Meyers

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Occupational Therapy / Health Research

Childhood trauma can affect students' interoceptive awareness affecting their ability to emotionally regulate within the classroom environment (Neal, 2021). Evidence demonstrates that for students to emotionally regulate, they must have interoceptive awareness (Mahler, 2020).

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Interoceptive awareness is the ability to detect the body's physiological state, such as recognizing signals of respiratory effort, temperature, fatigue, hunger, thirst, satiety, pain, muscle aches, and heart rate (Mahler et al., 2022). Children who have experienced trauma commonly have difficulty identifying and describing internal arousal states, labeling, and expressing emotions, and making their needs and wants to be known (Scaffa, 2019).

The development of Addressing Interoceptive Awareness in Elementary School Students Affected by Childhood Trauma to Improve Emotional Regulation was initiated through an in-depth literature review to identify interventions to improve emotional regulation in children with trauma. An onsite needs assessment through informal interviews and observation of students in the classroom was completed. The creation of the product was guided by the Person- Environment-Occupation model (Law et al., 1996). The product utilized andragogy and pedagogy teaching and learning theories to support the faculty and student teaching and learning styles (Bastable et al., 2020).

The product Addressing Interoceptive Awareness in Elementary School Students Affected by Childhood Trauma to Improve Emotional Regulation was created to be implemented at elementary schools and includes an interoception curriculum that provides objectives and directions for each session for school faculty to refer to. This product also provides a calming corner guide for teachers to implement calming corners within classrooms. The final product is anticipated to aid school faculty in navigating and assisting students with trauma and other students with emotional regulation. The use of these tools will improve students' performance in the classroom.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/bf214ad81948458e974f43f1eaf3e1e01d>

59. Increasing Parent Confidence and Involvement in the NICU: An Occupational Therapy Educational Guide

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Occupational Therapy / Health Research

Research shows that 40% of mothers with preterm infants in the neonatal intensive care unit (NICU) reported feelings of depression, and 23% reported experiencing post-traumatic stress symptoms, with that number increasing to 40% after discharge (Harris et al., 2018). Factors that contributed to this included a lack of social support, a lack of empowerment, perceived less capability in their new roles, and the stressful experiences that can happen in this setting (Matricardi et al., 2013; Sabnis et al., 2019). At discharge, 69.8% of parents reported that they were not confident in providing the necessary care to their infant without the support of the NICU providers and 47.2% reported that their infant required complex home care post-discharge. Parents also reported that returning to their daily routine took roughly 4 to 11 months post-discharge (Jiménez-Palomares et al., 2021).

This project aimed to create occupation-based and evidence-based educational materials for parents with infants in the NICU. This project includes information that applies during their infant's NICU stay and after discharge. The goal of this project is to decrease parent stress, assist parents with developing into their new roles, and facilitate the bond with their infant.

A literature review and needs assessment were completed to identify gaps in services within this population. The product was influenced by the Model of Human Occupation (MOHO) and andragogy teaching and learning theory (Bastable et al., 2020; Kielhofner, 2008). This product

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utilizes repetition, encouragement, and multidimensional learning and follows health literacy guidelines.

The product, an educational guide, titled “How to” Activities for Positive Parent Engagement and Empowerment Program, or the HAPPEE Program includes handouts and a QR code for Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-researchs> regarding various occupations in this setting and at home while safely adhering to their infant’s medical status. A questionnaire for parents is included to measure the effectiveness of the program.

The literature shows that the NICU can cause parents to experience increased levels of psychological stress and alterations in their new parenting roles. Parents in this setting need increased support while learning how to engage with their infant as they progress through their NICU stay and after discharge. The HAPPEE Program was designed to provide demonstrations for various caregiving occupations while offering support throughout the entire process.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/0f9e5ff890314d95831c53ab3a5bf6a31d>

60. Development of Wellness and Nutrition Through the use of Gardening

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Occupational Therapy / Health Research

Introduction: The population of older adults has been rising exponentially in recent years (Duffin, 2022), leading to an influx in people moving into retirement or independent living communities. This transition may cause many changes in the new residents’ occupational participation and overall well-being. Research has shown specific areas of concern in socialization, nutrition, self-esteem, physical abilities, and continued participation in meaningful occupations (Holland et al, 2017; Knecht-Sabres et al, 2020; Smith, 2015; Sommerfeld et al, 2018; Swann, 2006; Swann, 2010). Gardening has been shown to positively impact these areas of health and well-being and ease some of the negative symptoms (Thompson, 2018). A program was developed that focused on the use of gardening activities in a group setting to improve areas of wellness and nutrition, with the purpose of increasing self-confidence and self-perception.

Methodology: This project began with a literature review of the current evidence about the impacts of gardening on aspects of wellness and nutrition, with a specific focus on the older adult population. Based on the evidence, a program focused on the use of gardening to develop wellness and nutrition was developed and implemented. The program was developed using the Model of Human Occupation (MOHO) perspective with a specific focus on volition and desire to participate in the program (O’Brien, 2017).

Results: The created product is a 10 session, evidence-based, group gardening program that addresses well-being of older adults through socialization, nutrition, and participation in a new or meaningful activity. The program provides opportunities for socialization among peers in the group setting, hands-on learning of gardening techniques, education on uses of vegetables and herbs, and education on continued application of skills.

Conclusions: This program provides opportunities for increased occupational engagement and participation in a common meaningful occupation, a space for socialization and learning with peers, and education on nutrition.

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Significance: Practitioners will gain an understanding of the barriers to continued occupational engagement and participation that older adults face, specifically in relation to gardening. They will become confident in implementing the program and adapting it to meet the needs of the population

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/5ac016a4aa36453790a09ce9c63f83391d>

61. The People Left Behind: Older Adults in Custody

Therese Pettersen and Anne Haskins; Contributor: Joe Bugher

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Occupational Therapy / Health Research

The number of older adults in custody has significantly increased over the past few decades, now accounting for 10% of the total prison population (Carson & Sabol, 2016). It has been documented that older adults in custody have been subjected to bullying, lack of understanding and knowledge among prison staff, harassment, isolation, lack of age-appropriate occupations and more (Du Toit & McGrath, 2018). Increased staff training on older adult care (Brooke & Ryback, 2020; Williams et al. 2012) and environmental modifications (Bierie, 2018; Brooke et al., 2020; Du Toit et al., 2019; Du Toit & McGrath, 2018; Maschi et al., 2012) have been highlighted as potential solutions to decrease the barriers older adults in custody face.

The purpose of this scholarly project was to address the needs of older adults in custody as identified in the literature and during an on-site placement. Through an in-depth needs assessment, collaboration with a partnering facility, informal observations, and experiences in the field, an online educational module for correctional staff on older adult care, titled “The People Left Behind: Older Adults in Custody”, was created. Emphasis was placed on common chronic conditions found among older adults in custody, suggested interventions appropriate for the prison setting, Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/5ac016a4aa36453790a09ce9c63f83391d>, handouts, and case studies to encourage critical thinking. It is anticipated the educational module will aid correctional staff in choosing appropriate methods by which to communicate with and assist older adults in their daily life thereby benefitting the target population by increasing their quality of life, occupational participation, and performance in daily activities. Throughout the entire project development, a white paper including evidence-based information regarding occupational therapy services appropriate for the prison setting was developed for the purpose of being presented to appropriate stakeholders. For the occupational therapy profession, this scholarly project is anticipated to assist in delineating the role of occupational therapy in the prison setting while at the same time ensuring increased awareness surrounding older adult care which will increase their quality of life, health, well-being, and participation in daily activities.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/cf063af18d394ea78ef130acbbb44ec71d>

62. Development of a School Based Program: Implementing Occupational Therapy into General Education Classrooms

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Occupational Therapy / Health Research

In a technological advancing society, accessibility to tablets, screens and iPads has become easier than ever. Children who are born and raised with this technology become comfortable with using a tablet or screen at a young age. While children are gaining skills for navigating everyday technology, they are lacking the hand strength and fine motor coordination necessary for completing everyday tasks, including tasks within the classroom. Because of this, I partnered with an elementary school to build programming to provide young students opportunities to further develop their fine motor coordination and visual perception skills necessary for academic success, as well as becoming more independent in everyday activities.

Students' diminished abilities were linked to increased use of technology at home and school and less time for hands-on academic tasks during the school day. Field experts, such as general education teachers and school-based occupational therapists, confirmed the need for kindergarten and first grade students to be exposed to activities that target fine motor strength, bilateral coordination, and visual perception skills. I worked directly with eight classrooms, four kindergarten and four first grade, to develop age-appropriate activities that targeted skills needed for future handwriting instruction and furthering students' independence in completing educational tasks.

The Ecology of Human Performance (EHP) model was used to guide program development and assist with producing activities that were to be used in multiple and varying contexts (Dunn, 2017). This scholarly project resulted in 22 occupational therapy-based activities that can be used by kindergarten and first grade students in general education classrooms, special education classrooms and by school-based occupational therapists. The activities are directed towards engaging students in integrating fine motor, hand coordination and visual perception into their everyday learning experiences to further develop handwriting, reading, spelling and hand dexterity skills. Efficacy of the program was assessed through informal observation, weekly feedback from students and summative questionnaires from teachers. Modifications were made to activities throughout the weeks to better match students' abilities and the needs of the site. It is anticipated that this program will contribute to the increased hand function and visual perception abilities in elementary students.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/c9c5a212d48347d88b352fa807546d861d>

63. A Proactive Approach to Lymphedema Treatment: A Patient's Educational Guide

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Occupational Therapy / Health Research

Background: Lymphedema affects between 90 and 250 million people worldwide, yet there is little information about it, and it is poorly understood by the medical community (Manrique et al., 2022). This too often results in patients not receiving proactive treatment for their symptoms. Proactive intervention increases the patient's ability to engage in meaningful occupations,

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socialization, quality of life, mobility, and confidence (Dominick et al., 2014; Lu et al., 2015; Warren et al., 2007; Yarmohammadi et al., 2021).

Purpose: The purpose of this scholarly project was to create a guide specific to individuals who are at risk of developing lymphedema or who already have a diagnosis of lymphedema. This guide is intended to help patients manage lymphedema symptoms proactively so that they can remain independent in occupations that are meaningful to them. A Proactive Approach to Lymphedema Treatment: A Patient's Educational Guide is a paper handout for patients that consists of lymphedema education, preventative handouts, interventions, and safe exercises. The guide addresses proactive lymphedema education for patients who are at risk of developing lymphedema or who have already been diagnosed through an easy-to-use guide that includes best-practice interventions for lymphedema treatment. Additionally, this scholarly project is expected to improve patient outcomes and increase awareness of lymphedema conditions.

Methodology: An extensive literature review, needs assessment, informal observation, and continuing education courses, were completed during the process of creating the guide. To guide the methodology and development of the guide, theoretical models such as Ecology of Human Performance (EHP) and principles of andragogy were used (Bastable et al., 2020; Dunn et al., 1994).

Conclusions: The guide is intended to be viewed by individuals who are at risk or already diagnosed with lymphedema. A Proactive Approach to Lymphedema Treatment: A Patient's Educational Guide is an easy-to-use guide for patients to be used under the guidance of a healthcare professional. The guide is intended for individuals who are at risk or have already been diagnosed with lymphedema. The projected outcome of the guide is increased participation in daily tasks, health management, increased quality of life, mobility, socialization, and meaningful occupations.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/588766abb3164ba2aa38b7b3029a11e91d>

64. Social Skills Development: A Resource for Pediatric Occupational Therapy Group Sessions

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Occupational Therapy / Health Research

Purpose: Children with a neurological disorder often demonstrate delays in social skill development (Glenn et al., 2020; Goldingay et al. 2020; & Tanta & Kuhaneck, 2020). This delay in development impacts their participation in meaningful occupations as optimal performance range includes an element of social interaction. The purpose of this product is to provide pediatric occupational therapists with the resources necessary to build social skills groups following a hierarchy of social skill development.

Methods: An extensive literature review was completed to identify areas of need. Various online databases such as CINAHL and PubMed were searched and relevant articles were sifted through following certain inclusion and exclusion criteria. Impactful publications for this project included information on the effectiveness of social skills groups in children (Gilmore et al., 2022; Goldingay et al., 2020; & O'Rourke et al., 2020), the impact of peers on social development in children (Fox et al., 2020; Glenn et al., 2020; & Tanta & Kuhaneck, 2020), and the impact of play on a child's social skills development (Chester et al., 2019; Kuhaneck, 2020; & O'Keeffe et al., 2021). A combination of theories was used to guide the development of this project. The interconnection between the Ecology of Human Performance (EHP) Theory (Dunn, 1994), Cognitive Learning

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Theory (Piaget & Inhelder, 1969; Vygotsky, 1986), Social Learning Theory (Bandura, 1989), and the Polyvagal Theory (Porges, 2003) emphasizes the complicated connection between the child, their tasks, and the context, while capturing the impact each can have on a child's overall performance range.

Results: The product gives pediatric occupational therapists an outline for social skills group sessions that span eight weeks. This eight-session outline follows a progression of social skill development beginning with self-awareness. The outline moves into self-regulation, emotional awareness, emotional regulation, recognizing others' emotions, body language, and finishes with basic social skill development in sessions seven and eight.

Conclusion: This product was created to give pediatric occupational therapists the resources and outline necessary for creating social skills group sessions. It is anticipated that this product will target the need for social skill development in children with a neurological disorder and will continue to grow and develop into a product that can be used to reach a bigger population.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/b6483454ed6d43e18e2a08863aac04631d>

65. Individuals with Spinal Cord Injuries: A Dual-Component Resource

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Occupational Therapy / Health Research

Returning to societal functions after a spinal cord injury is often the primary goal of most individuals (Kennedy et al., 2010). The transition out of rehabilitation is often inhibited by difficulties ranging from a lack of quality peer support, a gap in post-discharge care, an absence of psychological support, experiences of unaddressed chronic pain, worries about bowel and bladder accidents, and altered body image (Dickson et al., 2011; Kennedy et al., 2010). Transitions for individuals with spinal cord injuries present a clear area of need and were the focus of this scholarly project. To complete this scholarly project, a thorough review of the literature was completed including searches in the Cumulated Index to Nursing and Allied Health Literature, PubMed, the National Spinal Cord Injury Statistical Center, American Occupational Therapy Association, and the UND Scholarly Commons. Other steps included an onsite review, a discussion with professionals, and the drafting of the product. Feedback from individuals with spinal cord injuries informed changes to that product throughout its development. The guiding model for all steps including product development was the Ecology of Human Performance (Dunn et al., 1994). The product included two components. First, A Guide for Transition for individuals and their families to use while completing inpatient rehabilitation and as they transition into the next setting. Areas addressed included activities of daily living, sexuality, mental health, transfers, durable medical equipment, and peer groups. Secondly, a presentation about findings while onsite to health care professionals at the site to guide implementation of the product across an interdisciplinary team. This scholarly project provided insight into what gaps in services were present within inpatient and outpatient rehabilitation of spinal cord injuries. It offered areas of improvement and future project topic areas. The product was created to provide a practical solution to begin bridging the identified gaps in services. This project provided a first step in ensuring individuals with spinal cord injuries were prepared for all of their future transitions. This scholarly project is an occupation-based, client-centered, and inclusive product that offered an

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opportunity for improved outcomes for individuals with spinal cord injuries. It aimed to improve outcomes for individuals and their support systems and the quality and efficacy of care by the entire team.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/3eab309ab0fc47c794b9f295dfd1f56e1d>

66. The Mind Matters: Interprofessional Mental and Emotional Health Guide for Cancer Survivors

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Occupational Therapy / Health Research

Introduction: Cancer is the second-highest leading cause of death in the United States with approximately 1.9 million new cancer cases and over 600,000 deaths in 2022 alone (Department of Health and Human Services et al., 2022). Cancer-related mental health is a primary barrier for engagement in treatment-related care; negatively impacting perceived quality of life (Islam et al., 2022). Comprised mental health is one of the contributing factors to suicide. Patients undergoing a cancer diagnosis are at an ever-high suicide risk with incidences higher than other diagnoses (Saad et al., 2019).

Feelings of anxiety, stress, fear, and depression are common among those in cancer survivorship (Hwang et al., 2015; Islam et al., 2022; Niedzwiedz et al., 2019; Pergolotti et al., 2020; Sleight & Duker, 2016). Mental health needs of those diagnosed with cancer are often given little attention during and after cancer treatment (Hunter et al., 2017a; Hunter et al., 2017b; Niedzwiedz et al., 2019; Pergolotti et al., 2019; Pergolotti et al., 2021; Sleight & Duker, 2016). Poor mental health can contribute to a decline in occupational engagement which overall influences perceived well-being and quality of life (Sleight & Duker, 2016; Niedzwiedz et al. 2019). This scholarly project addressed occupational performance and quality of life through evidence-based treatment interventions in health promotion, leisure, and social participation.

Methodology: The literature review results indicated a need for interprofessional support services for adult cancer survivors to increase occupational performance, quality of life, and awareness of mental and emotional health challenges. Additionally, healthcare providers are not consistently initiating conversations or treating patients regarding their mental and emotional health options.

Two models were used throughout the development of the scholarly project. The Person-Environment-Occupation Model (PEO) was utilized to ensure optimal occupational engagement through personal needs, evidence-based treatment interventions and institutional environment protocols (Law et al., 1996). The Cognitive-Behavioral Theory (***) was used within the product to organize, shape, and assist in evidence-based interventions to treat the affective self.

Results: The literature review combined with the theoretical models led to the development of an interprofessional guide focused on health promotion and social participation by targeting cancer survivors' mental and emotional needs.

Conclusion: It is anticipated that the interprofessional guide will enhance occupational performance for cancer survivors by addressing and meeting their mental and emotional health needs, whether through the provision of relaxation and coping strategies or access to mental health support and services.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/76d09969fb594a74a024f51314f44efb1d>

67. Educating the Educator: Articulating OT's role in School-Based Collaboration

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Occupational Therapy / Health Research

Background: Many teachers in the educational field are unaware of the role of occupational therapists (OTs) and how OTs can support teachers and students (Kennedy et al., 2018; Truong & Hodgetts, 2017). Educators who are aware of the OT role often desire further collaboration including realistic recommendations for their classroom (Truong & Hodgetts, 2017). This presents a need for increased education about the role of occupational therapy (OT) in school-based practice and additional instruction for increased effectiveness of OT-teacher collaboration.

Purpose: The purpose of this scholarly project was to develop an in-service opportunity for educators through the creation of educational Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-researchs> to promote the role of OT within the school system and give recommendations to teachers to enhance collaboration among teachers and OTs.

Methods: A literature review needs assessment took place to identify the overall needs of the population and guided the information presented in these Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-researchs>. A total of four educational Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-researchs> were created to educate teachers about the OT role and scope of practice in the school-setting. The Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-researchs> also gave recommendations to enhance teacher-OT collaboration based on the needs determined through the literature review. The Person Environment Occupation Model was used throughout the literature review needs assessment and in development of this product (Baptiste, 2017).

Results: A total of four educational Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-researchs> were created. The Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-researchs> will be used as part of a continuing education program for teachers. The expected outcome of this scholarly project is that the Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-researchs> will enhance educator understanding about the OT role allowing them to collaborate with school-based OTs more effectively.

Conclusion: Educators are often unaware of school-based OTs role and scope of practice (Truong & Hodgetts, 2017). The purpose of this scholarly project was to develop an in-service opportunity for educators to increase their knowledge about the role of school-based OT and effective collaboration with OTs. As a result, four education Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-researchs> were created to be used as part of a continuing education program for teachers with the expectation of enhancing teacher knowledge about the OT role and teacher-OT collaboration in schools. **Traditional Poster**

68. Interprofessional Collaboration Training Module - For Autism Service Provision

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Occupational Therapy / Health Research

Introduction: Autism spectrum disorder (ASD) is a neurodevelopmental disorder that is marked by challenges in social communication, restricted interests, and repetitive behavior which results

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in difficulties in many occupations (APA, 2013; Crabtree & Demchick, 2018). Occupational therapy is part of the multidisciplinary team providing services to children with ASD. The purpose of this doctoral experiential placement was to gain advanced clinical practice knowledge for serving children with ASD. Additionally, a product focused on enhancing interprofessional collaboration was developed.

Methodology: The person-environment-occupation (PEO) model guided this project (Law et al., 1996). An initial review of the literature was conducted on the best practices for ASD service provision. Once on-site, a needs assessment was conducted to detect the site-specific need. Next, a product was identified and developed through collaboration with the site's director of organizational development.

Results: An educational module addressing interprofessional collaboration for ASD service provision was developed to facilitate collaboration between team members of various disciplines. The training module is an online course that will be a part of the onboarding and training curriculum specific to the site for the necessary team member positions. The training module touches on the various standards for interprofessional collaboration within ASD treatment teams.

Conclusion: The purpose of this product is to increase the facilitation of interprofessional collaboration to create an enhanced continuity of care within ASD treatment plans. Interprofessional team members will be more equipped to engage in collaborative interactions with other members of their team, which ultimately enhances the outcomes of the child receiving services.

Significance: Interprofessional collaboration is best practice within ASD treatment plans as it increases service outcomes. Often professionals are not adequately prepared to engage in effective collaborative practice (Bowman et al., 2021; Gasiewski et al., 2021; LaFrance et al., 2019). Therefore, this product will improve collaborative service delivery for children with ASD.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/b64bf35df1444f1582bba3e1e84d09c31d>

69. Fostering a Loving Connection: A Foster Parent's Toolkit for Understanding and Addressing Behaviors for Children Placed in Out-of-Home Care

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Occupational Therapy / Health Research

Children in out-of-home care have been exposed to trauma by being removed from their biological parents due to abuse, neglect, or unsafe conditions (Bartlett, 2021). From this trauma, a child is more likely to have difficulty with basic self-care skills, executive functioning, emotional regulation, attachment disorders, or relationships within the foster home and their environment (Pervis et al., 2013). Current trauma-informed programming created for foster parents aim to educate them about the prevalence of trauma and how trauma impacts a foster child and their functioning (Association for Behavioral and Cognitive Therapies, 2022). Barriers to current programming are the cost of education, educational level requirements of the programming, and ease of usability and implementation of the programming (Bartlett & Rushovich, 2018).

The purpose of this scholarly project is to provide foster care professionals and parents with accessible and actionable activities, strategies, and environmental modifications for a trauma-informed approach to parenting. The intended audiences for this project are professionals who work with children placed in out-of-home care, foster parents, and children exposed to trauma.

This product was created following needs assessments comprised of a literature review and collaboration with stakeholders that revealed the need for trauma-informed parenting activities

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and strategies that are easy to access and implement. The product materials were created through a holistic approach to addressing trauma-related behaviors. The Person-Environment-Occupation model along with the Adult Learning Theory was used for structure and usability during product development. This product was also created with a concurrent doctoral experience placement in a private foster care agency with direct interaction among intended stakeholders.

The result of the literature review and interactions with staff and foster parents through the foster care agency placement directly shaped the development of the product, Trauma-Informed Parenting Toolkit. Product content included trauma-informed materials to use within the foster home through environmental modifications, parenting strategies, and bonding activities. The product will increase understanding of the impacts that trauma has on a child's mental and physical development and provide support to decrease those identified impacts to provide an environment for the foster child to begin their healing journey.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/f8362c5b70704e83b1f6425116e0a5bf1d>

70. Becoming an Occupational Therapy Advocate: A Toolkit for Practitioners

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Introduction: Advocacy is an important component of the occupational therapy profession. Advocacy helps advance the profession, promote client well-being, and ensure access to services. Although practitioners are aware of the importance of advocacy, there is still a lack of involvement in advocacy efforts. There are several reasons for the lack of involvement, including insufficient knowledge and preparedness, limited discussion of advocacy, and lack of time to interact with the policy process (Dhillon et al., 2010; Marfeo, 2020; Osman et al., 2020). A toolkit was developed to address the identified barriers by providing occupational therapy practitioners in Wyoming with information and resources to ease the process of advocating, specifically at the systems-level. The toolkit is intended to be used by any occupational therapy practitioner, regardless of their advocacy experience.

Methodology: A literature review was conducted through PubMed and CINAHL databases. The search terms were related to occupational therapy, advocacy, policy, healthcare professionals, and legislation. Personal communications with experts in advocacy and professional organization processes were also used for toolkit creation. The Person-Environment-Occupation (PEO) model (Law et al., 1996) was used to develop the entirety of this scholarly project. The PEO model was utilized to analyze the advocacy process, occupational therapy practitioners, as well as their environment to optimize occupational performance or overall engagement in advocacy efforts.

Results: The toolkit is an interactive information and resource guide, including two main components: education and advocacy tools. The education section aims to provide information to increase discussion and build practitioner's knowledge. The second section includes advocacy tools and resources to improve involvement by easing the advocacy process.

Conclusion: Becoming an Occupational Therapy Advocate: A Toolkit for Practitioners serves as a resource for occupational therapy practitioners in the state of Wyoming. The purpose is to educate and empower practitioners to engage in advocacy for the occupational therapy profession.

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Significance: This toolkit will increase occupational therapy practitioner involvement in advocacy efforts, specifically at the systems-level in the state of Wyoming.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/c8f2e7ce0e6142ceb692b564ca905dae1d>

71. Caring for All in the NICU

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Occupational Therapy / Health Research

Introduction: In the neonatal intensive care unit (NICU), the infants who are being examined, evaluated, and treated are not the only people that need to be thought of when providing care. The parents/guardians in the NICU are just as important to consider in providing support. Research has shown that parents who have a child in the NICU experience a great deal of stress and guidelines recommend emotional support intervention in the NICU (Bigsby, 2021; Dudek-Shriber, 2004, Hynan & Hall, 2015). Emotional support is needed for these parents as they are experiencing perinatal mood and anxiety disorders that are often left untreated (Griffiths, 2018; Johnson Rolfes & Paulsen, 2022).

Methodology: The Person-Environment-Occupation (PEO) model was used to guide the creation of the product. Each component of the PEO model was analyzed to create optimal transactions resulting in an increase in occupational performance (Law et al., 1996). A literature review along with personal communications with experts in the field were conducted to determine what interventions would best promote emotional well-being. Using evidence-based research, an emotional support booklet was created for parents.

Results: Caring for All in the NICU is an evidence-based emotional support resource for parents to use while they stay in the NICU. The booklet is divided into five sections; topics such as the NICU environment, stress and mental health, coping skills, what parental inclusion looks like, and resources on the local and national level are described. An anonymous survey was developed to evaluate the effectiveness of the booklet and modify as needed.

Significance: The product provides education to the parents to help orient them to the NICU environment. The purpose is to help parents adjust to the situation and offers ways to cope with stress in a healthy manner. This product aims to break the stigma of discussing mental health by encouraging parents to talk about their feelings and hopefully gain confidence in their role as a parent.

Conclusion: Inside the NICU there is uncertainty, loss of control, and significant stress. The booklet aims to give parents the means to express their emotions and cope with their feelings in a healthy way.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/3862dd918297488490c4ef28e58eeab71d>

72. Integrating Occupation-Based Groups in the Early-Elementary School Setting

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Occupational Therapy / Health Research

In the early-elementary school curriculum, foundational skills are established to promote success in education and beyond. With limited remediation opportunities in the areas of fine motor and social skills, students are not receiving adequate resources to foster academic success. Students who demonstrate deficits in fine motor and social skills are prone to negative peer and teacher perception, a lack of self-esteem, decreased mental flexibility, and an inability to communicate knowledge effectively (Case-Smith et al., 2014; Lust and Donica, 2011; Taverna et al., 2020). These adverse consequences often result in a negative attitude towards school and low academic performance, which may persist throughout life if not addressed early on (Fox et al., 2020).

The purpose of this product is to provide early-elementary school students with opportunities for remediation in the areas of fine motor and social skills. The product aims to support students who do not qualify for an individualized education plan (IEP), 504 plan, or have not begun the lengthy process to obtain such services. The product is intended to bridge the gap between students demonstrating need for skill remediation, and those currently receiving services.

A comprehensive literature review was completed to gain an understanding of fine motor and social skills and their influence on a student's educational experience. The Person-Environment-Occupation (PEO) Model was selected to gather information and direct the development of the product (Law et al., 1996). Evidence was obtained on the early-elementary school population, environmental constructs, and tasks that make up the occupation of education. It was also imperative to research constructs influencing how interventions could be delivered within the academic setting to effectively inform the product and its implementation. Employing literature and evidence, a product targeting fine motor and social skills was drafted and piloted at an elementary school. Informal observations of student performance and communication with school faculty were completed throughout and following program delivery to ensure the effectiveness of the product.

A product was curated with foundational skills and remediation opportunities in mind. Accessibility to interventions addressing skill deficits ensures fair and equitable attainment to academic success. Achievements within the classroom walls creates a trajectory for success across the lifespan.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/ddac1371c0b145f18a77a5d20b5582cd1d>

73. Occupational Therapy's Role When Treating Pediatric Feeding Disorders

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Occupational Therapy / Health Research

Feeding and eating are required occupations that all humans must engage in to meet one of their most basic needs (AOTA, 2020; Maslow, 1943). While feeding and eating allows humans to meet their most basic physiological needs it also allows them to meet other needs of Maslow's Hierarchy along with engaging in valued occupations (AOTA, 2020; Maslow, 1943). Children with Pediatric Feeding Disorders (PFD) have difficulty with one or more areas of feeding which are

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medical, nutritional, feeding skill and/or psychosocial dysfunction (Fleet et al., 2022; Goday et al., 2019; Howe & Wang, 2013; Marshall et al., 2015; Sharp et al., 2017 & Volker et al., 2019). The purpose of Occupational Therapy's Role When Treating Pediatric Feeding Disorders is to better understand the role of Occupational Therapy when treating PFD, other members of the treatment team and create home programming and educational resources for parents and caregivers to use outside of the therapy environment. The creation of the scholarly project including the home programming and educational resources were guided by an extensive literature review and completion of a needs assessment.

Occupational Therapy Practitioners address the feeding skills impacted when a child has PFD can include oral motor skills to manage food in mouth, expand the variety of foods in a child's diet and help with any environmental changes. The home programming and educational resources that were made include strengthening and improved coordination of the cheeks, tongue, lips and jaw, ways to make a safe and more fun eating environment, safe ergonomics when feeding and eating, and the differentiating between occupational therapy and speech therapy's role on the interprofessional treatment team for feeding and eating. Results of the scholarly project are an increase overall in food intake along with the variety of foods the child will eat. It also decreased mealtime behaviors and the stress of parents/caregivers while increasing the parent/caregiver and child relationship.

It is estimated that 25% if typically developing children, 80% if children with intellectual disabilities and 40-70% of children with medical complexities experience PFD which can impacts other areas of the child's life (Estrem et al., 2019; Saini et al., 2019; Sharp et al., 2017). A larger number experience PFD every day and their life is impacted in many different ways showing the importance of occupational therapy practitioners addressing it.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/91661ef567c44bb09370bd647680f1721d>

74. Best Practice Occupational Therapy Interventions for Addressing Trauma and Posttraumatic Stress Disorder: A Practitioner Guide

Madison Ertelt

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Introduction: Posttraumatic stress disorder (PTSD) impacts around 3.6 % of adults and 5% of adolescents in the United States and has pervasive impacts on occupational performance (National Institute of Mental Health, n.d.). Occupational therapy practitioners (OTPs) likely encounter clients with PTSD frequently due to this widespread prevalence in addition to trauma being comorbid with many mental and physical health conditions. Despite the high prevalence of trauma, many OTPs find that trauma-informed care (TIC) is not adequately implemented in practice (Holman et al., 2022). There is a gap in the literature regarding occupational performance deficits experienced among clients with trauma, knowledge of how to address these deficits among OTPs, and application of trauma related knowledge to practice. The purpose of ""Best Practice Occupational Therapy Interventions for Addressing Trauma and Posttraumatic Stress Disorder: A Practitioner Guide"" was to bridge these gaps.

Methodology: A needs assessment including a literature review, skilled observation, and collaboration with an OTP with expertise in trauma, was conducted to inform the design of the guide.

Results: ""Best Practice Occupational Therapy Interventions for Addressing Trauma and Posttraumatic Stress Disorder: A Practitioner Guide"", was developed to provide guidance for

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OTPs to address trauma and PTSD in practice. The guide leads OTPs through the occupational therapy process, discusses impacts of trauma, and addresses common comorbidities.

Significance & Conclusions: Trauma is highly prevalent, is often comorbid with a wide range of conditions, and impacts a wide range of occupations. TIC should be implemented by OTPs within all areas of practice given the high prevalence of trauma within society.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/868dcad3d9654afe82c08d24dc548f781d>

75. Living a Trustful Life- A Trauma-Focused Mentorship Program for Foster Youth

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Occupational Therapy / Health Research

Background: Foster youth can experience many challenges as they prepare for their transition into adulthood which can threaten their success to achieve who they wish to become. Often, foster youth are exposed to physical, mental, and sexual trauma leading to the removal from their biological home (Engler et al., 2020). Adverse experiences at a young age can be multi-dimensional and long-lasting, leading to negative consequences in occupational performance including self-isolation and hesitation to trust others (Häggman-Laitila et al., 2019; Paul-Ward & Lambdin-Pattavina, 2016).

Purpose: The product of this scholarly project is a mentorship program for youth preparing to age out of foster care. The program provides foster youth with a mentor to promote social stability and guidance as they prepare for their future endeavors. This product is necessary because it has the potential to improve foster youths' personal stability and self-confidence, with the help of a mentor, as they work towards achieving their goals in adulthood.

Methods: A comprehensive literature review was completed in the initial stages of product development to gain a holistic understanding of the gap between foster youths' skills and abilities and their participation in meaningful occupations. The person-environment-occupation (PEO) model served as the primary framework to guide this program by determining how to create a better fit between the person, environment, and occupation for optimal occupational performance as foster youth age into adulthood (Law et al., 1996).

Results: The product, Living a Trustful Life, was developed to enhance occupational performance by creating an evidence-based mentoring program that provides an opportunity for foster youth to experience a sense of belonging through the relationship with a mentor which can serve as a guide and promote social stability that youth may have lacked prior to their placement in foster care.

Conclusion: Living a Trustful Life was created to fill the gap that exists in foster youths' abilities to actively participate in meaningful occupations after aging out of foster care. It is anticipated that this mentorship program will help to enhance self-esteem and empowerment as foster youth further discover who they wish to become as adults and the goals they hope to accomplish as they prepare for their autonomous life.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/a46fe929b3cc4ea2bbcc500c5a911fe01d>

76. Water Based Therapy: Educational Resource and Program Development for Children with Neurological Disorders

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Occupational Therapy / Health Research

Introduction: Children with neurological disorders require more social, behavioral, and physical support to be successful in everyday life (Ogundele, 2018). The impairments these children face can often lead to isolation, decreased overall functioning, and impact engagement in occupations such as play, social participation, and leisure (Kwan and Collet, 2020). Access to water-based group lessons can be limited due to one-on-one instruction required. Occupational therapy has the skill set to be able to incorporate play, social participation, and leisure-based activities for children with neurological disorders.

Purpose: There are limited opportunities for children with neurological disorders to participate in group-based water activities due to costs, skill level, and lack of strategies used in the water for children with more needs. The purpose of Water Based Therapy Educational Resource and Program Development for Children with Neurological Disorders is to advocate for children with neurological disorders to be included in water-based activities within a community setting.

Methods: An extensive literature review was completed on water-based activities and the specific neurological disorders of cerebral palsy, autism spectrum disorder, and attention deficit hyperactivity disorder. Then a needs assessment was done through observation and informal interviews. The specific behaviors for typical and atypical children were researched during water-based activities for children aged three to five. The theoretical framework that was used to guide this information was the Person-Environment-Occupation model for occupational performance (Law et al., 1996).

Results: The Water Based Therapy Educational Resource and Program Development for Children with Neurological Disorders was created to provide staff and parents with a water-based activities program and resource that will be integrated into the current programming for children with and without neurological disorders. The educational resource will be provided to staff and parents on behaviors and strategies to alleviate behaviors to make water-based activities more accessible to children with neurological disorders.

Conclusion: Water-based activities has a wide variety of benefits for children with and without neurological disorders. The children can experience a wide variety of activities while enjoying the social participation of their peers.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/56a4521d54904000b1db1927ce4740931d>

77. Improving Occupational Engagement for Children with Executive Dysfunction

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Occupational Therapy / Health Research

Background: A person's ability to successfully perform complex tasks requires a higher level of thinking made possible through the successful use of executive functions. Executive functions develop over time, but typical development begins in early childhood. When children experience interruptions to development, executive dysfunction can inhibit their ability to reach their full occupational potential with play, academics, and social skill development. This scholarly project

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aims to promote executive function using an evidence-based approach to support occupational therapy practitioners and the children they serve with executive dysfunction.

Methodology: A literature review guided by the Ecology of Human Performance (EHP) was used to better understand the barriers and supports of those providing occupational therapy services for children with executive dysfunction. The occupational limitations revealed a need for additional practitioner education, intervention ideas to promote executive function, and parent education.

Results: An executive function toolkit was created for entry-level practitioners in the pediatric outpatient setting. The toolkit, Improving Occupational Engagement for Children with Executive Dysfunction, provides the practitioner with education materials, assessment and intervention suggestions, and parent education materials.

Conclusion: With improved access to assessment, intervention, and parent education materials on executive function, this author hopes the toolkit will positively impact a child's development, so they experience fewer barriers as they work to reach their occupational goals.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/13b3707f8f404136a14167f998b361b71d>

78. Addressing the Psychosocial Impacts and Recovery of a Patient with Carpal-Metacarpal (CMC) Arthroplasty: A Case Study

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Occupational Therapy / Health Research

Background & Purpose: Hands are an integral part of what defines us as human beings, they provide us with independence in work, leisure, self-care, and social interactions (Hannah, 2011). Injury to the upper extremity can harm one's ability to engage in daily occupations and often can result in a wide range of consequences affecting the physical, psychological, social, and economic aspects of a person's everyday life (Cederlund et al., 2010; Chown et al., 2017). Treatment is often placed on the physical aspects of the injury, while the psychological symptoms associated with the injury are often not addressed (Jack & Estes, 2010). Evidence indicates that there is a lack of psychosocial-based assessments and interventions, with further findings implying that therapists working in hands typically focus on physical factors such as range of motion, strength, edema, and scarring (Chown et al., 2017). To prevent psychosocial barriers to occupational performance, occupational therapists need to incorporate psychosocial-based assessments and interventions early in the rehabilitation process post-hand and upper limb injury (Chown et al., 2017). Occupational therapists are highly specialized in physical care, but also have the training and knowledge to address psychosocial issues that influence patient recovery (Hannah, 2011). The purpose of this case study is to assist occupational therapists in addressing the psychosocial symptoms associated with an upper extremity.

Methodology: A needs assessment was conducted through a review of the literature to determine the needs of clients who are experiencing psychosocial symptoms associated with hand and upper extremity injuries. The Person-Environment-Occupation (PEO) Model (Baptiste, 2017) was used as a guide in the development of the case study intended for use of occupational therapists in the outpatient hand setting, to address the psychosocial symptoms that are associated with hand and upper extremity injuries.

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Outcome: A case study was developed to assist the occupational therapist in addressing the psychosocial symptoms associated with hand and upper extremity injuries and the impact on recovery. Using this case study, psychosocial factors will be addressed throughout the occupational therapy treatment process.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/b5132eadd67948bd8125179ffb2bd31c1d>

79. Acting on the Need of a Client, Caregiver, and Practitioner Seating and Mobility Guide

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Physical Therapy / Health Research

Background: There is a significant need for individuals with a disability and specific mobility limitations to require a wheeled mobility device. Wheeled mobility devices allow individuals to gain and/or maintain independence and engagement in occupations. The evaluation, prescription, and fitment of wheeled mobility devices are complex, requiring clients and caregivers to use and maintain these devices in specific ways. Barriers caregivers face can include not positioning the client properly in the wheeled mobility device, damaged or missing wheelchair parts, or improper positioning of the straps and belts, affecting posture, which could lead to secondary complications.

Purpose: This scholarly project aimed to understand the supports and barriers of wheelchair users and the direct support professionals providing care. Using this new understanding to create a reliable and effective product for improved client and caregiver experiences when working with a wheeled mobility device.

Methodology: A literature review guided by The Ecological Model of Occupation and Ecology of Human Performance Framework (EHP) identified supports and barriers to wheelchair seating and mobility. Collaboration with experts in seating and mobility devices revealed the need for additional training and educational resources to support those providing direct, daily care for wheelchair users.

Results: The training and education module Acting on the Need of a Client, Caregiver, and Practitioner Seating and Mobility Guide was developed to target barriers related to providing care for wheelchair users using complex seating systems with the goal of increasing their comfort in achieving optimal positioning, and to trouble-shoot some common positioning errors.

Conclusion: This product was developed to train and educate the direct care providers of those using wheeled mobility devices to ensure consistency with positioning, reduce the risk of secondary complications developing due to poor positioning, and provide resources for those providing direct care. The hope is that this resource can be used across many settings and agencies for optimal outcomes on behalf of the wheelchair user.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/8b8e64cb45dc4e4c9852318baba935711d>

80. Assisting Mothers in The Transition to Motherhood?

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Background: The perinatal period ranges from 22 weeks gestation to 2 years postpartum (Hoekzema et al., 2017; Seth et al., 2016; World Health Organization, n.d.). During the perinatal period, intervention is primarily provided by an obstetrician and gynecologist (OBGYN) during pregnancy. After birth, mothers are discharged on average 2.1 days after a natural birth (Podulka et al., 2011). Women are seen at 6 weeks postpartum where mothers' physical health is the focus of the visit, leaving mothers' mental health concerns unaddressed and questions typically unanswered (American Academy of Pediatrics, 2012 & American College of Obstetricians and Gynecologists, 2012 as cited in Corrigan et al., 2015; Corrigan et al., 2015). This lack of follow-up care negatively affects motherhood mental health due to the lack of education and preparation that results from the lack of interdisciplinary care for this population.

Purpose: The purpose of this scholarly project is to create an improved interdisciplinary approach to support the mental health of mothers. Specifically, the target will be supporting both professionals and mothers in the understanding of the interdisciplinary team involved in perinatal healthcare.

Methods: A literature review, population needs assessment, and a site needs assessment was conducted to establish the foundation for the educational resource guide. The literature review was completed to determine the disciplines that support this population in the transition into motherhood, through pregnancy and postpartum. The author used the Model of Human Occupation (MOHO) to guide the literature review.

Conclusion: The Improving Interdisciplinary Healthcare to Support Mental Health of Mothers: A Resource Guide was created to highlight each discipline and their contribution to perinatal health with the intended purpose to educate the primary disciplines involved in the care of women during the perinatal period of each discipline that have the ability to address mental health needs of mothers during the transition into motherhood. It is anticipated that with this awareness and education, there will be increased referrals to create a greater interdisciplinary approach to perinatal health care and further, promote the overall wellbeing and mental health of mothers.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/1d23df4ad7ff4e548233b58bb21aa5331d>

81. Disability Awareness to Promote Inclusivity for Children in the Educational Setting

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Purpose: A large barrier to an effective and successful educational experience is the stigma and perceived judgment surrounding a child's disability (Fontil et al., 2020). Implementing disability awareness materials into young classrooms is a way to prevent the development of stigma towards disability. Children who received disability awareness programming in the past have shown improved attitudes towards disabilities as opposed to those who have not (Chae et al., 2019). The purpose of this scholarly project is to assist teachers with implementing disability awareness materials to increase encouragement for young peers to accept, include, and support young individuals with disabilities.

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Methodology: Following the completion of the comprehensive literature review, the author partnered with the childcare company New Horizon Academy. The author spent time in preschool classrooms while observing interactions between children as well as conversing with and learning from classroom teachers. Based on literature findings and field experience from young classrooms, the Disability Awareness: Promoting Inclusivity in the Classroom toolkit was developed. This toolkit, following development, was then accessible through New Horizon Academy's internal, online resource database for teachers' use.

Results: Continued implementation of this toolkit is necessary to determine effectiveness of this product. However, it is anticipated that teachers will feel more comfortable discussing disability and inclusion, children will feel more prepared to interact with their peers, and engagement in education and social participation will be improved for all young individuals.

Conclusions: The implementation of this product is anticipated to be beneficial to the entirety of New Horizon Academy staff. Due to limitations in time and company size, effectiveness was not determined at this time. The Disability Awareness: Promoting Inclusivity in the Classroom toolkit was created to be educational, encouraging, and empowering for teachers to facilitate an accepting, inclusive, and supportive classroom. Promoting inclusivity for children in the educational setting will lead to an enhanced experience for the occupations of education and social participation.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/9c5c52c920b745d1acbbcf712454b8181d>

82. Fostering Early Literacy Skills in School Aged Children

Jaden Pikarski, Julie McCann, Sarah Nielsen

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Purpose: The purpose of this scholarly project is to foster early literacy skill development for children within the school system. The materials created are intended to enhance the context and promote learning in a way that is meaningful and developmentally appropriate.

Methodology: The Ecology of Human Performance model was utilized to structure the literature review to guide in the creation of the materials (Dunn, 2017). Reviewing the literature through a model allowed for an in-depth analysis of several factors that influence a child's ability to learn early literacy skills. Through analyzing information found within the literature, observation within the classroom, and collaboration with the site mentor and members of the interdisciplinary team, it was determined that students may be missing an important developmentally appropriate tool for learning within the classroom - play. Therefore, the context was targeted and materials were developed that would allow for guided play to support early literacy skill development.

Results: The materials were created to align with the literacy curriculum currently implemented by the site. Materials for each section, such as rhyming, adding/deleting final syllables/phonemes, phoneme isolation, blending/segmenting words, and alphabet knowledge, were created. These materials are intended to be used in a variety of ways that enhance the context to further exposure, prompt play, and encourage learning through motivational means.

Conclusion: The materials are intended to increase students' performance range in the task of early literacy skill development through contextual modifications and guided play prompted by educators (Dunn, 2017). It is recommended that the materials are used in conjunction with the

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literacy curriculum, Heggerty (Heggerty, 2022; Heggerty, 2020), to ensure the blend of formal instruction and play to support the developmental stages of learning (Bastable et al., 2020).

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/53d167a258dd47ed9ef3dfc1f972fbe91d>

83. Exploring Nature-Based and Animal-Assisted Therapies as a Therapeutic Modality

Rachel Cheatley

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Animal-assisted therapy (AAT) is characterized by integrating animals into the therapy process as a therapeutic partner and modality (Laskowski et. al., 2019). AAT shows positive outcomes for those who take part in the practice (Ein et. al., 2018; Feng et. al., 2021; Mapes & Rosén, 2016; Nieforth et. al., 2021). Common goals that are targeted via AAT include anxiety and related symptoms, depression and related symptoms, coordination, fine motor skills, reaching, hand-eye coordination, body balance, body awareness, communication, and relationship building (Ein et. al., 2018; Feng et. al., 2021; Mapes & Rosén, 2016; Nieforth et. al., 2021). Even with the growing database of supportive literature, there is a gap in knowledge among occupational therapy practitioners regarding AAT and the identification of clients who would benefit from this therapeutic modality (Velde et al., 2005).

The purpose of this scholarly project was to create a guide that can be used to inform and recruit individuals to the host facility. The host facility is a faith-based youth mentoring and AAT facility that integrates animals and nature into the therapeutic realm. The information and recruitment materials were created for two specific groups. One group is potential mentors, volunteers, and interns. The second group are potential professional partners including occupational therapists, physical therapists, speech-language pathologists, and talk therapy professionals.

The product was developed following a comprehensive review of literature that emphasized the need for increased information related to the efficacy of animal-assisted therapy. Following the review of available literature an on-site needs assessment was conducted, determining the host facility's need for recruitment materials. The Model of Human Occupation (MOHO) was used to guide the research and development of the product (Kielhofner & Burke, 1980).

The Stable Days Youth Ranch Mentor Recruitment guide and Stable Days Youth Ranch Professional Partnership Recruitment guide was created to inform and recruit individuals to the host facility, ultimately, broadening the reach of the facility. The materials include information on the host facility as well as an outline of literature found on AAT and nature-based therapy. It is anticipated that the product will increase awareness as well as the volume of volunteers, mentors, interns, and professionals at the host facility.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/f2da813aae2742e1b5687066bd508c2d1d>

84. Transitioning a Hand Therapy Clinic from Traditional Paper Home Programs to an Electronic Platform: A Quality Improvement Project

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Individuals with upper extremity conditions who receive occupational therapy within the hand therapy context are often provided with paper or electronic home programs (HPs) as part of their rehabilitation protocol. Many patients either incorrectly perform the prescribed exercises and activities or do not complete them at all due to various factors. There is literature supporting the concept that electronic HPs promotes greater adherence and functional improvements than paper handouts, but despite such evidence, some occupational therapy practitioners (OTPs) may be hesitant to use a new online system. To promote patient adherence to HPs and overall health outcomes, OTPs should provide home programs in formats that best fit the lifestyle and needs of their patients.

The purpose of this scholarly project is to help transition an outpatient hand therapy clinic from using traditional paper HPs to using the electronic healthcare platform, MedBridge. The secondary purpose of this project is to understand what is inhibiting OTPs from currently using electronic HPs and use that information to create a resource to help ease the transition into using electronic HPs.

A literature review, needs assessment, and SWOT analysis were conducted to understand the potential impact of this project on patient care. A survey was distributed to hand therapists to understand practitioners' opinions regarding MedBridge. The person-environment-occupation (PEO) model and the plan-do-study-act (PDSA) quality improvement (QI) method were considered throughout the planning and formation of the product.

OTPs within the outpatient hand therapy context believe there are both benefits and barriers to using MedBridge for HPs. Therapists' concerns and ideas for improvement were taken into account when uploading current hand therapy patient resources to MedBridge and organizing the content. To improve ease of use as well as sustainability of this method of HP delivery, an in-service presentation oriented therapists to basic functions when using MedBridge HPs. Additionally, the MedBridge Home Exercise Program User Guide was developed which provides an in-depth explanation of the purpose of each function and how to use it.

This project is significant as there is potential for the updated resources on MedBridge and user guide to increase OTPs use of electronic HPs which may improve overall patient satisfaction and functional outcomes.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/0f5e966e51aa4feb832ecb552dfd90501d>

85. Sensory-Based Universal Design Strategies For Head Start Students To Optimize Educational Engagement

Lexi E. Zahn

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Purpose: This scholarly project aims to educate and enable early childhood education teachers on how children's sensory systems can be positively or negatively influenced to improve overall classroom experiences for all children. A teacher's resource guide was developed to inform early

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education teachers about the sensory system and sensory regulation so that they can better understand the sensory needs of their students. The guide provides them with universally designed, sensory-based strategies to implement in the classroom to increase the performance ranges of students in their educational pursuits.

Methodology: This scholarly project was completed in several key phases including a preparatory research phase, a comprehensive literature review guided by the ecology of human performance (EHP) model, extensive interviews with key stakeholders, on-site observation, and the development of a resource guide for early childhood education teachers. The process began in May 2022 when looking into sensory-based resources for classroom teachers. Following months of research, interviews, and on-site observation a gap was revealed in educational materials regarding sensory aspects of universal design for early childhood education teachers. From January 2023 until April 2023 information was deciphered from the literature, interviews, and observation resulting in a final product that was disseminated for use.

Results: The teacher's resource guide provides early childhood education teachers with education on terminology commonly used when discussing sensory dysregulation, as well as education on specific sensory-related topics such as sensory dysregulation vs emotional dysregulation and sensory seeking vs sensory avoiding. It also provides the teachers with sensory-based activities that can be used with all students and environmental recommendations to support the overall classroom context.

Conclusion/Significance: There is evidence that shows an inclusive sensory context can support overall educational engagement and success. The teacher's resource guide is intended to be a reference for teachers and staff at Head Start to fill this gap and utilize the information to provide more universally designed sensory-based activities to decrease dysregulation in the classroom context.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/f7a8539483f14c49bb6550aded7909271d>

86. A Holistic Approach to Promote Sleep for People Emerging from Homelessness: A Good Night's Rest in Your Nest Sleep Toolkit

Anna F. Burggraf and Scinda Janssen

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Sleep deprivation has been directly linked to chronic health issues, decreased physical and cognitive functioning, and overall decreased quality of life, limiting the ability to engage in desired tasks and occupations (Gonzalez & Tyminski, 2020). Individuals who have experienced homelessness consistently demonstrate higher rates of sleep inadequacies compared to the general public, which highlights the need for service providers to address the quality of sleep participation for this population (Gonzalez & Tyminski, 2020).

The purpose of this product is to supply occupational therapy practitioners and other service providers with an evidence-based and model driven toolkit to enhance sleep participation for clients emerging from homelessness. The product's aim is to assist clients in establishing healthy bedtime routines, make environmental modifications, and enhance the mind-body-spirit connection to promote sleep participation.

A thorough literature review was completed on a variety of current intervention approaches, programming types and formats, barriers to sleep participation and the role of occupational therapy for the target population. Analyzing the literature revealed a significant need for holistic and occupation-based interventions to enhance the quality of sleep received for clients emerging

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from homelessness to allow for appropriate functioning during daily activities and perceived quality of life. Concepts from the model of human occupation were used and applied for the development of the product (Kielhofner & Burke, 1980). The literature review and theoretical frameworks guided the creation of the toolkit, and all educational materials were developed with consideration of literacy levels along with andragogy and pedagogy teaching and learning theories to enhance the client's understanding and implementation of the product (Bastable et al., 2020).

A Good Night's Rest in Your Nest Sleep Toolkit provides educational materials to occupational therapy practitioners and other service providers to integrate into client's daily routines, habits, and their environments. The toolkit provides a theory driven, evidence-based, occupation-focused, and holistic product that enhances sleep participation for clients emerging from homelessness.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/4ebee2812efd4f2bb5fd70de9e540a2f1d>

87. Occupational Therapy's Role in Promoting Early Literacy in Head Start Programs

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Purpose: The purpose of this scholarly project is to create resources to support teachers and caregivers of Head Start students in supporting early literacy skill development. These resource guides and activity kits aim to support teachers and caregivers in closing the literacy gap between children raised in low-socioeconomic (SES) households and their peers from high-socioeconomic households.

Methodology: An in-depth literature review was conducted to identify barriers and supports impacting early literacy skill development of children living in low-SES households, as well as the role of occupational therapy in supporting early literacy skill development. Significant gaps in exposure to language, attitudes towards literacy, and self-regulation skill development were discovered as a result of contextual differences between high- and low-SES's. Additional surveys and classroom observations were completed to gain deeper understanding of barriers and supports development. The ecology of human performance model (Dunn, 2017) was used as a guide in the development of the teacher and caregiver resource guides.

Results: A teacher resource guide, caregiver resource guide, and interactive activity kits were created to support development of early literacy skills among Head Start students across their daily contexts. The teacher resource guide provides education and suggestions to support early literacy skill development in the classroom setting, while the caregiver resource guide provides education and suggestions to support early literacy skill development in the home setting. The interactive activity kits were created to increase exposure to literacy activities, encourage positive attitudes towards literacy, and increase engagement in previously established Head Start literacy programming. The kits are based on units from Head Start's curriculum and include a book with 3-5 correlating activities targeting skills for early literacy.

Conclusion: These resource guides and activity kits were developed to support early literacy skill development of children living in low-SES households, by increasing exposure, encouraging positive learning attitudes, and increasing engagement in educational activities and programming. It is anticipated that these resources will improve literacy rates among children raised in low-SES

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households, decreasing the literacy gap between high- and low- SES's, evidenced by future academic and vocational success.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/7a0860e444a7427b9a0c664ec82f76fb1d>

88. Supporting Caregivers of Children with Complex Health Needs

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Purpose: The purpose of this scholarly project is to develop and implement programming that provides support and meets the needs of caregivers of children with complex health needs. This was done by providing a resource guide of local community resources to caregivers to increase engagement in leisure occupations.

Methodology: At the start of development for this project, a literature review was completed to understand the challenges experienced by caregivers of children with complex health needs. From the research, it was determined that caregivers of children with complex needs experience mental health issues at high rates, have numerous unmet needs, and have challenges adapting to new roles while maintaining old habits and roles. Encouraging and promoting caregiver engagement in leisure occupations and finding occupational balance was determined to be a priority. Both the Person-Environment-Occupation and Eight-Dimensions of Wellness Models were utilized to guide the development of this product.

Results: The final product consists of a resource guide titled, A Resource Guide to Finding Balance. This resource guide is an 18-page document that includes information about the facility that the caregivers are staying in and breaks down the Eight Dimensions of Wellness into tangible tasks to achieve occupational balance. Within the resource guide, are embedded links to documents that provide more information about facility and community resources, such as gym equipment, local restaurants, local activities, etc. The resource guide, along with the linked documents, are provided to the caregivers during the check-in process through email for easy access throughout their stay.

Conclusion: It is anticipated that by implementing A Resource Guide to Finding Balance, caregivers will engage in leisure occupations more regularly. This will lead to increased occupational balance in the caregiver's lives. The project contributes to the field of occupational therapy by providing an occupation-focused resource to support the population of caregivers of children with complex health needs.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/aaaa8445ce1b43baa2a9735386cd55801d>

89. Submitting Research Grant Applications to Fund a Study Examining the Effect of Equine-Assisted Therapy on Compassion Fatigue in Caregivers

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Introduction: Caregivers are expected to provide the best care possible to their patients, no matter the circumstances. Depending on the need of the individual being cared for, a caregiver's job can cause an abundance of stress at various levels and can even lead to decreased mental health. This is often accompanied by a lack of self-care, poor health, and overall diminished wellness, otherwise known as compassion fatigue.

Methodology: Occupational therapists can address poor mental health due to compassion fatigue in caregivers by introducing a variety of important skills, habits, routines, and activities that patients need or want to engage in on a daily basis. Equine-assisted services (EAS) involve equine activities that can be combined with therapy professions, such as occupational therapy, by incorporating horses to address both the mental and physical health of individuals through occupational function, activity, and participation (Palsdottir et al., 2020).

Significance: Occupational therapy in the EAS environment provides an animal-assisted therapy (AAT) approach that can address and improve mental health conditions by incorporating occupation-based horse activities into therapy sessions. While researchers have linked AAT to improved occupational engagement and decreased mental health disparities in other populations, they have yet to examine the impact of occupational therapy in the equine environment on caregivers experiencing compassion fatigue.

Results: Animal-based research foundations, such as the Horses and Humans Research Foundation (HHRF) and the Human Animal Bond Research Institute (HABRI), offer grant awards for research studying the effectiveness of AAT services on individuals who struggle with significant mental health illnesses (HHRF, 2022; HABRI, 2022).

Conclusion: This scholarly project has utilized the 2023 HHRF Innovation Grant Applicant Guidelines and Information, and the HABRI 2023 Proposal Guidelines, to format grant applications introducing a proposed research project studying the effects of EAS on caregivers experiencing compassion fatigue.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/41e09993a14c4f3195086cbb98e4c06e1d>

90. Primitive Reflex Screening and Caregiver Education and Support

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A product to support children with retained primitive reflexes transitioning into the formal education system.

Introduction: Infants are born with movement patterns called primitive reflexes. Primitive reflexes are active for approximate times during the first few years of life (Smet et al, 2020; Myott et al., 2016). Retained primitive reflexes are primitive reflexes that have not integrated in the expected time. Retained primitive reflexes have been linked to a variety of developmental delays in older

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children including fine and gross motor (Gieysztor et al., 2018a), visual (Andrich et al., 2018), and academic performance (Feldhacker et al., 2021; Calvin & Ramli, 2020).

Methodology: A comprehensive literature review was completed prior to the start of the Doctoral Experiential Placement (DEP), at a pediatric outpatient clinic. After arrival at the DEP clinic, an onsite needs assessment was completed identifying the retained primitive reflexes most frequently seen at the clinic. Ecology of Human Performance Model (EHP) (Dunn et al., 1994) was used to guide the development of the retained primitive reflex screening and home exercise program.

Results: The product includes a retained primitive reflex screening for five primitive reflexes, parent/caregiver education handouts on primitive reflexes, and home exercise program focused on movement to integrate retained primitive reflexes created based on evidence from the literature review. The product is intended to be used prior to the start of formal education.

Summary: Retained primitive reflexes can impact children entering the formal educational system (Feldhacker et al., 2021; Gieysztor et al., 2018a). However, there are screenings available to determine which retained primitive reflexes children have (Goddard, 2005; Gieysztor et al., 2018a). There are exercises that will integrate retained primitive reflexes in older children (Gieysztor et al., 2018a) allowing them to decrease the impacts of retained primitive reflexes and improve their academic performance (Feldhacker et al., 2021; Calvin & Ramli, 2020). The product stream-lined the retained primitive reflex screening process at a pediatric outpatient clinic and provides parent/caregiver handouts and home exercises.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/f92c1ec6226b4d619451e565598f68691d>

91. A New Start for Student Veterans: A Transition-Focused Community Program

Sheena K. Miller, OTDS & Janet Jedlicka, PhD, OTR/L, FAOTA

Contributors: James E. Graham, PhD, DC, FACRM & Devin Celeste Barth MSOT, OTR/L

Occupational Therapy Graduate Student

Occupational Therapy / Health Research

For veterans integration into the community post-service poses a variety of unique challenges as they pursue different opportunities, one of them being higher education. It is estimated that approximately 900,000 veterans and their families had utilized the post-9/11 GI Bill as of 2018, with that number expected to increase over time (Ulrich & Freer, 2020). Some of the challenges faced by this population include higher rates of mental health diagnoses, suicidal thoughts, and service-related injuries than their civilian peers (Eakman et al., 2019; Dutra et al., 2016; Ulrich & Freer 2020). Military and Veteran Students (MAVS) have further reported concerns of belonging, isolation, adapting to a less structured environment, and executive functioning skills needed in the higher education setting (Dobson et al., 2022; Gregg et al., 2016; Tomar, 2014). These findings indicate the need for focus on program development efforts targeting MAVS transitioning to civilian life and life as a college student.

The purpose of this scholarly project was to focus on the needs of MAVS as they seek out higher education and integrate into the community. Through an extensive review of the literature, completion of an in-depth needs assessment, first-hand observational experience, interviewing stakeholders, and collaboration with the partnering agency, Center for Community Partnerships at Colorado State University, it was determined efforts would be directed at quality improvement measures to the holistic programming for the success of MAVS. This resulted in creating a decision-making guide for practitioners and supported education specialists outlining the

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sequencing and scope of services for programming to ensure the needs of MAVS are met and best outcomes are achieved. Emphasis was directed to defining the scope of services, the clinical decision-making process through the utilization of Occupational Therapy theory, self-advocacy/self-determination, and facilitating connection to community services to increase the performance and well-being of MAVS. The anticipated result is that the guide will clarify the scope of services offered through support in the decision-making process, thereby increasing the performance and overall well-being of MAVS. This scholarly project provides a unique perspective that the occupational therapy profession can offer to support successful community programming for MAVS while further expanding the profession's role in emerging areas of practice.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/a12001957acb44e89b41e5d8939429841d>

92. Withdrawn

93. Data Driven Decision Making: Developing Influential Burden of Disease Reports through Partnerships and Design

Tonya Connor, Shawnda Schroeder, Anastasia Stepanov, and Olivia Persinger
Graphic Design: Laura Stutrud

Indigenous Health Graduate Student Indigenous Health Research

Introduction: The North Dakota Oral Health Program developed a novel prototype for Oral Health Burden of Disease Reports. Disseminating oral health surveillance system data in a convenient format is imperative to inform decision makers as they develop community-based preventive interventions and enhance the dental workforce, decreasing health inequities.

Methodology: The team reviewed grey literature for oral health burden reports to assess best practices. The team collaborated with the state epidemiologist and Medicaid analyst, collecting data from multiple sources, gathering recommendations from stakeholder meetings, and partnering with the North Dakota Board of Dental Examiners among others.

Results: The results were a document approximately 60% shorter than the prior version. Included were 11 stand-alone handouts that can be used individually or in combination; and, the document also doubles as the state oral health plan. Oral health disparities were identified in multiple populations, including but not limited to children living in rural areas, Indigenous populations, persons living in long term care and persons enrolled in Medicaid.

Conclusions: When the goal is to ensure the report is utilized by decision makers, it is important to ask them how to share the data and to work with a communication team and graphic designer to ensure visual appeal and understanding. Comprehensive state oral health data can be conveyed in a succinct and effective way that promotes health equity using visual elements and engaging narratives.

Significance: How the data and information are translated can be nearly as important as the data and voices presented in the product.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/dd86c88d465b4c92bc442b5aea0735441d>

94. Differences in maternal outcomes in American Indian and White patients diagnosed with hypertensive disorders of pregnancy, 2007-2020

Megan Corn, B.S., Julia Dworsky, B.A., Abe E Sahmoun, Ph.D., and James R. Beal, Ph.D.

Medical Student Indigenous Health Research

Introduction: Hypertensive disorders in pregnancy are associated with maternal morbidity and mortality worldwide, and the incidence of this diagnosis is increasing. The purpose of this study was to determine differences in adverse maternal outcomes between American Indian (AI) and White women and to examine annual trends in hypertensive disorders of pregnancy.

Methods: A retrospective descriptive analysis of resident, in-state births was conducted utilizing the 2007-2020 North Dakota Birth Records. Inclusion criteria comprised North Dakota (ND)

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residents ages 12-45 years old who delivered in ND, singleton live births, race listed as American Indian, Alaska Native, or White, and having a hypertensive disorder. Exclusion criteria were patients who delivered out-of-state, a non-ND resident, multi-births, younger than 12 years old and older than 45, race other than American Indian, Alaska Native, or White, and patients without a hypertensive disorder. Hypertensive disorders included women with pre-pregnancy hypertension, gestational hypertension, and eclampsia. SPSS 28.0 was used to analyze the data. Analysis was performed using summary statistics and bivariate comparisons (Chi-square tests and t-tests). Trends across the study period were analyzed with Chi-square trend analysis. All significance tests were two-sided, P-value < .05 for significance. Institutional Review Board approval was obtained from the University of North Dakota.

Results: Of the 8,926 patients in ND with births complicated by hypertensive disorder from 2007-2020, hypertension in AI women rose from 6.6% to 13.6%, and in White women from 4.1% to 11.9% ($p < 0.001$). There was a significantly increased rate of blood transfusions in AI women compared to White women during labor and delivery (2.2% vs. 1.2%, $p < 0.009$). There was no significant difference between races for outcomes including third-or fourth-degree perineal laceration ($p=0.004$), ruptured uterus ($p=0.721$), unplanned hysterectomy ($p=0.311$), admission to intensive care unit ($p=0.246$), and unplanned operating room procedure following delivery ($p=0.582$).

Conclusion: Hypertensive disorders in pregnancy have increased significantly in the population of ND, especially in AI women. Higher-risk pregnancies are associated with increased morbidity and mortality, as demonstrated by a significant increase in complications requiring a maternal blood transfusion during labor and delivery.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/82882cea2d2b43fd8526cc7653f8669a1d>

95. Community Readiness Assessment for Type 2 Diabetes on the Standing Rock Reservation

Brooke Froelich, Advisor: Dr. Ursula Running Bear

Master of Public Health Graduate Student

Indigenous Health Research

Background: Type 2 diabetes is at epidemic proportions and is a great public health concern, affecting approximately 9.5% of the US population, however, disparities exist. The prevalence of Type 2 diabetes among White Americans is 8.6%, compared to 23.5% for American Indians and Alaska Natives nationally. On the Standing Rock Reservation, the prevalence of Type 2 diabetes is approximately 17.5%. A Community Readiness Assessment (CRA), a widely accepted model based on the Stages of Change, was conducted to determine the community's preparedness and readiness for Type 2 diabetes programs and activities on the Standing Rock Reservation.

Methods: County Health Rankings (CHR) and Census data were used to describe factors associated with Type 2 diabetes on the Standing Rock Reservation. Factors included the food environment index (FEI), access to exercise opportunities, and poverty levels. Six CRAs were conducted with providers knowledgeable of diabetes efforts on the reservation. The CRA assesses knowledge of efforts, leadership, community climate, knowledge of issues, and resources which are used to identify appropriate goals and strategies for program planning.

Results: Contributors to poor health are more prevalent on the Standing Rock Reservation than nationally. The FEI on the Standing Rock Reservation is approximately 4.5, compared to 7.8 nationally. Only 21% of people living on the reservation have access to exercise opportunities while the national average is 80%. Additionally, approximately 37% of individuals living on the

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reservation live in poverty while the national average is 12.8%. Results from the CRA suggest community leadership advocates and supports efforts toward reducing Type 2 diabetes. Although Type 2 diabetes is a concern, there is limited knowledge of efforts and reduced community climate. Additionally, more resources are needed.

Conclusion: The prevalence of Type 2 diabetes on the Standing Rock Reservation is more than double that of the US with contributing factors at disproportionate levels. The CRA found that the Standing Rock community is between the preplanning and preparation stages. Appropriate strategies include community focus groups, exposure through radio and other announcements, and consider sponsoring a community event to kick-start new or existing efforts. Understanding the community's readiness is vital to planning successful diabetes interventions and programs.

Traditional Poster

96. Heterogeneity in self-reported hospital experiences in the 2020 North Dakota Pregnancy Risk Assessment Monitoring System COVID-19 Supplement

Julia Wilson-Peltier, Lexie Schmidt, Grace Njau, Matthew Schmidt, Anastasia Stepanov, Andrew Williams

Indigenous Health Graduate Student

Indigenous Health Research

Background: There is limited research on hospital experiences of mothers who gave birth during the COVID-19 pandemic. This analysis describes COVID-19 hospital birthing experiences in North Dakota (ND).

Data: Data for 1588 women(weighted) was drawn from the 2020 ND Pregnancy Risk Assessment Monitoring System (PRAMS). Participants reported(Y/N) to questions regarding hospital experiences during delivery, social support, and breastfeeding. Data were summarized using weighted percentages by race, age, income, education, and marital status.

Results: White mothers had lower rates of receiving information on protecting baby (57.4% vs 43.1%), baby being tested for COVID-19(27.3% vs 3.7%), and having trouble consulting a lactation specialist (0% vs 3.3%) than American Indian(AI) mothers. Hospital experiences, social support, and breastfeeding also differed by marital status, education, income, and age.

Discussion: Results suggest differences in hospital experiences for mothers by demographic factors during the COVID-19 pandemic. These data may inform culturally safe healthcare practices to provide equitable experiences for all patients. **Traditional Poster**

97. Assess the effectiveness of Substance use treatment interventions for American Indian Alaska Natives – a literature review

Revathi B. Sabbella, Melanie Nadeau, Paula Aubrey, Devon Olson

Master of Public Health Graduate Student

Population / Public Health Research

Introduction: Substance use is a common public health concern among American Indian and Alaska Natives. There is large research pertaining to the origin of substance use problem, its causes, consequences, and treatment of substance use and related disorders. Yet, there is little information available about the treatment interventions of substance use for American Indian and Alaska Native population, including the effectiveness of treatment interventions and recovery

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status of the American Indian and Alaska Natives after treatment. The objective of this review is to explore the literature from 2013-2023, studying substance use treatment interventions utilized with the American Indian and Alaska Native population and to determine how effective these interventions have been in treating substance use. This literature review will also explore how treatment interventions are culturally tailored with respect to American Indian and Alaska Native culture, beliefs, and traditions and how these interventions have contributed to the healing or recovery process.

Methods: A preliminary assessment of substance use treatment interventions was conducted utilizing the University of North Dakota Medical library search engine. The search phrase was created by the medical librarian and manipulating the search phrase impacted the number of relevant articles. After exploring the literature and use of various search terms the search phrase was finalized.

Results: The finalized search phrase was applied in PubMed, Embase, CINAHL, PsychInfo and yielded 536 articles. These articles were exported to Covidence for screening and 179 articles were identified as duplicates and excluded. For further screening, the MMAT tool will be utilized by the reviewers to appraise the quality of the articles. The student investigator is currently in the process of summarizing preliminary findings.

Conclusion: The student investigator will work to identify effective mainstream and culturally tailored interventions that have positively impacted health and the recovery process. The student investigator will also identify gaps in the existing literature. Findings will be presented to community partners in hopes of informing current and future substance use initiatives.

Significance: This review will provide policymakers and researchers with information and recommendations on effective and culturally appropriate interventions to treat substance use among American Indians and Alaska Natives. **Traditional Poster**

98. Maternal asthma status modifies associations between placental measurements and infant size

Regina Schlichting, Danielle O'Hare, Courtney Hanson, and Andrew Williams PhD MPH

Medical Student Population / Public Health Research

Background: Low birth weight is a risk factor for poor health outcomes in adulthood. Placental function influences birth weight through nutrient supply to the fetus. Pregnancies complicated by maternal asthma are at higher risk for poor outcomes, including low birth weight. However, there is limited understanding regarding the role of placental function among pregnancies complicated by asthma. We examined the association between placental size and infant size by asthma status to better understand the modifying role of maternal asthma.

Methods: 292 women (220 with asthma) had measures of placental weight (g), length (cm), width (cm), and thickness (cm) taken by a pathologist. Birth weight (g), length (cm), and head circumference (cm) were measured within 24 after delivery by study staff. Linear regression models estimated the association with 95% confidence interval (CI) between placental size and infant size measures. Models were adjusted for demographic and medical factors, health behaviors, gestational age at birth, and infant sex and run for the overall sample and by asthma status.

Results: Overall there were positive associations between measures of placental size of weight, length, width, thickness and measures of infant size of birth weight, birth length, head circumference. Women with asthma had a stronger association between both placental length (68.69 (95%CI: 44.96, 92.41); no asthma: 32.53 (95%CI: -15.10, 80.17)) and placental width

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(120.73 (95%CI: 91.56, 149.90); no asthma: 64.26 (95%CI: 11.20, 117.29)) and birth weight. Women with asthma also had a stronger association between placental length (0.44 (95%CI: 0.27, 0.06); no asthma: -0.14 (95%CI: -0.41, 0.12)) and placental width (0.77 (95%CI: 0.57, 0.98); no asthma: 0.14 (95%CI: -0.16, 0.44)) and birth length. Women with asthma had a stronger association between both placental length (0.22 (95%CI: 0.12, 0.32); no asthma: 0.05 (95%CI: -0.14, 0.23)) and placental width (0.36 (95%CI: 0.23, 0.49); no asthma: 0.06 (95%CI: -0.15, 0.27)) and head circumference.

Discussion: Placental measures (weight, length, width, and thickness) were positively associated with measure of infant size (birth weight, birth length, and head circumference). The associations between placental length and width and measures of infant size consistently differed by asthma status, with stronger associations seen in women with asthma.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/ff85c7e40901463db720b3fd2c550e511d>

99. Does maternal asthma modify the association between placental hormones and placental weight?

Courtney Hanson, Sadia Saizy, Danielle O'Hare, Regina Schlichting, Andrew Williams

Medical Student Population / Public Health Research

Background: Placental endocrine function is essential for placental growth. Maternal factors such as asthma may alter placental growth and function, which may contribute to poor fetal outcomes. The relationship between placental hormones and placental size in asthmatic environments remains understudied. We examined the association between serum placental hormone concentrations and placental weight.

Methods: Prolactin(ng/mL), lactogen(ng/mL), placenta growth hormone (PGH; pg/mL), IGF-1(pg/mL) and IGF-2(ng/mL) were measured from serum drawn at 30 weeks (range 27-36 weeks) gestation, and categorized into quartiles. Placental weight was obtained from placental pathology reports. Data were available for 174 women (134 with asthma; 70 without) from the B-Well-Mom study. Overall and by asthma status, linear regression models estimated associations between placental hormones and placental weight, adjusted for maternal factors.

Results: Mean placental weight (overall 465.56g), differed between those with asthma (473.43g), and without asthma (439.20g). Mean placental hormone levels varied by asthma status. In overall regression analyses, high levels of PGH (quartile 4 compared to quartile 1) were associated with increased placental weight (68.32 95% CI: 24.23, 112.40). The association between high levels of PGH was stronger among women without asthma (127.47 95% CI: 19.22, 235.72) than among those with asthma (66.18 95% CI: 16.33, 116.03). The association between lactogen and placental weight also differed by asthma status.

Discussion: This data suggests the association between PGH and placental weight differs by asthma status. Additional research regarding placental function among women with asthma is warranted to better understand the etiology of adverse outcomes among pregnancies complicated by asthma.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/98e4a114ecf4483489597d8fe859e4141d>

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100. The impact of the COVID-19 pandemic on the association between physical activity for leisure and the diagnosis of coronary heart disease or myocardial infarction

MichaelLynn Kanichy and S. Cristina Oancea

Master of Public Health Graduate Student

Population / Public Health Research

Introduction: Research on the association between leisure-time physical activity (LTPA) and heart disease by race is limited. We sought to understand how the association between LTPA and coronary heart disease or myocardial infarction (CHD-MI) compares by race, pre- and during the COVID-19 pandemic.

Methods: Data from the BRFSS study, years 2018 through 2021 (N=914,741), was used to perform weighted multivariable logistic regression analyses to investigate the association between LTPA and CHD-MI, by race and year, in US adults ages 18-79, without prior cancer diagnosis and who were not pregnant at the time of the survey.

Results: Among White people the weighted and adjusted odds (WAO) of being diagnosed with CHD-MI were significantly greater among individuals who didn't perform LTPA than among those who did, in each of the years 2018-2021. For Whites, the WAO ratio (WAOR) of CHD-MI were the greatest in 2020 (WAOR=1.29; 95%CI: 1.15-1.44) compared to the other years under investigation. Among American Indian/Alaska Natives (AI/AN) and Black/African Americans (B/AA) this association was only significant in 2020. The WAO of CHD-MI among adults who didn't perform LTPA were 1.97 times significantly greater (95%CI: 1.19-3.27), and 1.62 times significantly greater (95%CI: 1.29-2.04), than the WAO of CHD-MI in adults who did perform LTPA, among AI/AN, and B/AA, respectively. This association was not significant among Asians, for any of the years under investigation.

Conclusion: The odds of coronary heart disease or myocardial infarction were significantly greater, among Whites, AI/AN and B/AA people who reported no physical activity for leisure, particularly in 2020, the year of the COVID-19 pandemic shutdown.

Significance: This study offers additional evidence of how COVID-19 shutdown resulted in significant life events disproportionately impacting leisure time and physical activity among the various racial groups in the US, with long term effects such as the potential development of CHD-MI as a result.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/c14ceff85c424c328116f6067c22d6141d>

101. Racial Disparities in Adverse Childhood Experiences & the Association with Intimate Partner Violence During Pregnancy in North Dakota (ND PRAMS 2017-2020)

Lexie Schmidt, Andrew Williams, Julia Wilson-Peltier, Grace Njau, Matthew Schmidt, Anastasia Stepanov, and RaeAnn Anderson

Master of Public Health Graduate Student

Population / Public Health Research

Background: In North Dakota, American Indian (AI) women have a greater prevalence of adverse childhood experiences (ACEs) than White women & experience a higher prevalence of intimate partner violence (IPV). Those exposed to ACEs are more likely to experience IPV, however evidence regarding racial disparities in this association among pregnant women is limited.

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Research Questions: Are ACEs associated with IPV during pregnancy? Do these associations vary between American Indian & White women in North Dakota?

Methods: Data for 2,513 AI & White women were collected from the 2017-2020 ND Pregnancy Risk Assessment Monitoring System survey. Participants self-reported (yes/no) to 10 ACEs (high ACEs ≥ 2). An “Any IPV” variable was created to capture “yes” to experiencing violence from a husband/partner or an ex-husband/partner during pregnancy. Logistic regression estimated odds ratios (ORs) & 95% confidence intervals (95% CIs) for associations between high ACEs & individual ACEs, & exposure to IPV during pregnancy, adjusted for maternal demographic & health factors.

Results: AI women with high ACEs were 2.36 times (95% CI: 1.30, 4.30) significantly more likely to experience violence during pregnancy, compared to those with low ACEs. White women with high ACEs were no more likely to experience violence during pregnancy than White women with low ACEs (OR: 3.87, 95% CI: 0.82, 18.22). In the overall sample, experiencing physical abuse as a child was most associated with increased risk of IPV during pregnancy (OR: 7.35, 95% CI: 3.18, 17.01). Among AI women, all but three ACEs (having separated/divorced parents, a mentally ill parent, or an incarcerated parent) were significantly associated with experiencing IPV during pregnancy. Among White women, 5 ACEs (physical abuse, feeling unloved during childhood, having an incarcerated parent, having a mother who experienced violence, & verbal abuse) were significantly associated with increased risk of experiencing violence during pregnancy, & ORs tended to be higher among White women.

Discussion: For both AI & White women, physical abuse, verbal abuse, having a mother who experienced violence, & feeling unloved during childhood were associated with increased risk of experiencing IPV during pregnancy. The ACEs with the highest OR for AI women was having a mother who experienced violence, & for White women was physical abuse. Lower ORs among AI women likely reflect higher prevalence of ACEs compared to White women.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/650d8f20294849a9afd74a17455b37521d>

102. Does Heavy Drinking Modify the Association Between Screening for Cancer and Use of E-cigarettes? Results from 2016, 2018, and 2020 National Level Study

Odele Rajpathy and Cristina Oancea

Master of Public Health Graduate Student Population / Public Health Research

Introduction: Although presented as a safer alternative to conventional cigarettes, smoking e-cigarettes (SEC) has potential oncogenicity. Heavy alcohol consumption is also oncogenic. In contrast, cancer screening (CS) is a preventative action that has contributed to substantial reductions in cancer-related deaths. In this study, we aim to investigate the influence of heavy drinking on the association between receiving CS and SEC.

Methods: Data from 2016, 2018, and 2020 BRFSS questionnaire (N=124,499) was used to perform weighted and adjusted logistic regression analyses to investigate the association between CS, by sex/age recommendations, and SEC, in US adults ages 18-79, without a prior cancer diagnosis. The effect of modifying the role of heavy drinking on this association was evaluated.

Results: Among heavy drinking females ages 21-65 years, without a hysterectomy, the weighted and adjusted odds (WAO) of SEC were 52% significantly lower (95%CI: 0.30-0.76) in those who screened for cervical cancer compared to those who didn't. Among heavy drinking females ages 50-74 years, the WAO of SEC was 44% marginally significantly lower (95%CI: 0.30-1.05) in those

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who screened for breast cancer when compared to those who didn't. Among heavy drinking females ages 50-75 years, the WAO of SEC was 47% significantly lower (95%CI: 0.36-0.76) in those who screened for colorectal cancer when compared to those who didn't. Among non-heavy drinking females ages 50-75 years, the WAO of SEC was only 18% significantly lower (95%CI: 0.70-0.96) in those who screened for colorectal cancer when compared to those who didn't. No other significant associations were observed among females or males in prostate/colorectal CS and SEC.

Conclusion: This study found that heavy-drinking females who engage in CS are less likely to SEC, potentially due to increased awareness of health risks. Addressing heavy drinking during CS could reduce both cancer risk and future EC use. These findings may inform public health strategies to promote healthy behaviors in high-risk populations. Further research is needed to better inform these findings.

Significance: CS is essential to preventive healthcare, as early detection of cancer can improve treatment outcomes and reduce mortality rates. Understanding its ability to influence EC use, can help increase CS uptake, identify populations that may be at risk of underutilizing CS services, and inform targeted interventions to promote CS. **Traditional Poster**

103. Racial differences in the association between health insurance and coronary heart disease - results from a multi-year cross-sectional study

Cortez Standing Bear and S.Cristina Oancea

Master of Public Health Graduate Student Population / Public Health Research

Introduction: Coronary heart disease (CHD) is the leading cause of death for U.S. adults. American Indians/Alaska Natives (AI/AN) have the highest prevalence of no health coverage compared to other racial/ethnic groups in the U.S. This study aimed to assess the association between having a health insurance plan and being diagnosed with CHD and to determine if race significantly modifies this association.

Methodology: This study was conducted using a large, U.S. nationally representative sample. Cross-sectional data from the 2018 through 2021 Behavioral Risk Factor Surveillance System (BRFSS) were used in this study. Weighted and adjusted logistic regression models were conducted, and corresponding weighted and adjusted odds ratios (WAOR) and 95% CI were reported on the association between having a health insurance plan and having a coronary heart disease (CHD) diagnosis. Tests for effect modification and corresponding subgroup analyses were run.

Results: Out of the final study sample size (N=912,828), 20,643 identified as AI/AN. Among AI/AN, 1.94% were diagnosed with CHD, and 88.96% had health insurance. Among all racial subgroups, the weighted and adjusted association between having health insurance and being diagnosed with CHD was significant only among American Indians/Alaska Natives. Further investigation revealed that the rural-urban status was a significant effect modifier among AI/AN. In urban and rural areas, the WAO of CHD were 53% significantly lower (95% CI: 0.30 – 0.75) and 167% significantly greater (95% CI: 1.17-6.08), respectively, among AI/AN with health insurance compared to those without.

Conclusion: This study's findings suggest that barriers to accessing healthcare, such as lacking health insurance coverage and living in rural areas, may significantly contribute to CHD among AI/AN. Despite having a health plan, AI/AN who live in rural areas had significantly greater odds of CHD compared to AI/AN who had a health plan in urban areas. The exacerbated odds of CHD

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for AI/AN in rural areas may reflect inequitable access to primary, secondary, and tertiary care for CHD.

Significance: Removing barriers to healthcare access is a public health priority. This study, the first of its kind, highlights the need for further research on healthcare access among AI/AN, especially among those residing in rural areas in the US. Future research should investigate how the type of health insurance impacts CHD outcomes. **Traditional Poster**

104. Social Isolation, Loneliness and Dementia: A Review of Associations, Screening, and Interventions

Christy Jesme

Medical Student

Population / Public Health Research

The number of adults over age 65 with dementia is projected to greatly increase by 2050. Research on modifiable risk factors for dementia has increased in recent years, including research on the effects of social isolation and loneliness as risk factors for dementia. Social isolation is defined as an objective lack of social contacts or engagement within a community. Loneliness is defined as the subjective, unpleasant experience of perceived discrepancy between desired interpersonal relationships and actual interpersonal relationships. Upon further investigation of the literature, a number of studies associated loneliness with an increased risk of the development of dementia, although the implication of these findings are not as understood as other risk factors such as diabetes and exercise. Social isolation is associated with an increased risk of poor cognition later in life in addition to dementia.

The proposed mechanism for development of dementia in the setting of loneliness and social isolation is the activation of the hypothalamic-pituitary axis and sympathoadrenal system. Activation of the HPA axis is thought to increase expression of pro-inflammatory genes and oxidative stress, which accelerates neurodegeneration. This further emphasizes the importance of screening for social isolation and loneliness with the goal of implementing patient-centered interventions to reduce risk for development of dementia.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/75013f98e328415a97573c32e07023231d>

105. The association between maternal lactogenic hormones and breastfeeding outcomes may differ by maternal asthma status.

Danielle O'Hare, Regina Schlichting, Courtney Hanson, Sadia Saizy, and Andrew Williams

Medical Student

Population / Public Health Research

Background: Placental lactogenic hormones, specifically prolactin and lactogen, promote maternal adaptations for breastfeeding. Due to alteration of maternal metabolic and immune response, asthma may alter placental hormone levels which may lead to impairment of lactation. We examined the association between lactogenic hormones and breastfeeding outcomes in women with and without asthma in participants enrolled in the B-Well-Mom study.

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Methods: Serum drawn at 30 weeks (range 27-36 weeks) gestation was available for 206 women. Prolactin(ng/mL) and lactogen(ng/mL) concentrations were measured via enzyme-linked immunosorbent assay method in duplicate and averaged. Participants self-reported breastfeeding initiation and 2-month breastfeeding duration. Logistic regression models estimated odds ratios and 95% confidence intervals for the association between lactogenic hormone levels and breastfeeding outcomes.

Results: Overall, 83.5% of women ever breastfed and a greater proportion of women with asthma (84.7%) breastfed than women without asthma (79.6%).

High levels of lactogen (quartile three) were associated with increased odds of 2-month breastfeeding duration (OR:3.76 95%CI: 1.05, 13.50), and the association differed by asthma status (women with asthma OR: 5.26 95%CI:1.13,24.52; women without asthma OR:4.44 95%CI:0.16,119.78; p-interaction=0.04). High levels of lactogen were association with increased odds of ever breastfeeding among women without asthma only, yet sample size was too small for reliable interpretation of the estimates.

Prolactin was not associated with breastfeeding outcomes.

Discussion: Lactogen and prolactin levels have the potential to affect the likelihood of women to breastfeed for up to 2 months in women with and without asthma. High levels of lactogen may increase the likelihood of women to breastfeed for at least 2 months. At high lactogen levels, women with asthma are more likely to breastfeed for up to 2 months, suggesting that the alteration of lactogen present in women with asthma can affect their likelihood to breastfeed and could potentially reduce lactation. These results suggest that lactogenic hormones differ in women with and without asthma and affect breastfeeding continuity.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/60e137797d4c4064b254d76afdf9d8561d>

106. Trends in Initial Imaging Modality Selection Among Patients Presenting to the Emergency Department with Lower Abdominal Pain

Mark D. Wiche, MD

Medical Resident/Fellow/Transitional

Population / Public Health Research

Right lower quadrant abdominal pain accounts for 50% of all patients presenting to the emergency department for abdominal pain, which itself makes up 7% of all ED visits. Since the 1990s there has been a rapid rise in the use of computed tomography (CT) to aide in diagnosing these patients, however situations exist in which other modalities may be warranted. This paper aims to evaluate the trends in first line imaging selection in patients presenting to the ED with lower abdominal pain. We used the National Hospital Ambulatory Medical Care Survey – Emergency Department data set to obtain information regarding CT scanning, Ultrasound, X-rays and MRI imaging of in patients presenting to the ED with lower abdominal pain from 2015 to 2020 which was then analyzed with SAS 9.4 to account for the complex sample survey design. The trends in CT imaging excluded children and the largest number of lower abdominal pain cases occurred in 2018 however the percentage of those patient undergoing CT demonstrated an increasing trend from 2015 to 2020. Comparatively there was a relatively low number of CTs performed in 2015 and 2017 with statistically significant increases from '15 to '16,'18,'19, and '20 and again from '17 to '18, '19, and '20. The trends for ultrasound follow a slightly different pattern with a peak in 2015 and overall downtrend to 2020, there were statistically significant decreases between '15 and '16 then again from '15 to '20, representing a down trending US usage. Finally,

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the usage of abdominal x-rays is much more sporadic with the only statistically significant difference being a decrease from '16 to '19 and again from '17 to '19. CT use appears to follow trends from prior studies showing a consistent increase starting in 1997. There are several postulated reasons including increased/ease of access, high sensitivity and specificity, and ability to detect a wide range of intrabdominal pathologies. A limitation of this study is the missing data on dual imaging i.e those who received US and CT in a single ED visit although prior studies demonstrate an increasing application of dual imaging. This could again be due to the need for definitive diagnoses and/or exclusion of intrabdominal emergencies. A final consideration is the risk of litigation among ED providers when deciding to discharge patients from the ED, thus the use of CT again plays a role in ruling out emergencies.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/7a6efc5b5b8c4d6990169fac340a1abd1d>

107. The Promising Role of Self-Compassion in Type 1 Diabetes Management

Chloe J. Kaelberer, Molly L. Tanenbaum, PhD

Medical Student Population / Public Health Research

Given the demanding daily regimen for type 1 diabetes (T1D) and the emphasis on personal responsibility for disease self-management, people with T1D can experience high levels of self-criticism, emotional distress, and psychological burden. How an individual responds to and copes with diabetes-related feedback may have implications for self-care behaviors, subsequent health outcomes, and overall well-being. The construct of self-compassion encourages acting with kindness toward oneself during challenging times and comprises three main elements: self-kindness, mindfulness, and common humanity. Current evidence in the general population and the limited work on individuals with T1D support the notion that compassion-based interventions have the potential to improve both the mental and physical health of individuals with T1D. However, little is known about diabetes-specific domains, challenges, and opportunities for enhancing self-compassion. We conducted a literature review on the construct of self-compassion as it relates to living with T1D and generated key diabetes-specific domains to create a working model of the potential influence self-compassion may have in each domain. We propose that self-compassion is a highly relevant construct for people living with T1D, particularly in the following domains: 1) healthcare interactions (e.g. appointment anxiety, embarrassment and shame about glycemic control and HbA1c); 2) interactions with diabetes technology (e.g. data overload, physical discomforts, alarm fatigue); 3) social interactions (unwanted attention, disease stigma, perceived isolation); 4) daily management, including the relationship with food and eating (e.g. disordered eating behaviors, insulin restriction for weight loss, guilt and shame around food decisions). Self-criticism is a common consequence of challenges within these domains and a precursor to distress and burnout, suggesting the opposite, self-compassion, may be a promising avenue for coping with diabetes-related emotions. Among the previous studies evaluating self-compassion in the T1D population, few have targeted the well-established stressors within the proposed domains or expanded outcome measures beyond HbA1c and diabetes distress levels, demonstrating opportunities for future work. Compassion-based interventions have the potential to refine skills for combating diabetes-specific emotional distress and thus may be a promising therapeutic approach for individuals living with T1D.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/7a6efc5b5b8c4d6990169fac340a1abd1d>

108. Sexual and Gender Minority status, race/ethnicity, and self-reported Depression and Anxiety in the Household Pulse Survey

Cody Ingle, BA and Andrew Williams, PhD MPH

Master of Public Health Graduate Student Population / Public Health Research

Background: Sexual and Gender Minorities (SGM) have historically been affected by adverse mental health outcomes. SGM individuals report approximately twice the rate of depression and anxiety compared to non-SGM individuals. Intersectionality of race is important, as those who experience multiple layers of discrimination have increased rates of depression and anxiety. We explored the rates of anxiety and depression among SGM individuals, stratified by race, utilizing the Household Pulse Survey (HPS).

Methods: Data for 918,892 households were collected from the HPS. DV was identified as depression or anxiety. Depression status was determined with the PHQ-2 and scores greater than 3 were identified as having signs of depression. Anxiety status was determined with the GAD-2 and scores greater than 3 were identified as having signs of anxiety. The IV was identified as sexual orientation and gender identity. Sexual orientation was divided into: “Gay or Lesbian,” “Straight,” “Bisexual,” “Something Else,” or “I don’t know.” Gender identity was divided into: “Cisgender Male,” “Cisgender Female,” or “Transgender or other gender identity.” Logistic regression (adjusted for education, job loss, age, and income), estimated odds ratios, and 95% confidence intervals for symptoms of depression and anxiety among sexual minority individuals compared to straight individuals and transgender individuals compared to cisgender males. Results were stratified by race for comparison.

Results: Odds of depression were greater in transgender individuals compared to cisgender individuals (2.30 95%CI: 1.98, 2.67) and odds of anxiety were about 2.5 times greater (2.41 95%CI: 2.23, 2.61). Odds of depression for sexual minorities were higher compared to straight individuals, with bisexuals having the highest odds (2.84 95%CI: 2.76, 2.92) and odds of anxiety were similar, with bisexuals having greater odds (3.07 95%CI: 2.83, 3.33). Non-Hispanic, White individuals had the highest odds of reporting symptoms of depression and anxiety in the crude model.

Discussion: DV follows the literature on increased rates of anxiety and depression among SGM individuals. However, racial disparity in the DV is not what researchers expect. More information is needed to understand how intersectionality affects DV.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/4e795351661941e4bd3a895ce3fe3e3f1d>

109. Evaluation of a Trauma-Informed Home Visiting Program for Child and Adolescent Refugee Mental Health in the USA

Olivia Rajpathy and Dr. Amber Lyon-Colbert, PhD, MS

Master of Public Health Graduate Student Population / Public Health Research

Introduction: Children <18 years make up two out of every five refugees to the US, and have experienced the atrocities of conflict-related violence, uprooting from their homes, flight, and resettlement. These stressors can leave them vulnerable to mental trauma and disorders, including post-traumatic stress disorder (PTSD), depression, and anxiety. Most trauma-related

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programs and models for refugee populations in the US have focused heavily on trauma-specific and trauma-focused interventions, prioritizing clinical treatment and therapeutic modalities. Research has shown that non-clinical approaches to addressing trauma can be highly beneficial and may even be the necessary precursor to formal therapy for a traumatized child.

Methods: The CDC's Evaluation Framework for non-clinical interventions will be used as a guide for the evaluation of the trauma-informed home visiting program for child and adolescent refugee mental health in the USA. The evaluation framework will be tailored to the following steps; engage stakeholders, describe the program, focus the evaluation design, gather credible evidence, justify conclusions, and ensure the use and share lessons learned. Subsequently, the evaluation framework for the program will be further checked for effectiveness based on its utility, feasibility, propriety, and accuracy.

Expected Results of the program: Increase the effectiveness of early detection and evaluation of mental trauma in child and adolescent refugees in need of mental health support and assistance; improve the mental health outcomes of the refugee children and their families through trauma-informed psychoeducation on positive coping strategies and parenting strategies; create a safe, supportive, and inclusive environment for refugee children and their families to come to terms with their experiences and emotions; promote mental health awareness and ensure equity among refugee families.

Conclusion: Non-clinical approaches can be highly beneficial and may even be a necessary precursor to therapy. A trauma-informed home visiting program in a non-clinical setting has the potential to effectively address mental health challenges faced by young refugees. Strengthening the program through state programs, funding, and resources can ensure mental health equity in the refugee community.

Significance: This study can reduce the social & economic burden of untreated mental trauma and improve the economic participation of young refugees in the community. **Traditional Poster**

110. Lyme disease prevalence in the upper Midwest 2000-2019

Marissa Wold, MS & Odele Rajpathy

Master of Public Health Graduate Student Population / Public Health Research

Introduction: Lyme disease, caused by the spirochete *Borrelia burgdorferi* and carried by the deer or blacklegged tick (*Ixodes* sp.) is becoming endemic to more regions of the United States. The CDC report on Lyme morbidity and mortality for the years 2008-2015 declared it to be the most reported vector-borne disease in the US during that interval. We aim to: 1) Identify trends in the data for the tri-state area; 2) Identify risk factors associated with Lyme disease in these states to aid in the development of targeted prevention and intervention strategies that reduce the regional disease burden and incidence; and 3) Identify gaps in current surveillance and reporting systems for Lyme disease in these states that may hinder accuracy and completeness of disease reporting, which is critical for tracking disease trends and identifying outbreaks early.

Methods: We conducted a comprehensive literature search to identify relevant epidemiological studies on confirmed adult cases of Lyme disease during 2000-2019 in North Dakota (ND), South Dakota (SD), and Minnesota (MN). We searched electronic databases including CDC, state DOH, and PubMed using keywords like Lyme disease, *Borrelia*, *Ixodes*, Midwest, North Dakota, Minnesota, and South Dakota. We also manually searched reference lists of identified articles for additional relevant studies.

Results: The incidence of Lyme disease in the region has been observed to be on the rise over the past decade, as evidenced by an increase in both the raw counts and the proportions of

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reported cases. MN reported a 146% increase in laboratory-confirmed incidence between the years 2010-2019 when compared to the previous interval of 2000-2009. Similarly, ND reported a significant increase of 586% while SD reported a remarkable increase of 709% in the same period.

Conclusion: The incidence of Lyme disease is increasing in the states of MN, ND, and SD as Ixodes moves westward, demonstrating a steady climb over the last decade.

Significance: The national disease burden for Borrelia infection is estimated at 300,000 new cases annually with likely under-reporting. Over the past 20 years Ixodes and Lyme disease have progressively become endemic to more regions of the US. In states where it was not historically present, it's important to educate for early intervention. Treatment with antibiotics is effective if disease is detected early; without treatment symptoms progress irreversibly and leave the carrier with lifelong disease.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/ea42eb743d4f43ef8e82e78cc6465ac61d>

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111. Factors Associated with Antidepressant Use During Pregnancy in United States Ambulatory Care Settings, 2013 - 2019

Madeline Klein B.A., Jessica Zola B.S., James R. Beal, Ph.D. & Abe E. Sahmoun

Medical Student Clinical Science Research

Background: Antidepressant use in pregnant patients has long been controversial due to uncertain fetal developmental impacts. Due to the evolving research on safety of antidepressant agents, the purpose of this study is to determine the predictors of antidepressant use during pregnancy in United States Ambulatory Care Settings and the most common type of antidepressant used.

Methods: We conducted a retrospective analysis of visits involving pregnant women using the 2013-2019 National Ambulatory Medical Care Survey (NAMCS). We compared demographic and clinical characteristics of women who were prescribed or on antidepressants while pregnant. Included were adult (18 year or older) women that are pregnant. SPSS 28.0 Complex Surveys were used to account for the NAMCS complex sample survey design. Analysis was performed using summary statistics and bivariate comparisons (Chi-square tests and GLM means). Trends across the study period were analyzed with Chi-square trend analysis. All significance tests are two-sided, P-value < 0.05 for significance. Institutional Review Board approval was obtained from the University of North Dakota.

Results: Of the estimated 204 million (unweighted N=4,959) visits by pregnant women, 3.7% were on an antidepressant, with SSRIs comprising the majority (79.1%). Women on antidepressants during pregnancy were likely to be White (91.1% vs 75.9%, p=.001), older (33.8 vs 29.6 years, p=.000), have alcohol misuse/abuse/dependence (7.2% vs 0.1%, p=.000), diagnosed with depression (47.2% vs 5.0%, p=.000), and previously seen (96.0 vs 89.5%, p=.003). No association was found with antidepressant use and private insurance (p=.682), region (p=.275), substance dependence (p=.199), type of specialty (p=.125), patient's primary care physician (p=.246), type of practice (p=.094), or practice ownership (p=.966).

Regarding treatment, antidepressants use was associated with higher rates of mental health counseling (6.9% vs 0.2%, p=.000) and psychotherapy (p=.000). There was no association with antidepressant use and a return visit (p=.682) or referrals (p=.330).

Conclusion: Antidepressant use in pregnancy was associated with increased alcohol dependence, depression, mental health counseling, and psychotherapy. SSRIs were the most common type of antidepressant used.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/d02ace24dbf641d594186b86b2b041761d>

112. Risk Factors and Trends of Hospitalization for Atrial Fibrillation in US Emergency Department Visits

Samuel E.M. Wilke, Stephanie A. Ziegler, Byrne B. Curl, James R. Beal, Abe E. Sahmoun

Medical Student Clinical Science Research

Background: Atrial fibrillation (AF) is the most common cardiac arrhythmia, with the Framingham Heart Study noting a four-fold increase in AF from 1958-07. Evaluation of possible risk factors for hospitalization may influence the need for increased screening and awareness of lifestyle

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modifications that could decrease risk of hospitalized patients with AF. In this study, we investigated risk factors of hospitalization for AF visits in US emergency departments (ED). Also, we determined the trends in ED visits and hospitalizations for AF.

Methods: We conducted a retrospective cross-sectional analysis of adults diagnosed with AF in EDs by utilizing the 2012-2020 National Ambulatory Medical Care Survey–Emergency Department. We examined the rate of ED visits and rate of hospitalizations with AF fibrillation from 2012 to 2020. Inclusion criteria was adult males and females of any race from 18- through 65-years old diagnosed with AF at an ED visit. Exclusion criteria included patients age < 18 or > 65, as well as hospital disposition of left before treatment complete, left against medical advice, dead on arrival, died in ED or blank. SPSS 28.0 Complex Surveys was used for analysis to account for the complex sample survey design. All significance tests will be two-sided, P-value < .05 for significance. This study was approved by the Institutional Review Board of the University of North Dakota.

Results: Of the estimated 2.1 million (unweighted n=330) ED visits for AF from 2012-2020, 45.6% were hospitalized. The rates of AF visits to the ED and visits hospitalized remained stable (Trend p = 0.134 and p = 0.308). Hospitalized patients had significantly higher rates of obesity (26.3% vs. 13.0%, P=.016) or diabetes (29.8% vs. 13.5%, P=.011) and lower rate of hypertension (63.2% vs. 79.7%, P=.035). Hospitalized patients were managed with high rates of cardiac monitoring (46.2% vs. 30.3%, P=.028), anti-arrhythmics (74.5% vs. 48.7%, P=.000), calcium channel blockers (59.1% vs. 4.2%, P=.006), and inotropic agents (15.2% vs. 4.2%, P=.036). Management was similar for beta-blocking agents (P=.573), antiplatelets (P=.870) and EKG (P=.786).

Conclusion: Risk factors associated with hospitalization of AF ED visits were obesity and diabetes. Lifestyle adjustments should be made to decrease the risk of hospitalization. Our results also indicate that patients requiring certain medications may lead to hospitalization to further manage their AF.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/d1f333f3337d435ebecfc8a241a2db461d>

113. The Effect of Homelessness on Patient Wait Times for Chest Pain in United States Emergency Departments, 2011-2019.

Riley Madigan, B.S., Ellen Erie, B.S., Abe E. Sahmoun, Ph.D , James R. Beal, Ph.D

Medical Student Population / Public Health Research

Background: Emergency department (ED) overcrowding has become an increasingly significant issue during recent years in both urban and rural communities. Homeless patients had longer wait times for both emergent and urgent triage categories when compared those with private residence. The purpose of this study was to compare the wait times for chest pain between homeless and private residence visits in United States EDs between 2011-2019.

Methods: We conducted a retrospective analysis of ED visits for chest pain utilizing the 2011-19 National Hospital Ambulatory Care Survey Emergency Department (NHAMCS-ED) datasets. We compared ED visit wait times for chest pain between homeless and private residence visits. Chest pain was defined by the Reason for Visit Code: 1050.x-Chest pain and related symptoms. SPSS 28.0 Complex Surveys will be used to analyze the data in a manner that accounts for the complex sample survey design. All significance tests will be two-sided, P-value < .05 for significance. This study was approved by the University of North Dakota Institutional Review Board approval.

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Results: Of the estimated 95 million (14,466 unweighted) ED visits for chest pain, 0.7% were by homeless patients. Homeless patients were more likely to be male (63.6% vs. 44.4%, $P=.006$), White (80.3% vs 71.1%, $P=.041$), and have government insurance (76.4% vs 56.3%, $P=.000$). Homeless patients had a higher rate of being seen within the previous 72 hours (13.2% vs 3.3%, $P=.000$), arriving via ambulance (62.0% vs 20.2%, $P=.000$), going to government owned ED (62.4% vs 17.03%, $P=.023$), No association was found between homeless status and age ($P=.601$), pain scale category ($P=.351$), triage category ($P=.513$), metropolitan area status ($P=.066$), or season of visit ($P=.494$).

The average wait time for chest pain ED visits was 36.4 minutes. There was no significant difference in wait times between homeless and private residence ED visits for chest pain (36.0 ± 6.5 vs 36.4 ± 1.6 , $P=.943$).

Conclusion: We found no difference in wait times between homeless and private residence visits for chest pain in United States EDs between 2011-2019. However, homeless patients had four times the rate of being seen within the last 72 hours compared to their private residence counterparts.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/97bd6d6ac6e44a8a9c252c720e10e3751d>

114. Association Between HPV Vaccination and Routine Pap Smear Testing

Madison R. Burgard B.S, Holly J. Mitzel B.S., James R. Beal Ph.D., and Abe E. Sahmoun PhD

Medical Student

Population / Public Health Research

Introduction: Cervical cancer is the third most common malignancy in women worldwide and is caused by HPV. The HPV vaccine has greater than 99% efficacy for women that have not been exposed to HPV, while pap smears continue to be used for detection and prevention of cervical cancer. Current recommendations include routine Pap smear screening for women ages 21-65, regardless of human papillomavirus (HPV) vaccination status. The purpose of this study is to investigate the association between HPV vaccination and routine Pap smear testing.

Methods: The Behavior Risk Factor Surveillance System (BRFSS) is a U.S. national self-report telephone survey. We conducted a retrospective analysis comparing rates of routine pap smear between HPV vaccinated and nonvaccinated women utilizing the 2020 BRFSS database. We also analyzed associations between HPV vaccination and sociodemographic factors and health behaviors. Women aged 21-65 were analyzed while men, women with a total hysterectomy, and cervical cancer diagnosis were excluded. SAS v9.4 was used to analyze the data in a manner that accounts for the BRFSS complex sample survey design. Analysis was performed using Chi-square test, all significance tests are two-sided, P -value $< .05$ for significance. This study was approved by Institutional Review Board approval of the University of North Dakota.

Results: Of the estimated 6.6 million (unweighted $n=6353$) females, 17.8% reported complete HPV vaccination (3 shot series), 7.4% reported incomplete, and 74.8% reported no HPV vaccination. Women who reported receiving the complete HPV vaccination series were significantly more likely to report having a Pap test within the last 3 years than women who received incomplete shots or none ($p < .003$). They are also more likely to report having HPV testing in the last 5 years ($p < .000$). There was no difference in reported vaccination status and cost as a barrier for completing the shots ($p=.712$) or undergoing an annual physical exam ($p=.122$).

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Conclusion/Significance: Completed HPV vaccination status was associated with adherence to routine pap screenings and HPV testing. However, the majority of eligible women for HPV vaccination did not complete or initiate this preventive cancer modality. Public health campaigns and health policies should be designed to increase education regarding the importance of the completion of HPV vaccination in order to prevent cervical cancer.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/ef0be74351bc4ea6b13ab26853ea25131d>

115. Association Between Difficulty Communicating and Breast and Cervical Cancer Screening

McKenzie Samson, MSIII; James R Beal, PhD; Abe E Sahmoun, PhD

Medical Student

Population / Public Health Research

Background: As diversity continues to flourish in the United States (US), more patients encountered by physicians primarily speak languages other than English. 25.5 million people in the US disclosed they were Limited English Proficient (LEP). LEP patients are known to be marginalized in terms of receiving adequate health care and undergo less preventative care than other individuals of the same ethnicity that are proficient in English.

Objective: To determine the prevalence and risk factors of breast and cervical cancer screening rates between women with and without difficulty communicating.

Methods: A retrospective analysis was conducted of adult women using the 2021 National Health Interview Survey (NHIS). The rates of breast and cervical cancer screening between women who indicated they had “difficulty communicating” to women who did not were compared. The US Preventive Screening Task Force guidelines were used. We also analyzed demographic and behavioral variables in relation to reported breast and cervical cancer screening. SAS v9.4 was used to analyze the data in a manner that accounts for the NHIS complex sample survey design. Bivariate comparisons was performed using Chi-square test, all significance tests were two-sided, p-value < .05 for significance. This study was approved by University of North Dakota IRB.

Results: Of the estimated 50 million (unweighted n=6,851) female respondents, 4.2% reported have difficulty communicating. Women who reported having difficulty communicating were significantly less likely to have received a mammogram within the last 2 years than women who reported no difficulty communicating (p=.015). Similarly, women who reported having difficulty communicating were significantly less likely to have ever had cervical cancer screening (p=.000), to have the last visit as wellness visit (p=.014), and to report poor health (p=.000) than women who reported no difficulty communicating. There was no association between being a US citizen, duration in the US, or birth in the US and difficulty communicating.

Conclusion: Women with difficulty communicating were less likely to report mammography and cervical cancer screening compared to those with no difficulty communicating. Physicians should spend longer visits with women who have difficulty communicating in order to enhance preventive cancer screenings. They should also encourage yearly wellness visits.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/073e8af0ad0c4ca6a276d2360af9501b1d>

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116. Association between Concussion and High-Risk Behaviors in Youth in the United States

Kalli J Fautsch, BA, BS, Ashlynn D Krieger, BS, James R Beal, PhD, Abe E Sahmoun, PhD

Medical Student Population / Public Health Research

Background: 6.8% of adolescents have had symptoms of a concussion or traumatic brain injury in their lifetime. Brain injuries sustained during adolescence have been shown to interfere with social relationships and mental health. To investigate the association between concussion and high-risk behaviors including sexual activity and substance use in adolescents in the United States.

Methods: We conducted a retrospective analysis of adolescents in grades 9-12 utilizing the 2019 Youth Risk Behavior Surveillance System (YRBSS) biannual dataset. We compared the rates of risky sexual behaviors and substance use in those who had previous concussions with those who did not have a history of concussion. SAS v9.4 was used to analyze the data in a manner that accounts for the YRBSS complex sample survey design. Analysis was performed using summary statistics and bivariate comparisons with Chi-square test. All significance tests were two-sided, p-value < .05 for significance. Institutional Review Board approval was obtained from the University of North Dakota.

Results: Of the estimated 12,637 (unweighted n=11,549) adolescents, 15.1% reported having a concussion at least one time in the past 12 months. Adolescents who reported a concussion were more likely to be male than female (56.4% vs 43.6%; p=.001) and play team sports (77.3% vs 54.3%; p=.000). They are also more likely to be tested for HIV (13.5% vs 8.4%; p=.000), tested an STD (13.3% vs 7.6%; p=.000), had sex for the first time before age 13 (6.7% vs 2.2%, p=.001), and had sex with four or more people during their lifetime (17.1% vs 7.1%, p=.000). They also were more likely to use currently smoke tobacco products (51.1% vs 33.3%, p=.000), currently use alcohol (41.5% vs 27.5%, p=.001), ever use marijuana (30.1% vs 20%, p=.000) and ever use illicit drugs (23.9% vs 12.4%, p=.000).

Conclusions: Adolescents who report having a concussion also reported higher rates of risky sexual behaviors and substance use than those who did not have a history of concussions. Assessment and investigation into risk-taking behaviors may be considered in caring for adolescents who have a concussion due to the prevalence of risk-taking behaviors.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/0a2698d3aefa4343af3fbcdc833ee05e1d>

117. Trends and Predictors of Antibiotic Utilization for Acute Respiratory Tract Infections in Children in United States Ambulatory Care Settings

Aishwarya Sharma, BA, Hannah Ganzel, BS, James R. Beal, Ph.D. and Abe Sahmoun, Ph.D.

Medical Student Population / Public Health Research

Background: Over 70% of pediatric outpatient visits result in antibiotic prescriptions, with some of the most common diagnoses including acute respiratory tract infections (ARTIs) which includes both bronchitis and upper respiratory infection. The aim of this study is to determine the predictors

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of antibiotic prescriptions among children diagnosed with an ARTI in the ambulatory care setting (ACS) in the United States.

Method: We conducted a retrospective analysis of visits involving children (1-18 years) diagnosed with ARTI using the 2011-2019 National Ambulatory Medical Care Survey (NAMCS) datasets. We compared the utilization of any antibiotic treatment for ARTI in pediatric patients in the ambulatory care setting and determined existing disparities comparing demographics and geographic location. SPSS 28.0 Complex Surveys was used to analyze the data, and analysis was performed using summary statistics and bivariate comparisons (Chi-square tests and GLM means). All significance tests were two-sided, P-value <0.05 for significance. Institutional Review Board approval was obtained from the University of North Dakota.

Results: This study found that of the estimated 829 million pediatric ACS visits from 2011-19, 16.9% (unweighted N=3,514) were due to ARTIs. The rate of ARTIs increased significantly from 12.5% in 2011 to 17.9% in 2019 (trend analysis P<0.001). Among the ARTI visits, 47.6% received an antibiotic. Those receiving antibiotics were significantly older 7.8 ± 0.3 vs 6.3 ± 0.2 (P=.000). Those receiving antibiotics were more likely to be White than the no antibiotic group, 87% vs. 82.2% (P=.038). Children on antibiotics had a higher rate of spirometry (0.5 vs 0.1, P=.030) and asked to return for another visit (64.8% vs. 54.4%, P=.004) compared to the no antibiotic group. Administration of any antibiotic for ARTIs remained stable from 2011-2019 (trend analysis P=.306). Use of Macrolides antibiotics decreased significantly from 13.9 % in 2011 to 10.0% in 2019 (P=.026). There was no association between antibiotic prescription and gender, insurance, urban status, season of visit, reason for visit, primary care physician, fever, x-ray, or referral to another physician.

Conclusion: We found that between 2011-2019, the rate of ARTIs increased in the U.S., with 47.6% receiving an antibiotic. Those receiving antibiotics were significantly older and more likely to be White than the no antibiotic group.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/browse/null/most-recent/null/0/null>

118. Association between Food Insecurity and Prediabetes in a Pediatric Population

Abigail M. Smith, James R. Beal, Abe E. Sahmoun

Medical Student Population / Public Health Research

Introduction: Food insecurity is defined as uncertain or limited access to adequate food, affecting 10.2% of U.S. households. Inadequate access to proper nutrition in childhood has been linked with chronic conditions, obesity, and asthma.

Objective: To investigate whether food insecurity is associated with prediabetes in a pediatric population

Methods: A retrospective analysis of children aged 2-17 was conducted, using the 2021 National Health Interview Survey data. Rates of diabetes, prediabetes, and additional sociodemographic factors were compared between children with high, marginal, low, and very low food security. SAS v9.4 was used to analyze the data in a manner that accounts for the BRFSS complex sample survey design. Bivariate comparisons were performed using Chi-square test, all significance tests were two-sided, p-value < .05 for significance. This study was approved by the University of North Dakota IRB.

Results: Of the estimated 64 million (unweighted n=7,293) respondents, 7.2% reported having low or very low food security. Children who reported very low food security were significantly more

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likely to report having prediabetes than children who reported high food security ($p=.024$). Similarly, younger age, black race, not having health insurance, non-U.S. citizen status, and receiving free or reduced meals were associated with very low food security ($p=.000$).

Conclusion & Significance: Food insecurity is associated with prediabetes in the study population. Public health efforts promoting adequate nutrition in childhood may be protective against childhood-onset prediabetes.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/a13a48aab608451eae8e5f5ded806bc31d>

119. Association between Race and Influenza Vaccination Rates

Hayden May, BS, Ken Ryan, BS, James R Beal, PhD, Abe E Sahmoun, PhD

Medical Student

Population / Public Health Research

Background: An estimated 38,000,000 illnesses, 400,000 hospitalizations, and 22,000 deaths were caused by influenza. During this time, widespread vaccination prevented an estimated 7,520,000 illnesses, 105,000 hospitalizations, and 6,300 deaths.

Objective: To assess the association between race and influenza vaccination rates in the United States.

Methods: We have performed a retrospective analysis of adults utilizing the 2021 Behavioral Risk Factor Surveillance System (BRFSS) datasets from the CDC's National Center for Health Statistics. Inclusion criteria were men and women over the age of 18 of any race. Exclusion criteria are persons under the age of 18, over the age of 99, those with no race identified, and those with missing responses. SAS v9.4 was used to analyze the data in a manner that accounts for the BRFSS complex sample survey design. Analysis was performed using summary statistics and bivariate comparisons. All significance tests were two-sided, P -value $< .05$ for significance. Institutional Review Board approval was obtained from the University of North Dakota.

Results: Of the estimated 240 million (unweighted $n=427,703$) respondents, the majority (61.6%) were White. The rate of influenza vaccination was 45.2%. Compared to White and Asian, other races were significantly less likely to report having received influenza vaccination ($p = .000$). Among vaccinated respondents, the proportion of vaccination for all races was highest in the Fall, but Whites and Asians had significantly higher rates than other races in that season ($p = .000$). Asian respondents had significantly higher rates of health insurance ($p = .000$) and to graduate from college ($p=.000$). The proportion of White respondents who reported having at least one personal doctor is significantly higher than other races ($p = .000$).

Conclusion: There is a significant association between race and flu vaccine status. Other confounders were also significantly associated with race. The rate of influenza vaccination are low regardless of race. Public health decision makers should develop effective strategies for increasing vaccination rates.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/9818425c091c45bab1819c7545380d6c1d>

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120. Association between Inhaled Corticosteroids and Lung Cancer or Pneumonia in Adults with Chronic Obstructive Pulmonary Disease in the United States

Stacy Ploom, BS, Abe E. Sahmoun, Ph.D., & James R. Beal, Ph.D.

Medical Student Population / Public Health Research

Introduction: Longstanding inflammation in Chronic Obstructive Pulmonary Disorder (COPD) is associated with lung cancer. The principal management plan for COPD includes the use of long-acting inhaled bronchodilators, whereas that of asthma-COPD overlap (ACO) includes the addition of inhaled corticosteroids (ICS). Studies have shown conflicting results, with several depicting lower rates of lung cancer and others showing increased risk of pneumonia. We aim to investigate the association between ICS use with lung cancer and pneumonia in adults with COPD in the US.

Methods: We conducted a retrospective analysis of adult visits for COPD utilizing the 2011-2019 National Hospital Ambulatory Care Survey (NAMCS) datasets. We compared demographic and clinical characteristics among adults with COPD using ICS to those not using ICS. Primary outcomes were lung cancer and pneumonia. Inclusion criteria was adults 30 years or older and who have a diagnosis of COPD, defined as a diagnosis of COPD or ACO.

SPSS 28.0 Complex Surveys was used to account for the complex sample survey design. All significance tests will be two-sided, P-value <0.05 for significance. This study was approved by the Institutional Review Board of the University of North Dakota.

Results: Of the estimated 5.6 billion adult ambulatory care visits from 2011-2019, 4.9% (unweighted n=9520) had COPD/ACO. The majority were managed with respiratory agents (53.4%) and/or bronchodilators (43.3%), with trend analysis showing a significant increase in bronchodilator use from 2011-2019 (p=.015). Among COPD patients, only 1.1% received ICS, 2.2% had lung cancer and 1.0% pneumonia.

COPD patients on ICS were older (73.2 vs 68.2, p=.003), and were more likely to be a current/former smoke (80.1% vs. 79.8%, p=.033). Clinically, ICS patients had higher rates of using any respiratory agents (100% vs 52.9%, p=.000) and bronchodilators (86.6% vs 42.9%, P=.000). ICS patients had a lower rate of pneumonia compared to non-ICS patients (0.0% vs 1.0%, p=000). ICS use was not associated with obesity (p=.805) or lung cancer (p=.175).

Conclusion: Patients with COPD who used ICS were less likely to have pneumonia than those who did not, equating to 2.7 million less cases of pneumonia. The use of ICS had no association with lung cancer in our study, which may be attributed to our small sample size, low absolute number of lung cancer cases, and the rarity of lung cancer in general.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/b516447656124a0c99cb868552b3cc9f1d>

121. Disparities in Rural Access to Care for Soft Tissue Sarcomas

Allie D. Stover, BS, Hilla T. Sang, Ph.D. and Sabha Ganai, MD, MPH, Ph.D.

Medical Student Rural Health Research

Rural populations have long been faced with various barriers to comprehensive healthcare, including limited service availability, transportation, and insurance coverage. However, there is a lack of data describing how these barriers may influence rare disease outcomes, especially on a more localized population level. This study aims to better understand rural healthcare disparities

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by comparing trends in soft tissue sarcoma (STS) care between rural and urban populations in the Northern midwestern United States. We hypothesize that rural STS patients will have longer travel times, delayed treatment, and worse overall outcomes. This study is a retrospective chart review of adult patients diagnosed with STS of the trunk or extremities between the years 2012-2022. Patients included were diagnosed within the Sanford Health hospital system across Fargo, ND, Bismarck, ND, Sioux Falls, SD, and Bemidji, MN. Patients were designated as rural based on USDA rural-urban commuting area (RUCA) codes 4-10. Distances traveled were calculated as geodesic miles between patient zip code centroid and treatment facility coordinates. Patient demographics were not significantly different between rural (n=66) and urban (n=54) patient groups. However, rural patients traveled significantly farther miles on average than their urban counterparts for radiation (119 vs 69 miles), surgery (182 vs 135 miles), and chemotherapy (207 vs 74 miles). Additionally, there was a trend toward more rural patients being diagnosed with stage 4 sarcoma (14 vs 5 patients). Despite this, our Kaplan-Meier curve found no significant difference in survival rates between the two patient groups. In conclusion, rural Midwestern populations have a higher incidence of STS and continue to face barriers to healthcare that urban populations do not. Our data demonstrate that rural patients travel farther than urban patients for STS treatment and had higher rates of stage 4 disease, though there was no significant difference found in survival rates. It has been well documented that rural populations have historically been faced with various barriers to comprehensive healthcare. However, there is limited data available on how these barriers affect rare disease outcomes, especially on a localized population level. This project aimed to investigate how rural healthcare disparities affect STS disease outcomes, specifically in the Midwestern US, such that further research and necessary intervention can be initiated.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/b4eb0e32b1dc456da399eeb04c41a0821d>

122. Association between Maternal Residence and Cesarean Sections among Uncomplicated Nulliparous Births in North Dakota

Tiffany Barth, B.S., Megan DeVillers, B.S., Abe E Sahmoun, Ph.D., and James R. Beal, Ph.D.

Medical Student Rural Health Research

Background: The practice of cesarean sections (CS) has steadily increased across the United States in the last 30 years and accounted for nearly 32% of births in 2020 according to the CDC. Elective CS that are not otherwise medically indicated pose an elevated risk of complications to both mother and fetus. Of particular interest, studies analyzing CS trends have shown an increased rate of CS in low-risk nulliparous women. The purpose of this study was to determine the association between mother's residence and CS among uncomplicated nulliparous births in North Dakota.

Methods: Retrospective review of resident, in-state, singleton births to nulliparous, low-risk women who have undergone cesarean section utilizing the 2007-2020 North Dakota Birth Records from the Division of Vital Records. Primary outcome was the rates of CS between rural and urban women, defined by maternal residence. Inclusion was singleton, nulliparous births, maternal age 20-44 years, cephalic presentation, birthweight 2500-4500grams, clinical gestation 37-40weeks, and no diabetes, hypertension, exposure to alcohol/illicit drugs during pregnancy, or infections during pregnancy.

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Results: Of the 20,041 women in our study, 45.8% lived in rural locations. Rural women were more likely to have a CS (17.3% vs 16.0%, $P=.019$), receive an induction of labor (32.7% vs 29.7%, $P=0.000$), be American Indian (5.3% vs. 1.8%, $P=0.000$), and have government insurance (32.3% vs 25.5%, $P=0.000$). Also, rural women were younger (25.6 ± 4.1 vs 26.7 ± 4.3 , $P=.000$) and less likely to receive augmentation of labor (40.5% vs 43.5%, $P=0.000$), epidural (76.9% vs 79.7%, $P=0.000$) or have a college degree (77.2% vs. 83.3%, $P=0.000$). No association between rural/urban status and clinical gestations ($P=358$)

Conclusion: Among uncomplicated nulliparous births, rural women had higher rate of CS and induction of labor. Rural women were younger and more likely to be American Indian, less educated, and have government insurance. Future public health initiatives and physicians' efforts should be made to address the rising rates of CSs in uncomplicated nulliparous women, especially in rural women.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/4e3aaecff1354eb5837745a1de1b17311d>

123. Association between Rural and Urban Emergency Departments in the Management of Pediatric Cough Patients

Jon Roberts, BS, Abe E. Sahmoun, Ph.D., and James R. Beal, Ph.D.

Medical Student Rural Health Research

Background: Rural emergency department (ED) visits have dramatically increased in the 21st century, with one study reporting over a 50% increase from 2005 to 2016 [3]. Cough is one of the most common reasons for an ED visit, especially in the pediatric population. The purpose of this study was to determine the association between rural and urban emergency departments in the management of pediatric patients presenting with a cough.

Methods: A retrospective review was completed of pediatric ED visits for cough utilizing the 2013-2020 National Hospital Ambulatory Care Survey Emergency Department datasets. Inclusion criteria were patients aged 1-17 years, with cough as the reason for the visit. Exclusion criteria were ages <1 or >17 years, or if the reason for the visit was not a cough or left blank. Urban and rural EDs were defined by metropolitan statistical area status. SPSS Complex Samples 28.0 was used to account for the complex survey design. Trends analysis was determined by the likelihood ratio. All significance tests were two-sided, with $P<0.05$ being significant. This study was approved by the Institutional Review Board of the University of North Dakota.

Results: Of the estimated 32 million ($n=4535$) pediatric visits for cough, 13.7% were in rural EDs. Rural patients were more likely to be male (59.1% vs. 53.0%, $P=.025$), White (79.2% vs. 60.7%, $P=.000$), and had a lower rate of no pain (48.4% vs. 58.3%, $P=.038$). There was no association between rural-urban status and age, insurance, triage level, or fever status.

The management of a cough differed, as rural patients were more likely to receive any antibiotic (39.8% vs. 29.9%, $P=.000$) and waited less time to see a practitioner (27.2 ± 2.1 vs. 37.2 ± 2.6 mins, $P=0.004$). There was no association between rural-urban status and rates of respiratory agents prescribed, CBC, any imaging, or being admitted to the hospital.

Trend analysis showed that usage of antibiotics in EDs decreased from 2013 to 2020, from 44.5% to 20.3%, $P=.000$. Specifically, the use of macrolides ($P=.008$) and cephalosporins ($P=.020$) decreased significantly, while the use of penicillins remained stable.

Conclusions: Rural and urban EDs serve different pediatric populations and manage coughs slightly differently. Rural patients had shorter wait times and were more likely to receive

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antibiotics, despite similar triage levels. Further studies comparing ED visits for cough by triage level may further clarify the care given.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/b258eb39e7854a67ad460a036677fa811d>

124. Association Between Rural-Urban Status and Low-dose CT Lung Cancer Screening

Theoren Solseng, Bostin J. Svihovec, James R. Beal, Abe E. Sahmoun

Medical Student

Rural Health Research

Background: Lung cancer (LCa) remains the leading cause of cancer death in the United States (US). Smoking is the main risk factor for LCa and smoking rates are higher in rural than urban areas. Screening with Low-Dose CT (LDCT) has been shown to reduce LCa mortality by 20-33% in high-risk populations. Many older individuals diagnosed with early-stage LCa will be able to undergo curative-intent treatment. Access to health care services for individuals living in rural areas is still a public health issue.

Objective: To assess the association between rural-urban status and LDCT LCa screening.

Methods: We conducted a retrospective analysis of patients meeting the 2018 US Preventive Services Task Force LDCT LCa screening guidelines. We used the 2019-2021 Behavior Risk Factor Surveillance System (BRFSS) which is a U.S. national self-report telephone survey to assess the association. Rural populations were defined as nonmetropolitan counties (Micropolitan/Noncore) and Urban populations were defined as metropolitan counties (Large central metro, Large-fringe metro, Medium metro, and Small metro) according to the 2013 NCHS Urban-Rural Classification Scheme. SAS v9.4 was used to analyze the data in a manner that accounts for the BRFSS complex sample survey design. Bivariate comparisons was performed using Chi-square test, all significance tests were two-sided, p-value < .05 for significance. This study was approved by the Institutional Review Board of the University of North Dakota.

Results: Of the estimated 1.3 million (unweighted n=8,142) respondents, 14.7% reported living in rural counties. Reported LDCT LCa screening was not significantly different between rural and urban counties (21.3% vs. 20.5%; p = .698). Rural respondents were significantly more likely male than urban respondents (64.5% vs. 57.8%, p = .040). There was no association between rural-urban status and having a personal doctor (p = .419), having a routine checkup in the past year (p = .175), and having health insurance (p = .649).

Conclusion: Despite the clear benefits of LDCT LCa screening, the screening rates remain low. There was no difference in screening by rural-urban status. Public health campaigns should encourage high-risk populations to get screened to promote early detection which leads to better 5-year survival rate.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/998d37e3eb61480baf0677666328aaf21d>

125. Association between Rural Residence and Depression Among Adults

Dianessa Dizon, Torrin Poss, James R Beal, Ph.D. and Abe E. Sahmoun, Ph.D.

Medical Student Rural Health Research

Background: Depression is a highly prevalent mental health condition in the United States (US). 8.4% of all US adults had at least one major depressive episode. Access to health care and mental health care within rural areas is less than in urban areas. Limited research exists on the prevalence of depression in adults in rural areas compared to urban areas.

Objective: To investigate the association between rural residence and depression among adults in the US.

Methods: We conducted a retrospective analysis of rural and urban adults in the US utilizing the 2021 Behavioral Risk Factor Surveillance System (BRFSS) dataset. BRFSS is a survey that collects data about adult U.S. residents regarding their health-related risk behaviors, chronic health conditions, and use of preventive services. We examined associations between self-reported rates of depression in rural areas compared to urban, along with demographic, socioeconomic, and health behaviors. The 2013 NCHS Urban-Rural Classification Scheme was used to define nonmetropolitan counties and Urban populations. SAS v9.4 was used to analyze the data in a manner that accounts for the BRFSS complex sample survey design. Analysis was performed using summary statistics and bivariate comparisons (Chi-square tests and t-tests). All significance tests were two-sided, P-value < .05 for significance.

Results: Of the estimated 243million (unweighted n=431,639) respondents, 93.6% lived in urban counties. Residents of rural counties were more likely to report ever having depression than urban counties (p=.005). Similarly, Residents of rural counties were more likely to report having arthritis (p=.000), being diagnosed with skin cancer (p=.000), having a personal doctor(p=.006), being male (p=.008) and being white (p=.000).

Conclusion: We found that residents of rural counties are more likely to report having depression. Demographic and environmental factors contribute to the observed higher risk. Increasing access to care and funding for local mental health programs in rural communities should be promoted.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/678b9aa54cd74234aaac3c5b5f1c75bf1d>

126. Comparison of Advanced Imaging between Rural and Urban Adult Emergency Department Visits for Abdominal Pain in the United States

Carter Schimke BS, Dakota Snustad BS, Abe E. Sahmoun Ph.D., and James R. Beal Ph.D.

Medical Student Rural Health Research

Introduction: Imaging modalities such as ultrasound (US), computed tomography (CT), and magnetic resonance imaging (MRI) represent important diagnostic modalities in abdominal pain cases in the Emergency Department (ED). Previous studies found that rural populations were less likely to undergo imaging than urban populations in United States EDs. This study determined the association between rural-urban location and advanced imaging in the work-up of abdominal pain in adult visits to United States EDs.

Methodology: We conducted a retrospective analysis of the utilization of advanced imaging for abdominal pain in adult ED visits utilizing the 2013-2020 National Hospital Ambulatory Care

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Survey Emergency Department (NHAMCS-ED) datasets. We compared advanced imaging (CT, US, and/or MRI) among rural and urban EDs, defined by Metropolitan Statistical Area (MSA). SPSS 28.0 Complex Surveys was used to analyze the data in a manner that accounts for the complex sample survey design. All significance tests were two-sided, P-value < .05 for significance. This study was approved by the Institutional Review Board of the University of North Dakota.

Results: Abdominal pain accounted for 13.1% (unweighted N=15,912) of the estimated 112 million adult ED visits from 2013-20. Of these, 13.9% occurred in rural EDs. Overall, 53.5% of adult abdominal pain visits received advanced imaging. Rural ED visits had a significantly lower rate of advanced imaging than urban ED visits (54.5% vs. 47.6%, P=.003). Rural ED visits also had a significantly lower rate of MRI (0.1% vs 0.7%, P=.003) and ultrasound (9.9% vs 18.7%, P=.000) utilization than their urban counterparts. There was no difference in the usage rates of x-ray (P=.793) and CT-abdomen-pelvis imaging (P=.775) between rural and urban EDs. There was an association between rural-urban status and immediacy with which patients should be seen, with rural EDs having a higher rate of non-urgent visits (18.4% vs. 13.0%, P=.020).

Conclusion: Rural EDs had a lower rate of advanced imaging for adult abdominal pain visits. Specifically, the usage of MRI and US imaging was lower in rural EDs. This information elucidates differences in care between rural and urban EDs and helps identify that interventions to increase the availability of MRI and US imaging may be needed in rural areas to provide equitable care similar to urban EDs.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/3db79b9f4b524879b6c51510212851331d>

127. Association of Rural-Urban location and Hospitalization for Heart Failure in United States Emergency Departments, 2013-2019

Lauren Johnson, Emily Hao, Abe Sahmoun, James Beal

Medical Student Rural Health Research

Background: Heart failure (HF) continues to be a significant healthcare burden and is a leading cause for both hospital admissions and readmissions, with up to 6.5 million hospital days per year attributed to the disease. Previous studies have indicated that the outcomes of heart failure in non-metropolitan populations are often worse. The aim of this study was to determine the association between rural-urban emergency departments (ED) and hospitalization of heart failure visits.

Methods: A retrospective analysis of adults diagnosed with HF in the ED using the 2013-19 National Hospital Ambulatory Medical Care Survey-Emergency Department datasets. We compared demographic, clinical, and management characteristics of heart failure visits among rural-urban emergency departments. Urban was defined as being a metropolitan statistical area. Primary outcome was hospitalization defined as admit to hospital or admit to observation unit, then hospital. Patients were excluded if disposition was DOA, died in ED, left against medical advice/before being seen, or blank. SPSS Complex Samples 28.0 was used to analyze data, accounting for the NHAMCS-ED complex sample survey design. Significance tests utilized a two-sided t test. A P-value < .05 indicated significance. Institutional Review Board approval was obtained from the University of North Dakota.

Results: Of the estimated 10.4 million (unweighted n=1582) ED visits for HF from 2013-2019, 18.1% were in rural EDs. Overall, 59.6% of ED visits for HF were hospitalized. Rural visits were older (74.5 ± 0.9 vs 70.3 ± 0.6 , P=.000) and more likely to be White (91.7% vs. 70.6%, P=.000).

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Clinically, rural visits were more likely to have a systolic BP>160 (32.5% vs. 24.4%, $P=.014$) and pulse oximetry<90% (13.4% vs. 7.6%, $P=.013$), but less likely to have a history of congestive HF (89.8% vs. 94.4%, $P=.020$) or diabetes (35.2% vs. 42.9%, $P=.048$).

Management of HF showed rural visits had a shorter wait-time to see a provider (23.8 vs. 35.5 minutes, $P=.006$), and lower rate of receiving a vasopressor (0.3% vs. 1.3%, $P=.004$). Rural EDs had a lower rate of hospitalization than urban EDs (40.9% vs 62.9, $P=.000$). However, rural EDs had a higher rate of transfers (13.7% vs. 2.4%, $P=.000$).

Conclusion: We found rural EDs had a lower rate of hospitalization, but a higher rate of transfer for HF visits. Future studies should compare hospitalization rates of HF by triage levels to further define rural-urban disparities.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/52a55a5c794e4206bfed130910ce88991d>

128. Factors Associated with Refusal of Skin Cancer Treatment

Mitchell Gullickson, Grant Gunderson, Abe Sahmoun, James Beal

Medical Student Clinical Science Research

Background: In addition to being the most common cancer in the United States, approximately one in five Americans will go on to develop skin cancer in their lifetime. Studies have noted a significant proportion of skin cancer patients reporting financial stress related to both healthcare and non-healthcare factors.

Objective: To determine the factors associated with refusal of skin cancer treatment in the United States.

Methods: We conducted a retrospective analysis of patients with skin cancer utilizing the 2018, 2020, and 2021 Behavior Risk Factor Surveillance System (BRFSS) combined datasets. BRFSS is a U.S. national self-report telephone survey conducted by the CDC. We compared demographic and clinical factors between adults with skin cancer who refused cancer treatment to those who are currently receiving treatment. We included all individuals who had only reported skin cancer. SAS v9.4 was used to analyze the data in a manner that accounts for the BRFSS complex sample survey design. Analysis was performed using summary statistics and bivariate comparisons. All significance tests were two-sided, and a P -value < .05 was considered significant. Institutional Review Board approval was obtained from the University of North Dakota.

Results: Of the estimated 339,000 (unweighted $n=1,063$) skin cancer respondents, 9.1% reported having refused cancer treatment. Those that refused cancer treatment were significantly younger (56.6% vs 33.4%, $p=.000$) and non-White (15.7% vs. 5.2%, $p=.000$). Individuals in the refused cancer treatment group were less likely to have a history of depression (69.9% vs. 85.4%, $p=.001$), and less likely to receive the influenza vaccine (52.1% vs. 40.2%, $p=.038$).

Conclusion: We found individuals that were diagnosed with skin cancer and refused cancer treatment were more likely to be younger, non-White, and less likely to have a history of depression. These results suggest practitioners should target and address these factors while discussing treatment options for skin cancer.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/243a89fa61a043208ca2c6c9fd795e441d>

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129. Association between Race and Imaging for Diagnosis of Acute Appendicitis in United States Emergency Departments

Kaitlin Reitz, B.S., Mackenzie M. Wild, B.A., Abe E. Sahmoun, Ph.D, and James R. Beal, Ph.D

Medical Student

Population / Public Health Research

Background: Appendicitis is one of the most common surgical conditions prompting presentation to the emergency department (ED). Diagnostic imaging remains an important tool for early diagnosis as expeditious diagnosis aids in reducing morbidity and mortality. The purpose of this study was to determine the association between race and imaging in pediatric acute appendicitis in United States emergency departments (ED).

Methods: We conducted a retrospective review of patients aged 5-21 years diagnosed with acute appendicitis utilizing the 2011-20 National Hospital Ambulatory Care Survey Emergency Department (NHAMCS-ED) datasets from 2020. We compared utilization of imaging (x-ray, abdominal CT, or ultrasound) between White and Minority visits. Magnetic resonance imaging was not included due to very low n's. SPSS Complex Samples 28.0 for Windows was used to analyze the data. All significance tests were two-sided, P-value < 0.05 for significance. This study was approved by the Institutional Review Board of the University of North Dakota.

Results: Of the estimated 1.2 million (unweighted n=191) pediatric acute appendicitis visits, 8.0% were by Minorities. Overall, 82.5% of visits received some form of imaging, with the most common being CT (55.8%). Minority visits were more likely to be males (92.6% vs. 59.4%, p=.000). There was no association with race and age (p=.975), private insurance (p=.295), MSA status (p=.233), episode of care (p=.305), seen in the last 72hrs (p=.203), and triage category (p=.246). There was no association between race and utilization of any imaging study (81.9% vs. 88.7%; p=0.207). There were also no differences in utilization rates of specific types of imaging: x-ray (11.5% vs 16.25; p=0.630), CT (55.1% vs 62.8%; p=0.594), CT abdomen/pelvis (48.8% vs 54.8%; p=0.694), or ultrasound (35.7% vs 17.6%; p=0.119). Pain management also showed no differences between White and Minority visits in analgesia use (75.3% vs 57.6%, p=0.156), opioids/narcotics given (65.2% vs 48.9%, p=0.226), or NSAIDs/acetaminophen given (28.0% vs 14.8%, p=0.053). Finally, wait-times were similar (p=.419).

Conclusions: We found similar rates of any imaging and types of imaging obtained among White and Minority pediatric acute appendicitis visits. Similarities may be due the acute status and the relative rarity of acute appendicitis visits. Further study is warranted to possibly include non-acute appendicitis ED visits.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/84b014dbdf8d4bbcb6ac0a637b5985ba1d>

130. Association between Race and Cancer Screenings among United States Veterans

Judge Muskrat, BS; Tarlynn Tone-Pah-Hote, BA; James R Beal, PhD; Abe E. Sahmoun, PhD

Medical Student

Population / Public Health Research

Background: Minority populations make up a small percentage of the United States (US) population, however they often represent a large proportion of the US military and veteran population. In general, there is a higher incidence of cancers within minority populations when

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compared to the general population. In addition, lower rates of cancer screenings among minority peoples further contributes to the higher incidence of cancer.

Objective: To elucidate the association between race and cancer screenings among US veterans.

Methods: The Behavior Risk Factor Surveillance System (BRFSS) is a U.S. national self-report telephone survey that provides prevalence data regarding behavioral risk factors associated with common health conditions. We conducted a retrospective analysis of adult veterans cancer screening rates utilizing the 2020 BRFSS. Chi-Square tests were performed, all significance tests were two-sided, and p-value < .05 was considered significant. SAS v.9.4 was used to analyze the data in a manner that accounts for the BRFSS's complex sample survey design.

Results: Of the estimated 25 million (unweighted n=46,916) veterans respondents, the majority (71.1%) were White. It was found that race was associated with colonoscopy screening (p = .040), blood stool testing (p = .001), stool DNA testing (p = .000), virtual colonoscopy (p = .001), prostate specific antigen testing (p = .016) and HIV testing (p = .000). Other tests including mammogram, HPV testing and Pap smear screening were found to not be associated with race.

Discussion: U.S. veterans are potentially at increased risk of developing cancer. Cancer screening is an important component of secondary prevention for everyone eligible, especially U.S. veterans. It was found that race was associated with whether a veteran is screened for certain cancers. Prospective studies looking into tests for colorectal cancer, PSA and HIV testing should be further investigated in U.S. veterans to help decrease the cancer burden on these populations.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/d8ecca49080148a6aef516cfc3e0d2e91d>

131. Association between Rural-Urban Primary Care Practice and Management of Knee Pain

Foley Schreier, Nicholas Van Horssen, Abe E. Sahmoun, Ph.D., James R. Beal, Ph.D.

Medical Student

Population / Public Health Research

Background: Knee symptoms are among the most frequent patient expressed reasons for visiting ambulatory care physicians. Musculoskeletal pain is debilitating for patients and has a high societal cost. The purpose of this study was to determine the association between rural-urban clinics and management of knee pain in ambulatory care clinics in the United States.

Methods: We conducted a retrospective cross-sectional analysis of adults who sought medical care for knee pain utilizing the 2011-19 National Ambulatory Medical Care Survey (NAMCS). We compared knee pain management including imaging, medications, and referral between rural versus urban clinic settings. Inclusion criteria was adults age ≥ 18 or < 65 years seen for a problem of knee pain. SPSS 28.0 Complex Surveys were used to analyze the data in a manner that accounts for the complex sample survey design. All significance tests were two-sided, P-value < .05 for significance. This study was approved by the Institutional Review Board of the University of North Dakota.

Results: Of the estimated 28.4 million (unweighted N=804) adult knee pain visits from 2011-19, 15.9% occurred in a rural clinic. Rural patients were more likely to see "their" primary care physician (92.1% vs 80.2%, P=.000). There was no association between rural-urban clinics and patient gender (P=.954), age (P=.305), private insurance (P=.091), obesity (P=.723), and clinic region (P=.096).

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Management of knee pain showed rural clinics had lower rates of ordering/giving a complete blood count (3.9% vs 16.1%, $P=.000$), urinalysis (2.0% vs 7.7%, $P=.000$), MRI (1.7% vs 4.9%, $P=.005$), and exercise counseling (8.3% vs 16.9%, $P=.021$), and referral to physical therapy (1.8% vs 8.2%, $P=.018$). Rural clinic visits had higher rates being on or prescribed an opioid (39.3% vs 25.0%, $P=.001$). There was no association between rural-urban clinics and any imaging ($P=.355$), diet/nutrition counseling ($P=.944$), weight reduction counseling ($P=.833$), NSAIDs/Acetaminophen analgesics ($P=.852$), splint/wrap ($P=.488$), scheduling a return visit ($P=.977$), or referral to another physician ($P=.116$).

Conclusion: Differences were found between rural and urban clinics' management of adult knee pain, including rural clinics having a higher rate of opioids and lower physical therapy referral. Some differences may be explained by availability of medical personnel and distance, but not all differences.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/2216324db1b74b9fa12c590f89a67beb1d>

132. Factors Associated with Prostate Cancer Screening using Prostate Specific Antigen: A Cross-Sectional Analysis

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Population / Public Health Research

Background: Current United States Preventive Services Task Force (USPSTF) guidelines recommends men aged 55 to 69 years should talk to their physician about the benefits and harms of prostate cancer screening prior to making a shared decision about the use of the Prostate Specific Antigen (PSA) test.

Objective: To identify demographic, financial, and healthcare factors associated with discussions of the harms and benefits of PSA screening.

Methods: We conducted a retrospective analysis utilizing the 2018 and 2020 Behavior Risk Factor Surveillance System (BRFSS). Our analysis examined associations between age, race, BMI, urban/ rural residence, marital status, education level, health cost issues, health insurance status, smoking status, and health status. Furthermore, we stratified these demographic factors into discussions that included benefits and harms of PSA test screening, benefits alone, harms alone, or no discussion. Analysis was performed using summary statistics and bivariate comparisons (Chi-square tests). All significance tests were two-sided, $p\text{-value} < .05$ for significance. This study was approved by the Institutional Review Board of the University of North Dakota.

Results: Of the estimated over 25 million (unweighted $n=101,845$) male respondents, 44.9% of men between the ages of 55-69 reported having no discussion of PSA testing and only 1.3% reported discussing harms. Respondents who discussed the benefits and harm of PSA screening were significantly more likely to be White (71.1% vs. 65.9%, $P=.000$) and non-smokers (87.4% vs. 80.3%, $P=.000$). Similarly, those that received discussions of benefits and harms had higher rates of health status-excellent or very good (51.6% vs. 43.0%, $P=.000$), health insurance (95.7% vs 80.3, $P=.000$), and education level-graduated college or technical school (38.7% vs. 22.7%, $P=.000$), compared to those that didn't have any discussions.

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Conclusions: We found that almost half of men respondents had no discussion about the benefits or harms of PSA screening. Furthermore, the talks tended to focus on mostly the benefits of screening and not both potential benefits and harms. This study also highlights several confounders related to healthcare counseling between physicians and their patients that should be addressed to improve quality of care.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/0dd989c35fdd4dc98501f260557c4eed1d>

133. Association between Rural-Urban Physician and Physical Therapy Referrals for Musculoskeletal Conditions

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Rural Health Research

Background: A referral to physical therapy (PT) in the setting of a musculoskeletal (MSK) condition has been shown to improve outcomes in both the short- and long-term, however, studies have shown that socioeconomic barriers exist that lead to disparities in referrals. The purpose of this study is to analyze differences in PT referrals as well as routine labs and imaging for MSK conditions between urban and rural areas.

Methods: We conducted a cross-sectional analysis of adult visits for MSK conditions utilizing the 2011-2019 National Ambulatory Medical Care Survey datasets (NAMCS). The data analyzed included age, gender, race, insurance status, patient primary care physician, number of visits in the past 12 months, geographic hospital region, MSA status, imaging including X-ray, CT (Computed Tomography), MRI (Magnetic Resonance Imaging), ultrasound, medications prescribed (analgesics provided), counseling/education including diet or nutrition, weight reduction, exercise, occupational therapy, physical therapy, and visit disposition (including referral to another physician).

Results: We analyzed 56354 unweighted total primary care visits, which represented an estimated 1.8 billion visits from 2011-18, excluding 2017. Of those visits, 8663 were for MSK conditions which represents an estimated 294 million visits. The rate of physical therapy referrals was not statistically significant with Rural being 4.3% and urban 6.2 ($p = 0.217$). The rate of referral to other physicians for MSK conditions was 11.1% in rural compared to 17.9% in urban ($p < 0.001$). The rate of lifestyle education and counseling was lower in rural compared to urban, with the topic regarding exercise being 8.9% to 14.4% ($p = 0.007$). Patients with the visit occurring in a rural setting had an increased rate of receiving analgesic medication with opiates prescriptions for management in 45.4% visits in rural and 36.9% in urban ($p = 0.005$).

Conclusion: Referral to PT was similar between rural and urban areas. However, there was a difference in the referral rate to other physicians, with it being more frequent in an urban setting. This could be explained by the availability of specialists in urban populations compared to rural. A potential associated consequence of this difference may explain why there was an increased rate of analgesic prescriptions including opiates in the rural setting. We also identified lower rates of exercise education in the rural population.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/daabb50571ae4e5d9b67b29e22707f701d>

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134. Association between clinic location and pediatric asthma management among primary care physicians

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Clinical Science Research

Background: Asthma is the most common chronic condition facing children in the United States with an estimated 6.3 million children diagnosed with the condition. The purpose of this study was to determine the association between rural-urban clinic location and pediatric asthma management among primary care physicians.

Methods: We conducted a retrospective analysis of primary care visits involving pediatric patients with asthma using 2011-2019 National Ambulatory Medical Care Survey (NAMCS) datasets. We compared asthma management including asthma education, asthma action plan, medications, and asthma control between children visiting rural versus urban clinic settings. The inclusion criteria were children and adolescents ages 1- 17 years old with a diagnosis or history of asthma and seen by a primary care physician. SPSS 28.0 Complex Surveys will be used to account for the complex sample survey design. All significance tests will be two-sided, P-value < 0.05 for significance. This study was approved by the Institutional Review Board of the University of North Dakota.

Results: Of the estimated 75.6 million (unweighted n=2471) pediatric asthma visits, 8.0% were in a rural setting. Overall, 87% of childhood asthma visits were well-controlled, although most visits did not have severity documented; only 18.6% were given asthma education; and only 8% were given an asthma action plan.

Rural visits were younger (8.2 vs 9.0 years, $p=.045$), more likely to be white (84.3% vs. 78.4%, $p=.022$), and previously seen in the same practice (97.2% vs. 93.1%, $p=0.23$) compared to urban visits. There was no association between rural-urban status and asthma severity ($p=.445$) or asthma control ($p=3.13$)

Regarding management, rural clinic visits were less likely to have received an asthma action plan (2.5% vs. 8.0%, $p=.005$) and exercise education (0.1% vs. 8.9%, $p=.046$), but more likely to be prescribed leukotriene modifiers (10.0% vs. 15.1%, $p=.032$). There was no association between rural-urban clinic status and utilization of any respiratory agent or other specific respiratory agents.

Conclusion: Rural and urban clinics similarly managed pediatric asthma visits. However, rural patients received a decreased rate of guidance with an asthma action plan and exercise education and were prescribed more leukotriene modifiers compared to their urban counterparts. Demographic and encounter differences found may partially explain these differences, but further study is warranted.

Video - <https://capture.med.und.edu/Mediasite/Channel/frank-low-research/watch/9ea4a009243e4c508bdade1108629cce1d>

Clinical Sciences – Add on

135. A 49-year-old Male with Shortness of Breath after Upper Extremity Surgery

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Clinical Sciences Case Report

Introduction: Patients who present to the emergency department with shortness of breath require the emergency physician to consider an extremely broad differential diagnosis.

Case Presentation: We report the case of a 49-year-old male who presented to the emergency department with one week of dyspnea, following surgery for carpal tunnel syndrome.

Discussion: This report takes the reader through an atypical case of shortness of breath in a post-surgical patient with unique chest X-ray images (hemidiaphragmatic paralysis resulting from inadvertent phrenic nerve blockade during pre-operative nerve block) to make the diagnosis. We highlight the importance of good history-taking and the need to keep a broad differential diagnosis for common chief complaints. **Traditional Poster**

136. Did COVID-19 impact how caregivers received cancer screening? Results from a national level study in 2018 and 2020

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Population / Public Health Research

Introduction: Informal caregiving is the underrecognized backbone to healthcare with 1/5 Americans falling into the category. With an aging population on the rise and healthcare worker shortages, it is important to uncover the challenges caregivers face. This study examines the relationship between caregiver status and their screening for cervical, colorectal, female breast, and prostate cancer using data from the BRFSS 2018&2020 study. The purpose is to investigate whether COVID-19 impacted caregiver behavior as to whether cancer screening was utilized in accordance with USPSTF recommendations in comparison to a pre-pandemic year.

Methods: Data from the BRFSS 2018&2020 study was used to perform weighted multivariable logistic regression analyses to investigate the association between being a caregiver for a friend/family member who has a health problem/disability, and getting screened for cancer, by corresponding screening age recommendations. US adults ages 18-79, without a prior cancer diagnosis, were included in the study. A subgroup analysis was performed by year of study, to investigate this association before and during the COVID-19 pandemic. After a DAG evaluation, adjustment was made for age, race, education, employment, income, health insurance, marital status, smoking, heavy drinking, obesity, and depression.

Results: In 2020, among females, the weighted and adjusted odds (WAO) of screening for cervical cancer were 2.25 times significantly greater (95%CI: 1.38-3.64) and for colorectal cancer were 1.32 times significantly greater (95%CI: 1.01-1.71) in those who were caregivers compared to those who were not. In 2020, among males, the WAO of screening for prostate cancer were 1.27 times marginally significantly greater (95%CI: 0.94-1.70) in those who were caregivers compared to those who were not. These associations were not significant in 2018.

There were no significant associations between caregiver status and their screening for male colorectal and female breast cancer, in either 2018 or 2020.

Conclusion: Despite the burden caregivers face, their screening odds for cancer in 2020 - the COVID-19 pandemic year, were significantly higher than those of non-caregivers regarding prostate, female colorectal, and cervical cancer. These associations were non-significant in the

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pre-pandemic year 2018. This COVID-19 pandemic significantly impacted how caregivers addressed the importance of cancer screening.

Significance: The particular significance of this study outlines the complexity COVID-19 had on caregivers and their cancer screening behaviors. We demonstrate that caregiver status should be taken into account when understanding population health screenings and further research should be done to examine COVID-19's effect on cancer screenings. **Traditional Poster**