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# Zeigler Research Forum 2022

College of Nursing and Health Sciences

May 11, 2022

7:30 AM – 12:15 PM

Grand Maple Ballroom & Livak Fireplace Lounge

Davis Center

**Schedule of Events**

**Keynote Address**

**Departmental Mini-Talks**

**Poster Presentations at a Glance**

**Poster Abstracts**

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# Schedule of Events

**7:30-9:00 a.m.** – Breakfast served

**8:45 a.m.** – Welcome and Introductory  
Remarks: CNHS Dean Noma  
Anderson

**9:00 a.m.** – Keynote: Dr. Yanick Vibert

**10:00 a.m.** – Poster Session

**11:00 a.m.** – Departmental Mini-Talks

**12:00 p.m.** – Awards and Closing Remarks:  
Dean Anderson

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# Keynote Address

## R IS FOR RESILIENCE, SEEING THE "R" IN MCH (MATERNAL CHILD HEALTH)

### Learning Objectives:

1. Define neonatal and infant mortality
2. Recognize the role that Sustainable Development Goals have played in promoting Maternal Child Health
3. Discuss challenges and ongoing downstream effects of the pandemic to MCH care delivery
4. Discuss "Global is Local"

### Speaker:



#### **Yanick M. Vibert, DO, MPH, FAAP**

Attending Physician, Section of Neonatal-Perinatal Medicine  
Maternal Child Global Health Specialist, St. Christopher's Hospital for Children  
Adjunct Professor, Drexel University Dornsife School of Public Health  
Assistant Professor of Pediatrics, Drexel University College of Medicine

**Dr. Yanick M. Vibert** is an Attending Neonatologist whose passion for and involvement with global health spans over two decades. She credits her grandmother for launching her public health career early on by teaching her to "not forget to speak for those who are unable to do so for themselves." Dr. Vibert earned her BS in Natural Sciences with a Biology concentration at Spelman College and her Doctor of Osteopathic Medicine degree from the New York College of Osteopathic Medicine. She completed a rotating internship at St. Clare's Hospital and Medical Center (NYC), her pediatric residency at Penn State Hershey Children's Hospital and neonatology fellowship at St. Christopher's Hospital for Children where she is currently an attending Neonatologist. Inspired by the 2010 earthquake and subsequent public health catastrophe in Haiti, she went on to earn her Master of Public Health with a Maternal Child Health concentration from Harvard School of Public Health in 2012. Her Neonatology career converged with her long-time public health service when she became a Master Trainer with the Helping Babies Breathe Neonatal Resuscitation Program in May 2010. The Helping Babies Survive series, an initiative of the American Academy of Pediatrics and World Health Organization, is an evidence based educational program geared towards reducing neonatal mortality by teaching resuscitation techniques to providers in resource limited settings. Over the last decade, she has trained over 200 health care providers across three continents. Since 2002, Dr. Vibert has been involved with and continues to work to support community based Maternal Child Health capacity building projects in Haiti, Guyana, Cuba, Uganda, and The Gambia. She has also developed educational sessions and curriculums geared towards the medical providers in these countries as well as trainees and public health graduate students here in the US. She is an Assistant Professor of Pediatrics with Drexel University College of Medicine and teaching faculty with Drexel University Dornsife School of Public. Dr. Vibert is the recipient of the 2014 March of Dimes Roosevelt Award for Service to Humanity. She has also been featured in the May 2015 Philadelphia Magazine Top Doctors Edition, 'The Global Health Warriors'.

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# Departmental Mini-Talks

## Biomedical and Health Sciences

- **Presenter: Julia Snyder**  
*The Impact of Nitric Oxide on Dendritic Cell Metabolism*

## Communication Sciences and Disorders

- **Presenter: Claudia Abbiati**  
*Early diagnostic indicators of childhood apraxia of speech in young children with 7q11.23 duplication syndrome*

## Nursing

- **Presenter: Brigid Meehan-Brese**  
*The Vermont Safe Infant Sleep Project: Evaluation of an Online Learning Module*

## Rehabilitation and Movement Sciences

- **Presenter: Justine Dee**  
*Pain Neuroscience Education, Graded Motor Imagery, and Exercise to Improve Function in Adults with Chronic Pain and Trauma: A Randomized Trial*

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# Posters at a Glance

## **Biomedical and Health Sciences**

Livak Fireplace Lounge, poster numbers 1-7

## **Communication Sciences and Disorders**

Livak Fireplace Lounge, poster numbers 8-22

## **Nursing**

Grand Maple Ballroom, poster numbers 23-44

## **Rehabilitation and Movement Science**

Grand Maple Ballroom, poster numbers 45-61

# Biomedical and Health Sciences

Poster Number	Author(s)	Title
1	Bovee, H. J.	Verification of Molecular Assays for Bacterial Vaginosis, Vaginal Candidiasis, and Trichomoniasis
2	Nandagopal Gopika, Hogan Tyler, Edwards Jenna	Functionally Assessing STK11 Variants of Unknown Significance
3	Baillio, J, P	Measurement of Fecal LPS levels using a Limulus Ameobocyte Lysate Assay
4	Agan, Marie Little Fawn	Performance of Loop Mediated Isothermal Amplification (LAMP) to detect the presence of SARS-CoV-2 in wastewater; preventing an outbreak of COVID-19 on a residential college campus
5	Hudson, M, C	Systematic literature review of progesterone stimulation of stem-like cell lines in mammary tissue, and proposed methods for inhibition of cell growth
6	Prior, S, M	Investigating the effects of metabolic rewiring on metastasis in STK11-null lung cancer cells
7	Hogan, TC; Georgeson, T; Adams, AA; Schmoker, AM; Ballif, BA; Deming, PB	Functional Interaction between PKA and 4.1 Proteins

# Communication Sciences and Disorders

Poster Number	Author(s)	Title
8	Murphy, G. E. & Meller, A. L. A	How speech language pathologists can better support children who have had adverse childhood experiences: A systematic review.
9	Hewitt, J.K.	Concussion in University Students: A Qualitative Study of Academic Support Service Access and Use.
10	Kinney, Lizzie C.	Restorative Practice Circles: Experiences of Students with and without Special Education Services.
11	D'Amico, M., R.	The associated effects of adverse childhood experiences (ACEs) on speech and language development: A systematic review.
12	Malapad, M. E.	The Effectiveness of Palatal Lifts for Management of Velopharyngeal Insufficiency: A Systematic Review.
13	Smith, M.B.	Salient Acoustic Features that Impact Perceptions of Gender Identity and Vocal Naturalness: A systematic review.
14	White, N. E.	Do behavioral-based treatment approaches show positive effects when working with children with selective mutism?: A systematic review.
15	Belliveau, S. N. & Latteri, S. A.	Comparing the effects of constraint-induced aphasia therapy (CIAT) to conventional aphasia treatment: A systematic review.
16	Bex, S, E.	Effectiveness of abdominal binding in treating impaired respiratory-phonatory systems: A systematic review.

# Communication Sciences and Disorders

Poster Number	Author(s)	Title
17	Matthews, Shannon, R & Tella, Randi, L	Conceptualizing quality of life for post-stroke individuals with aphasia: A systematic review.
18	Gavitt, E.E.	Effects of prosodic manipulation on lip aperture and movement duration in habitual versus emphatic stress in adults.
19	Baustin, Ana, Haugenes, Skylar, Sheehy, Hannah.	Piloting a New Task Battery to Assess Episodic Memory in Children with Autism.
20	Lewis, J. B., Tursky, B. S., Abbiati, C. I., Velleman, S. L., Bercerra, A. M., Mervis, C. B.	Relations Between Maternal Phonetic Contingencies and Early Speech-Language Production in Toddlers with Williams Syndrome.
21	Ekstrom Grenon, K.; Dooley, S.; Crouch, K; Cannizzaro, M. S.; Jangraw, D. C.	Measuring the Emotional Arc of Conversational Stories: Automated Analysis and Clinical Norming.
22	Medeiros, S, Cohn, N, Coderre, E.	Visual Narratives and Inference Generation in Individuals Across the Autism Spectrum.

# Nursing

Poster Number	Author(s)	Title
23	Brigid J. Meehan-Brese, Rosemary Dale, Julie Parent, and Jean Pelski	The Vermont Safe Infant Sleep Project: Evaluation of an Online Learning Module.
24	Webb, C.B.	Creation of a Parent-Directed Toolkit to Prevent Youth Vaping.
25	Tang, Edna, K	Improving Knowledge and Competency of Self-Monitored Blood Pressure in Older Adults.
26	Rocheleau, E, K, Laurent, J, S	Effects of a Community-Based Child Obesity Prevention Program on Adult Health Behaviors.
27	Wasserman, E, A.	Improving Sexual Health Knowledge in College Students.
28	Wilson, E, M	Improving Empowerment in People with Type 2 Diabetes.
29	Burns, Jacob	Using Audit and Feedback to Improve Compliance to Medication-Assisted Treatment.
30	Woller, Jacob, N.	Oncology Nurse Hazardous Drug Safe Handling Competencies: A Quality Improvement Project.
31	Shepard, Junelle B	Adolescent Suicide Prevention via Parental Education.
32	Surwilo, K. A.	Evaluating & Improving Adolescent Mental Health Accessibility in VT.
33	Stones, K. A.	Improving Provider and Nurse Knowledge of Timeline Recommendations for Pediatric Patients in Foster Care.
34	O'Leary, K.S.	Optimizing Secure Patient Messaging Workflow in a Vermont Primary Care Clinic.
35	Kori Gargano, Rosemary Dale, Erin Leighton	Improving Continuous Glucose Monitor Knowledge in Primary Care Providers.
36	Luce, K. C.	Increasing utilization of the delirium prevention protocol in post cardiovascular surgery to improve quality and safety of healthcare.
37	Ozimek, L.E.	Improving Mental Health Documentation Through Education: An Intervention for Level of Care Utilization System (LOCUS) Use in Psychiatric Crisis Placement.

# Nursing

Poster Number	Author(s)	Title
38	Brady, M, L. Lichtig, C. Pelski, J. E.	Behavioral Intervention Education in Primary Care to Address Pediatric Functional Constipation: A Feasibility Assessment.
39	Via, M. P.	Implementation of Adverse Childhood Experiences Screening Tool for Providers in Primary Care Pediatrics.
40	Pickering, R. L.	Txt4toc: Improving the transition process for youth with special health needs.
41	Santor, R, R.	Neonatal Abstinence Syndrome: Assessing Practice and Challenges in Vermont Hospitals.
42	Wilson, T, L	Increasing Inpatient Access to Palliative Care Consultations: A Pilot Quality Improvement Study.
43	Victoria Greenough, Mary Val Palumbo, Betty Rambur	Developing a Telehealth Protocol for Cognitive Testing.
44	McDermott, Warren, P	Implementing SBIRT in a Critical Access Emergency Department.

# Rehabilitation and Movement Sciences

Poster Number	Author(s)	Title
45	Carley Giroux, Bel Sogoloff, Lance Bergmans, Myeong-Jin Bae, Michael Vannostrand, Susan Kasser	Predicting Falls in Adults with Multiple Sclerosis using Patient-Reported Measures: Are Perceptions of Dual-Tasking Missing?
46	Devereux, L., Duncan, B., Ratner, M., Thompson, W.	Reliability and Validity of TekScan F-Scan-64® System for Measurement of Forces During Overground Walking.
47	Hansen, I.E.	Improving accuracy of Kinovea for linear measurements through lens distortion correction.
48	Parker, Jack; Westervelt, Karen; Sibold, Jeremy; Kasser, Susan	Screen Time, Physical Activity, and Anxiety in Honor's College Students during the COVID-19 Pandemic
49	Caefar, J, F.	Exercise Interests and Preferences of People living with Multiple Myeloma.
50	Van Horn, Lucas., Carlson, Birgitta., Mohapatra, Sambit., & Kurien, George.	Evaluating Clinical Characteristics in Persistent Postural Perceptual Dizziness (PPPD): A Retrospective Review.
51	Johnston, McKenzie, C	The Impact of Psychosocial Factors on Injury Risk, Injury Recovery and Rehabilitation - Evidence Based Recommendations for Practitioners.
52	Myeongjin Bae, Jacqueline Caefar, Elizabeth Harding, Nancy Gell	Secondary Outcomes of a Remote Exercise Trial for Rural Older Cancer Survivors: Impact on Physical Activity and Sedentary Behavior.

# Rehabilitation and Movement Sciences

Poster Number	Author(s)	Title
53	Balakrishnan S, Gell NM & Peters DM	A Literature Review of Wearable Technologies used to calculate Intensity of Physical Activity (PA) among Adults with Neurological Conditions.
54	Allyson Balboni, Morgan Bunton, Jordan Glenning, Madison Randall	Understanding biopsychosocial constructs in outcome measures used for adolescents with Cerebral Palsy (CP) during the transition into adulthood.
55	Martin, A, R; Tompkins, C, L	Come Alive Outside: Findings from a Community-Based Physical Activity Passport Program.
56	Avery ST, Celley AN, Cho J, Donoghue RE, Goodrich BM, Rose GL, and Westervelt KC	Group Wellbeing Program for University and Hospital Employees: A Feasibility Study.
57	Cacciola A, Corapi G, Garcia B, Young R, Sargent E.	Implementation of the Neck Pain Clinical Practice Guideline: A Case Report.
58	Benz C, Meibauer L, Mercia J, Nelson M, Voelker J	Effective Interventions in Oncology Rehabilitation to Minimize the Impact of Sarcopenia among Breast Cancer Patients: A Systematic Literature Review.
59	Amthor, M., Bianchi, N., Boisclair, R., Madison, M., Moore, C., Niedermaier, T., Dee, J.,	Using the Biopsychosocial Approach in Physical Therapy to Treat Chronic Pain: A Systematic Literature Review
60	Smith, P., Campbell, C., King, M., Lemieux, N., Niedermaier, B., Wolforth, J.	Implications of Telehealth for Physical Therapy in the Musculoskeletal Population: A Systematic Literature Review.
61	Desai, C., Nadeau, A., Kraemer, B., Nguyen, D., Cornbrooks, M., Deffeyes, J.	Assessing the Reliability and Validity of Pressure-Measuring Insoles in Quantifying Variables of Postural Control.

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# Poster Abstracts

## Biomedical Health Sciences

### 1. **Verification of Molecular Assays for Bacterial Vaginosis, Vaginal Candidiasis, and Trichomoniasis.** *Bovee, H. J.*

Background and Objective: Vaginitis is one of the most prevalent vaginal conditions in the United States with over 25 million cases per year. Untreated vaginitis may increase the risk of pregnancy complications and contracting STDs. The most common causes of vaginitis are bacterial vaginosis (BV), *Candida vaginitis* (CV), and *Trichomonas vaginalis* (TV). UVMCC had been using a Nugent scored Gram stain and rapid POC test for differential vaginitis diagnosis. Updated CDC TV guidelines and difficulties with indeterminate BV results and CV speciation however led UVMCC to adopt the FDA cleared Hologic Aptima Vaginitis Panel (AVP). The AVP uses transcription mediated amplification to simultaneously test for BV, CV, TV, and *Candida glabrata* (which may cause antimycotic resistant infections). Prior to reporting patient results with a new assay however, the Clinical Laboratory Improvement Amendments dictate that a verification study must be completed to ensure quality testing. The purpose of this project was to complete the required in-house study so UVMCC could replace their vaginitis exam with the AVP.

Methods: A total of 103 clinical samples characterized for BV, CV, and/or TV were tested on both UVMCC Panther instruments to determine accuracy, inter-day, and intra-run precision of the AVP.

Results: All precision samples were valid and correct. Precision was 100% for all analytes. Of the accuracy samples, 16 BV and 3 CV/TV samples were invalid, and 1 BV and 1 CV returned incorrect results. All other accuracy samples were both valid and accurate. Accuracy was 98% for BV, 99% for CV, and 100% for TV.

Discussion: Investigation showed all invalid samples were rejected due to low sample volumes. The Hologic AVP is acceptable under CLIA regulations and UVMCC protocol to use with patient samples at UVMCC

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for the differential diagnosis of vaginitis. Future research may investigate how the AVP results BV samples deemed indeterminate by Nugent score.

## **2. Functionally Assessing STK11 Variants of Unknown Significance.**

*Nandagopal Gopika, Hogan Tyler, Edwards Jenna*

Background: STK11 is a serine/threonine kinase whose somatic loss of function (LoF) has been demonstrated to impact many pathways associated with tumorigenesis, most notably in non-small cell lung cancer (NSCLC). STK11 substrates include AMPK, p53, and the MARK family of kinases making it a master regulator of growth, energy sensing, polarity, apoptosis, and DNA repair. STK11 mutant NSCLC are associated with more aggressive disease, and a higher risk of metastasis. STK11 LoF has also been linked to poor response to PD-1 checkpoint inhibitor immunotherapy in KRAS driven NSCLC. Using clinical data from next generation sequencing of tumors isolated from NSCLC patients at the UVM medical center we have identified more than 28 uncharacterized STK11 missense variants. Understanding the functional status of these missense variants of unknown significance (VUS) is important for disease prognosis and clinical treatment plans.

Methods: We proposed that whether these STK11 VUS retain their kinase activity would be an appropriate measure of normal biological function. Our lab attempted to functionally characterize 28 STK11 missense variants using a p53 dependent luciferase reporter assay. To get a direct reading of STK11 kinase activity we developed an assay that allows us to monitor autophosphorylation of STK11 using in-vitro kinase assays, through a visible, and easily detectable mobility shift on a western blot. The data from our kinase activity assessment systems were then compared to 22 different in silico predictive algorithms as well as the ClinVar database.

Results: The kinase assays were intriguing, as the majority of VUS appeared to fall into 2 distinct bins of either kinase active or kinase inactive. Only 6 of the 28 variants that were tested resulted in uniform agreement across both the predictive algorithms and the luciferase assay and kinase assays, highlighting the need for robust biochemical assays to reliably classify STK11 VUS.

## **3. Measurement of Fecal LPS levels using a Limulus Ameobocyte Lysate**

**Assay.** *Baillio, J, P*

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The ability to measure endotoxin levels from fecal samples has widespread importance for poliovirus vaccine studies. Evidence shows that poliovirus' ability to infect cells in the gut is enhanced by Lipopolysaccharide (LPS) produced by species of gram negative bacteria. Therefore, new live attenuated poliovirus vaccine candidates' effectiveness may be altered by differing levels of LPS. The ability to measure endotoxin in human fecal samples has not been widely studied. The use of a Chromogenic Endotoxin Quantitation Kit relying on a Limulus Ameobocyte Lysate (LAL) in order to quantify endotoxin from fecal samples was investigated in this study. Fecal samples from a healthy donor were used to quantify LPS at different dilution levels. A wide variation in ideal dilution levels was found but preliminary testing demonstrated that dilution ranges between 1:125 and 1:750 could produce samples with endotoxin levels within the standard curve limits for the assay. This information provided a proof of concept showing it is possible to quantify LPS levels from fecal samples using the Chromogenic Endotoxin Quantitation Kit. Further testing is needed to identify the ideal dilution level for the assay and to investigate variation in fecal LPS concentrations between multiple test subjects. Future studies comparing LPS levels to live attenuated polio vaccine efficacy could provide crucial information about timing of vaccine dosage and help improve efficacy in areas of the world relying on live attenuated oral polio vaccines.

**4. Performance of Loop Mediated Isothermal Amplification (LAMP) to detect the presence of SARS-CoV-2 in wastewater; preventing an outbreak of COVID-19 on a residential college campus.** *Agan, Marie Little Fawn*

When the world was at the beginning of the SARS-CoV-2 pandemic and the greatest threat was the safety of our neighbors and ourselves, an interdisciplinary team of students, faculty and staff from Norwich University pooled their strengths and knowledge to form the Norwich University Wastewater-based Epidemiology Initiative (NWBE). The multidisciplinary team hailed from backgrounds in Engineering, Construction management, Chemistry, Biology, Communication, and facilities operations for the University. Conceptualization began in the fall of 2020 when prevalence of COVID-19 was quite low in Vermont. The concept was to collect wastewater samples from manholes on campus and investigate for the presence of SARS-CoV-2 viral ribonucleic acid (RNA), using Loop Mediated Isothermal amplification (LAMP) to alert the campus

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of a pending outbreak. LAMP is an easily distinguishable colorimetric assay that does not require any instrumentation to read. An existing concentration procedure was optimized for use with LAMP prior to analyzing sewage samples. The SARS-CoV-2 LAMP assay detected the SARS-CoV-2 viral RNA in 8/9 (89%) of PCR positive COVID-19 wastewater samples with 100% specificity (n = 6) within a 30-minute time frame, making it much quicker than Q-PCR. Additionally, the LAMP method positively detected SARS-CoV-2 in wastewater samples with copies as low as 21.3 GC/mL. The results obtained in our study indicate that employing LAMP for the detection of SARS-CoV-2 in wastewater, provided an early warning to an outbreak on campus and was comparable to the more expensive and costly quantitative PCR for wastewater-based epidemiological monitoring of COVID-19.

**5. Systematic literature review of progesterone stimulation of stem-like cell lines in mammary tissue, and proposed methods for inhibition of cell growth.** *Hudson, M, C*

Background: Progesterone (P4) is an ovarian derived hormone which is critical in various functions within the body, including regulation of breast development. However, progesterone and progestins (synthetic progesterone) have been implicated in breast tumorigenesis. The cancer stem cell theory states that tumors contain subpopulations of cells that possess properties of self-renewal, indefinite replicative potential, and are thought to play a role in tumor initiation. The aim of this review was to examine the link between breast cancer stem cells (CSC) and progesterone use.

Methods: The articles included data pertaining; progesterone/progestin treatment, published in the last 10 year, contain direct cell-based research, and contain research directed at stem-like cells of the luminal and/or basal region.

Results: Progesterone has been shown to mediate the cellular expansion of specific populations through a multitude of various cellular and molecular processes. The processes include micro-RNA regulation, bipotent stimulation of luminal and basal cell lines, expansion of CSCs by increasing CD44+ cell lines, and receptor stimulation. Much of the P4 mediated receptor stimulation was directed towards cytokeratin5 (CK5) positive cells which resulted in the phenotype being imprinted in subsequent generations even after P4 exposure had ceased. CK5 cells

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represent myoepithelial precursor cells that are inherently resistant to many forms of chemotherapy. Various methods of inhibiting P4 have been examined and retinoic acid showed preliminary data that both transcription of CK5 transcripts as well as P4 mediated cellular division were limited when combine with P4 treatment.

Discussion: Based upon the findings of the article within this review, the induction of CK5+ cell populations by progesterone causes more of an aggressive and more resistant tumor formation. Progesterone also increases biopotency of stem-like breast cancer cells which contributes to this aggressive phenotype. Greater research into possible therapeutics to reduce the effects of progesterone is lacking within this field of study.

#### **6. Investigating the effects of metabolic rewiring on metastasis in STK11-null lung cancer cells. Prior, S, M**

Background and Objective: STK11 is a tumor suppressor that downregulates cell growth upon energetic depletion. A subtype of non-small cell lung cancer (NSCLC) driven by concurrent KRAS/STK11 mutations (KS) results in worsened prognosis and enhanced dependence on glutamine metabolism. The hexosamine biosynthetic pathway (HBP) intersects both STK11 and glutamine via the enzyme GFPT2 and its upregulation is associated with increased metastasis. Additionally, specific upregulation of GFPT2 has been associated with the epithelial-to-mesenchymal transition (EMT), a precursor for tumor metastasis. This study aims to clarify how the rewired metabolism and utilization of glutamine in STK11-null NSCLC cells promotes metastasis.

Methods: The Agilent Seahorse Mitochondrial Stress Test (MST) was used to assess the effect of 5 hours of glutamine deprivation. In brief, H2009 WT and KS cells were subjected to glutamine deprivation prior to the addition of mitochondrial respiration inhibitors. Basal and maximal respiration rates along with spare respiratory capacity (SRC) were calculated from 3 biological replicates.

Retrospective RNA sequencing analysis was performed on NSCLC H2009 WT and KS cells subjected to +/- 24 hours of glutamine deprivation. Differentially expressed gene (DEG) and gene set enrichment (GSEA) analyses were conducted, and DEGs from various metabolic pathways and EMT markers were compared.

Results: Metabolomic analysis revealed that H2009 KS cells are metabolically "maxed out", as represented by their lack of SRC. Pathway

analysis revealed that KS cells downregulate metabolic processes while predominantly upregulating NF- $\kappa$ B signaling upon glutamine deprivation. Furthermore, DEG analysis showed a significant upregulation of GFPT2 and the NF $\kappa$ B-related EMT marker, SNAI2.

Discussion: KS-driven NSCLC represents an aggressive NSCLC subtype with poor prognosis and increased metastasis. Upon glutamine deprivation in KS NSCLC cells, we observed a downregulation of metabolic pathways and upregulation of NF- $\kappa$ B signaling and SNAI2 expression. These results suggest KS NSCLC cells promote EMT and metabolic quiescence upon glutamine deprivation.

## **7. Functional Interaction between PKA and 4.1 Proteins.** Hogan, TC;

Georgeson, T; Adams, AA; Schmoker, AM; Ballif, BA; Deming, PB

Background and Objective: Canonically activated from increased cAMP concentrations, the serine/threonine kinase cAMP dependent protein kinase (PKA) is involved in diverse cellular processes including migration and proliferation. Recent work has identified growth factor receptors as regulators of PKA activity. Our lab has identified novel physical interactions between PKA and two cytoskeletal proteins in response to growth factor signaling in fibroblast cells. A scan of the amino acid sequences of these proteins, EPB41L2 (4.1G) and EPB41L3 (4.1B), revealed putative PKA phosphorylation sites. Considering the physical interaction between PKA and proteins 4.1G and 4.1B and the presence of putative PKA phosphorylation sites, we sought to determine if 4.1G and 4.1B are phosphorylated by PKA in response to growth factor signaling.

Methods: To determine whether proteins 4.1G and 4.1B are phosphorylated by PKA, NIH-3T3 fibroblasts were grown to confluency and serum starved overnight before stimulation with PDGF or vehicle control. Cell extracts were made and used to enrich for proteins 4.1G/B by immunoprecipitation and subsequently subjected to SDS-PAGE electrophoresis and western blot analysis. Untreated NIH-3T3 extracts were used to enrich for proteins 4.1G/B for use as a substrate in cold kinase assays using catalytical active PKA, which were subsequently subjected to mass spectrometry analysis to determine phosphorylation sites.

Results: Immunoprecipitation western blots for phospho-PKA substrates suggested proteins 4.1G and 4.1B to be direct substrates of PKA in response to PDGF stimulation. Mass spectrometry identified 2 serine residues on 4.1B as being sites of PKA phosphorylation, one of which is

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conserved in 4.1G.

Discussion: Our work has identified differential binding partners of PKA in response to growth factor signaling, including proteins 4.1G and 4.1B, which were also identified as downstream substrates of PKA. Future work will use unphosphorylatable mutants of 4.1G and 4.1B to determine the effect of PKA on these proteins' function.

## Communication Sciences and Disorders

### **8. How speech language pathologists can better support children who have had adverse childhood experiences: A systematic review.** *Murphy, G. E. & Meller, A. L. A*

Purpose: There is very little understanding of intervention techniques used by speech language pathologists (SLPs) for working with children with Adverse Childhood Experiences (ACEs). The aim of this study was to compile effective intervention strategies for SLPs to use with children who have had ACEs.

Methods: An electronic search of publications resulted in 1,312 records from five databases (from September 2021 to March 2022), including PubMed, CINAHL, Ovid Medline, CINAHL Complete, and PsychInfo; citation chaining for relevant studies were performed. Only studies with participants between 0-13 years old who have had ACEs and received treatment within the scope of SLPs were included. The search strategy resulted in 15 relevant studies.

Results: The main findings are that studies that used play-based, social-emotional learning, or parent coaching interventions reported generally positive results following treatment.

Discussion: This systematic review identified several techniques that are beneficial for SLPs to use with children who have had ACEs. Based on these findings, SLPs working with children who have experienced ACEs should incorporate play-based, social-emotional learning, and/or parent coaching interventions into their practice. Most of the articles reviewed for this study incorporated treatment from counselors or in a school in general. The interventions were screened to determine whether they were within the scope of practice for an SLP. Further research is needed to

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analyze the specific role of an SLP in the treatment of a child who has had ACEs.

**9. Concussion in University Students: A Qualitative Study of Academic Support Service Access and Use.** *Hewitt, J.K.*

Officially categorized as a mild form of traumatic brain injury (TBI), a concussion is defined as a “traumatically induced transient disturbance of brain function” (Harmon et al., 2013, p. 216). Individuals whose symptoms linger for longer than the typical two-week recovery period may be diagnosed with post-concussion syndrome (PCS). Following concussion and subsequent PCS, many college students struggle to return to academics successfully and may have highly variable knowledge of concussion and academic support services. Standards or recommendations post concussion are not typically found at the university levels. This leaves the implementation of concussion accommodations to the discretion and advocacy abilities of individual students and faculty. This is problematic given the variability of concussion knowledge of each student and professor, as well as the variability of concussion symptomatology. It is our proposition that students with PCS experience academic performance declines and additional challenges with mood and socialization. We assert that there is a general lack of knowledge amongst students regarding best practices following concussion, access to support service, and evidence-based strategies used to support academic success. This study utilized a qualitative research approach, using semi-structured interviews and reflexive thematic analysis. The study population included individuals who are current students or have graduated in the past five years. Participants were 18 years or older, had experienced a diagnosed concussion while a UVM student, and did not report any other neurologic conditions. Data will be reported explaining participant experiences in relation to academic, mental, and emotional health, as well as their knowledge and use of support services on campus. This data will highlight the student perceptions as to the efficacy and accessibility of on-campus academic supports. Suggestions for the implementation of standardized processes and procedures will be made to address systems level support of students post-concussion.

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## **10. Restorative Practice Circles: Experiences of Students with and without Special Education Services.** *Kinney, Lizzie C.*

**Background.** In comparison to their peers without disabilities, students in the United States with disabilities are at disproportional risk of later involvement with the criminal justice system (Kervick et al., 2019; U.S. Department of Education Office for Civil Rights, 2014). Many of these students receive services related to communication. Because of this discrepancy, it is critical that students with disabilities are both responsive to and empowered by school disciplinary models. In response, the Restorative Practices model has recently been implemented in the Vermont's Burlington School District. This model is centered around the principles of ensuring that all students feel restored, habilitated, and reconciled following interpersonal conflict (Gavrielides, 2011). In order to determine its effectiveness, the annual Restorative Practices Student Survey was administered in 2021 to students in grades 3-12.

**Objectives.** The purpose of this exploratory project was to explore the experiences in Restorative Practice circles of students with and without special education services.

**Methods.** Select items regarding student experiences in Restorative Practice circles, an element of Restorative Practices, were analyzed with respect to two groups: students with versus without special education services, identified through self-report. Data were analyzed using descriptive statistics and independent t-tests.

**Results.** Students with services versus those without had positive experiences to a significantly greater degree with Restorative Practice circles with respect to two individual items (working better with others; making new connections with students). Students without services had a significantly more positive experience with these circles on one item (feeling listened to). Overall, both groups indicated positive experiences with Restorative Practice circles.

**Discussion.** These findings are promising as they are a hopeful indicator that students with special education services in the Burlington School District may be responsive to the Restorative Practices model based on findings related to an aspect of the model, Restorative Practice circles. Students with special education services experience Restorative Practice circles favorably and to a similar degree of positivity as students without services.

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## **11. The associated effects of adverse childhood experiences (ACEs) on speech and language development: A systematic review.** *D'Amico, M., R.*

**Purpose:** The purpose of this systematic literature search was to identify speech and language characteristics/behaviors that indicate Adverse Childhood Experiences (ACEs) in children in order for them to be available for Speech-Language Pathologists (SLPs) to use in diagnosis and treatment. If SLPs are able to identify these characteristics they then can provide trauma informed care to these individuals.

**Method:** A systematic review was completed using seven research databases and citation chaining. The search initially revealed 93,391 articles. After title review and further evaluation for inclusion/exclusion criteria, the search resulted in 15 viable articles.

**Results:** The findings of this systematic literature search revealed that children who experience ACEs more often than not, have impacted speech and language development. Extracting data on speech and language characteristics, revealed that children who have had ACEs have shown the following behaviors: slowed learning of perceptual strategies used in speech, shorter mean length utterance (MLU), delayed vocabulary development, delayed development of syntactic structures, higher prevalence of language disorders, reduced communication skills, twice as many grammatical negations, fewer explanations to causal questions, lower performance on tests of: articulation, social skills, repetition, denomination, comprehension, metalinguistics, reading accuracy, speed of reading, writing accuracy, narrative composition, and speed of writing.

**Conclusion:** This systematic review provided a multitude of speech and language characteristics that can be identified by SLP. There is more research to be done to fully address the outlined research question. Of the many ACEs, this systematic literature search only revealed speech and language characteristics for three of them. Future research should focus on the associated impact of the remaining ACEs on children's speech and language development.

## **12. The Effectiveness of Palatal Lifts for Management of Velopharyngeal Insufficiency: A Systematic Review.** *Malapad, M. E.*

**Introduction.** Palatal lifts are used as an alternative treatment in place of corrective surgery when treating patients with velopharyngeal insufficiency. The purpose of this study was to assess the effectiveness for

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use of palatal lifts for management of velopharyngeal insufficiency. Methods. Two hundred and nine articles relating to velopharyngeal insufficiency treatment were retrieved from the databases Ovid Medline and Embase. A total of 16 studies, 13 case studies and three cross-sectional studies were selected based on quality assessment and inclusion/exclusion criteria. Outcome measures were collected from standardized speech assessments and patients' self-reports.

Results. Main findings indicated that palatal lifts have a positive impact on the patient's overall speech and quality of life. The studies showed that patients demonstrated an increase in speech intelligibility and a decrease in hypernasality when using the palatal lifts in conjunction with speech therapy. All studies emphasized the importance of speech therapy in addition to the palatal lift intervention to ensure the patients were able to speak with the speech prostheses in their mouths.

Conclusion. Overall, the palatal lift is reported to be an effective tool for managing velopharyngeal insufficiency when corrective surgery is not an option.

### **13. Salient Acoustic Features that Impact Perceptions of Gender Identity and Vocal Naturalness: A systematic review.** *Smith, M.B.*

Purpose: The overall goal of behavioral voice therapy for transgender and nonbinary speakers is to modify the features of one's voice to align with their gender identity and expression. This study served to determine the most salient acoustic features of voice that are important to perceptions of gender and vocal naturalness and to use this information to inform therapy targets.

Methods: An electronic search of databases, including OVID Medline and PubMed, revealed 104 studies. Thirteen studies that followed voice feminization and masculinization for transgender participants (13+ years), reported acoustic analysis of voice during connected speech tasks, and utilized patient-reported outcome measures (e.g., Transgender Voice Questionnaire, Voice Handicap Inventory) to reveal perceptions of gender and naturalness. Twelve studies were excluded for not meeting these criteria.

Results: Several acoustic features of voice had an impact on gender perception. Voice feminization acoustic measures included mean fundamental frequency (f0), speaking fundamental frequency (SFF), semitone (ST) range, and vowel formant frequency. Voice masculinization

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acoustic measures included SFF, habitual pitch (f0), mean f0, vocal tract length (VTL), and duration of hormone treatment (HRT). Results indicate a relationship between acoustic cues and listener perceptions of gender and naturalness. The correlation between acoustic voice cues, gender perception, and vocal naturalness is largely non-linear and based on individual goals.

Discussion: Findings revealed that voice feminization and masculinization therapy should follow an individual, descriptive approach. This would allow for individual goal development, self-monitoring, and generalization across contexts. Acoustic analysis of SFF, habitual f0, ST range, and vowel formant frequency should be paired with self-and listener perceptions of gender and naturalness as part of treatment goals.

#### **14. Do behavioral-based treatment approaches show positive effects when working with children with selective mutism?: A systematic review.** *White, N. E.*

Purpose: A wide variety of treatment techniques have been used to treat children with selective mutism. This systematic review examines whether behavioral-based treatment approaches show positive effects when working with children with selective mutism.

Method: Electronic searches were conducted using PsychInfo, Medline, Embase, and Web of Science. Additional research articles were found by reference chaining. Out of the 126 articles retrieved, 36 were included in this review based on quality assessment and inclusion/exclusion criteria.

Results: Behavioral treatments netted a positive change in selective mutism criteria in 34 out of the 36 research articles. Twelve studies used the Selective Mutism Questionnaire (SMQ) and found 47% of children to show improvement (parent report) in selective mutism symptoms, with a median of 53.5%. Five studies assessed whether children still met the DSM-V criteria of selective mutism post treatment. Sixty- nine out of 81 children no longer met DSM-V criteria at the end of treatment. Positive change was reported using the following treatment strategies: gradual exposure, fading, group behavioral, audio/video, parent-child, education, and social anxiety communication (S-CAT). Several of these strategies were used together. Gradual exposure was the only technique found successful without additional treatments. Treatment was not found successful when using the following techniques: intensive exposure and social skills.

Conclusion: The majority of behavioral treatment techniques for selective

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mutism are effective. A discussion will focus on the similarities and differences across these different techniques.

**15. Comparing the effects of constraint-induced aphasia therapy (CIAT) to conventional aphasia treatment: A systematic review.** *Belliveau, S. N. & Latteri, S. A.*

Objective: Constraint-induced aphasia therapy (CIAT) suggests potential language rehabilitation benefits to post-stroke individuals with aphasia. The purpose of this study was to determine the efficacy of CIAT compared to traditional aphasia therapy.

Methods: One hundred seventy-five publications in English were identified from three databases, including CINAHL, Ovid, and PsycInfo. One hundred sixty publications were excluded based on quality assessment, inclusion/exclusion criteria, and case study design. The fifteen articles used in this review utilized similar outcome measures, including naming, repetition, spontaneous speech, written language, and comprehension. Results: Improvements were made in all primary outcome measures, but naming, repetition, comprehension, and spontaneous speech showed significance in the CIAT group. In the conventional aphasia therapy group, participants demonstrated significant improvements in each of the primary outcome measures.

Conclusion: In post-stroke aphasia rehabilitation, CIAT may be useful; however, its long-term effects are relatively unknown due to the lack of research on this approach. Implementing CIAT is less feasible than conventional aphasia therapy due to the inclusion of intensity and constraints.

**16. Effectiveness of abdominal binding in treating impaired respiratory-phonatory systems: A systematic review.** *Bex, S, E.*

Background. Individuals with spinal cord injuries (SCIs) experience paresis or paralysis of the respiratory muscles, leading to reduced breath support for phonation and risk of illness and death.

Objectives. This systematic review assesses the effectiveness of abdominal binders (ABs) in supporting impaired respiratory systems to help preclude negative health outcomes faced by the SCI population. To accomplish this, AB use was measured against no AB use.

Methods. A search of electronic databases, EMBASE and CINAHL, yielded 295 studies that were narrowed down to 15 through application of

inclusion/exclusion criteria and quality assessment tools. Respiratory measures (i.e., total lung capacity (TLC), vital capacity (VC), functional residual capacity (FRC), residual volume (RV), forced vital capacity (FVC), forced expiratory volume in 1 second (FEV1); peak expiratory flow (PEF); maximum inspiratory pressure (MIP); maximum expiratory pressure (MEP); inspiratory capacity (IC)) and voice measures (i.e., sound pressure level (SPL), maximum phonation time (MPT)) connected to the two treatment conditions were collected. Sample means for each condition were pooled and compared. Listener perceptions of phonation characteristics (i.e., loudness, naturalness, phrasing/pausing, and vocal quality overall) connected to each treatment condition were also compared.

Results. Findings demonstrate that ABs increase VC, FVC, FEV1, PEF, MEP, and IC when seated upright. Data also demonstrated that ABs increase MPT and SPL when seated upright. Data regarding listener perceptions of phonation either connected or not connected to AB use was insignificant and inconclusive due to the lack of research regarding the effects of ABs on voice and speech outcomes.

Conclusion. Based on these findings, ABs improve respiratory function, particularly expiratory function. Additionally, more research needs to be conducted regarding the effects of ABs on phonation.

### **17. Conceptualizing quality of life for post-stroke individuals with aphasia: A systematic review.** *Matthews, Shannon, R & Tella, Randi, L*

Background: Current research suggests speech-language pathologists (SLP) lack the training and resources required to best address quality of life (QoL) for post-stroke people with aphasia (PwA). This review described QoL factors that PwA reported as significant and how clinicians can conceptualize their patients' well-being to implement practical and functional rehabilitation.

Methods: An electronic search was conducted for two databases, CINAHL and PsychInfo, and hand searching through reference chaining. Sixteen studies that focused on identifying important factors of QoL for both PwA and SLPs were selected. Aspects of QoL were identified across the literature to develop important themes that impacted PwA post-stroke. The same process was used to derive information regarding SLPs' perceptions and applications of QoL in clinical practice with PwA.

Results: Findings showed that for PwA, activities (i.e., self-care, ADLs), communication, physical (e.g., functioning, disability), psychological (e.g.,

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emotional health, life perspective), and social/relationships (e.g., support, community) were considered the most impacted domains. The top two most discussed domains were communication and psychological. Information gathered for SLPs were understanding (i.e., their perspectives of QoL), significance (i.e., if they found QoL important), application (i.e., if, how, and when QoL was incorporated), information sources (i.e., how they obtained information about their patients' QoL), and barriers and facilitators to incorporating the concept.

Conclusions: Due to the subjective nature of QoL, both PwA and SLP perspectives varied slightly. However, both participant groups conceptualized it similarly, particularly regarding patient motivation, levels of support (for each group), and how aspects of QoL are interrelated and codependent. PwA held value in areas of QoL that are directly related to communication, social participation, and psychological well-being. While SLPs found QoL vital, some factors restricted incorporating this concept in clinical practice.

### **18. Effects of prosodic manipulation on lip aperture and movement duration in habitual versus emphatic stress in adults.** *Gavitt, E.E.*

Prosody is a term used to describe the pitch (i.e., changes in fundamental frequencies), duration (i.e., length of time), and intensity (i.e., loudness) of speech (Cho, 2006). Changes to prosody include the respiratory, phonatory, and articulatory systems (Zemlin, 1998). Breath support (respiration) is needed to vibrate the vocal folds (phonation), which are then shaped and modified by the articulators (vocal tract) to produce speech (Zemlin, 1998). To convey emphatic stress, adjustments to the speaker's prosody are required. The purpose of this research was to investigate the effects of changes in lip amplitude and movement duration when applying emphatic stress.

Participants included six neurotypical adults (3 males: 3 females) between 18-35 years of age. Participants repeated four sentences varying in length and complexity under baseline and habitual stress conditions. Participants for this study were selected from a larger, on-going study by PhD candidate, Claudia Abbiati.

Preliminary results from Wilcoxon tests indicate neurotypical adults produced significantly greater lip aperture for /b/ in "Bobby" in long-simple sentences ( $p = .028$ ) and in short-simple sentences ( $p = .046$ ) during contrastive stress conditions compared to habitual speaking conditions.

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Furthermore, the duration of /b/ in “Bobby” was significantly longer during contrastive stress conditions compared to habitual speaking conditions ( $p = .027$ ) when producing short-simple sentences.

Understanding the motoric effects from prosodic manipulation supports the development of treatment approaches aimed at improving speech intelligibility and communicative function in individuals with speech motor impairments. More specifically, results support treatment approaches that focus on making articulatory movements “bigger”, especially when stressing a syllable or word.

### **19. Piloting a New Task Battery to Assess Episodic Memory in Children with Autism.** *Baustian, Ana, Haugenes, Skylar, Sheehy, Hannah.*

**Background/Objectives:** Autobiographical memory (ABM) is memory about oneself. Episodic memory (memory for personally experienced events; EM) is a subset of ABM. EM influences a wide variety of social communication functions and other cognitive domains. Autistic individuals have relative difficulties in EM and free recall, thus impacting social communication and a host of cognitive functions. Currently, formal measures for EM do not exist in the field. Generally, informal measures (e.g., narrative analysis) or standardized measures evaluating free recall are used as a proxy for EM assessment. Given the social communication implications of EM deficits, a more comprehensive measure for assessment in children is warranted.

**Methods:** Hutchins et al. (2022) have developed an assessment battery to evaluate ABM which includes a caregiver interview and six subtests. We piloted this assessment battery to evaluate its ease of clinical use. Our participant was a 7-year-old male with suspected autism. After administration, we wrote an in-depth summary report for the participant's parent. Lastly, we engaged in critical analysis of clinical ease of administration/report-writing, limitations, and viability for future clinical use.

**Results:** The assessment battery provided an in-depth overview of the child's ABM, outlining his specific strengths and limitations in detail. Data was collected related to number accuracy, source (semantic v. episodic), recent v. remote, specificity - time (when), specificity - space (where), temporal sequencing, detail, free recall, cued recall, prompting vs. spontaneity, memory for objective v. subjective information, and memory for mundane v. surprising information.

**Discussion:** Piloting revealed some limitations of the battery, such as high

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linguistic/cognitive demands of task instructions, failure of scores to account for narrative inaccuracies, and lack of norms for some tasks. However, the battery provided a comprehensive portrait of the participant's ABM abilities and informed clinical recommendations. Overall, the battery meets some needs for additional EM assessments.

## **20. Relations Between Maternal Phonetic Contingencies and Early Speech-Language Production in Toddlers with Williams Syndrome.** *Lewis, J. B.,*

*Tursky, B. S., Abbiati, C. I., Velleman, S. L., Bercerra, A. M., Mervis, C. B.*

**Background & Objective:** Williams syndrome (WS) is a rare neurodevelopmental disorder caused by a genetic microdeletion at chromosome 7q11.23. Children with WS often have delayed or atypical linguistic milestones; thus, it is important to understand how caregivers can facilitate early speech-language growth. Phonetic contingencies (PC) provided by parents to child utterances encourage further communicative attempts. This study examines whether the number of PC maternal responses during 30-minute mother-child play sessions are related to the canonical babble ratios (CBR) or number of word types of toddlers with WS.

**Methods:** Twenty-one 24-month-olds were audio-video recorded in play sessions with their mothers. Phonetically-transcribed toddler vocalizations were analyzed using Phon software and CBR and number of word types were computed. Orthographically-transcribed maternal responses were coded for PC. Toddlers were also administered the Mullen Scales of Early Learning (MSEL), and the Visual Reception (VR) scale T-score was used as a measure of nonverbal reasoning.

**Results & Discussion:** Preliminary results from 21 toddler-mother pairs show that the number of PC maternal responses and T-score of MSEL-VR for toddlers with WS accounted for significant variance in the CBR and number of word types produced. These findings are consistent with previous reports in other populations that maternal PC is associated with maturity of vocalizations and expressive vocabulary size, and that benefit from PC may be dependent on the child's level of cognitive development. They are also consistent with the link between frequency of canonical syllables during the prelinguistic stage and onset of meaningful word types. The limitations of this study include the small sample size at this time. This preliminary evidence has clinical utility for providers working with

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WS populations to encourage caregivers to increase their use of PC responses.

**21. Measuring the Emotional Arc of Conversational Stories: Automated Analysis and Clinical Norming.** *Ekstrom Grenon, K.; Dooley, S.; Crouch, K; Cannizzaro, M. S.; Jangraw, D. C.*

Background and Objective: Neurological disorders can disrupt conversational communication function, but there is no standardized, normed tool to measure this. Conversation complexity and small data sets have limited the feasibility, statistical power, and sensitivity of prior norming attempts. We identified an ecologically valid dataset that is orders of magnitude larger than any existing clinical corpus. The objective of this pilot project is to provide proof-of-concept for a computational tool that will facilitate large-scale clinical norming and analysis of conversational story-telling.

Methods: In this methodological study, we developed Python scripts to automate the transfer of story transcripts from the StoryCorps Archive to local storage. Using existing metadata, we selected stories told between two English-speaking conversation partners. Our clinical sample is a group of 1000 stories told by people reporting memory loss, and we have two matching control groups.

Our analytic strategy utilizes the Hedonometer, a validated nine-point Likert scale of emotional valence (Dodds et al., 2015) and sliding windows (Reagan et al., 2016) to measure positive or negative emotional valence of common words in each story over narrative time. We report the mean happiness score and SEM across narrative time for each group.

Results: We successfully acquired a large, diverse, corpus of conversational stories. Analytic results are forthcoming.

Discussion: Acquisition of this dataset is a novel methodological achievement. Furthermore, we demonstrate automated measurement of conversational story features with enough accuracy to distinguish between typical and pathological communication. Use of a preexisting dataset without experimental control of selection and acquisition can be seen as a limitation to our approach, however improved statistical power decreases risk of error. We will use this methodological framework to develop clinical norms for natural communication features, and subsequently scale our tool for automating patient communication assessment in the field.

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## **22. Visual Narratives and Inference Generation in Individuals Across the Autism Spectrum.** *Medeiros, S, Cohn, N, Coderre, E.*

Background and Objective(s): Individuals with Autism Spectrum Disorder (ASD) commonly exhibit difficulties with understanding narratives.

Narrative comprehension requires, among other cognitive processes, the generation of inferences to understand story elements that are not explicitly stated. Although difficulties with inferencing are documented among individuals with ASD when using linguistic stimuli, it remains unclear whether similar difficulties would be observed for non-linguistic stories. Here, we investigated this issue in adults using visual narratives, i.e., comic strips.

Methods: In Experiment 1, 101 individuals across the autism spectrum viewed comic strips with a panel missing and determined which panel was removed. Accuracy and reaction times (RTs) were recorded. In Experiment 2, 48 participants across the autism spectrum performed a self-paced viewing paradigm in which they viewed visual narrative sequences with a panel missing (forcing an inference) or not (requiring no inference). RTs to view each panel and accuracy on comprehension questions (following a subset of sequences) were measured. In both experiments, participants also completed the Autism Quotient (AQ) questionnaire, which assesses levels of autistic traits in the general population. We examined the influence of AQ subscale scores on RTs and accuracy using linear regressions.

Results: In Experiment 1, scores on the Imagination subscale of the AQ, which measures participants' inclinations for fantasy pretending and character perspective-taking, was negatively associated with accuracy at identifying a missing panel. In Experiment 2, this same subscale was negatively associated with accuracy on comprehension questions. This suggests that increased difficulties with imagination were associated with reduced inference-making abilities.

Discussion: Our results show a possible link between Imagination AQ subscale scores and subsequent inference generation skill. Because RTs and accuracy scores are only rough estimates of cognitive processes, future research should explore this paradigm utilizing neuroimaging techniques.

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## Nursing

### **23. The Vermont Safe Infant Sleep Project: Evaluation of an Online Learning**

**Module.** *Brigid J. Meehan-Brese, Rosemary Dale Ed.D, APRN, Julie Parent MSW, and Jean Pelski PhD, APRN, NNP-BC*

Background: In the United States, sudden unintended infant death syndrome (SUIDS) is a leading cause of infant mortality. Accidental suffocation, and strangulation in bed (ASSB) deaths are the third leading cause of postnatal deaths (CDC, 2021). The Vermont Safe Infant Sleep Project is a collaborative effort focused on standardizing evidence-based practice recommendations for nurses to support safe infant sleep practices. An online learning module for registered nurses was developed in phase one of the project. Purpose: In phase two, the online learning module was evaluated for efficacy and ease of use by registered nurses and maternal-child educators caring for infants across the state of Vermont. Methods: Participants completed the online learning module including a pre- and post-test and survey. The quantitative data were collected and analyzed using a web-based test, allowing for a direct question-to-question comparison. The qualitative data were collected using an online survey assessing reception and ease of use. Results: 30 participants from two regional hospitals and a state agency completed pre-tests, 25 finished post-tests, and 5 completed post-test surveys. Combined averages for the registered nurses and maternal-child educators pre-test and post-test scores were 14.00 or 77% and 16.4 or 91% representing a 17% improvement overall. 100% of survey participants found the course to be convenient and user-friendly. Conclusions: The module is effective in closing knowledge gaps. Participants improved their scores after the module. Surveys indicated that the module is user-friendly and convenient. The data indicates a positive reception to the module.

### **24. Creation of a Parent-Directed Toolkit to Prevent Youth Vaping.** *Webb, C.B.*

Background and Objectives: Parental attitudes towards substance use strongly influence youth behaviors, yet many parents have inaccurate perceptions regarding adolescent vaping, putting children at risk for vape use. With recent data demonstrating that vaping rates among Vermont adolescents are at an all-time high, this project developed and tested an evidence-based toolkit to educate parents of adolescents about the risks

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of vaping, with a specific aim of improving knowledge among 75% of participants (Vermont Department of Health, 2020). Enhancement of parent ability to initiate conversations about vaping with youth was also sought.

**Methods:** The toolkit's creation was informed by published evidence and multimedia content delineating the scope of the vaping crisis. The toolkit was reviewed and revised by content experts. Pre- and post-implementation assessments were created and tested with faculty members, public health professionals, teachers, and parents. Assessments were utilized to evaluate parental vaping knowledge before and after implementation of the toolkit. The assessments and final version of the toolkit were deployed electronically to parents from a private high school in a mid-size city. Quantitative data analysis was performed using Excel, while qualitative data was evaluated based on word frequency in nVivo.

**Results:** Incremental increases in parents' ability to identify a vape device and comfort discussing vaping with youth were noted in test responses (n=13). Qualitative pre-test data demonstrated a willingness of parents to discuss vaping with their adolescents.

**Discussion:** Reduction of adolescent vaping remains a meaningful public health target with important implications for limiting the prospective healthcare needs and costs of this population. With project response rate negatively impacted by the COVID-19 pandemic, the association between parental knowledge and teen vaping should be further examined with a larger sample. The toolkit remains a valuable web-based resource for parents and teachers to address the youth vaping crisis.

## **25. Improving Knowledge and Competency of Self-Monitored Blood Pressure in Older Adults.** *Tang, Edna, K*

**Background.** The risk for developing uncontrolled hypertension increases with age. Hypertension remains under-controlled and underdiagnosed in rural areas. This trend is exacerbated by the COVID-19 pandemic due to decreases in primary care visits, increases in telehealth visits, and a significant decline in assessment of blood pressure. Evidence reveals that telemedicine in conjunction with self-monitored blood pressure (SMBP) are proven tools to support patients and providers in the remote management of hypertension.

**Purpose.** This project aimed to improve utilization of self-monitored blood pressure (SMBP) for management of hypertension in older adults (65 years

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and older) and accuracy of self-reported results at a nurse practitioner-led primary care clinic.

**Methods.** Standardized protocols for SMBP were developed, deployed, and evaluated at a primary care clinic in a city in Northwestern Vermont. Interventions included the development of protocols for provider initiation of SMBP and a nurse-driven telemedicine follow-up with patients after initiation of SMBP. Patient knowledge of SMBP and patient performance of SMBP technique using an evidence-based competency checklist were evaluated (n=12).

**Results.** The intervention resulted in an increase in mean patient knowledge assessment score and improved patient SMBP competency post-intervention.

**Conclusion.** Implementing evidence-based protocols and interventions, and nurse-driven follow-up, enhances the effectiveness of SMBP as a tool to manage hypertension in older adults. Further study to evaluate the accuracy of SMBP to guide diagnosis and treatment in older adults is warranted.

## **26. Effects of a Community-Based Child Obesity Prevention Program on Adult Health Behaviors.** *Rocheleau, E, K, Laurent, J, S*

**Background:** Community-based intervention (CBI) programs aim to change individuals' behaviors to reduce the risk of chronic disease, often by addressing factors that contribute to obesity. To provide information for improving and prioritizing interventions and allocating resources, program evaluation is needed. In Franklin and Grand Isle Counties, childhood extreme obesity decreased where a child-targeted, obesity prevention focused CBI was implemented. It has been shown that these programs can have an indirect effect on parent health/body mass index (BMI), but it is unclear if indirect effects of such programs might have an impact on adult BMI and related health behaviors.

**Purpose:** The purpose of this project was to determine any indirect effects of the CBI on adults in two counties in terms of BMI, physical activity, and general health.

**Methods:** 2016-2018 data from the Behavioral Risk Factor Surveillance System (BRFSS) was used. Health behaviors and outcomes were analyzed from two counties. BMI, physical activity and general health of adults with and without children was examined.

**Results:** There was no change in BMI or physical activity level in adults from

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2016-2018 regardless of child status. Adults without children were 2.8 times more likely to report “excellent” health, 2.7 times more likely to report “very good” health, and 2.8 times more likely to report “good” health. Conclusion: Large data sets may not be appropriate to assess indirect effects or conversely, child CBI may not improve adult health. Recommendations for future program intervention goals include better assessment of parent health behaviors from children engaged in CBI. BRFSS data suggest that the health and wellbeing of parents may be an important programmatic intervention while emphasizing strategies to mitigate childhood obesity.

**27. Improving Sexual Health Knowledge in College Students.** *Wasserman, E. A.*

Background: Since 2014, the rates of chlamydia, gonorrhea, and syphilis have increased in the United States with young people (ages fifteen to twenty-four), gay and bisexual men, and pregnant women being some of the most vulnerable groups for these sexually transmitted infections (CDC, 2014, 2018). In parallel, only 51.4% of college students have a moderate level of STI knowledge (Adebayo, Anderson, & Wardecker, 2020).

Objectives: The aim of this quality improvement project was to implement a sexual health product ordering system and initiate an education platform to (1) improve sexual health knowledge by 25% by December 2021 and (2) provide evidence of student satisfaction with the ordering service and educational platform.

Methods: A novel sexual health product online ordering platform was implemented allowing students to order condoms, lubrication, and dental dams. To provide education, a slide deck was created, focusing on sexually transmitted infections, recommended sexual health screenings, and pertinent sexual health education. Additionally, students were given other resources to review at their leisure. The Sexually Transmitted Disease Knowledge Questionnaire (STD-KQ) was utilized to evaluate sexual health knowledge prior to and after receiving the requested products and education material (Jaworski & Carey, 2007).

Results: Seven students completed the pre- and post- questionnaire and showed a 38.22% increase in scores and 6 out of 7 students reported positive satisfaction with the project.

Discussion: Providing sexual health education to college aged students has potential to increase knowledge of STIs and lead to improved future health outcomes.

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## **28. Improving Empowerment in People with Type 2 Diabetes.** *Wilson, E, M*

**Background:** In 2018, greater than 11% of Americans had been diagnosed with Type 2 Diabetes, a number that is projected to increase to 17% by 2060. Approximately 40% of individuals with diabetes develop long-term complications, accounting for one-in-four healthcare dollars. Current initiatives supported through Accountable Care Organizations place an emphasis on improving the quality of care delivered in chronic medical problems such as diabetes to optimize patient outcomes, moving away from the traditional fee-for-service. One cornerstone of improving quality of care is care coordination and education.

**Objectives:** Improve empowerment in people with Type 2 diabetes by 20% as measured by the Diabetes Empowerment Scale-Short Form (DES-SF).

**Methods:** Utilizing the Plan-Do-Study-Act methodology of quality improvement, a care coordination and empowerment program was developed to determine gaps in patient knowledge, self-management, and redundancies in services. Patients meeting selection criteria were invited to participate in a diabetes care coordination and empowerment session directly following an upcoming appointment with their Primary Care Provider (PCP). Diabetes related empowerment was evaluated through the independently validated DES-SF. DES-SF scores are considered a way to measure higher-order self-efficacy correlated with successful clinical or education interventions.

**Results:** Four participants met selection criteria and were contacted for care coordination and empowerment session following PCP visit. Three participants agreed to attend, one was unable to attend due to a schedule conflict with another provider. Of those that participated, empowerment scores increased by 4.27% overall following intervention, with sub-scale scores improving by 3.89%, 10.82% and 0% in psychosocial management, readiness for change and goal setting respectively.

**Conclusions:** Participants realized an increase in diabetes related empowerment following care coordination sessions. Initial pilot program results indicate potential and a need for further investigation due to low sample size.

## **29. Using Audit and Feedback to Improve Compliance to Medication-Assisted Treatment.** *Burns, Jacob*

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Background: Of the 111 opioid deaths reported in the State of Vermont in 2019, 30 were found to be prescription opioid-related and accidental. Medication Assisted Therapy (MAT) programs support patients with substance use disorders, promoting recovery and preventing overdose. Vermont uses the “Hub and Spoke” model to increase the availability of MAT for patients with OUD (Opioid Use Disorder) by increasing the number of primary care providers who prescribe buprenorphine. Hubs are the specialty opioid treatment programs while spokes are the office-based community settings where a patient receives ongoing follow up integrated into general medical care. Evidence-based documentation guidelines and clinical quality measures exist to improve the quality of care for these patients. Adherence to evidence-based treatment guidelines at one spoke practice setting was unknown.

Purpose: This project sought to evaluate compliance to evidence-based treatment recommendations for patients being treated with MAT through evaluation of provider documentation.

Methods: A documentation evaluation tool was created using the recommended American Academy of Addiction Psychiatry clinical quality measures and evidence-based practice recommendations. A retrospective review of electronic health record documentation was conducted to assess the presence or absence of 16 recommended quality measures within the provider clinical visit notes (n=12).

Results: Overall, documentation was compliant with evidence-based recommendations in most quality measures. A clinical documentation template with recommendations for improvement in 4 elements was created.

Conclusion: Audit and feedback of clinical records by providers improves consistency of documentation and may result in improved outcomes for patients with substance use disorder.

### **30. Oncology Nurse Hazardous Drug Safe Handling Competencies: A Quality Improvement Project.** *Woller, Jacob, N.*

Purpose: Healthcare workers are potentially exposed to hazardous drugs (HDs) in the workplace, especially with chemotherapeutics used in oncologic treatment. Exposure to HDs increases the risk of adverse health effects. Personal protective equipment (PPE) as one control to prevent exposure. A Northeast academic medical center required implementation of annual competencies on HDs to comply with national

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standards detailed in United States Pharmacopeia (USP) Chapter 800. This project sought to evaluate the effectiveness of this HD competency and evaluate the PPE practices of healthcare workers who are frequently involved with HDs

Methods: A hands-on HD annual competency was developed for nurses and nursing assistants involved in patient care on an inpatient oncology unit to demonstrate staff follow appropriate PPE protocols for handling HDs and HD contaminated excreta. A follow-up voluntary survey using multiple choice, Likert scale questions, and qualitative responses was conducted to evaluate PPE practices on the job based on self-report.

Results: All eligible staff members completed the hands-on annual competency successfully (n=71). Twenty-one staff members completed the voluntary survey. Staff demonstrated a high degree of knowledge and self-efficacy for PPE use but reported significantly lower rates of PPE use with handling HD contaminated excreta than demonstrated in the hands-on competency ( $p < 0.01$ ), and less use of labels, disposable pads, and touching the IV pump with gloves during administration ( $p < 0.05$ ).

Conclusion: This project demonstrated a successful hands-on competency to assess HD administration and HD excreta handling, but more research is needed to better understand the self-reported lower compliance with established policies and procedures for handling HD infusions and contaminated excreta in practice.

**31. Adolescent Suicide Prevention via Parental Education.** *Shepard, Junelle B*  
Purpose. Up to 24% of children from the ages of 12 to 17 have reported suicidal ideation, with 7-11% reporting at least one suicide attempt in the past 12 months (Hetrick, 2017). In a study by Jones et al (2019) over 50% of parents were unaware their child was exhibiting suicidal ideation. This project aims to increase community awareness of suicidal ideation and teach community members how to talk with adolescents about this sensitive topic.

Methods. Five online training sessions were offered in Fall 2021, with each session lasting 90 minutes. Using Smith et al.'s Suicide Knowledge and Skills Questionnaire, participants' knowledge and skills were measured pre-training, immediately post-training, and one month after training using two online surveys.

Results. Fifteen participants took the Umatter® Suicide Awareness training. Knowledge about suicide increased both immediately after training and

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one month after training compared to pre-training. Skills measured included the participant's confidence in having received the training, skills, and support needed to assist those with suicidal intent. Skills decreased one month after training compared to immediate post-training, but still remained higher than pre-training levels.

Conclusions. Participants showed an increase in their knowledge regarding suicide, and in their skills with interacting with those who show warning signs of suicidal ideation. Umatter® shows promise as an online suicide awareness program for teaching community members about suicidality in adolescents. Given the ease of use of this program, advanced practice nurses could easily incorporate parts of this program into their practice with their patients.

### **32. Evaluating & Improving Adolescent Mental Health Accessibility in VT.**

*Surwilo, K. A.*

Background: Rates of anxiety among adolescents are increasing. Providers at a rural Vermont clinic identified the need for an evidence-based process to use when adolescents screen positive for anxiety. Reports from providers regarding the challenges of referring to mental health providers called the accessibility of care into question.

Purpose: The purposes of this quality improvement project are to create an evidence-based toolkit for adolescent anxiety and assess the accessibility of mental health care in Vermont.

Methods: A literature review identified mindfulness and exercise as effective tools for managing anxiety. An anxiety toolkit was designed for adolescents aged 11-18 years. Content was validated by a panel of independent reviewers using AHRQ's PEMAT-P and assessed by adolescent volunteers for usefulness. An exploration of the mental health resources available in three Vermont counties was then compiled into a report.

Results: The toolkit was rated 100% on actionability and averaged 93.3% on understandability on the PEMAT-P. Overall, adolescent volunteers reported that they found the toolkit engaging and applicable. As for accessibility of care, 41% of private providers in the counties of interest were not accepting new patients at the time of the project. Those interviewed reported that COVID increased the incidence of adolescent anxiety, providers are overwhelmed, interagency communication requires improvement, and more mental health providers are needed in Vermont.

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Conclusion: An evidence-based toolkit may empower adolescents to take charge of their mental health care at home. Action is needed to ensure that mental health resources in Vermont are timely, accessible, and affordable.

### **33. Improving Provider and Nurse Knowledge of Timeline Recommendations for Pediatric Patients in Foster Care.** *Stones, K. A.*

Background: The American Academy of Pediatrics (AAP) identifies children living in foster care (CFC) as a special health care needs population due to a higher prevalence of health conditions compared to that of the general pediatric population. To address these disparities, the AAP released guidelines regarding the timeliness of health care assessments for CFC. Reported lack of recognition or adherence to guidelines further widens existing health disparities experienced by this population.

Objectives: 1.) Improve pediatric primary care providers' and nurses' knowledge of AAP guidelines by at least 50%. 2.) Initiate explicit acknowledgment by participants that CFC represent a special health care needs population.

Methods: A root cause analysis (RCA) was conducted via qualitative interviews of stakeholders including foster parents, child welfare staff, social workers, and various medical providers and scheduling staff. This was followed by the creation and distribution of pedagogical materials on guideline clarification and importance. Materials were distributed over email to physicians, nurse practitioners, and nurses at five pediatric primary care locations in Vermont. Changes to guideline knowledge were measured by identical pre- and post-intervention surveys.

Results: Out of 53 overall pre-intervention respondents, only 13 were aware of any guidelines, and zero participants were able to cite all guidelines correctly. Of the 141 responses to core questions in Survey 1, 62 (44.0%) were correct. Of the 75 responses to these questions in Survey 2, 66 (88.0%) were correct. Compared to 0% at baseline, 67% of respondents cited all of the guidelines correctly by project's completion. By project's completion, 100% of participants agreed with the AAP designation of CFC as a special health needs population.

Conclusions: Findings corroborate widespread lack of awareness of these guidelines. Increasing access to clarifying materials can significantly

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increase knowledge of guideline components and acknowledgment that CFC represent a special health care needs population.

#### **34. Optimizing Secure Patient Messaging Workflow in a Vermont Primary Care Clinic.** *O'Leary, K.S.*

**Background and Objectives:** Secure patient messaging is a popular tool designed for non-urgent questions, yet patients sometimes use it to relay urgent concerns. As office workflows tend to prioritize responses to other methods of communication, this sets up presents a potentially unsafe situation in which clinical staff may not respond to these urgent messages in a timely manner given workflows that prioritize other methods of communication such as phone calls to the office. The objective of this quality improvement project is to develop a methodology to improve the timeliness, effectiveness, and safety of secure patient messaging workflow within one primary care office in suburban Vermont.

**Methods:** Clinical staff were surveyed at baseline to assess attitudes towards messaging workflow. Staff were redeployed to focus exclusively on secure messaging, patient education materials were developed, incoming messages were audited, and RN stress levels were assessed daily. Post implementation surveys with staff assessed effectiveness of pilot.

**Results:** Pre-implementation surveys revealed staff concerns that there is insufficient time to adequately address a lack of time exists during the workday to address secure messages adequately. An initial daily baseline message audit revealed many unresolved messages throughout the day, the majority of which were appropriate for non-urgent, email discussion, with a small, but concerning, number of messages that were of urgent nature and inappropriate for secure messaging minority that would be considered inappropriate for email. Post-implementation surveys showed a clear improvement in staff attitudes toward efficiency, timeliness and safety of secure messaging workflow. , and Mmessage audits showed marked improvement in timely responses and reduction in fewer urgent messages incoming to received by the office overall.

**Discussion:** This effort illuminates project identified the challenges and facilitators into the secure messaging process workflow. Findings of the project suggest d recommends best practice for clinical staff to optimize their address secure messaging workflow in responding to patients optimally in a timely, efficient and safe manner.

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### **35. Improving Continuous Glucose Monitor Knowledge in Primary Care**

**Providers.** *Kori Gargano, DNPC, Rosemary Dale, EdD, APRN, Erin Leighton, DNP, APRN*

Purpose: Continuous glucose monitors (CGM) have emerged as the ideal tool for monitoring and responding to real time blood glucose levels, having lasting impacts on A1c levels. Barriers to clinician prescription of CGM in the primary care (PC) setting include lack of education surrounding CGM data, complexity of technology available and lack of clarity surrounding required documentation necessary for insurance. The purpose of this project is to increase provider knowledge and confidence surrounding continuous glucose monitors by 10% through participation in an interactive online educational module. A secondary measure was to decrease self-reported barriers to the prescription of CGM in the PC context.

Methods: An online module regarding current CGM (duration of wear, insertion, calibrations, alarm features, compatible software), data interpretation, current guidelines and coding requirements was sent to all providers. A reference guide summarizing commonly prescribed monitors, and the ambulatory glucose profile (AGP) data report was placed in each exam room for patient review. A prescription cheat sheet, including two Epic ready dot phrases for documentation standardization, was created for provider use. A survey was sent pre and post intervention to assess changes in provider knowledge and confidence.

Results: Provider knowledge increased by 25%, and confidence increased by 75% after the intervention. Providers reported decreased barriers to discussion and prescription of CGM after the module. Providers reported decreased barriers to discussing and prescribing CGM after completing the module.

Conclusions: The education module improved provider understanding and comfort with continuous glucose monitoring, decreasing barriers to CGM prescription within this setting.

### **36. Increasing utilization of the delirium prevention protocol in post cardiovascular surgery to improve quality and safety of healthcare.** *Luce, K. C.*

Background and Objectives: Post-operative delirium (POD) is the most common complication seen following surgery in older adults (Janjua,

Spurling, & Arthur, 2021). Two-thirds of delirium cases are diagnosed late or missed in everyday practice across health care settings which can lead to a variety of long-term complications (O'Hanlon et al., 2014). POD prevalence can be reduced within inpatient practice settings by utilizing established screening tools, such as the Confusion Assessment Method (CAM) (Wei, Fearing, Sternberg, & Inouye, 2008). This project aims to increase nurse screening of delirium and provide education on POD to nursing staff on the cardiovascular surgery unit to increase utilization of the delirium prevention protocol.

Methods: Small continuous refinement was made throughout implementation using the Plan-Do-Study-Act (PDSA) cycle. Educational sessions provided to nursing staff included delirium risk factors, signs and symptoms, complications, and the introduction of interventions from the delirium prevention protocol. Data was collected by the CNL student weekly over a 4-month period including chart audit to determine the utilization of the CAM tool, protocol, and visual cues learned from education sessions.

Results: Thirty-eight of 89 nursing staff received educational sessions. Retrospective chart review identified 0% of delirium screenings were completed by the registered nurses and the delirium prevention protocol was initiated by the provider on admission. The CNL student adjusted implementation efforts to role-model delirium screening and in addition provide education to patients determined high-risk with two or more risk factors for delirium. Eleven of 47 patients eligible for the delirium prevention protocol received a consult. There was an increase in the utilization of the delirium prevention protocol from 0% to 23.4%.

Discussion: Both educational sessions and role-modeling behavior can translate to improving staff utilization of the delirium prevention protocol. The role of a CNL can greatly improve patient outcomes related to phenomenon like delirium.

### **37. Improving Mental Health Documentation Through Education: An Intervention for Level of Care Utilization System (LOCUS) Use in Psychiatric Crisis Placement. Ozimek, L.E.**

Background & Objectives: The Community Mental Health Act (1963) created crisis stabilization units to lessen burdens of emergency departments addressing psychiatric crises. Crisis stabilization units – including the project site – evaluate treatment efficacy via assessments

including the Level of Care Utilization System (LOCUS). The LOCUS is totaled into a composite score, expected to decrease at treatment completion. The project site has not consistently seen LOCUS scores decrease at treatment completion. The global aim was to improve use of a clinical assessment tool to reflect treatment and progress for patients utilizing crisis stabilization programs. A secondary aim was to increase incidence (75%) of composite LOCUS score change (decrease from admission to discharge).

Methods: A Failure Mode and Effects Analysis focusing on LOCUS completion identified staff knowledge gaps. An evidence-based QI project implemented a one-hour educational seminar with project site staff. Composite admission and discharge LOCUS scores for clients at the project site were collected by staff and compared pre- and post-intervention.

Results: Thirteen of 23 staffers (57%) attended intervention. Of pre-intervention (n=35) composite scores, 66% (n=23) decreased from admission to discharge. Of post-intervention (n=11) composite scores, 46% (n=5) decreased.

Discussion: The 75% incidence aim was not met. Multiple factors may have impacted post-intervention findings. Staff who completed LOCUS post-intervention were not identified; this limits the ability to evaluate the intervention's impact. Lack of uniformity in data collection impacted intervention fidelity. Replication of this QI project with all staff participation is appropriate. Future QI projects could assess other aspects of LOCUS completion process including clinical interview and EHR review. Research is needed to assess reliability of LOCUS in crisis stabilization settings.

**38. Behavioral Intervention Education in Primary Care to Address Pediatric Functional Constipation: A Feasibility Assessment.** *Brady, M, L. Lichtig, C. Pelski, J. E.*

Background and Objectives: Functional constipation (FC) is a common condition frequently seen in pediatric primary care, with an estimated median prevalence of 16% among pediatric patients (Mugie et al., 2011). Standard care for this condition is typically limited to laxative therapy, however evidence supports improved outcomes for patients who also receive behavioral intervention education. The purpose of this quality improvement study was to assess the feasibility of implementing a standardized intervention strategy in a primary care setting for pediatric

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patients with FC to inform a future pilot study. **Methods:** This feasibility project was completed in three steps. 1) A practice gap analysis assessed current practices through data collection on specialist referral sources, consult workflow, and provider experiences with behavioral interventions. 2) A standardized intervention was developed as a clinical reference tool with content from evidence-based behavioral interventions. 3) An implementation strategy was developed and measured utilizing the Implementation Logic Model outcome measurements (Pearson et al., 2020) to assess implementation strategy and overall study feasibility. **Results:** The majority of specialist referrals came from non-healthcare providers, which may have been due to a cumbersome consult workflow. Most providers reported behavioral interventions were helpful and thought a clinical reference tool would be useful. The implementation strategy satisfied all outcome measurements. **Discussion:** Implementation of a standardized intervention strategy was found to be feasible based on study outcomes. It is recommended that a future pilot study use the intervention and implementation strategy described in this study. Introducing a screening for FC is also recommended.

### **39. Implementation of Adverse Childhood Experiences Screening Tool for Providers in Primary Care Pediatrics.** *Via, M. P.*

**Background:** Adverse childhood experiences (ACEs) are recognized by the American Academy of Pediatrics and the Centers for Disease Control and Prevention (CDC) as contributing factors to poor health outcomes in childhood and beyond. Many pediatric providers are aware of the importance of ACEs, yet most do not participate in routine screening.

**Objectives:** The goal of this project was to implement ACEs screening at a semi-rural pediatric primary care office, aiming to screen 50% of eligible patients over 6 weeks. A secondary goal included increasing provider knowledge of and comfort with discussing ACEs through participation in an online training module.

**Methods:** Families of 3- and 5-10-year-olds presenting for routine health supervision visits completed the Center for Youth Wellness Adverse Childhood Experiences-Questionnaire. An algorithm was created to guide providers through the scoring process, which also included information on follow-up and resources. Providers volunteered to complete a CDC training on ACEs, and surveys were created to assess provider knowledge pre- and post-intervention. Rates of eligible visits and screening

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completion were also evaluated.

Results: Fifty-three patients were eligible and a screening rate of 47% was attained over 6 weeks. No families refused to complete screening, and no new referrals were placed for Social Work or Behavioral Health. Pre-intervention, 62.5% of providers completed the survey, while 20% completed post-intervention. CDC training did increase provider knowledge of and comfort with addressing ACEs.

Conclusion: Families are willing to complete ACEs screening. Pediatric primary care is an ideal setting for screening and utilizing provider trainings may increase provider preparedness to address ACEs.

#### **40. Text4toC: Improving the transition process for youth with special health needs.** *Pickering, R. L.*

Purpose: Pediatric patients who have complex medical needs require guidance and education through a transition process from their pediatric to adult specialty provider. Without support throughout this process, youth are at risk for problems with self-management and medication adherence, have higher emergency room use and hospital admissions, and have a higher cost of care. Utilizing a texting platform is a method that has been replicated in research of adolescents and shown to be an effective way to provide education. Nurses and nurse practitioners can help facilitate this process by leveraging established relationships with patients and families.

Methods: A 16-week texting program was conducted with 14 pediatric specialty patients aged 13-21. Nurses and physicians identified and recruited patients at office visits, via telephone, or via the online portal. The platform sent out one text message per week to adolescents to ask yes or no questions about different aspects of their healthcare according to Got Transition guidelines. Messages asked about understanding of their chronic condition and medical history, ordering prescriptions, contacting the provider's office, and preparing for appointments. The chatbot then replied with links depending on how the user interacted.

Results: Mean response rate was 79.5%, near projected rate of 80% and compared to 97% engagement during the pilot study.

Conclusions: This project identified a method that can be implemented in the clinical setting that supports adolescents throughout the transition process from pediatric to adult specialty. Next steps include program sustainability, quantifying healthcare cost savings, engaging stakeholders

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in long term transition planning, and integration into clinical workflow via the electronic health record.

**41. Neonatal Abstinence Syndrome: Assessing Practice and Challenges in Vermont Hospitals.** *Santor, R, R.*

Background and Objectives: Neonatal abstinence syndrome (NAS), characterized by tremors, vomiting, diarrhea, fever, diaphoresis, irritability, high-pitched cry and tachypnea, affects some newborns with prenatal opioid exposure. In 2018, the rate of opioid use amongst Vermont's pregnant women was reported highest in the nation, with a rate of infants developing NAS significantly higher than the national average. This project assessed the use and impact of evidence-based best practice when caring for infants with NAS in Vermont's birth hospitals. These included utilization of the Eat, Sleep, Console model, non-pharmaceutical interventions, and volunteer cuddler programs. Methods: This project adopted a mixed method approach, using internet-based surveys, retrospective chart reviews, and semi-structured interviews to collect data from Vermont birth hospitals. Results: Ten birth hospitals participated in the project, with nine reporting current use of the ESC model. Four birth hospitals reported using volunteer cuddler programs in the care of infants with NAS. Collaborative decision-making, engagement and empowerment of the family, a need for leadership and ongoing training, nurse autonomy, patient-centered care, family concern about stigma, and staffing issues were common qualitative themes identified through the semi-structured interviews. Discussion: The ESC model has been both widely adopted and well-received in birth hospitals in Vermont. Increased use of volunteer cuddler programs will require systems that address barriers to implementation and minimize the burden on staff. The identification of common experiences, needs, and challenges amongst Vermont birth hospitals presents opportunities for collaboration and knowledge-sharing in improving the care of infants with NAS and their families.

**42. Increasing Inpatient Access to Palliative Care Consultations: A Pilot Quality Improvement Study.** *Wilson, T, L*

Purpose: Palliative care is focused on providing relief of symptoms and the stress of chronic illness, providing an improved quality of life for both patient and family (CAPC, 2020). Eighty percent of consumers who

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receive information about palliative care say they would choose it for themselves or their loved ones, however, 60% of those consumers never actually receive those services (CAPC, 2020; Compton-Phillips, 2020).  
Methods: This quality improvement study aimed to increase the number of appropriate palliative care consultations on an inpatient general medicine unit by designing and implementing a nurse-driven protocol and palliative screening assessment. Staff nurses were educated on the use of the palliative screening assessment and how to follow the nurse-driven protocol.

Results: The palliative screening assessment had a <10% completion rate throughout the 5 week intervention period starting in December 2021. Three palliative care consultations were called as a result of the 15 completed assessments that may not have occurred otherwise.

Conclusions: Several limitations included increase in hospital census above maximum capacity, trained staff out sick with COVID-19, reduced support staff available to help with nursing care, and a large staff turnover. Permanent nursing staff on the inpatient unit expressed that this study could be valuable when speaking to a provider and requested the project continue and expand onto different inpatient units. For process improvement, patients could be assessed during the night shift while nurses complete their chart review, screening tool integration in the EHR would promote greater access to the screening assessment.

**43. Developing a Telehealth Protocol for Cognitive Testing.** *Victoria Greenough BS, DNPc, RN, Mary Val Palumbo DNP, APRN, GNP-BC, Betty Rambur PhD, RN, FAAN.*

Purpose. When the Coronavirus (COVID) pandemic reached the United States in March of 2020, many healthcare services were moved to remote delivery for continuation of care while complying with social distancing restrictions. According to Roth (2021), a 3,060% increase was noted in the number of virtual visits for health services in October 2020 when compared to data from October 2019. To accommodate the follow-up visits for patients with cognitive impairment, the Mini Mental Status Examination (MMSE) testing was moved from traditional face-to-face assessment to testing via telehealth in one specialty clinic in Vermont.

Methods. A retrospective chart review was performed on 30 patients seen between April 2020 and September 2021 via telehealth and fitting the inclusion criteria of two face-to-face MMSE assessments, and two MMSE

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assessments performed via telehealth. This quality improvement project will determine if the individual rate of decline is consistent between telehealth and face-to-face MMSE assessment, identify characteristics of individuals for whom measurement of cognitive capacity via telehealth does not match the predicted trend, and develop of a protocol for conducting the MMSE 2 via telehealth.

Results. To compare the rate of cognitive decline for face-to-face and telehealth visits, linear regression was used to calculate the MMSE slope for each patient's face-to-face and telehealth assessments in MMSE score per unit time. A paired t test was then used to compare MMSE slope for face-to-face and telehealth assessments. Although there was a larger decrease per unit time (year) in MMSE score across telehealth assessments when compared to in-person, the difference in individual decline from in-person to telehealth was not statistically significant.

Conclusions. Telehealth cognitive assessment using the MMSE appropriately follows the predicted rate of decline when compared to face-to-face assessment, and therefore it is appropriate to continue with implementation of the MMSE 2 protocol for telehealth.

#### **44. Implementing SBIRT in a Critical Access Emergency Department.**

*McDermott, Warren, P*

Purpose: Universal screening and brief intervention with referral to treatment (SBIRT) has become best practice for emergency departments (EDs) over the last two decades. Given the prevalence of alcohol use and the subsequent health impacts of drinking, EDs are well positioned to be on the front line of screening for risky drinking. The available literature is clear in its consensus that universal screening for alcohol use in the ED is critical to identifying people at high risk for drinking and improving health outcomes.

Aims: This project aimed to implement an SBIRT process in a critical access ED. To achieve this global aim, the project team developed an SBIRT process and educated nurses and providers on its use in the department.

Methods: The project team performed a two-month retrospective chart review determining the baseline rate of alcohol screening in the department. An SBIRT process was implemented in the unit. After implementation of the SBIRT process, a two-month chart review measured staff usage of the new procedure.

Results: Over the two-month implementation period, the percentage of

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patients in the ED screened for alcohol use increased from an average of sixty-five percent before the intervention to seventy-nine percent after. Conclusions: Increased alcohol screening for patients in a critical access ED is possible with education and buy in from clinical staff. The existing electronic screener tool was widely preferred to the newer, paper AUDIT\_C tool. Embedding the new screener tool in the electronic chart may be a way to increase convenience and therefore its adoption.

## Rehabilitation and Movement Science

### **45. Predicting Falls in Adults with Multiple Sclerosis using Patient-Reported Measures: Are Perceptions of Dual-Tasking Missing?** *Carley Giroux, Bel Sogoloff, Lance Bergmans, Myeong-Jin Bae, Michael Vannostrand, Susan Kasser, PhD*

**Background and Objective(s):** This study examined self-reported predictors of falling in people with multiple sclerosis (PwMS) to evaluate the added contribution of perceived dual-tasking. Previous research suggests that PwMS experience decrements in balance and gait when engaged in dual-tasking that accentuates fall risk. The dual-task questionnaire (DTQ) is a tool used to assess dual-tasking ability across a variety of cognitive-motor and motor-motor tasks. Five additional questions were added to create the DTQ-expanded (DTQ-E) to include common mobility related dual tasks derived from the literature. The purpose of this study was to identify the most significant self-reported predictors of falling with the added utility of perceived dual-tasking.

**Methods:** Seventy-nine PwMS completed a web-based survey involving measures of disease status, ambulation disability, concerns about falling, fatigue impact, and dual-tasking ability. Fall history was obtained retrospectively and used to classify participants as fallers or non-fallers. Backwards stepwise logistic regression analysis was employed with significance set at  $p < .05$ .

**Results:** Findings showed that dual-tasking and ambulation disability were the only significant predictors of falling. Both models with the DTQ predicted fall status with 81% accuracy. However, the model including the DTQ-E with additional mobility-related dual-tasks better discriminated fallers from non-fallers by 13%.

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Discussion: This study was one of the first to include perceived dual-tasking as a variable in predicting fall risk in PwMS. DTQs have the potential to improve measurements of fall status in PwMS outside the clinic, facilitating early identification and intervention. Despite the study sample of fallers and non-fallers being unequal and the number of fallers being small, self-reported dual tasking difficulties still allowed sensitivity to predict fall risk. Future studies should aim to test the validity of these measures.

**46. Reliability and Validity of TekScan F-Scan-64® System for Measurement of Forces During Overground Walking.** *Devereux, L., Duncan, B., Ratner, M., Thompson, W.*

Background: While gait analysis was historically recorded via clinician observation, objective gait analysis tools have evolved. Force plates have emerged as the gold standard for measuring ground reaction forces (GRFs) during gait, but are practically limited by cost, setup, and poor portability. Tekscan F-Scan64® is an in-shoe pressure mapping system designed to make objective gait analysis more accessible. The purpose of this study is assessment of the reliability and validity of the TekScan system compared to force plates (Advanced Mechanical Technology Inc.) for analysis of vertical GRFs during gait.

Methods: A convenience sample of 7 healthy adults wore TekScan F-scan64® insoles while performing gait trials at two walking speeds (self-selected and fast) across an elevated walkway with two AMTI force plates; a minimum of 3 “good” hits on each leg at each speed. Intraclass correlation coefficients (ICC) were calculated to determine within-session test-retest reliability of vertical GRFs from TekScan. ICCs and Bland-Altman plots were used to determine concurrent validity.

Results: TekScan was shown to have good overall reliability for maximum initial stance vertical force (ICC=.82, n=44) and excellent reliability for maximum terminal stance/push-off force (ICC=.93, n=44), with average reliability values higher at self-selected speeds. When compared to force plate data, TekScan had poor overall validity (ICC .008-.04 , n=83) for vertical GRFs but good validity (ICC=.82, n=83) for temporal stance duration measures.

Discussion: Findings indicate that TekScan F-scan64® system is not a valid tool for measuring vertical GRFs during gait. The TekScan system measured lower body weights than force plates resulting in discrepant GRF calculations. The TekScan system was reliable and may have applications

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in tracking changes in spatiotemporal parameters over time. Future studies should focus on determining intersession reliability. Study limitations included small sample size and technological difficulties impacting data collection.

#### **47. Improving accuracy of Kinovea for linear measurements through lens distortion correction.** *Hansen, I.E.*

**Background and Objective(s):** Video analysis is often used to measure human motor performance for research, rehabilitation and athletic performance. Validated video analysis tools for measuring motor performance are often expensive and not portable, limiting their accessibility. Kinovea is a free, open-source software that holds promise for use in clinical trials of motor performance interventions in natural settings. While angular measures have demonstrated accuracy, there is no data validating the measures of linear distances across a large field of view. The objective of this study was to refine a lens distortion correction procedure and apply it to assess the resulting accuracy of linear measurement from video recordings using the Kinovea software.

**Methods:** Linear distances of up to 150 cm were measured using video recordings from a Hero4 GoPro camera set at two angles of 90 degrees and 45 degrees from a 250x280 cm area, its center located at 2.15 meters from the camera. Kinovea measures were compared to the actual measures obtained with a Keson model PG18M10 retractable measuring tape. Descriptive statistics for measurement discrepancy along with visual assessment of results were utilized for 34 distances across the study area.

**Results:** Without lens distortion correction, the mean measurement discrepancy was significant at 2.3 cm (SD=0.8; range 0.7-3.5 cm). Once corrected, the mean measurement discrepancy was 0.2 cm (SD=0.2; range: 0.0 - 0.7 cm) at a 90 degree camera angle and was 0.3 cm (SD=0.2; range 0.0 -1.0 cm) at a 45 degree camera angle. Neither discrepancies are statistically significant and both are within the expected measurement error.

**Discussion:** Using Kinovea to measure linear distances from video recording is accurate and reliable within  $\pm 0.2$ cm when applying the refined lens distortion correction procedure.

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#### **48. Screen Time, Physical Activity, and Anxiety in Honor's College Students during the COVID-19 Pandemic.**

*Parker, Jack; Westervelt, Karen; Sibold, Jeremy; Kasser, Susan*

Background: The COVID-19 pandemic presented a unique opportunity to study the effects of increased screen time on student mental health. Honors students were an ideal group to study due to perfectionism, academic achievement, and educational aspirations. Emerging research suggests that increased screen time increases anxiety, but never had there been such a marked increase in screen time. Purpose: The aim of this pilot study was to observe the relationships between anxiety, screen time, and physical activity in Honors students during the COVID-19 pandemic. Methods: A REDCap survey, consisting of the GAD-7 measure of anxiety, screen time questionnaire, physical activity questionnaire, and self-reported impact of the pandemic, was distributed to Honors students. Results: Anxiety and screen time increased during the pandemic, while physical activity did not significantly change. Eighty-point-nine percent of respondents met GAD-7 scoring guidelines for mild to severe anxiety and 71.56% self-reported experiencing more anxiety than before the pandemic. The average GAD-7 score for High Screen Time subjects was 4.20 points higher than Low Screen Time subjects ( $p = <.001$ ). The average GAD-7 score for High Exercise subjects was 2.28 points lower than Low Exercise subjects ( $p = .008$ ). Conclusion: Anxiety and screen time increased in Honors students during COVID-19. Increases in screen time were associated with increased anxiety in Honors students, while physical activity was associated with decreased anxiety. Universities should consider strategies to mitigate negative effects of increased screen time, including the use of physical activity.

#### **49. Exercise Interests and Preferences of People living with Multiple Myeloma.**

*Caefer, J, F.*

Background and Objectives: Exercise increases quality of life in cancer survivors and improves function. Yet, little is known about preferences and barriers to exercise for people living with multiple myeloma (MM) survivors. Therefore, the purpose of this study is to identify the exercise interests and barriers of people living with multiple myeloma (MM).

Methods: We chose a qualitative approach. We conducted interviews over zoom with MM survivors. Using a semi-structured guide, participants were asked about barriers to exercise, exercise interests, and delivery

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format preferences. Interviews were transcribed verbatim, coded and thematically analyzed.

Results: Participants (n=5) ranged in age 64 to 70 and were all female and married. As a result of their MM treatment, 3 participants still experience fatigue, 4 experience numbness and tingling, and 3 experience sleep disturbances. We identified four themes from the interviews:

1: Participants believe that exercise is a critical part of life for both their mental and physical health 2: Exercising outdoors provides greater benefit than indoors due to the mood increase 3: All participants have difficulty with balance and are interested in improving it 4: Social support is a critical motivator to feel safe while exercising.

Discussion: The themes and information emerging from analysis of the interviews will be used to design and test exercise programs tailored to people with MM. This study was limited by a sample of current exercisers however, we gained valuable insight on how they overcome common barriers to exercise. In the future it will be helpful to talk to MM survivors that are not current exercisers to better understand the barriers that impede people from exercising.

## **50. Evaluating Clinical Characteristics in Persistent Postural Perceptual**

**Dizziness (PPPD): A Retrospective Review.** *Van Horn, Lucas., Carlson, Birgitta., Mohapatra, Sambit., & Kurien, George.*

Background and Objectives: Prevalence of sustained chronic problems with dizziness affects 8 million Americans. Persistent postural perceptual dizziness (PPPD) is a chronic functional disorder of the nervous system depicted by symptoms of dizziness, unsteadiness, and hypersensitivity to self-motion or complex visual stimuli. Current PPPD diagnostic criteria classifies unsteadiness and non-spinning vertigo as the primary symptoms reported by patients. However, current research fails to examine the reported prevalence of these symptoms in patients with PPPD. Our purpose in this study was to examine PPPD patients for reported symptoms and provocative factors by analyzing clinical notes and physician input to enhance diagnostic accuracy and assessment. Methods: A retrospective patient health record review of 111 patients diagnosed with PPPD across the University of Vermont Health Network was conducted. Reviewers evaluated chronology/symptom reporting, history of head, neck, or spine trauma, and any clinical evaluations completed based to determine a diagnosis of PPPD. Prevalence outputs of persisting symptoms and

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gender-based correlations were analyzed. Results: The analysis showed that 55.9% of PPPD patients were diagnosed with a previous vestibular disorder, 97.3% had visual motion sickness, 54% had chronic headaches/migraines, 42.3% were diagnosed with anxiety/depression, and 12.6% of patients had a head, neck, or spine injury. Chi-Square test of independence and an odds ratio calculation reported that females were 3.3 times more likely to be diagnosed with migraines/chronic headaches as compared to males ( $p=.002$ ), and males were 3.2 times more likely to have an audiogram conducted as compared to females ( $p < .001$ ). Discussion: Altogether, these findings aid in progressing the future diagnostic decisions and testing procedures that physicians could use during initial assessments of future PPPD patients. Understanding the prevalence of common symptoms reported within PPPD, could improve clinical decision-making, increase the diagnostic accuracy, as well as enhance possible treatment outcomes in PPPD.

## **51. The Impact of Psychosocial Factors on Injury Risk, Injury Recovery and Rehabilitation - Evidence Based Recommendations for Practitioners.**

*Johnston, McKenzie, C*

Background/Objectives: Sports injuries take a toll on athletes' physical and mental health. Typically, the rehabilitative focus has been on the physical impact of sports injuries; however, more recently, athlete mental health following injury has been discussed. The purpose of this review was to determine the psychological factors related to both injury onset and recovery, the current use of psychological skills in rehab, and to provide evidence-based recommendations for practitioners.

Methods: For this literature review, 23 sources from 1994-2022 were selected from PubMed.

Results: Psychosocial factors can predict both injury onset and return to sport following injury. Trait anxiety, negative life event stress, high life stress and previous injury are all associated with increased injury risk. Following injury, injured athletes also commonly experience depression, frustration, anger, and loss of identity, and these emotions negatively influence the rehab process. Following injury, relaxation, goal setting and self-confidence skills have all been determined to decrease injury risk, increase physical recovery and decrease anxiety.

Discussion: Physical therapists and athletic trainers are an essential aspect of physical recovery, and can also play a role in the mental recovery of

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an athlete. Relaxation, goal setting, and self-efficacy skills have all been determined to decrease injury risk, improve physical recovery and decrease anxiety. Based on this review, it is the recommendation of the author that clinicians utilize more psychological skills during the rehab process with injured athletes, To be able to utilize more psychological skills, it is recommended that PT and AT graduate programs incorporate more psychology competencies in their curriculum and that continuing education courses about psychological techniques are offered.

**52. Secondary Outcomes of a Remote Exercise Trial for Rural Older Cancer Survivors: Impact on Physical Activity and Sedentary Behavior.** *Myeongjin Bae, Jacqueline Cafer, Elizabeth Harding, Nancy Gell*

Background and Objective: Cancer survivors who live in rural areas are underserved in physical activity promotion opportunities in comparison to urban cancer survivors. There is a need for bridging the physical activity gaps through innovative approaches, such as real-time, supervised, remote exercise. The purpose of this study was to examine changes in physical activity and sedentary behavior in rural, older cancer survivors after participating in a 16-week remote exercise program. Methods: Participants (71% female; mean age: 70.4±5.7) were randomly assigned to intervention (n=20) and waitlist control (n=18) groups. The remote exercise program included balance, strength, and aerobic exercise for one hour, 3 days/week. An ActivPal accelerometer was used to assess secondary outcomes of physical activity metrics (e.g., moderate-to-vigorous physical activity, step intensity, sedentary time, cadence bands) at baseline and 16 weeks later. We used linear mixed modeling to examine group by time differences. Results: Intervention group participants had a significant group by time interaction effect in sedentary time (post-pre: -61.83±93.64 min, p=0.013). The intervention group participants showed significant within-group difference in light intensity physical activity (p=0.04), daily step counts (p=0.04), and sporadic movements (p=0.02). There were no significant within- and between-group differences in MVPA (p=0.09), sit-to-stand transition (p=0.49), and peak-1 (p=0.21) and peak-30 (p=.03) step intensities. Discussion: Replacing 30 min/day of sedentary time with equal amounts of light-intensity is associated with physical health, cardiometabolic health, and mortality risk. Supervised, remote exercise may be a feasible and effective strategy to reduce sedentary behavior and increase light physical activity for rural older cancer survivors.

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However, the remote exercise program did not affect MVPA and step intensities. Additional research ensuring sufficient sample size and a more diverse population is warranted to examine the efficacy of remote exercise program on physical activity and sedentary behaviors.

### **53. A Literature Review of Wearable Technologies used to calculate Intensity of Physical Activity (PA) among Adults with Neurological Conditions.**

*Balakrishnan S, Gell NM & Peters DM*

**Background:** Physical inactivity and increased sedentary time are major problems among adults with neurological conditions. Wearable sensors provide a new way to monitor free-living physical activity (PA). However, the validity of wearables to assess PA intensity among individuals with neurological conditions has not been well-described.

**Study Purpose:** The primary purpose of this review was to determine which consumer and research-grade wearable technologies have been validated to calculate the intensity metric of PA among adults with neurological conditions in free-living settings. The secondary purpose was to determine the most calculated PA intensity metric.

**Methods:** We searched the databases PubMed, CINAHL, Web of Science, and Cochrane Trials for articles published in English between January 1, 2011, to December 31st, 2021. Only studies utilizing a selected list of commonly used consumer and research-grade wearable technologies in specific neurological conditions were selected. Keywords included fitness tracker, step count, heart rate, energy-expenditure, activity-counts community-dwelling, central nervous system diseases validation, physical exertion, and others. All Study types and various intensity metrics used were included.

**Results:** ActivPal is the only research-grade wearable with documented measures of validity for calculating step counts in the community setting. Step count was the most commonly validated PA intensity metric. The validity of most wearable sensors in calculating the intensity of PA decreased at slower walking speeds, especially among those using assistive devices. The location of the sensor placement in the body also affected the accuracy of the intensity metric calculated by both consumer and research-grade wearables.

**Discussion:** There is a need for research studies to validate PA intensity metrics other than step count among those with moderate to severe mobility deficits using assisted devices. Future studies should focus on

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improving the accuracy of both research and consumer-grade wearables in calculating the intensity of PA.

**54. Understanding biopsychosocial constructs in outcome measures used for adolescents with Cerebral Palsy (CP) during the transition into adulthood.**

*Allyson Balboni, Morgan Bunton, Jordan Glenning, Madison Randall*

**Background:** Adolescents with CP face numerous challenges when transitioning from childhood to adulthood, including changes in healthcare, relationships, and activity participation. Our aim is to identify what outcome measures are currently used during the transition and what contents are compatible with the biopsychosocial model of healthcare. **Methods:** We performed a literature review through CINAHL, OvidMedline, and Psychinfo to identify outcome measures currently being used to assess the transitional period for adolescents with CP. Concepts from the items of the outcome measures were linked to the ICF adult and adolescent core sets for CP. The search strategy yielded 11 articles from which 25 outcome measures were identified. The linked outcome measures were mapped onto the ICF CP Core Sets to determine if their contents comprehensively address the biopsychosocial framework. **Results:** The Vineland Adaptive Behavior Scale (Vineland) had the best distribution for both the adult and adolescent Core Set and had roughly two times better distribution than the next best outcome (AQoL and SIB-R respectively). This indicates that Vineland could more effectively address the patient as a whole through a biopsychosocial lense and provide the patient-centered care necessary during the transitional stages. **Discussion:** Despite Vineland having the highest distribution, it is not feasible for healthcare providers to administer due to its length and poor population psychometrics. Due to the poor population psychometrics of all the outcome measures used, there are no outcome measures that include all biopsychosocial principles for individuals with CP. Therefore, the results suggest the need for a new outcome measure or further validation of current outcome measures for adolescents with CP transitioning to adulthood.

**55. Come Alive Outside: Findings from a Community-Based Physical Activity Passport Program.** *Martin, A, R; Tompkins, C, L*

**Background and Objective:** Children that spend more time outdoors engage in more physical activity and less sedentary behaviors than

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children who spend less time outdoors. Come Alive Outside's (CAO) passport program was intended to incentivize children to be active, and engage in outdoor activities during summer and winter months. The objective is to present findings from a field test of the CAO passport program.

Methods: Passports were distributed to children in pre-kindergarten to 6th grade (N=196) in schools throughout Rutland County, Vermont in summer 2018, winter 2018-2019, and summer 2019. Children earned points and prizes for completing activities outdoors and finding secret codes at local sites (playgrounds, parks). Children were asked to return passports to their schools and/or local businesses. Activities recorded in returned passports were manually entered into an electronic format and descriptive statistics were then calculated.

Results: A total of 196 passports were returned, 49 from summer 2018, 88 from winter 2018-2019, and 59 from summer 2019. First graders returned the most passports (20%), while 6th graders returned the least (5%). An average of 9.65 activities were completed across all 3 seasons, with the highest completed in Summer 2019 (14.05). The most popular activities included visits to local parks/playgrounds and outdoor exploration activities. The least popular activities were volunteering and one-day events (5K races, Family Fun Day).

Discussion: The most popular activities were those that children could complete relatively independently and when convenient for families. Activities offered only on specific days/times were perhaps less accessible and convenient, as they were the least popular/completed. The CAO passport program demonstrates potential for incentive-based programs to encourage children to be active outside and increase physical activity. Future research is warranted to examine how community-based, physical activity programs may increase engagement in the outdoors across different populations and age groups.

**56. Group Wellbeing Program for University and Hospital Employees: A Feasibility Study.** Avery ST, Celley AN, Cho J, Donoghue RE, Goodrich BM, Rose GL, and Westervelt KC

Background and Objective: Little research exists about the effectiveness of group health and wellness coaching in employee wellbeing programming. The objective of this study was to evaluate the effectiveness and feasibility of a university and hospital employee

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wellbeing program using group health and wellness coaching.

**Methods:** University and hospital employees enrolled in the Open Source Wellness program were invited to participate in this study. Participants completed surveys measuring physical and mental health (PROMIS-10), perceived stress (PSS-4), burnout (2-item burnout questionnaire), and self-care goal attainment (GAS). Participants attended weekly, one-hour sessions guided by health and wellness coaches for 12 weeks. Participants were surveyed at the following weeks: start, 6, 12, 18, and 24 weeks. Data was collected using RedCap and analyzed using Excel.

**Results:** Participants (n=30) most frequently established goals based on improving movement, nutrition, and work/life balance. PROMIS-10 results indicated participants began below the national average for physical and mental health, and increased above average during the program. PSS-4 results indicated participants began with perceived stress levels below the national average and decreased further while participating in the program. Burnout scores did not change. Improvements were not fully maintained after completion of the program. When asked how beneficial the program was for achieving health goals, 56% said 'very' and 44% said 'somewhat'. 94% of participants would recommend the program to peers.

**Discussion:** This study demonstrated group health and wellness coaching may be a feasible and effective employee wellbeing intervention for short-term improvements in perceived physical and mental health, and stress. Since improvements were not maintained after the program concluded, future research should investigate maintenance programming. It is also important to explore the scalability of this approach and its ability to promote a culture of wellness among employees during a time when a focus on health is needed more than ever.

### **57. Implementation of the Neck Pain Clinical Practice Guideline: A Case**

**Report.** *Cacciola A, Corapi G, Garcia B, Young R, Sargent E.*

**Background:** Physical therapists are obligated to provide care using evidence-based practice (EPB). Clinical Practice Guidelines (CPGs) offer recommendations for clinical decision making though have their limitations when applied to an n of 1. This case study applies the Neck Pain CPG to a patient with neck pain and investigates the contribution of the clinician's expertise and patient factors in treatment and outcomes. This is contrasted with four novice clinician perspectives with implications

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for knowledge translation of EBP.

**Methods:** This case study followed the CARE Guideline Checklist for accuracy and transparency. The patient was selected based on reports of neck pain and her PT diagnosis was categorized as neck pain with mobility deficits based on CPG recommendations. The patient completed a subjective interview, the Neck Disability Index, and Patient-Specific Functional Scale at initial visit and discharge to determine appropriateness of interventions and offer insight into patient factors.

**Results/Discussion:** The complex interaction of patient, provider, and evidence shaped the outcomes of this case. Manual therapy was used throughout the 7 encounters, influenced by the clinician's experience and patient preferences. This was contrasted by four student physical therapist observations, noting their preference for active treatments such as therapeutic exercise and little to no use of manual therapy. Both treatments received the same grade of evidence in the Neck Pain CPG.

**Conclusion:** This case study highlights the intersection of best evidence, patient factors, and clinical judgment using novice clinician interpretations to provide a unique look into how each influences care.

An experienced clinician may be able to better understand the expectations of a particular patient and match their treatment within the bounds of CPG recommendations. Student reflection may be useful as a form of knowledge translation to determine how novice and expert clinicians differ in their interpretation EBP.

### **58. Effective Interventions in Oncology Rehabilitation to Minimize the Impact of Sarcopenia among Breast Cancer Patients: A Systematic Literature Review.**

*Benz C, Meibauer L, Mercia J, Nelson M, Voelker J*

Breast cancer is the most common cancer diagnosed among women and second leading cause of cancer death among women. The use of chemotherapy to treat breast cancer to reduce the cancer size, slow the progression of the cancer, prevent cancer regrowth, and help lessen cancer-related symptoms. Although chemotherapy has helped improve survival, there are negative side effects associated. One such side effect is sarcopenia. Sarcopenia can be examined as a process of pathologic muscle wasting, inhibiting physical activity, and leading to sedentary lifestyles and perpetual disability. The purpose of this systematic literature review is to identify evidence of exercise interventions and address its effects on sarcopenia in breast cancer patients during and after the

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process of chemotherapy. Results gathered from this review show preserved BMD in two studies ( $p=0.001$ ;  $p<0.01$ ), improved upper body strength ( $p<0.01$ ;  $p=0.05$ ;  $p<0.001$ ), improved lower body strength ( $p<0.02$ ;  $p<0.05$ ;  $p<0.001$ ), and significant results for SMI ( $p=0.017$ ) in patients treated with resistance and combined (resistance and aerobic) training. The studies reviewed show that resistance training can improve muscular strength, increase lean body mass, increase bone mineral density, and reverse sarcopenic changes. Exercise should be encouraged throughout all stages of treatment and should follow established guidelines. Even once a week resistance training can improve strength, and bone mineral density improvements can remain for up to a year after cessation of interventions. Current limitations include heterogeneity in the definition of Sarcopenia and methodology of included articles.

**59. Using the Biopsychosocial Approach in Physical Therapy to Treat Chronic Pain: A Systematic Literature Review.** *Amthor, M., Bianchi, N., Boisclair, R., Madison, M., Moore, C., Niedermaier, T., Dee, J.,*

Background: A biopsychosocial model is thought to include psychological, social, and physical factors into chronic pain treatment, which is purported to lead to better outcomes. However, there is variability in what a BPS method entails. It is unclear how physical therapists are currently implementing the BPS approach in treatment of individuals with chronic pain. This systematic literature review will describe how this BPS model is being implemented by physical therapists for patients with chronic pain. Methods: A systematic literature search was conducted using Ovid MEDLINE, CINAHL, PsychINFO, Web of Science, and PubMed. Inclusion criteria consisted of randomized controlled trials of physical therapy intervention studies for adults 18 years and older, with chronic pain lasting >3 months, where the Biopsychosocial approach was used as one of the interventions. Results: 464 articles were screened, and seven articles met the inclusion criteria. All seven studies included a biological intervention, six included a psychological intervention, and only one article included a social intervention, while all claimed they were using a BPS treatment. Conclusion: There is variability in how PT's are using the BPS model, with few studies describing use of all 3 constructs. Physical therapists need to be more accurate in the way they are using and providing a BPS intervention to patients with chronic pain, rather than claiming their treatment is BPS without fully encompassing all that the model entails.

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More research needs to be done to continue to investigate how physical therapists are using the BPS model and how it affects patients with chronic pain.

#### **60. Implications of Telehealth for Physical Therapy in the Musculoskeletal**

**Population: A Systematic Literature Review.** *Smith, P., Campbell, C., King, M., Lemieux, N., Niedermaier, B., Wolforth, J.*

Background: Telehealth includes a variety of interfaces that allow for the delivery of virtual healthcare services. With the COVID-19 pandemic, there has been increased demand for telehealth services, although not a lot of information exists as to whether this virtual care is beneficial for physical therapy patients or if in-person care is superior. Objective: The purpose of the study was to compare validated outcome measures in patients with musculoskeletal conditions between in-person vs. telehealth in order to determine the effectiveness of telehealth care for physical therapy patients with a focus on: 1) patient satisfaction, 2) functional outcome measures specific to musculoskeletal impairments, 3) pain, 4) patient-reported health status, and 5) cost comparators. The research was investigated based on a question raised by the University of Vermont Medical Center's Rehabilitation Department to provide the most up to date evidence on how to best sustain telehealth services. Methods: A systematic literature review of the available literature was conducted utilizing OVID, Google Scholar, Medline, PEDro, and OpenGrey. Results: Data reveals there is no significant difference in outcomes between the two modalities. Telehealth and the traditional in-person delivery of care yield comparable results when evaluating physical therapy outcomes, suggesting both modes promise similar results. Research shows that telehealth physical therapy can reduce healthcare costs, provide equivalent health outcomes and sustain high patient satisfaction while also improving function and reducing disability. Conclusions: Telehealth is non-inferior to in-person physical therapy when comparing outcomes and demonstrates improved outcomes in some patient populations. Further research should be conducted to increase the strength of evidence while including other modalities of delivery, such as a hybrid method, as well as a focus on additional musculoskeletal conditions.

## 61. Assessing the Reliability and Validity of Pressure-Measuring Insoles in

**Quantifying Variables of Postural Control.** *Desai, C., Nadeau, A., Kraemer, B., Nguyen, D., Cornbrooks, M., Deffeyes, J.*

Background: Force platforms are the gold standard for reliable and valid quantitative balance assessments but are limited in flexibility and space requirements. TekScan F-Scan64® insoles have an advantage of being wireless and portable to objectively collect postural control data in real-time. The purpose of this study is to assess the test-retest reliability and concurrent validity of the TekScan system to the gold standard, Advanced Medical Technology Inc (AMTI) force platform in standing postural control.

Methods: 16 young healthy participants were enrolled in the study. TekScan insoles were worn while performing three trials during eight standing unperturbed balance conditions while on AMTI force plates. Conditions included a combination of eyes open/closed, double-legged/tandem stance, and firm/foam surfaces. Intraclass correlation coefficients (ICC) estimates and their 95% confidence intervals were based on a mean-rating ( $k = 2$ ), absolute-agreement, 2-way mixed-effects model to examine construct validity. Cronbach's alpha was calculated to determine test-retest reliability from either instrument. Variables of interest were Sample Entropy and Leibniz Area.

Results: Excellent internal consistency ( $0.9 \leq \alpha$ ) of insoles was demonstrated in medial-lateral and anterior-posterior entropy in three conditions. Excellent validity ( $ICC > 0.9$ ) was shown for Leibniz Area (left foot  $ICC = 0.952$ ) for one condition. Other conditions and variables showed poor to moderate reliability and ICC validity.

Discussion: TekScan and AMTI both demonstrated good to excellent test-retest reliability for Entropy X and Y in all double-leg stance positions except eyes open-firm surface; moderate to good test-retest reliability was shown in Entropy Y using Tekscan in all tandem stance conditions. Moderate to good ICC demonstrated Entropy Y as a valid qualitative variable between TekScan and AMTI in all double-leg stance positions except eyes open-foam surface.