

Pocatello Podium Presentation (Broadcast to Meridian from Pocatello)

OPIOID ABUSE AS A RELATIONAL ISSUE

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Objectives: To present the opioid crisis from the family systems viewpoint, bring awareness to healthy and unhealthy relationships and the cycle of self-defeat, the root of the opioid epidemic. Current individual treatments and pathologizing the abuser is ineffective. We propose that re-establishing family bonds, teaching helping coping skills, and involving the family in recovery are therapeutically effective methods.

Data Sources: Dr. Dan Weinrich's substance abuse group (Tueller Counseling Services) is on-going study reinforcing new therapeutic methods for recovery. Health, psychology, counseling and scientific journals were searched for family and individual substance abuse treatment from 2002-2018.

Review Methods: Sought studies and journal articles which had qualitative and quantitative, evidence based and empirically proven results. Data was obtained through various journals from the Eli M. Oboler Library, EBSCO Host System, and through observational assessment of a 90-day substance abuse group. Outcomes were substance abuser self-awareness of the cycle of self-defeat, and unhealthy relationships. Correlation between disconnection to family, mental illness and addiction.

Results: Seven articles address how the use of family systems and relationships will aid recovery, six articles address current government funding and intervention as ineffective, and two articles outline how the instillation of hope in counseling will aid recovery.

Conclusion: With 80-90% relapse rate in current opioid recovery treatment, there is moderate strength of evidence to suggest that family and relationship-based recovery programs would decrease current relapse rate.

Meridian Podium Presentation (Broadcast to Pocatello from Meridian)

PSYCHOSOCIAL AND NUTRITIONAL IMPACT OF FAMILY-STYLE MEALS FOR UNIVERSITY STUDENTS

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Background: Research shows adolescents who eat meals with their family more frequently have improved mental health, diet quality, and academic performance. Studies have not been done to demonstrate the effect family-style meals may have for university students.

Objective: This pilot study explores feasibility of family-style dining at a university and establishes initial data on the how introducing family-style meals in a university dining hall impacts mental health, eating competence, and academic performance among university students.

Methods: A control and an intervention group of up to 16 students each, were recruited from university housing, dining halls, and courses. The control group received no intervention. The intervention group ate family-style meals with other participants one time per week for four weeks consecutively. Measures of depression, anxiety, loneliness, eating competence (a measure of food attitude, variety, regulation and acquisition), and academic performance were taken at the beginning of the study and approximately four weeks following the initial survey for both groups. Variance between intervention and control groups at baseline was assessed using independent t-tests and Pearson Chi-Square tests. Variance within subjects pre- and post-assessment for both the intervention and control groups was assessed using paired t-tests and Pearson Chi-Square tests. Statistical significance was determined at $\alpha < 0.1$.

Results: At baseline, no significant differences were observed between the intervention group (n=16, 56.3% female, 43.8% male, mean age=20.06) and control group (n=8, 75% female, 25% male, mean age=20.25). Within subject decrease in loneliness was marginally significant for the intervention group (38.19 to 36.36, $p=0.177$), but not for the control group (37.38 to 35.88, $p=0.570$). Eating competence pre- and post-assessment mean scores improved significantly among the intervention group (33.38 to 36.19, $p=0.074$), but not the control group (32.13 to 32.75, $p=0.724$). Acceptability of family-style dinners was high; On a 1 (low) to 5 (high) Likert Scale, intervention participants enjoyment of, family-style meals was 4.94 (4 week mean) and desire to have family-style dining on campus was 4.83 (4 week mean). 66.67% of dining services staff (n=6) described both the set-up and food preparation as good and easy and all perceived value in offering family-style meals to students.

Conclusions: This initial study establishes the feasibility, acceptability, and value of family-style dining for students in university dining halls. Further research can be done with larger sample sizes with statistical power to detect modest effects and explore other potential impacts of family-style dining at universities.

Meridian Podium Presentation (Meridian Only)

THE EFFECT OF A POST-DOCTORAL FELLOWSHIP ON BUILDING RESEARCH RELATIONSHIPS AND RESEARCH.

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Background: Idaho ranks 39th overall in federal healthcare research funding and 49th in NIH funding. Last year ISU received less than 1.5% of the 14 million awarded to the state by NIH. At larger, better funded institutions, the engine for building and maintaining research is the trainees and post-doctoral fellows. Our group set out to increase Idaho's research profile through building and funding a St Luke's/ISU Post-doctoral Fellowship in Applied Research. To have the greatest impact this program needed great partners: a provider with a project that had potential to become a program of research, University and Hospital financial/administrative support, cooperative Co-directors and quality fellows with enough time in the program to become established.

Purpose: This is an initial evaluation of the value added by this Fellowship, now in its third year. We will examine the impact on research interest at ISU and at St Luke's Medical Center.

Methods: Impact is measured in relationships built on both campuses, expansion of programs, scientific dissemination and progress on the initial plan for the first program of research. Presentations and publications are counted and authorship will also be an evidence of faculty and hospital employee involvement. Progress on the original plan will be presented as evidence progress for the team. Also, placement of Post-doctoral fellows in potential research positions in Idaho is included as a measure of success.

Results: This project has recruited 3 post-doctoral fellows and is currently recruiting its 4th. The first fellow took an academic position in treasure valley. Since the beginning, we have been embarking on a program of research in Pediatrics. Within that program of research, there are 8 separate projects in various stages of completion. For ISU, currently there are 4 faculty directly involved in the project and a graduate intern. In 2017, there were 4 presentations and one other presentation is accepted at a national Pediatric conference on Quality and Safety. Currently, 3 papers are in preparation for submission. St Luke's continues to expand their applied research team and now has support of St Luke's Health Partners.

Conclusion: Post-doctoral fellowships, under the right guidance, can provide the momentum needed to develop a program of research. It also takes a partnership with the community and the mutually beneficial pairing of people. To truly grow we need to keep these individuals working in our state and continue to expand this and other successful programs.

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LOST IN TRANSITION: IMPLEMENTATION OF AN INTERDISCIPLINARY TRANSITION OF CARE SERVICE

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Background: Hospital discharge is a vulnerable time for many patients as they transition to home or other health care facilities. Approximately 20% of patients experience a post-discharge adverse event within 2 weeks of hospital discharge. The largest cause of hospital readmissions are medication-related problems (MRPs), a contributing factor in approximately 40% of readmissions. Several interventions to reduce hospital readmissions have been developed with most focused on patient risk stratification, multicomponent interventions occurring before, during and after hospital discharge, and team-based care. The primary objective of this project was to develop an interdisciplinary transition of care (TOC) intervention to reduce hospital readmissions to the Idaho State University (ISU) Adult Medicine Service at Portneuf Medical Center.

Methods: A TOC service has been in place to reduce hospital readmission to the ISU Adult Medicine Service since 2005. Several evidence-based interventions have been implemented, evaluated, and improved since 2005. In 2014, a curricular change at the ISU Family Medicine Residency program expanded the role of medical residents to include the provision of TOC services. A TOC team was formed to include a full-time nurse practitioner, family medicine resident, pharmacy resident, and other health professions students. The TOC team identifies patients at most risk for hospital readmission, provides brief information to patients prior to discharge, telephones patients 48 hours after discharge, and conducts interdisciplinary home visits within seven days of discharge.

Results: Since 2014, over 150 patients have received an interdisciplinary TOC home visit. Full results will be presented describing program implementation, TOC curriculum, and changes in readmission rates.

Conclusion: An interdisciplinary TOC service improves patient care while providing an innovative approach to interdisciplinary training of health professions residents and students.

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PSYCHOMETRIC PROPERTIES OF GAIT INITIATION IN INDIVIDUALS WITH PARKINSON'S DISEASE

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Background: Parkinson's disease (PD) is characterized by gait deviations that progress with the disease such as reductions of gait speed, stride length, and arm swing, as well as difficulty initiating gait. Our understanding of the psychometric properties of kinematic measures for gait initiation in patients with PD is limited.

Purpose: The purpose of this study was to determine the minimal detectable change (MDC), reproducibility, and diagnostic properties of kinematic and temporal measures of gait initiation in individuals with PD.

Methods: 17 individuals with mild-moderate PD (avg age 68.4 + 11.8 years) were recruited for this study. An investigator-blinded randomized controlled study assessed and calculated the MDC of temporal and kinematic variables of postural stability during gait initiation. Data was collected using the VICON™ motion analysis system and 2 AMTI force plates for kinetic outcomes. Each participant was instructed to move from a standing position to continuous gait down a 1- by 5- meter walkway. This task was performed 6 times- 3 off medication then 3 on medication 1 hour later. Reliability was estimated by calculating the Intraclass Correlation Coefficient (ICC). MDC scores were calculated for 8 components of gait initiation, on and off medication by multiplying the standard error of measurement by the z-score for a 95% CI, and the square root of 3 to account for the variance of 3 measurements. The motor subsection of the Unified Parkinson Disease Rating Scale (UPDRS) was used as an anchor along with MDC values for predicting motor impairments. Microsoft Excel (version 15.11.2) was used for statistical analysis.

Results: ICCs for all components of gait initiation were fair to excellent (0.411-0.966). The posterior COP shift and the lateral COP shift had the greatest discriminatory properties of gait initiation. Posterior COP shift on-medication had a sensitivity (Sn) 75%, and specificity (Sp) 67%. Posterior COP shift off-medication was Sn 50%, Sp 56%. Lateral COP shift on-medication yielded Sn 88%, Sp 44%. Lateral COP shift off-medication was Sn 25%, Sp 67%.

Conclusions: MDC values help to determine whether change in patient performance is reflective of true change beyond measurement error. Between-group differences of MDC scores demonstrate that PD patients off-medications yielded greater discriminatory results with gait initiation variables than when on-medication. Amongst the 8 variables, Lateral and Posterior COP shift variables were most predictive of gait impairments and could be used to rule in or rule out motor impairments based on MDC and UPDRS. Our results demonstrate that psychometric properties of gait initiation may differ between on and off-medication states. We suggest that testing patients during peak optimal performance (on-medications) should be complemented with ecologically valid assessments (off-medications).

Meridian Podium Presentation (Meridian Only)

ADAPTING THE STATEWIDE COMMUNITY HEALTH WORKER TRAINING ACCORDING TO STUDENT EVALUATIONS

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Introduction: Community health workers (CHW) evaluating the live-online training offered by Idaho State University, in partnership with the Idaho Department of Health and Welfare and the Statewide Healthcare Innovation Plan (SHIP), indicated that a 3-hour per week course with a 17-week duration was a difficult after-work commitment given course length. The Health specific modules (HSMs) portion of the training was adapted to be asynchronous to allow CHWs to complete HSMs at their own pace and shorten their overall time commitment to a 13-week core module. More HSMs were developed to allow CHWs flexibility in the HSM training topics.

Methods: Our objective was to evaluate satisfaction and self-reported pre/post competency scores for the modules. As of January 9th, 2018, there were 97 total completed pre-module competency tests from asynchronous health specific modules (HSMs) and 71 total completed post-module competency tests and satisfaction scores for the Behavioral Health and Substance Use, Oral Health, Colorectal Health, Cervical Health, Breast Health and Cancer Screening, Cardiovascular Health and Screening, and Heart Failure modules.

Results: In terms of community health worker satisfaction with the HSMs, on average, all CHW agreed with the statement "Overall, I am satisfied with my learning experience in this module". On average, CHWs did not rank themselves competent in any HSM in the pre-test across all competency subscales, but indicated a marked improvement in each area in the post-test including: having sufficient knowledge to serve as a resource to patients (+1.98 in 7-point agree/disagree Likert), feeling comfortable discussing screening methods for each respective condition (+1.97), ability to identify risk factors for each respective condition (+2.09), and ability to develop an action plan with a patient to address barriers (+2.17).

Conclusion: CHWs indicated improved self-rated competency for knowledge and ability to identify risk factors, screen for, and develop an action plan for each respective HSM. In addition, CHWs indicated satisfaction with the course. Current and future HSM offerings include COPD, traumatic brain injury, diabetes, medication adherence, family caregiving, and tobacco cessation and will also need to be evaluated.

PRODOCK: A 3D VISUALIZATION ENABLED WEB APPLICATION FOR RAPID STRUCTURE-BASED SMALL MOLECULE SCREENING AND PROTEIN-PROTEIN DOCKING

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Objectives: Computer-Aided Drug Design (CADD) plays a crucial role in pre-clinical drug discovery. Most CADD software packages require local high-end computing hardware, computational expertise, and often paid licenses to operate, which limits their impact and use in biomedical research. In this project, we aim to democratize CADD among non-computational researchers by offering the two most widely used CADD applications, structure-based small molecule high-throughput virtual screening (HTVS) and protein-protein docking, through a WebGL-based modeling environment named ProDock. ProDock is free and does not require local hardware, software setup, or computational expertise. All CADD tasks are accessible and completed in a web browser.

Methods: NGL javascript code was used as a template to construct the ProDock modeling environment. For the small molecule HTVS application, 13 pharmaceutically relevant molecular databases (FDA-Approved Drugs, DrugBank, DrugCentral, ChEMBL23, SureChEMBL, HMDB, LINCS, NCI2016, NCI Diversity Set, PDB Ligands, ZINC15, MolPort, and eMolecules) containing 58,061,493 drug-like compounds were curated. The 2D fingerprints and 3D conformers of all molecules were generated from the SMILES representation using RDKit and Omega. Python and PHP code was developed to synergize the 2D/3D ligand-based screening techniques with receptor-based binding energy evaluations, leading to a highly efficient and more accurate HTVS approach. For the protein-protein docking application, PHP and javascript code was developed to interface with the GPU-accelerated MegaDock program and allow users to highlight the receptor residues not involved in the protein-protein interactions.

Results: Protein-protein docking can be completed within seconds. Millions of small molecules can be screened and docked within minutes. Using the DUD benchmark set, we show that ProDock outperforms AutoDock Vina, the most widely used academic molecular docking software, in terms of speed and accuracy. Additionally, ProDock enables users to (1) review small-molecule HTVS and protein-protein docking results in 3D; (2) render publication-quality images with molecular visualization options similar to VMD or PyMol in a web browser.

Conclusions: Our results demonstrate that ProDock is a powerful and user-friendly tool for anyone involved in drug discovery, especially non-computational researchers. It is available at <http://dxulab.org/software> to facilitate biomedical and pharmaceutical research worldwide.

TARGETSEARCH: AN INTEGRATIVE CROSS-DATABASE MOLECULAR SEARCH ENGINE FOR DRUG DISCOVERY, DRUG RE-PURPOSING, AND DRUG SAFETY RESEARCH

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Objectives: Although there are numerous web services available for search small-molecule databases, most of them adopt the conventional 2D fingerprint search algorithms and lack the ability to search across multiple molecular databases. Our goal is to develop an integrative cross-database search engine that harness the power of both conventional 2D and the more precise 3D fingerprint search algorithms for drug discovery, drug re-purposing, and drug safety research.

Methods: First, 13 pharmaceutically relevant molecular databases (FDA-Approved Drugs, DrugBank, DrugCentral, ChEMBL23, SureChEMBL, HMDB, LINCS, NCI2016, NCI Diversity Set, PDB Ligands, ZINC15, MolPort, and eMolecules) containing 58,061,493 drug-like compounds were imported into an in-house MySQL database. Second, the 2D fingerprints and 3D conformers were generated from the SMILES representation of all molecules using RDKit and Omega software. Third, a web-based search engine named TargetSearch was developed to enable users to upload a query molecule of interest and screen any of the 13 databases by 2D or 3D structural and chemical similarities. TargetSearch ranks the resulting compounds by Tanimoto scores and provide a variety of options to optimize the search results and user experience. The utility of TargetSearch was demonstrated by (1) screening for MyD88 protein-protein signaling inhibitors to limit lethal immune response associated with Staphylococcal pathogenesis; (2) predicting off-target polypharmacology for an investigational drug CIS22a; and (3) repurposing FDA-approved drugs against Zika virus.

Results: TargetSearch can rapidly screen a query molecule against millions of compounds. Users are provided with a wide range of options for query molecule entry, choices of 13 molecular databases and 13 2D/3D search algorithms. Search results can be early configured and include cross-database molecular information, 2D molecular depiction, and statistical significance of the hits. The high hit rates and performance data obtained from the case studies show that TargetSearch is a powerful and user-friendly tool for drug discovery, drug re-purposing, and drug safety research.

Conclusions: By making TargetSearch available at <http://dxulab.org/software>, we expect this cross-database molecular search engine will facilitate biomedical research and discovery worldwide.

THE CARDIOVASCULAR EFFECTS OF SEROTONIN 2B RECEPTOR AGONISTS, ANTIDEPRESSANTS, AND THEIR COMBINATIONS: A COMPARATIVE RETROSPECTIVE COHORT

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Objectives: Certain medications may have unintended stimulation on the serotonin 2B receptor (5-HT_{2BR}) and pose substantial cardiac risks. Since the withdrawal of anti-obesity treatment fen-phen by the FDA in 1997, more drugs have been discovered as potential 5-HT_{2BR} agonists through off-target interactions. Research has shown that 5-HT_{2BR} agonists have an increased risk of inducing valvular heart diseases (VHD), a potentially life-threatening side effect. Additionally, an elevated serotonin level as a result of antidepressant use that blocks serotonin reuptake may increase the VHD risks. The objective of this study is to examine and evaluate the drug-induced VHD risks associated with 5-HT_{2BR} agonists, antidepressants, and their combinations in a comparative retrospective cohort study using the cross-sectional FDA adverse event reporting system (FAERS) and longitudinal PharMetrics Legacy medical claims data.

Methods: The exposure cohort exclusion criteria were: history of VHD-associated etiologies (rheumatic disease, endocarditis, cardiomyopathy, carcinoid syndrome, congenital heart disease, pericarditis, myocarditis, or congestive heart failure); and history of known valvulopathogens: fenfluramine, dexfenfluramine, ergotamine, pergolide, cabergoline, bromocriptine, methysergide, dihydroergotamine, ergometrine, and methylergometrine. The exposure cohort inclusion criteria were: aged 5 or older at the time of the drug entry date; and at least 180 days of continuous insurance coverage prior the drug entry date; and used the drug of interest for at least 90 days. The control cohort was extracted with a 1:4 matching ratio to the exposure cohorts by age, sex, and insurance enrollment. All medications were identified using GPI codes. VHD diagnoses were identified using either MedDRA PT in FAERS or ICD9/CPT codes in PharMetrics. Logistic regression and odds ratio analyses were performed by adjusting for confounding factor such as age, sex, reporting year, hypertension, and other co-morbidities.

Results: Results from the retrospective cohort study show an increased VHD risk for patients prescribed 5-HT_{2BR} agonists or antidepressants compared to the control cohort. When 5-HT_{2BR} agonists and antidepressants are co-administered, the synergistic stimulation of 5-HT_{2BR} further elevates the risks of VHD.

Conclusions: Without a clear understanding of drug-induced cardiac risks, it would be difficult for healthcare providers to make clinically sound decisions on medication prescription and management. We anticipate the study findings will assist healthcare providers weigh the benefits and risks of drug regimen and prevent drug-induced cardiac risks in patient care.

IN SILICO ANALYSIS AND PREDICTIVE MODELS OF SEROTONIN 2B RECEPTOR LIGANDS AND ITS IMPLICATIONS IN DRUG-INDUCED CARDIOTOXICITY

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Objectives: Valvular heart disease (VHD) is one of the major cardiovascular pathogenesises and a leading cause of death. VHD can be induced by 5-HT_{2B} receptor (5-HT_{2BR}) agonists.

Therefore, 5-HT_{2BR} has become a major anti-target in modern drug design. The objectives of this study are to (1) construct a pharmacologic database covering all small molecules and drug known to interact with 5-HT_{2BR}; (2) analyze their physicochemical properties; and (3) build machine-learning (ML) classification and regression models to predict binder vs. non-binders, agonists vs. antagonists, binding affinity, and functional efficacy.

Methods: First, our 5-HT_{2BR} ligand database named 2BDB was manually curated by extracting molecules with known experiment binding and/or functional data from ChEMBL23, PDSP KiDB, IUPHAR Guide to Pharmacology, and Binding DB. Duplicate entries were merged or removed. All molecules in 2BDB were stored in a MySQL database and completely annotated in terms of their binding and functional data, assay type, clinical trial and FDA approval status, and molecular representations, etc. Second, Schrodinger suite and RDKit were used to generated descriptors of 2BDB ligands to assess and stratify their structural and pharmacophoric features. Third, a subset of the 2BDB ligands were used as the training set to build classification and regression models using state-of-the-art ML techniques such as SVM, Random Forest (RF), and Convolutional Neural Networks (CNN, aka, Deep Learning). Another subset of the 2BDB ligands were used as the validation set to test the performance of the ML predictive models.

Results: The 2BDB SQL database was successfully constructed and is web accessible. Subset ligands can be rapidly extracted using SQL queries. Molecular descriptor data suggests that it is possible to classify 5-HT_{2BR} ligand and their functions by structural and pharmacophoric features. The excellent performance of our ML predictive models (AUC >0.83) supports the notion that not only they can correctly predict ligand binding, they are also able to predict ligand functions.

Conclusions: In this study, we demonstrated the feasibility and performance of applying modern ML techniques to predict ligand binding and functions on the 5-HT_{2BR}, providing an efficient and accurate alternative to experimental assays. These new methods can be readily extended to other GPCRs, thus they will have significant impact on drug discovery and drug safety research related to 5-HT_{2BR} and GPCRs in general.

PREFERENCES FOR THE MATCH OR EARLY COMMITMENT PROCESS FOR OBTAINING A POST GRADUATE YEAR 2 (PGY2) PHARMACY RESIDENCY

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Background: Pharmacy students during the P4 year have the option to apply for a postgraduate year 1 (PGY1) residency to gain more clinical experience. After acceptance into and completion of a PGY1, a postgraduate year 2 (PGY2) residency can be completed to specialize in various pharmacy related fields such as ambulatory care, oncology, and internal medicine. There are two methods for applying for a PGY2 program: the ASHP Resident Matching Program (“the Match”) and the Early Commitment Process (ECP). The Match involves an application process to many different programs. After applying to different programs, chosen applicants are invited to interview. After all of the interviews are completed, a matching algorithm is run and applicants are paired with programs based on the algorithm’s results. The alternate process, the ECP, involves the resident applying to a PGY2 at their current PGY1 site and occurs well before the Match. Many PGY2 programs use a mix of ECP and the Match where others use either the Match or the ECP. Both processes have advantages and disadvantages for all parties involved.

Objective: To assess the preferences for the Match and ECP across the country by Residency Program Directors (RPDs), residents, and P4 pharmacy students.

Methods: Three web-based surveys will be created and distributed to the three groups of interest: RPDs, current and past residents, and P4 pharmacy students. All of the PGY2 RPDs in the nation will be contacted by e-mail and they will be asked to distribute the resident survey to the residents at their site. The P4 survey will be distributed to the Deans of the College of Pharmacies across the country. The Deans will be asked to distribute the survey to their P4 students. Only P4 students interested in a pharmacy residency will be asked to complete the survey. The surveys will be developed and the IRB will be submitted by July 1st. After this process is completed, the surveys will be distributed, data will be collected, and an abstract will be developed to submit for the American Society of Health-System Pharmacists Midyear poster session held in December 2018. Descriptive statistics will be used to evaluate survey responses.

Results: Project in-progress. Estimated to be available in December 2018.

Conclusions: Project in-progress. Estimated to be available in December 2018.

INTERPROFESSIONAL EDUCATION MICRO LEVEL CHANGE THROUGH LONGITUDINAL SIMULATION CASE STUDY EVENTS

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Background: Interprofessional simulated problem solving, case based approaches to situational learning allows students to work collaboratively. Learning in this pro-social informal setting is optimized by inevitable relationships that connect prior knowledge to new contexts. With intentional interprofessional education involving students and faculty learning individually and collectively in new and different ways, micro level change occurs providing value to the education setting.

Purpose: Longitudinal interprofessional pharmacy/ physician assistant case study events formative evaluations to date have focused on activity processes such as willingness to work in interprofessional relationships, and been conducted to provide feedback to local stakeholders, inform infrastructure needs and assess micro level change.

Design: As part of Meridian interprofessional pharmacy/physician assistant case study events mixed-methods evaluation, students have been asked questions linked to Kirkpatrick's expanded typology level 1 perceptions (values/ethics) and level 2 acquisition of knowledge (roles/responsibilities) framework. Select questions from the Interprofessional Socialization and Valuing Scale (ISVS) were administered post event that coincided with the specific event process objectives. Supplemental open ended questions were asked regarding role ambiguity/blurring between professions related to the case.

Results: Thirty -six physician assistant students and twenty-three pharmacy students anonymously and voluntarily completed the post event survey. Students recognized the need for other health professions not participating in the event to contribute to the problem solving, with the most common team member requested being nursing and respiratory therapy. In terms of assessment (on a scale of 1-6 strongly disagree to strongly agree) of collaboration skills (5.6-6.0), role on a team (5.7-6.0), value of a team to the patient (5.3-5.6) and team communication (5.3-5.5), student confidence ratings were high with the lowest related to team communication. Differences were not significant between the different health profession ratings. Four qualitative themes emerged from the role ambiguity question. The most common being medications, followed sequentially by no ambiguity noted, diagnosis and assessment.

Conclusion: Development of an interprofessional identity and the valuing of collaborative care that occurs from socialization through interprofessional case study events is a key component of an interprofessional curriculum that prepares health professionals for the workforce. The ISVS is useful in helping teams who have not worked together or benefited from foundational concepts of interprofessional education. This ISVS application is one step in promoting the shift of interprofessional collaboration at Idaho State University that will develop fully when institutional structural elements are in place for full implementation and sustainability of interprofessional education.

IDAHO PHARMACISTS KNOWLEDGE, ATTITUDES AND BARRIERS TO NALOXONE PRESCRIBING

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Background: The opioid epidemic and death rates continue to rise. In 2015, Idaho passed legislature giving pharmacists prescriptive authority to prescribe naloxone. Naloxone is an opioid antagonist approved for use in emergency treatment of respiratory and central nervous system depression as a result of opioid overdose. Naloxone is not a substitute for emergency medical care, it is effective in providing someone who has overdosed with critical time they need to reach medical services. Despite the rise in opioid abuse, need for overdose intervention, and provision of prescription authority, the rate of naloxone prescriptions by Idaho pharmacists has not risen significantly since the law was passed.

Purpose: The purpose of this study is to identify the attitude and barriers Idaho pharmacists experience related to prescribing naloxone.

Methods: A survey was created using the Theory of Planned Action as a theoretical foundation to measure attitudes, normative beliefs, and control beliefs in relation to prescribing naloxone. Questions were developed to measure behavioral intention, self-reported prescribing behaviors, and barriers to prescribing naloxone. An invitation was sent to all pharmacists currently registered with the Idaho Board of Pharmacy to complete an 80-question survey.

Results: Of the 2,612 invitations sent, 374 individuals started with 249 completing the survey, for a completion rate of 67%. Of the 249, 158 (63%) indicated they are currently practicing in Idaho. Of those responding, 67 were female and 85 were male. The average age was 44 years old (SD=13.37 years) with mean of 18 years since graduation from pharmacy school. The majority (70%) currently practice in community pharmacy. Adequate training during pharmacy school, affordability to patients, and professional liability were among the top barriers identified that prevent pharmacists from prescribing naloxone. Many feel a positive attitude toward initiating conversations and educating patients about naloxone but did not necessarily feel it was their responsibility to do so. Older pharmacists were more likely to endorse that it is their responsibility to educate patients about naloxone, as well as prescribe it. Overall most pharmacists feel supported by their community in prescribing but think the community is not aware of naloxone's role in overdose.

Conclusions: In general, pharmacists seem to have a positive attitude towards discussing and prescribing naloxone; however, feel it is not their responsibility to do so. Despite the available information regarding benefits of naloxone and relatively innocuous liability profile, pharmacists identify lack of adequate training and concern for professional liability as barriers to prescribing. Affordability and lack of community awareness are also identified as barriers to naloxone prescribing.

RETROSPECTIVE CHART REVIEW TO EVALUATE OVERUSE OF SHORT-ACTING BETA AGONISTS (SABA) AND FAILURE TO ESCALATE THERAPY FOLLOWING AN ED ADMISSION FOR SOB IN PATIENTS WITH A DIAGNOSIS OF ASTHMA.

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Background: Use of short-acting beta agonists (SABA) during acute asthma exacerbations are an optimal choice due to rapid relief of symptoms, ease of use, portability and low side effect profile. However, according to National Asthma Education and Prevention Program (NAEEP) Expert Panel Report, SABA use of more than two times per week indicates overuse, warranting further evaluation of a patient's current therapy. Overuse of SABAs increases the risk of Beta-2 receptor down regulation within the lungs leading to a decline of efficacy. Frequency of SABA use during a 3-month period has been associated with poorer asthma outcomes. In addition, the use of greater than 2 canisters of a SABA per month increases the patient's risk of mortality from asthma. If patient education and appropriate escalation of therapy were initiated in patients seen in the ED and recognized as overusing SABAs the number of repeated ED visits may be avoided.

Objectives: To identify the number of asthmatic patients overusing SABAs who are admitted to the ED for shortness of breath and to determine the percentage of those patients who return to the ED within 3 months due to failure to escalate therapy by their PCP. In addition, further analysis will be conducted to determine what patient factors are associated with not escalating therapy.

Methods: A retrospective chart review will be conducted from 6/1/17-8/31/17 to evaluate the number of patients admitted to Boise Saint Alphonsus Emergency Department with an ICD-10 code of J45, the code that encompasses Asthma as a whole. All patients presenting to the ED \geq 2 times within 3 months with a primary or secondary diagnosis of J45 will be identified and reviewed. Chart review from ED physician will be used to identify overuse of SABA therapy. Following ED admission, progress notes from PCP will be used to determine if escalation in therapy was initiated. Failure to escalate therapy will place the patient in one of three categories: patients whose provider was unaware of patient overuse, patients whose provider was aware but made no attempt to escalate therapy, and patients whose provider attempted escalation but patient was not compliant. Provider type (MD, DO, PA, or NP) will also be identified to evaluate possible trends. Patient factors, such as demographics and socioeconomic status, will be assessed in patients whose therapy was escalated but the patient was noncompliant in recommendations to escalate therapy

Results and Conclusion: Research still in progress. Results and conclusions will be presented at Research Day.

HIGH RISK OPIOID PRESCRIBING WHEN MULTIPLE PRESCRIBERS ARE INVOLVED

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Background: With opioid related deaths rising across the United States, dangerous opioid prescribing patterns have come under national scrutiny. In an attempt to guide clinicians to safer practices, the Centers for Disease Control and Prevention (CDC) published guidelines on prescribing opioids for chronic pain in 2016. These guidelines included strategies such as limiting the use of long-acting formulations, avoiding high daily morphine milligram equivalents (MME), and avoiding concomitant use of benzodiazepines or other CNS depressants. Patients taking opioids for chronic pain often have multiple comorbidities that require care from more than one provider. Communication is important between these providers to ensure that the patient is not being put at unnecessary risk of an opioid overdose. The CDC Guidelines state that “most fatal overdoses were associated with patients receiving opioids from multiple prescribers and/or with patients receiving high total daily opioid dosages.” Frequent utilization of the Prescription Drug Monitoring Program (PDMP) is highly encouraged by both providers and pharmacists before prescribing or dispensing any opioid or other controlled medication. The PDMP can be very useful to identify high-risk combinations. The CDC suggests clinicians check the PDMP every 3 to 12 months when their patient is on long-term opioid therapy. However, inconsistent use of the PDMP by prescribers has been noted across the United States due to lack of familiarity, administrative barriers and time constraints among other things. Pharmacists are often in a prime position on the healthcare team to help identify high risk opioid combinations that may have been overlooked, particularly when multiple providers are involved. This identification could prompt an Idaho pharmacist to make interventions on behalf of the patient, including ensuring the prescribers are aware of the additional prescriptions and offering the patient an opioid antagonist.

Objectives: To quantify the number of Idaho patients receiving opioids for chronic pain who also received an overlapping prescription for another opioid, benzodiazepine or CNS depressant involving >1 prescriber. To compare the frequency of these high-risk opioid combinations being prescribed when only one provider is involved versus >1 provider.

Methods: This is a cross-sectional study involving all patient profiles reported to the Idaho PDMP from January to December 2017. Profiles were grouped into those receiving chronic opioid therapy defined as taking an opioid for >90 days. These chronic opioid patients were then stratified into those also receiving an overlapping prescription for either an opioid-opioid, opioid-benzodiazepine or opioid-CNS depressant combination at any point during 2017.

Results/Conclusions: Research in progress.

BROAD-SPECTRUM ANTIBIOTIC EXPOSURE IN PATIENTS WITH DOCUMENTED PENICILLIN ALLERGIES

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Objective: To evaluate the incidence of broad-spectrum antibiotic exposure in patients both with and without documented penicillin allergies: a quality improvement medication use evaluation aimed at improving strategies to de-escalate unnecessary broad-spectrum antibiotic exposure.

Background: Penicillin has become the most commonly reported allergy. Up to 10% of patients self-report allergic reactions to PCN, although the majority of these are based on historical childhood occurrences, family history, or non-allergy related adverse effects that may not accurately reflect a true IgE-mediated allergy. Even in patients with well-documented PCN allergies, there is a possibility that the patient may no longer be allergic, or that hypersensitivity may have not persisted, due to the natural loss of anti-PCN antibodies that can occur at a rate of up to 80% over 10 years. Documented PCN allergies have a large impact on antibiotic selection. Often, patients are prescribed second or third-line agents that may end up being more expensive, or more broad-spectrum. Despite the vast amount of knowledge on this topic, it continues to be a common problem in both inpatient and outpatient settings. The objective of this MUE is to compare the rates of broad-spectrum antibiotic exposure between patients in an outpatient setting with documented penicillin allergies to those without, and to evaluate the use of implementing systems/processes in an effort to improve accurate allergy documentation, prescriber communication and follow-up, as well as de-escalate unnecessary broad-spectrum antibiotic exposure. Data Sources (in progress): Query of out-patient database ©SuiteRx Intelligent Pharmacy Software (Version 8.5) for patients having received an antibiotic, and having a documented antibiotic allergy within the past two years (March, 2017 – March 2018). Antibiotics counted as broad-spectrum will be those not considered preferred based on generally accepted treatment guidelines. No further determinations of appropriateness of therapy will be evaluated. Rates of exposure will be compared in patients with and without Penicillin allergies using an unpaired Student's T-Test.

Results:(in progress)

Conclusions: (in progress)

ASSESSING PATIENT RISK FOR INADVERTENT OPIOID OVERDOSE BY UTILIZING A PRESCRIPTION DATABASE AND A VALIDATED RISK INDEX

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Background: The State of Alaska recently adopted legislation allowing pharmacists to independently prescribe and dispense naloxone to patients who are at risk for opioid overdose. The Risk Index for Overdose or Serious Opioid-induced Respiratory Depression (RIOSORD) is a validated index designed for use within healthcare settings to quickly evaluate individual patient risk for an opioid overdose or serious opioid-induced respiratory depression (OSORD).

Purpose: The objective of this medication use evaluative study was to retrospectively apply the RIOSORD index to a pharmacy dispensing data-set to assess patient risk of OSORD; thereby identifying patients most likely to benefit from pharmacist intervention and placement of naloxone emergency kits.

Methods: This study utilized a retrospective cohort design. Subjects were identified by electronic search of a prescription database and corresponding electronic medical records. Inclusion criteria was based on exposure to any opioid medication between January 1, 2016 and December 31, 2016. The search function within the Intergy (v10.00.00.05) electronic medical record was used to identify potential subjects as well as the variables required to calculate each subject's RIOSORD index score. Subject demographics were also collected. Subjects were excluded from the study if the electronic record was insufficient to calculate the RIOSORD index score. Using Microsoft Excel, de-identified data from the Intergy search results was loaded into the Excel template to calculate the RIOSORD index score for each subject. Abstractors reviewed Excel template results for any anomalies or errors. Subjects were stratified into seven RIOSORD risk classes with Class I being the lowest risk for OSORD and Class VII representing the highest risk. Descriptive statistics were used to quantify all results.

Results: 1815 subjects met the inclusion criteria, underwent full abstraction and were stratified according to RIOSORD risk classification: Risk Class I (n=1044; 57.5%), Risk Class II (n=114; 6.3%), Risk Class III (n=190; 10.5%), Risk Class IV (n=159; 8.8%), Risk Class V (n=129; 7.1%), Risk Class VI (n=137; 7.5%), Risk Class VII (n=42; 2.3%). The majority of the reviewed subjects were classified as low-risk (n=1348; 73.6%) for OSORD (I-III). However, 25% (n=467) of reviewed patients were classified in the high-risk groups (Class IV-VII).

Conclusions: Utilizing the RIOSORD risk index retrospectively to a prescription database may help pharmacist's implement a naloxone service to more efficiently target patients who are at highest risk for developing OSORD. Results could vary between pharmacies based on the availability of patient co-morbidities within individual dispensing software.

RETROSPECTIVE PRESCRIPTION REVIEW OF PEDIATRIC PATIENTS DISCHARGED FROM THE EMERGENCY DEPARTMENT (ED)

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Purpose: The primary objective is to determine if pediatric patients discharged from the emergency department at Saint Alphonsus benefit from a pharmacist review of their discharge prescriptions. This objective will be obtained by retrospective chart review evaluating dosing, indication, and drug-interactions. Secondary objectives include: determining what types of prescriptions (i.e. antibiotics, high risk medications) and interventions that are most common (dosing adjustments, therapy change). These study results will then be used to assess whether there are sufficient potential interventions to justify time and resources for a review of discharge prescriptions by the ED pharmacist.

Background: Medication errors are believed to be the most common type of medical error with a higher potential for harm in the pediatric population.¹ Additionally, a previous study has indicated that more than 1 in 9 emergency department visits are due to drug related adverse events.² Further strategies to prevent and reduce the occurrence of these errors have the potential to improve patient care within this population. While a pharmacist reviews these prescriptions prior to dispensing in the community setting, they do not have access to all of the patient information available in the hospital chart; additionally, as ED providers do not have set office times, it may be difficult to clarify with the ordering provider in a timely manner when necessary. Intervention rates by ED pharmacists ranging from 0.25% to 23.4% have been previously published, and one study included a provider survey in which prescribers felt pharmacist review and medication optimization improved patient safety and satisfaction.^{3,4}

Methods: This study is to be approved by Saint Alphonsus Institutional Review Board for approval prior to commencement. A retrospective electronic medical record review will be conducted on all patients less than or equal to 16 years of age that were prescribed prescriptions at discharge in the Emergency Department. Utilizing the medical record ED look up function we will study patients within the most recent 30 days period following IRB approval. Patient data that will be collected includes: age, weight, medication history, indication, allergies and disease state. This data will be evaluated for inconsistencies in dosing practice, drug-interactions, and potential for optimizing therapy by using alternative medications. Patient information will be deidentified once collected and only non-identifiable information will be used and presented in the findings. Ultimately, this will help determine whether ED pharmacist review of pediatric discharge prescriptions should be implemented.

Results/Conclusions: Research still in progress. Results and conclusions will be presented at research day.

EVALUATION OF THE APPROPRIATE UTILIZATION OF CONTRACEPTIVE METHODS IN WOMEN VETERANS ON TERATOGENIC MEDICATIONS AT THE BOISE VAMC

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Objectives: To assess the utilization of contraceptive methods among women veterans of child-bearing age prescribed a teratogenic medication within the Boise Veterans Affairs Medical Center (BVAMC). This study will also assess differences in contraception use and counseling on teratogenic medications in veterans seen in Women's Clinic vs. Non-Women's Clinic.

Data Sources: Patient demographics will be collected including name, date initiated, and refill history will be collected from VA Computerized Patient Record System(CPRS). Charts will also be reviewed for documentation of counseling on the teratogenic risks of the medication.

Review Methods: Retrospective cohort evaluation using the Computerized Patient Record System (CPRS) of 107 female patients who have filled a teratogenic medication in the last year. Data will be assessed and compared to current CDC guidelines and other literature as described in background section. Assessment will be focused on noting if the proportion of women on contraception is similar to other references.

Results: Results of this medication use evaluation may provide more information on a growing population at the Boise VAMC as well as provide insight on contraception methods prescribed, counseling performed, and overall efforts in preventing high risk pregnancies. In addition, this evaluation will assess if there is a higher percentage of women veterans preventing pregnancy that are taking a teratogenic medication compared to those not on a teratogen. The harms of conceiving while on a teratogenic medication, knowledge of medications that are teratogenic, selection of appropriate contraceptive devices, and counseling on contraception methods are potential areas to provide further education to providers.

Conclusions: The study is currently being conduct and results will be presented at research day.

PATIENT PERCEPTIONS OF PHARMACIST-PRESCRIBED STATINS: AN ANALYSIS OF ENHANCED PHARMACIST PRESCRIPTIVE AUTHORITY IN IDAHO

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Background / Purpose / Objective: As early as April of 2018, pharmacists in Idaho will have the authority to prescribe HMG-CoA reductase inhibitor (statin) medications to patients. Idaho will be the first state in the U.S. to enable pharmacist prescribing of statins and many entities will be interested in patient and medical associations' perception of the program.

By establishing new prescribing protocol in select pilot Albertsons Sav-on pharmacies, we can see the importance of evaluating the program from the beginning. Outside of select practice areas such as the Department of Veterans Affairs, pharmacists have not been able to prescribe statin medications in the U.S. but there have been attempts to ensure that patients in need are prescribed and begin statin therapy. The most common approach has been to identify patients through medication therapy management (MTM) platforms and directly contact a primary care provider with a recommendation. This approach has had limited success (Renner et al., 2017), prompting the idea to give pharmacists independent prescriptive authority.

The aim of this research project is to describe perceptions and demographics of patients who are recommended statins from prescribing pharmacists per the new Idaho protocol. Additionally, the study will determine why patients were not originally prescribed these medications to address incongruence with evidence-based guidelines or patient educational gaps in therapy.

Albertsons Companies submitted a request to the Idaho Board of Pharmacy to implement a pilot prescribing service in April 2018. As part of this pilot program, pharmacy staff from four pharmacy locations in Idaho will be trained to identify, screen and prescribe statins to patients in need. Patients will also complete a survey related to their satisfaction of the service. This research will focus on the responses to that survey.

Methods / Results / Conclusions: Dispensing and patient satisfaction data will be collected and analyzed in May 2018 (based on survey response data) once the program has had time to prescribe to patients in need. This research will analyze the responses for trends and overall patient perceptions of the program.

THE IMPACT OF PEDIATRIC CARE COORDINATION: A SYSTEMATIC REVIEW

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Background: Care coordination is a service provided to high-need patients and their caregivers to organize their healthcare resources. In the pediatric patient population, it is strongly associated with positive outcomes for providers (reduced per patient cost, improved care experiences), patients (less hospitalizations, emergency department visits), and family (fewer missed work days, lower out-of-pocket costs). However, the pediatric care coordination models and the research methodologies used to gather, interpret, and report these findings are disparate. While systematic reviews have been conducted in general patient populations, data has not been systematically summarized in pediatrics. Thus, we are performing a systematic review of the literature to present a comprehensive summary of study results that will be a resource for investigators interested in the outcomes associated with pediatric care coordination.

Objective: To systematically review pediatric care coordination literature to determine its effect on measurable patient, family, and provider outcomes.

Methods: We conducted a systematic literature search of MEDLINE, CINAHL, and PsycINFO from inception of databases through November 13, 2017. Studies were included if they reported on pediatric (<22 years of age) care coordination, involved more than two participants, coordinated outpatient services, and were published in the English language. For the purposes of this review, care coordination was defined as the organization of patient care activities to facilitate the delivery of health care services. Two investigators independently screened citations and will review full-text articles to assess study eligibility; disagreements will be reconciled through discussion or a third investigator. Forward and backwards citation tracking of included studies will be performed. A standardized data collection form will be used to extract relevant study details including characteristics of care coordination activities and outcomes of interest. The internal validity of studies will be assessed. Data will be synthesized qualitatively and quantitatively through meta-analysis, if appropriate.

Results: The bibliographical database search yielded 1,892 non-duplicate citations. There are currently 288 articles included and 215 conflicts to resolve. This review is currently in-progress with full-text review underway.

Conclusion: The results of this systematic review will identify outcomes associated with pediatric care coordination and the processes of care associated with such outcomes. Such knowledge can be used to optimize ongoing and future pediatric care coordination initiatives.

THE ST. LUKE'S CHILDREN'S ACUITY TOOL (SLCAT): ACUITY TIERING FOR CHILDREN WITH SPECIAL HEALTH CARE NEEDS

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Background: Children with special health care needs (CSHCN) are a growing segment (19%) of the pediatric population that account for a disproportionate amount of pediatric healthcare dollars (40%). CSHCN have a diverse range of diagnosis (e.g. ADHD, asthma, diabetes, cancer, spinal bifida), social challenges (e.g. integrating into public school, developing peer relationships), and are unique as a group in part because parents and other family members play a large role in coordinating their care and acting as a medical proxy. Due to their increased utilization of healthcare resources, CSHCN benefit from proper care planning that accurately identifies their characteristics and needs. By accurately identifying CSHCN, resources can be allocated in an efficient manner and relieve the burden of care experienced by families and providers. Acuity tiering (AT), or risk stratification, which categorizes patients according to medical and non-medical criteria, is an appropriate solution if it strongly predicts outcomes (e.g. ED visits, or hospital readmissions). Three challenges to current AT methods exist: 1) develop AT for CSHCN populations, 2) emphasis other variables (e.g. school integration, social functioning, quality of life, and family involvement) over medical record data, and 3) incorporate behavioral health diagnosis (e.g. ADHD, anxiety, depression) into tiering calculations. The St. Luke's Children's Acuity Tool (SLCAT) is an AT method designed for the CSHCN population that uses information outside of the patient medical record and incorporates behavioral health variables to stratify patients into 5 increasing levels of acuity.

Purpose: The purpose of this study was to determine the predictive power of the SLCAT.

Design: This study used a retrospective chart review (3 years) SLCAT determine model fit and compare the SLCAT to the Care Coordination Measurement Tool (CCMT) and Pediatric Chronic Condition Categories (CCCv2) predicting amount billed, number of encounters, problem list, ED visits and hospital admissions.

Results: Logistic regression and area under the receiver operating curve (ROC) were examined to determine the goodness of fit for the SLCAT and to compare the predictive power of each method. Overall the SLCAT had the best 'fit' for the data and accounted for the most variability in outcome variables (C statistic range=.56-.95, 95%CI range = .47-.98). All three methods poorly predicted ED visits and hospital admissions (C statistic range=.53-.57).

Conclusions: The SLCAT addresses common criticisms of AT methods for CSHCN and demonstrates high predictive power. The SLCAT may be a good alternative for AT the CSHCN population but future studies are required to establish reliability and precision across different providers and healthcare settings.

TBI SCREENING AND REFERRAL THROUGH ISU'S COMMUNITY HEALTH SCREENINGS

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Background: Traumatic Brain Injury (TBI) is a leading cause of death and disability in the United States. However, because there may be no visible signs of injury, TBI's are frequently unreported or misdiagnosed. We conducted a series of TBI and quality of life screenings that identified individuals with potential brain injuries; provided referrals to a primary care provider; and trained a cadre of future health care professionals.

Purpose/Objective: To increase awareness and establish the referral pathway, the TBI team committed to the following objectives:

- Conduct TBI screenings at ISU's community health screening (CHS) events
- Train an interdisciplinary team of student professionals to administer the screening tool
- Follow up with a Quality of Life After Brain Injury (QOLIBRI) survey
- Provide free or low cost TBI primary care provider referrals to uninsured and underinsured participants

Method: In conjunction with ISU's free Community Health Screenings (CHS), an interdisciplinary team of student professionals screened for the likelihood of TBI using the Ohio State University TBI Identification Screening Method (OSU-TBI). Participants who screened likely and were interested in a primary care referral were contacted again, usually within two weeks, to complete QOLIBRI. Results from both instruments were used to indicate the need for a TBI referral to primary care services, with additional referrals if warranted.

Results: Since Fall 2014, 213 ISU students and faculty across several healthcare disciplines have been trained to administer the TBI screening. 608 individuals have been screened during this time period. Two hundred and thirty individuals or 37.8% met the criteria for likely having experienced a TBI. Of those who screened "likely", 75 were already receiving help, not interested in a referral, did not leave a contact number, or were otherwise unreachable. Sixty have completed the QOLIBRI, triggering a primary care referral and additional referrals to ISU counseling and/or speech and language clinics. Health West in Pocatello, and Unity Health in Meridian, have partnered with the IRH to accept TBI referrals for free to low cost primary care services.

Conclusion: ISU's Institute of Rural Health continues to be at the forefront of identifying and coordinating TBI needs and resources in the community. The TBI programs involvement in the CHS events aims to, or has, 1) increased the knowledge and skills of future health care professionals with interdisciplinary trainings, 2) established a protocol for identifying those in need of referrals, and 3) overall strengthened the network of services and supports for TBI in Idaho.

NEEDS ASSESSMENT OF TRAUMATIC BRAIN INJURY IN IDAHO

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Background: According to a report published by the Idaho Trauma Registry, 1,801 head injuries were reported in the state of Idaho during 2014. The World Institute on Disability estimates that just over 2% of the population lives with a disability resulting from a TBI, which means that about 32, 243 Idahoans are currently affected by a TBI.

Purpose: The purpose of this project is to develop, administer, and analyze a statewide needs assessment based on the Traumatic Brain Injury Reauthorization Act of 2014 and the Traumatic Brain Injury State Implementation Grant Program via the Administration for Community Living (ACL), Department of Health and Human Services. The overall purpose of the program is to increase access to rehabilitation and other services for individuals with traumatic brain injury (TBI).

Design/Methods: ISU developed the needs assessment, with both online and paper version, and asked a variety of questions. The online version of the needs assessment survey had the highest percentage of respondents at 77%. The least effective was the direct mailings at only 3% return. This may be in part due to our lack of a database or registry of people in Idaho experiencing a TBI. Surveys handed out at group meetings or in-home care facilities had a return rate of 86%.

Results: The top three current needs most often identified by respondents were (1) social relationships and support (29.7%), (2) financial assistance (27.5%), and (3) TBI Ombudsman Services (26.5%). When asked about specific health care services and if they qualified for health care subsidies only 16.4% responded they qualified for health insurance subsidies. However, 50.9% still stated they were able to afford the services they wanted and only 33.6% responded they have outstanding medical bills. Given that 89.1% of person responding are on Medicare or Medicaid, it is was not surprising such a small percentage report qualifying for subsidies. It is noteworthy that 49.1% of individuals responded they are not able to afford the services they want and need.

Conclusions: The changes occurring in the structure of Idaho's population, and the perceptions reported in the needs assessment, predict a rapidly increasing need for expanded services. Changes in the organization, financing, and delivery of health services are currently beginning to take place in Idaho. For example, Idaho's Statewide Healthcare Innovation Plan (SHIP) is currently under implementation. This Centers for Medicare and Medicaid Services (CMS) grant funded project fosters health system changes to improve health care access, quality, and outcomes. This program is regionally based to accelerate the expansion of patient centered medical homes that improve care coordination and access to services through the use of community health workers, community health emergency medical services, and expanded telehealth services. The SHIP model will provide health care workforce and communications resources that can be aimed directly at the needs of Idaho's traumatic brain injury population in both rural and urban areas. All of these resources will be increasingly critical in meeting the growing demand for services by individuals with a TBI in Idaho.

IMPROVING MENTAL HEALTH LITERACY IN THE COMMUNITY THROUGH IMPLEMENTATION OF STUDENT-DELIVERED MENTAL HEALTH CURRICULUM

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Background: When relating health disparities by state, Idaho ranks 50th in the nation for number of primary care physicians, 44th for rate of suicides, and 39th for number of people lacking health insurance.¹ Additionally, 100% of Idaho's total land mass is designated as a health professional shortage area in mental health.² These confounding factors illustrate a concerning environment for Idaho as pertains to mental health.

Purpose: To improve mental health literacy, Idaho State University Physician Assistant program faculty developed a mental health curriculum to address health disparities through a community-based project. The curriculum aimed to enhance existing monthly interprofessional community health screenings (CHS) by incorporating mental health education.

Methods: The interactive mental health educational session was student-delivered using iPad presentations. Curriculum included instruction on why mental health is important, contributing factors to mental health, recognizing signs of mental health disorders and what to do in mental health crisis. Community participants attending CHS events completed pre and post curriculum surveys assessing knowledge and attitudes regarding mental health. Surveys were identical, other than the post-curriculum survey had one additional question regarding usefulness of mental health education. Additionally, students completed surveys prior to the first CHS event and after the final CHS event of the semester. Surveys contained seven mental health knowledge/attitude statements with a 5-point Likert-scale.

Results: Forty community participants were surveyed, 39 (97.5% response rate) completed pre-curriculum surveys and 35 (87.5% response rate) completed post-curriculum surveys. The mean was determined for each survey statement while pre and post-curriculum results were compared using paired t-tests. All seven survey statements increased in mean. Increases in three statements were statistically significant ($P < .05$) including: "I can recognize signs of mental illness", "I know how to find mental health resources in my community", and "treatment can help people with mental illness lead normal lives". Of 12 students surveyed, 10 (83.33% response rate) completed pre-curriculum surveys, and 11 (91.67% response rate) completed post-curriculum surveys. The mean was determined for each statement. Pre and post-curriculum survey results were compared using paired t-tests. The mean increased on six of seven survey statements. Increases in three survey statements were statistically significant ($P < .05$): "I am comfortable educating a patient about how to recognize signs of a mental health disorder", "I am comfortable educating a patient on how to find mental health resources in the community", and "people are generally caring and sympathetic to people with mental illness".

Conclusions: The results of this study show improvement in the knowledge and attitudes regarding mental health by both community participants receiving mental health education and students delivering curriculum.

CLINICAL CARE COORDINATION IN MEDICALLY COMPLEX PEDIATRIC CASES: RESULTS FROM NS-CSHCN

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Background: Children with medical complexity (CMC) have better health outcomes with care coordination (CC), though the broader impact of CC on CMC and their families is understudied. Our aims are to 1) Describe CC for CMC including sources of assistance and prevalence of support, 2) Determine how CC dynamics, impacts on the CMC and family, and household factors vary according to level of CC, and 3) Investigate which factors are independently associated with receiving clinical CC.

Methods: We used the National Survey of Children with Special Health Care Needs (NS-CSHCN) from 2009-2010 to describe the level of CC for CMC (ages 0-17 years), by source of CC according to CC dynamics, impact on child and family, and household characteristics. Data analyses included chi-square and t-tests to determine differences between level of CC. Factors associated with receiving clinic-based CC were determined using weighted multivariate logistic regression.

Results: Among children with special health care needs, 6.57% were CMC. Of these a quarter (25.73%) received clinic-based CC and most received no CC support (66.47%). In multivariate models, parent/guardians dissatisfied with communication between the child's doctor and other healthcare providers, and those receiving family-centered care were less likely to currently receive clinical CC. CMC more likely to receive clinic-based CC were younger, had lower household income, and reported greater absenteeism from school.

Conclusions: Clinical CC may improve communication between the child's doctor and other health providers, in turn improving the health of CMC and their families. Clinical CC must innovate to reduce student absenteeism for CMC.

ULTRAVIOLET-C LIGHT AND CLOSTRIDIUM DIFFICILE

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Background: Four studies were analyzed to answer the question: for oncology patients, is Ultraviolet-C light irradiation effective in reducing Clostridium Difficile infections compared to not having Ultraviolet-C light irradiation in the hospital setting? One study was a quasi-experimental, interrupted time-series analysis with a comparison arm, one was a case control study, one was a Pragmatic, cluster randomized, multi-center, crossover trial, and the last one was a prospective cohort study. The sample sizes ranged from 39 (cohort study) to 288 (case control study) to 541 (quasi-experimental) to 21,395 (pragmatic). The quality of evidence was high in all the studies except one, which provided good evidence on the use of UV-C devices on multiple drug resistant organisms, but found little change when it came to C. diff. The three other studies proved through the evidence that UVGI was associated with a 25% decrease in CDI incidence rates (quasi study, IRR of 0.75 and CI of 0.55-1.04), that chemotherapy was not a risk factor in the development of CDI but antimicrobial therapy was (case control study), and that UV devices reduce the environmental bio-burden of MRSA, VRE, C. diff, and Acinetobacter (pragmatic study).

Objective: The objective of this research was to answer the question: for oncology patients, is Ultraviolet-C light irradiation effective in reducing Clostridium Difficile infections compared to not having Ultraviolet-C light irradiation in the hospital setting?

Methods: Using the CINAHL complete database, articles were found using Boolean terms connecting Ultraviolet-C light and Clostridium Difficile. Search terms included: Cancer, malignancy, Tumor, UV-C light UV-C radiation, Clostridium Difficile, C. Diff, GI bacterial infection, and C. diff spores. Thirty-one total hits were found for the research results, four of those thirty-one were reviewed for research.

Results: Evidence from these research articles indicate that using Ultraviolet-C light disinfection/irradiation in rooms where patients previously had Clostridium Difficile infections reduced the incidence of Clostridium Difficile in patients within the hospital setting.

Conclusions: For oncology patients, Ultraviolet-C light irradiation is effective in reducing Clostridium Difficile infections compared to not having Ultraviolet-C light irradiation in the hospital setting. Recommendation: Instead of using a large and expensive apparatus for UV-C light, miniaturizing the device so that it can be used in regular cleaning of patient rooms that had isolation orders, would improve the disinfection process. A second option or used in conjunction would be to install a UV-C device outside C-Diff isolation rooms for nursing staff to use. This could potentially decrease the costs of using gloves, gowns, masks, and hair nets each time a nurse needs to enter an isolation room.

A COMPARISON OF BIOSURGICAL DEBRIDEMENT (MAGGOT/LARVAL THERAPY) OF NECROTIC TISSUE VERSUS SURGICAL DEBRIDEMENT IN REDUCING OCCURRENCE OF INFECTION AND RECOVERY TIME.

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Background: Biosurgical debridement (maggot/larval therapy) has been used and studied as an alternative option for wound debridement of necrotic tissue throughout history, and is still used today. Exploring alternative therapies is important due to the advancement of antibiotic resistant microbes. Surgical debridement can cause damage to underlying healthy tissue, slow healing time, increase risk of pain, and lengthen the period that wounds are vulnerable to infection.

Purpose/Objective/Hypothesis: Evidence will be evaluated to conclude if biosurgical debridement is a method that is supported as a practice in our contemporary clinical setting. Our hypothesis is that biosurgical debridement will offer advantages (more economic, better patient outcomes, reduced occurrence of pain and reduced risk of pain medication dependence) over other methods, such as surgical debridement.

Design/Methods/Scope: A search was conducted using several databases. Search terms included biosurgical debridement, wound debridement, review, and systematic review. Databases searched and the number of search results found included PubMed (15 results using search terms “biosurgical debridement”), CINAHL search #1 (4 results using search terms “biosurgical debridement”), CINAHL search #2 (11 results using search terms “wound debridement review”), Google Scholar (17,200 results using search terms “systematic review of wound debridement”), and National Guideline Clearinghouse (5 results using search terms “wound debridement”). The UpToDate database was searched using the search terms “wound debridement”, but the number of results was not listed. Four studies were reviewed for this project.

Results: Biosurgical debridement of chronic wounds reduces occurrence of infection and reduces recovery time. Two studies were systematic reviews, one was a systematic review with meta-analysis, and the last was a meta-analysis with a cohort study. Sample sizes ranged from 111 and 612 (cohort study with meta-analysis), 800 (Systematic Review with Meta-Analysis), 959 (systematic review), and 1222 (systematic review). The quality of evidence ranged from moderate to high. Bio-surgical therapy shortened healing time and rate (RR of 1.80 and SMD of -0.95, both statistically significant), reduced amputation (RR 0.43, statistically significant), and chance of healing was 53%-77% higher than comparison group. Bio-surgical treatments were more cost effective, shortened healing time by 15.99 days, and reduced risk of injury to underlying healthy tissue from sharp surgical instruments. This kind of treatment has an innate ability to overcome drug resistance and targets only damaged and necrotic tissues.

Conclusions: The results were conclusive and supportive of biosurgical debridement as a superior method for debridement of necrotic tissue. Improved patient outcomes, including less healthy tissue damage and decreased recovery times, may lead to less pain medication dependence.

PROBIOTIC ADMINISTRATION AS A MEANS TO LOWER INCIDENCE OF INFECTION FOR ADULT ABDOMINAL SURGICAL PATIENTS

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Background: Increase optimal gastrointestinal health of patients with probiotics prior to abdominal surgical procedures indicated by a decrease in postsurgical infection rates.

Hypothesis: The administration of probiotics prior to elective abdominal surgery lowers the incidence of postsurgical infections. Balancing the microbiota of the gastrointestinal tract prior to abdominal surgery will increase the overall health and absorption of nutrients. The health of a patient with a need for gastrointestinal surgery indicates decreased health and balance of microbiota with probable administration of postsurgical antibiotics to prevent infection that will further diminish the balance of microbiota. Optimizing the balance of microbiota prior to surgery lessens the impact of surgical and pharmaceutical imbalances to the microbiota and increasing health of the microbiota in the gastrointestinal tract leading to enhanced recovery and healing of the patient.

Methods: A literary review was conducted using Google Scholar, CINAHL and PubMed databases yielding 4 meta-analyses that qualified for this research topic. One author reviewed all studies found among the searches with requirements of pertaining to probiotics or microbiota, gastrointestinal or abdominal surgery, infection, and within the year 2013 to present.

Results: The four meta-analyses considered from 13 randomized control trials with 963 patients to 28 randomized controlled trials and 2511 patients with varied lengths of administration of probiotics and time in relation to surgery. The statistical measures used were both risk ratio and odds ratio with confidence interval of 95% in all four analyses. Two of the meta-analyses sorted statistics of infections into subgroups of surgical site infections (SSI) or wound infections, urinary tract infections (UTI), respiratory infections, along with combined or overall statistics on infections. The results of one meta-analysis was risk ratio (RR) of 0.63 (95% CI: 0.41-0.98) for SSIs, RR of 0.29 (95% CI: 0.15-0.57) for UTIs, and combined infections RR of 0.49 (95% CI: 0.35-0.70). The other two meta-analyses focused on infections statistics related to postoperative sepsis infections to determine if probiotic administration lowered the incidence of infections in abdominal surgery for adults. The results for one of the meta-analysis was RR of 0.62 (95% CI: 0.52-0.74) and a 38% reduction of risk for developing postoperative sepsis within a month of abdominal surgery with the administration of a probiotic/symbiotic.

Conclusions: The meta-analyses reviewed supported decreased infection rates with administration of probiotics when considering postoperative infection rates in abdominal surgery for adult patients. More studies and evidence need to be presented to narrow down the most effective dose, probiotic species, and timing of administration in order for probiotics to be administered for evidenced based practice related to abdominal surgery.

THE EFFECTS OF CHEWING GUM ON POSTOPERATIVE ILEUS FOLLOWING ABDOMINAL SURGERY

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Background: Enhanced recovery after surgery (ERAS) is a multimodal, multidisciplinary, evidence-based approach to the perioperative care of patients. Bowel complications, particularly postoperative ileus is among the most common problem following abdominal surgeries. This complication prolongs recovery, delays hospital discharge and increases patient expenses. Research shows that chewing gum postoperatively improves early gastrointestinal function. This is a form of sham feeding, where the food is chewed but does not enter the stomach. This is suggested to increase cephalo-vagal stimulation, which leads to increased gastrointestinal motility.

Purpose: The purpose of this study was to answer the following question, in early recovery patients, does chewing gum compared to standard postoperative care reduce postoperative ileus following abdominal surgery?

Methods: We explored the available literature on the implementation of chewing gum during the postoperative period and its effect on preventing prolonged postoperative ileus by initiating an early return of gastrointestinal function. The search terms “abdominal surgery”, “chewing gum” and “postoperative ileus” were used for research in the following databases: Cochrane Library, PubMed, Medline and Clinical Key. The number of results obtained from each search was limited by publication date (less than 5 years old), language (English only) and peer-reviewed and full text only. A total of 1,087 results were obtained from the 4 separate database searches. The study criteria included a population of post-abdominal surgery in adults, an intervention of chewing gum compared to standard postoperative care (no chewing gum) and the measured outcome of time to first flatulence. A total of 4 meta-analyses were identified and reviewed.

Results: A total of four, systematic review/meta-analysis studies were reviewed. The meta-analyses examined anywhere from 12 to 77 randomized controlled studies and the sample sizes ranged from 1,019 to 8,293 total participants. The quality of evidence was low in all four studies, due to a high risk for bias; as participants cannot be blinded to the intervention (chewing gum) and the outcome (time to first flatus) is self-reported. There was a reduced number of hours to first flatus (MD -10.4 and -9.21 in 2 meta-analyses, both statistically significant), with the use of chewing gum in postoperative patients.

Conclusions: There is consistent evidence that chewing gum after surgery improves digestive system recovery and reduces time to postoperative ileus. The studies reviewed are of poor quality, due to a high risk for bias as participants cannot be blinded and outcomes are subjective. The results are not as reliable as we would like. It is important to further explore the use of chewing gum postoperatively in studies with more participants, of better quality, and include different types of surgery.

SINGING THERAPY AND CYSTIC FIBROSIS

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Background: Cystic fibrosis is a progressive, autosomal recessive exocrine gland disorder characterized by decreased chloride secretion and increased reabsorption of sodium and water across epithelial cells. The resulting increased viscosity of respiratory and other exocrine secretions is difficult to clear, and it promotes bacterial infection and inflammation.

Therapeutic management of cystic fibrosis involves airway clearance techniques, targeted gene therapy, surgery, pancreatic enzymes, and other medications. It is understood that compliance with these intensive treatment modalities is low. Previous studies report that cystic fibrosis patients experience a lower quality of life than people without the disorder, regardless of adherence to treatment regimens. It has been suggested that singing may provide adequate respiratory exercise in patients with cystic fibrosis (Irons, Petocz, Kenny, & Chang, 2016). This study is to demonstrate the effectiveness of specifically-designed singing interventions as an adjunct therapy to standard treatments for cystic fibrosis.

Purpose/objective/hypothesis: Nurses routinely encounter patients with Cystic Fibrosis (CF). Nurses need to understand CF and know what interventions to implement for improved respiratory function and quality of life. Singing therapy demands to be researched in order to acquire the evidence of improvement for CF patients.

Design/method/scope: Databases searched: Academic search complete, PubMed Health, Cochrane Library, CINAHL, Clinical Key Search terms: Cystic fibrosis, traditional therapy, singing therapy, symptoms, relief, treatment, improved respiratory function Number of hits: 1-8000 Studies Reviewed: 2 RCT's, Literature Review, Systematic Review

Results: The authors concluded that singing therapy did show improvement in patients with CF. Participants in the singing group demonstrated a greater increase in respiratory muscle strength than the control group. Data shows significant increases MIP (inspiratory pressure), MEP (expiratory pressure) and QoL (quality of life) in the treatment groups. The findings demonstrated that children and young people with CF perceived singing as having contributed towards improved respiratory health and psychological well being. Some of the studies reported that 40% showed an improvement in respiratory function, 60% improved in self-esteem, and over 90% of participants said they were happy and felt calm and enjoyed the program.

Conclusions: There is insufficient amount of evidence. Even though the studies were thorough, there is not enough studies on this topic. Most of the studies available are carried out by similar groups and would be critical to our study to have different perspective. Even though the study lacks diverse perspective, the studies found supports singing therapy and the positive result of the intervention.

PATIENT ADHERENCE AND HOW IT AFFECTS COMPLICATION RATES IN TOTAL SHOULDER ARTHROPLASTY

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Background: Total shoulder arthroplasty (TSA) has proven to be a safe and effective surgical intervention for relieving pain and loss of function due to degenerative processes. Within the past decade the indications for TSA have expanded and the surgical implants and techniques have improved making this treatment a more utilized option for treatment of multiple afflictions. The rate of medical and surgical complications from TSA may escalate in relation to the annual number of procedures performed. Studies have established a direct correlation between complications and the presence of comorbidities and the level of adherence to preoperative education received by the patient.

Purpose: The purpose of this scholarly project was to determine if the degree of patient adherence to preoperative recommendations for TSA patients affects the complication rate within the first thirty post-operative days.

Methods: Two orthopedic clinics agreed to participate in this project. Patients were invited to complete an anonymous paper and pencil survey. Demographic information, the Age-Adjusted Charlson Comorbidity Index (ACCI), incidence of complications and adherence to 15 elements of pre-operative patient directions reported. All participants had to be over the age of 18 and the recipient of a primary unilateral TSA during 2017. Sixty-one patients were eligible to participate in this survey.

Results: Forty patients completed and returned the surveys (response rate = 66%). Mean age was 62 years old, with 30% receiving Medicare and 68% being male. ACCI score average was 2.8 on a scale from 0-33 with age positively and moderately strongly related ($r=0.5$, $p<0.001$, $r^2=0.25$). Thirteen percent ($n=6$) of the patients experienced at least one complication following TSA; the most frequent complication was neuralgia ($n=3$). Total adherence score average was 19.63 (SD=3.1).

Conclusions: Evaluating the quality of pre-operative education and subsequent patient adherence is correlated with improving patient post-operative outcomes. In this project, patient adherence to pre-operative instructions was less than optimal. However, the group had similar complication rates as those reported elsewhere. The ACCI was unusually low for a group with an average age of 62. This project establishes the need for improvement in the pre-operative educational process to ensure optimal adherence. Further investigation into the barriers of patient adherence is warranted.

THE EFFECT OF PERINEAL MASSAGE ON THE OCCURRENCE OF EPISIOTOMY AND PERINEAL TEARING

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Background: Perineal trauma occurring during labor can result in poor health outcomes for women worldwide. These outcomes include urinary and anal incontinence, dyspareunia, and perineal pain. Severe pain as a result of perineal trauma is subsequently treated with opioid analgesics. These substances can be highly addictive. Techniques to avoid perineal trauma should be investigated in order to reduce health complications and treatment using opioid analgesics. In clinical practice today, controversy exists regarding the effects of perineal massage in reducing the occurrence of episiotomy and perineal tearing. Collection and evaluation of the evidence is needed to determine the possible benefits of perineal massage among laboring women.

Objective: To determine if perineal massage can be utilized to reduce the occurrence of episiotomy and perineal tearing among laboring women.

Design/Methods/Scope: In collecting evidence, a thorough database search was conducted using CINAHL Complete, PubMed, and Google Scholar. Search terms included perineal massage, labor, trauma, and episiotomy. Thirteen studies from the search met inclusion criteria for the topic of interest, with data extracted and evaluated by a single reviewer. From these studies, four randomized control trials were selected in support of the research question. A total of 917 women were analyzed in these studies. Criteria included adequate sample size, minimum of 5 minute massage/intervention performed, and a control group with either no intervention or a significantly different approach.

Results: Evaluation of the efficacy of perineal massage in reducing episiotomy and perineal tearing was analyzed for each of the four studies examined. The studies varied in the length of time in which perineal massage was conducted. Two studies demonstrated a significant reduction in occurrence of episiotomy and perineal tearing with the application of perineal massage, while two studies demonstrated no significant reduction in perineal tearing and episiotomy occurrence. When perineal massage was performed for a total of five, 10 minutes intervals or for the duration of the second stage of labor, there was a significant reduction in perineal trauma. No reduction in episiotomy and perineal tearing was found when perineal massage was utilized for less than 15 minutes during labor.

Conclusions: There is strong evidence supporting the use of perineal massage to prevent episiotomy and perineal tearing when performed for a total of five, 10 minutes intervals or for the duration of the second stage of labor. When applied in this manner, perineal massage can reduce perineal trauma and the ensuing detrimental health effects. In addition, perineal massage can lead to a reduction in the use of opioid analgesics for treatment of postpartum perineal pain.

TIMING OF REMOVAL OF URINARY CATHETER FOLLOWING HYSTERECTOMY SURGICAL PROCEDURE

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Background: Hysterectomies are the most common major gynecological procedure performed among women in the United States. Following the surgical procedure, women are typically admitted to a postsurgical unit for one to two days. Before the operation, it is standard practice to insert an indwelling urinary catheter in order to assess urinary output, prevent postoperative urinary retention, and to improve the surgical view for the surgeon by keeping the bladder out of the surgical site. There is debate however, as when exactly is the best time to remove the catheter. Immediate removal of the catheter following surgery is thought to reduce the incidence of a catheter acquired urinary tract infection (CAUTI). Delayed removal (after 24 hours) is thought to increase the risk of CAUTIs, but decrease the risk of postoperative urinary retention.

Objective: Hospital acquired CAUTIs have been associated with poor patient outcomes, increased length of stay, and increased hospital costs. Our objective was to determine if immediate removal of the urinary catheter correlates to a lower incidence in CAUTIs compared to late removal following uncomplicated hysterectomy procedures.

Methods: A total of 11 studies were found related to this topic. We chose to use four of them due to inclusion and exclusion criteria, and the overall strength of the studies. One of the chosen studies was a systematic review, and the other three were randomized controlled trials. Inclusion criteria were: women undergoing uncomplicated total hysterectomy for benign conditions, removal of catheter immediately after surgery and 24 hours postoperatively, and urine specimen collection at least two days postoperatively. Exclusion criteria were: positive preoperative urine cultures and a complication of the procedure.

Results: Immediate removal of the urinary catheter after a hysterectomy results in a lower incidence of CAUTIs in comparison to removal after 24 hours.

Conclusion: The evidence supports the notion that immediate removal of the urinary catheter results in a lower incidence of CAUTIs compared to delayed removal. However, more evidence needs to be researched to determine the risks and benefits of immediate removal. Immediate removal has been associated with an increased incidence of postsurgical urinary retention. Ultimately, the question is if the benefits of a decreased incidence of CAUTIs outweighs the risks of an increased incidence of postsurgical urinary retention.

PROGRESSIVE CLINICAL SUPERVISION PRACTICES FOR MILLENNIAL CLINICIANS

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Objectives: Clinical supervisors are faced with the challenges of adapting to the learning styles of the millennial generation, and the necessity for increased efficiency and effectiveness of instruction with decreasing amounts of supervision time. With current technological advances and the ease with which technology can be incorporated into the clinical supervision model, it is incumbent that clinical supervisors remain up-to-date on the most effective modalities for providing supervision with both traditional and more contemporary methods to the current generation of clinicians. The objectives of this poster include identifying multiple modalities for provision of supervision to the millennial clinician, methods for facilitating clinical independence and self-evaluation of clinical performance, and methods for evaluating effectiveness of clinical instruction. These objectives and information provided relate to multiple disciplines that involve clinical education.

Data Sources: An analysis of articles and research related to generational learning and clinical training was conducted using EbscoHost and Google Scholar to identify related literature. Specifically research targeted general learning styles of the millennial generation and associated teaching strategies, as well as more contemporary methods for providing clinical feedback. Clinical experience and information we gathered in the published survey study we conducted regarding use of iPads for video-review feedback were also used to compile the components outlined in this poster.

Review Methods: Articles were reviewed based upon relevance to clinical learning, interactions, and contemporary instructional methods.

Results: The content of this poster was compiled based upon our review of the literature, our study regarding video-review feedback in clinical instruction, and our personal experience as clinical instructors (combined 25+ years experience). The results of this compilation of research and clinical experience provide supervisors of various disciplines with contemporary tools and methods for evaluating student clinicians and increasing collaborative learning. Methods of incorporating technology easily and effectively are outlined so that they can be implemented immediately by the attendees, as well as methods for individualizing instruction based upon the learning style preferences of the student. Modifications of delivery and content of verbal and written feedback are also presented to ensure that students receive maximal benefit. Methods for effectively evaluating supervisory practices are also outlined.

Conclusions: Modification of supervisory methods to facilitate collaboration and involvement with the current generation of student clinician is imperative. Education delivery across the continuum and disciplines is continually adapting to meet the needs of changing learning styles and to ensure the most effective practices. This poster presentation will provide current clinical supervisors with tools that will allow them to easily adapt to these changes in learning, as well as improve their efficiency with providing supervisory feedback by increasing student/supervisor collaboration.

LANGUAGE SAMPLING AND STUDENT CONFIDENCE

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Objectives: While it is important that graduate students in SLP learn how to effectively obtain and analyze language samples (Kroecker et al., 2010), there are few studies that examine student language sampling practices and student confidence with the samples they have collected. Graduate students in speech-language pathology should learn how to effectively obtain and analyze language samples to ensure that the sample obtained is a truly representative sample of the child's language. To address this a six-month pilot study was undertaken by undergraduate and graduate SLP students from the Idaho State University HATCH Lab (N=8). The students took monthly language samples of preschool children who are DHH. After completing the samples, students took a questionnaire related to the language facilitation techniques used and students' confidence in eliciting a representative language sample from a child who is DHH. After this six-month pilot study, the questionnaire was edited for clarity and restructured to an online format. The updated questionnaires were collected each month from a new set of undergraduate students from the HATCH Lab (N=6).

Data Sources and Review Methods: A literature review was conducted through CINAHL Complete and Idaho State University Library databases in general using the major search terms "language sampling" and "confidence." We sought studies that considered confidence levels of SLPs regarding language sampling. Studies that discussed findings about language sampling as an assessment or treatment tool in general were used as well.

Results: The data was recorded and analyzed using descriptive statistics. This presentation will examine student clinicians' confidence in language sampling over time as a function of the type of language facilitation techniques used while collecting samples. Findings suggest that student's confidence increases over time with the number of language samples taken. Also, confidence increased for using all language facilitation techniques (LFTs). Students appeared to feel the least confident with the LFT Information Talk, and the most confident with Recasting. There was no statistically significant relationship between confidence and the time it took to transcribe and analyze samples by student clinicians ($p = .450$, $r = .190$).

Conclusions: On average, student clinician confidence did increase overtime. However, when the students were examined individually, it was clear that confidence fluctuated over time for some students. This shows that language sampling, and language sampling support from clinical supervisors, should be an ongoing, dynamic process with regular feedback and opportunities for discussion.

SPEECH TREATMENT OUTCOMES GENERATED BY HIGH FREQUENCY WORDS, ACADEMIC VOCABULARY WORDS, AND NONWORDS

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Objectives: Greater treatment effects have been observed when late-acquired words, as compared with early acquired words, are selected for speech treatment (Gierut & Morrisette, 2012). Alternatively, nonwords have also been used effectively in speech treatment (Cummings & Barlow, 2011) as they activate sublexical structures associated with sounds and sound sequences. The present study sought to compare the outcomes of speech treatment using three types of words: high frequency (HF) words, late-acquired academic vocabulary (AV) words (Beck, McKeown, & Kucan, 2013), and nonwords (NW). Each word type differed in its lexical and sublexical properties in order to test what word characteristics generated the greatest amount of system-wide phonological change in children with speech sound disorders (SSD).

Methods: Participants. Twenty-four children with moderate to severe SSD were equally divided into three treatment groups. Treatment stimuli. Depending on the child's treatment group assignment, the treatment target sound was presented in either HF words, NW, or AV words. Treatment procedure. Treatment was delivered in two phases: imitation and spontaneous production (Cummings & Barlow, 2011; Morrisette & Gierut, 2002). All sessions were 50 minutes in duration and typically occurred twice a week.

Results: Treatment Sound Effect Size: Standard Mean Difference (SMD) d . Children in the HF condition demonstrated the largest effect of treatment on their treated sound production accuracy, with a group d average of 12.65. Children in the NW condition had a group d average of 9.54. Children in the AV group had a group d average of 6.02. Treatment Sound Learning Rate and Cumulative Intervention Intensity. When the total average number of trials administered to each child was divided by the pre-to-post treatment change in treatment sound accuracy scores, a different picture of treatment effectiveness was observed. Namely, to gain one percentage point of production accuracy, children had to complete 84 trials in the NW condition and 86 trials in the HF condition; children needed to complete 137 trials in the AV condition.

Conclusions: All three treatment word types elicited positive phonological change in the children. Overall, children in the NW condition performed the most consistently as a group, and demonstrated the greatest gains in generalization and learning rates. As a result, it was determined that the NW were the best overall speech treatment stimuli in the present study. Thus, focusing solely on the phonological form of a treatment word, without any associated lexical information, appeared to support the greatest amount of learning of the treated sound, as well as system-wide phonological change.

WORDS COUNT: USING DATA TO UNDERSTAND HOW BOOK CHOICE INFLUENCES WORD USE OF PRESCHOOL CHILDREN WHO ARE DEAF/HARD-OF-HEARING

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Background: Children who are Deaf/Hard-of-Hearing (DHH) often have challenges learning new words, particularly when those words are introduced in noisy classroom settings (Blaiser, Nelson, & Kohnert, 2014). Books are often used in classroom settings as a way to expose children to new vocabulary. Given that preschool is a particularly important time for children to learn new words, it is important for educators to understand how the books they choose influence the words that children learn and retain from these experiences.

Purpose/Objective/Hypothesis: This project examines the vocabulary of preschool children who are Deaf or Hard-of-Hearing from monthly story retells. We will examine the rate of change of vocabulary of the children as well as the relationship between the vocabulary modeled in books (such as number of different words (NDW) and number of total words (NTW) and the vocabulary used in 13 preschool-aged children with permanent hearing loss.

Design/Methods/Scope: Language samples utilizing a book retell task were collected from the children on a monthly basis. The book retell was elicited from the child by showing a picture of a book that had been presented in class. The research assistant obtained a language sample, then analyzed the sample for Mean Length of Utterance (MLU), number of total words (NTW) and number of different words (NDW) for each sample. Each book that was used was also analyzed in terms of NDW and NTW.

Results: There were large discrepancies between the books in the vocabulary that was modeled ranging from 52-852 total words (mean: 495.8) and 32-147 different words (mean: 101.7). On average, children made progress in both vocabulary metrics (NDW and NTW) over time but there was significant variation between the children's vocabulary levels. For children with higher vocabulary levels, results show positive relationships between books that were selected and child vocabulary measures; however, children with lower vocabulary levels had more variability and did not show a clear relationship between book vocabulary and vocabulary use/retention.

Conclusions: Educators, families, and clinical professionals have an opportunity to utilize books to teach new vocabulary to children who are Deaf/Hard-of-Hearing. For children with higher level vocabulary skills, it is important to consider the vocabulary that is being modeled as it has significant impacts on the vocabulary that the child retains and uses.

AN EVENT-RELATED POTENTIALS STUDY OF PLURAL -S PROCESSING IN SCHOOL-AGE CHILDREN ACROSS TWO AGE GROUPS

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Objective: This study evaluates potential developmental changes in the neurolinguistic patterns in the processing of the plural morpheme -s in typically developing 5- to 7-year-olds and 10- to 12-year-olds, with particular focus on any differences across ages in semantic and syntactic processing.

Background: Few studies have specifically investigated the underlying neurolinguistic processing of grammatical morphology in children. At this time we do not know whether morphology is processed semantically or syntactically in children, nor whether there is a developmental trajectory of neurolinguistic patterns. Researchers have been using neurophysiological methods, including electroencephalography (EEG), to examine language processing. An EEG approach especially suited to measuring neurolinguistic activity is the event-related potentials (ERPs) technique. ERPs are brain waves that are extracted from an EEG and are time-locked to a particular stimulus type. Thus, ERPs reflect the brain's response to a particular stimulus of interest and allow researchers to examine various components that index different aspects of language. The N400 is a well-documented negative-going ERP wave peaking around 400 ms post-stimulus onset. This peak measures responses to semantic incongruity/error (e.g., Kutas & Federmeier, 2011) even in very young children (Friedrich & Friederici, 2005). The P600 is a well-documented positive-going wave peaking at about 600 ms post-stimulus onset. This peak measures responses to syntactic incongruity/error or complexity in adults (e.g., Hagoort et al., 1993; Coulson et al., 1998; Osterhout & Holcomb, 1992) and children (e.g., Friederici & Hahne, 2001; Silva-Pereyra et al., 2005).

Method: Participants wore a 128-electrode head-net during three experimental tasks. During task 1 was a picture word matching task involving the plural -s morpheme. Task 2 was an auditory-only, sentence grammaticality judgment task. Children used a button press response to indicate their behavioral response and EEGs were recorded during the tasks.

Results: Based on visual inspection of the grand average topographic ERP plots for the PPW and PS tasks, latencies and regions of potential N400 and P600 components were identified and ANOVAs were calculated. For Task 1 The 6-8 yo group exhibited a significant difference between congruent and incongruent conditions from 500 -900 ms in the right parietal and right central-parietal region. The 10-12 yo group exhibited a significant difference between congruent and incongruent conditions from 550 -650 ms in the right frontal-central region (N400). There was an age by condition interaction in the right parietal region, from 500-600 ms and from 700-750 ms, due to a lack of difference between conditions for the 10-12 yo group. For Task 2, no significant differences were found.

**USING TECHNOLOGY TO FACILITATE STUDENTS' LANGUAGE SAMPLE ANALYSIS SKILLS:
AUTOMATING INSTRUCTOR FEEDBACK**

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Language sample analysis has long been considered an important part of a comprehensive assessment of language skills in children (e.g., Haynes & Pindzola, 1998; Owens, 2004; Price, Hendricks, Cook, 2010) and provides contextualized information on language usage that is not accessible through norm-referenced testing. However, given the results of their recent survey of school-based SLPs, Pavelko et al. (2016) concluded that many do not use frequent language sample analysis in practice. The most frequent barrier to language sampling that was identified was limited time. Two of the other barriers identified were limited training/expertise and limited recognition as a valid assessment measure. These barriers appear to be related. Language sample analysis is a skill, and as with any skill, it requires feedback and practice to become proficient and efficient. Once one is efficient with a skill, limited time may not be as large of a barrier as it once was. Further, if one does not use language sample analysis regularly it may be difficult to appreciate the information that it provides as an assessment tool. Increasing students' skills with language sample analysis may be one way to address the limited use of this tool in actual practice. However, the teaching of language sample analysis is very time consuming specifically with regard to providing students with feedback on their performance. This challenge limits how often individualized feedback is provided, how many language samples students actually, and how comfortable they are with this skill in their future practice. Some instructors have reported spending hours grading language samples line by line manually. Others have reported having students do a language sample analysis, briefly reviewing them and having students use an answer key in order to assess their performance and learn from any errors. This method requires students to make time to review those answer keys and lacks accountability. In this poster, we will demonstrate and share how we have automated the process of grading students' language sample analyses using the quiz tool in the LMS system at Idaho State University through the Moodle LMS. Although an initial time commitment was required for setting up the samples, once the system was set up, it has been used for multiple classes, considerably reducing the amount of time the instructor needs to provide feedback, while still providing individualized feedback to each student about their accuracy. How this may impact student learning and student confidence in language sample analysis will be discussed.

A COMPARISON OF NARRATIVE CONTENT ANALYSIS METHODOLOGIES IN THE ORAL AND WRITTEN NARRATIVES OF FOURTH-GRADE CHILDREN

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Background: For children with language impairment (LI), narrative development may fluctuate in comparison to children with typical language (TL). Fey et al. (2002) found that the gap in narrative skill between children with LI and TL is wide during kindergarten, narrows at second grade and widens at fourth grade. Koutsoftas and Gray (2011) argued that typical story grammar measures are insufficient for assisting children with LI to meet curricular writing standards.

Methods: We compared three methods of assessing oral and written narrative macrostructure in typically developing fourth graders to determine whether these methods assess the same or different aspects of narrative macrostructure. We predicted positive correlations across methods, as they analyzed the same narratives. We additionally predicted that the Story Levels and Percent of Dyadic Constituents approaches would be more highly correlated with each other than with the Index of Narrative Complexity (INC) scores. We also compared the productivity and complexity of oral vs. written narratives to identify modality differences for typical fourth-graders, as demands for written narrative production increase in higher grades. This may assist clinicians in developing appropriate treatment targets for children with LI who are at risk for academic deficiencies in narrative production. We predicted 1) that oral narratives would contain more words, more T-units and more constituents per story than written narratives; and 2) that written narratives would exhibit greater complexity with a higher percentage of dyadic constituents and higher story level ratings than oral narratives. Prior research also indicated more complexity in written than in oral which would lead to the expectation of a higher percentage of dyadic constituents. The oral and written narratives of 21 fourth-grade children were analyzed. Narratives were elicited using two pictures prompts and were transcribed and scored using the 3 scoring methods: Story Level, Percent Dyadic Constituents, and INC.

Analysis and Results: Non-parametric correlations indicated that the scoring methods were not significantly correlated for oral narratives. The correlations were significant between the Story Level and Percent Dyadic Constituents methods for written narratives only. Paired t-tests indicated that both productivity and complexity were greater in oral than in written narratives. Results suggest that the 3 methods of analysis are likely measuring different aspects of narrative production and may make different contributions to narrative assessment. Comparisons between oral and written narratives suggest that for typical fourth-graders, oral narratives are better developed than written narratives, although this may change with as the written modality improves. Results with typical children highlight the need to address both oral and written narratives with older children with language impairments.

TRAINING PRACTICES FOR SPEECH-LANGUAGE PATHOLOGY STUDENTS

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Background: Language sampling is widely accepted as a gold standard of clinical practice for speech language pathologists (SLPs; Heilmann, Nockerts, & Miller, 2010; Miller, Andriocchi, & Nockerts, 2016). Despite the inherent value of language sampling, clinicians have decreased their use of them in the last twenty years (Pavelko, Owens, Ireland, & Hahs-Vaughn, 2016). Clinicians report time, lack of computer resources, lack of training and expertise, and financial constraints as barriers for collecting and analyzing language samples on a consistent basis (Kemp & Klee, 1997; Pavelko, Owens, Ireland, & Hahs-Vaughn, 2016). Up to now, very little research has been done examining the state of language sampling training practices at the university level.

Purpose/Objective: The purpose of this study was to examine current training practices for language sample collection, transcription, and analysis in programs for speech-language pathology students. This study sought to identify current training practices for CSD students from the perspective of both clinical and academic faculty. A better understanding of the type and amount of training that graduate students are provided with could be useful in creating better training in clinic and coursework that may carry over to professional practices.

Design/Methods/Scope: An electronic questionnaire was created that comprised of 49 questions regarding demographics for both clinical and academic faculty, barriers to language sample training, current training practices, and rating-scale questions. The questionnaire was distributed to approximately 266 universities in the United States with Master's level programs in speech-language pathology.

Results: 160 clinical and/or academic faculty members responded to the questionnaire. 40% of those who completed the questionnaire either disagreed or strongly disagreed with the statement, "In general, I believe students have adequate training to collect and analyze language samples." In contrast, 38.2% of academic faculty did not require collection or analysis of language samples in graduate courses, 40.5% did not require it in undergraduate courses, and 13.2% of clinical faculty did not require it in clinic. Further results, including a description of the language sampling training practices including frequency of collection, length of samples, transcription methods, and training protocols will be discussed. The relationship between class size and language sample analysis methods and the factors that contribute to professors' and supervisors' decisions related to language sampling will also be discussed.

Conclusions: There appears to be inconsistency between the amount and type of language sample training that is being provided, and what faculty believe is adequate for students as they move to the professional field.

MORPHEME USE OF PRESCHOOL CHILDREN WHO ARE DEAF OR HARD-OF-HEARING

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Background: The preschool years have shown to be a critical time frame for the emergence and acquisition of grammatical morphemes – the smallest units of language that cannot be divided. The rate of a child’s morphological growth between three and five years of age, directly impacts language proficiency. Due to reduced and/or delayed auditory access, many preschool children who are deaf or hard-of-hearing (DHH) exhibit a deficiency in morpheme production during oral communication and often lag behind their same-age hearing peers in morphological development. Increased understanding of the morphological abilities of preschool children who are DHH can guide speech-language pathologists’ clinical decision making, shape optimal developmental outcomes, and possibly prevent long term comprehensive services for this population in the future.

Objectives: Examine the morphemes used in obligatory contexts over time by preschool children who are DHH.

Data Sources: Publications associated with the American Speech-Language Hearing Association (ASHA) such as American Journal of Speech Language Pathology, Journal of Speech, Language and Hearing Research, Language Speech and Hearing Services in Schools, and ASHA special interest group 9 (SIG 9) – Hearing and Hearing Disorders in Childhood. Additional, high quality scientific articles published in peer reviewed journals were also reviewed.

Methods: Seventeen preschool children with permanent hearing loss participated in monthly language samples. The first (Time 1) and the last (Time 2) language samples collected from each child in a one year period were analyzed to examine the accuracy, error and omission patterns of the morphemes used at these two time points. Target morphemes were selected based on current literature identifying specific morphemes that are challenging for children who are DHH, but developmentally appropriate for children ages three to five years.

Results: There were increases from Time 1 to Time 2 of morphemes produced. Eleven articles were evaluated for morpheme production in children; however, only five of the eleven articles met inclusion criteria for age and context. Children from this sample specifically demonstrated difficulty with high frequency morphemes such as plural – s or possessive – s. They also struggled with morphemes that share the grammatical property of tense such as (1) copula be (My dog is big), (2) auxiliary be (The boy is swimming), (3) Third person singular – s (The boy kicks the ball), (4) Auxiliary do (Does she want to go?) and (5) Past tense – ed (They jumped high). Omissions comprised the majority of morpheme errors produced in obligatory context, indicating that morphemes are not acoustically salient.

Conclusions: There is strong and consistent evidence to demonstrate that children who are DHH lag behind in developing morphological skills at the same rate as their hearing peers. Clinical implications for assessment and intervention with children who are DHH will be discussed.

SUBORDINATE CLAUSE PRODUCTION IN THE NARRATIVES OF SCHOOL-AGE CHILDREN WITH SPECIFIC LANGUAGE IMPAIRMENT

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Background: Specific Language Impairment (SLI) is a developmental disorder characterized by marked difficulties acquiring language in the presence of normal nonverbal cognition and the absence of any sensory deficits or frank neurological damage (Leonard, 2014). Much research in SLI has been conducted with preschool children. Less research has been conducted on school-age children with SLI. However, several studies have demonstrated that school-age children with SLI have difficulty with the production of complex syntax (e.g., Fey, et al., 2004; Gillam & Johnston, 1992; Marinellie, 2004; Montgomery & Evans, 2009; Nippold, Mansfield, Billow, & Tomblin, 2008, 2009; Scott & Windsor, 2000).

Purpose: The purpose of the present study is to evaluate the various types of subordinate clauses that are produced in complex sentences by 6-9 year old children with SLI in comparison to their same-age peers in the context of oral narratives. Narratives are an important aspect of academics in the school-age years. A better understanding of the differences between children with typical language skills and children with SLI will assist with assessment and intervention.

Methodology: The study participants will include at least 8 children with SLI and 8 age-matched children with TL. All of the participants were administered the Test of Narrative Language (TNL) and their narratives were audio-recorded, transcribed, coded and analyzed using the SALT software program (Miller & Chapman, 1993).

Results: The children with typical language demonstrated greater clausal density than the children with SLI. This difference was statistically significant. The analysis of the types of clauses used by each group is currently in progress and will be completed by April 15, 2018. The results will be discussed in terms of clinical application to assessment and treatment, as well as educational impact.

SYNTHESIS AND BIOLOGICAL EVALUATION OF JASPINE B ANALOGS TARGETING CERAMIDE METABOLIZING ENZYME

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Background: Anhydrophytosphingosine, Jaspine B is a marine natural product with an all syn trisubstituted tetrahydrofuran motif. It has exhibited sub-micromolar cytotoxicity ($IC_{50} < 0.5 \mu M$) in several cancer cell lines. Jaspine B exhibited a dose- and time-dependent increases in apoptosis in murine B16 and human SK-Mel28 melanoma cells. Preliminary biochemical studies have identified that Jaspine B inhibited Sphingomyelin Synthase (SMS) resulting in increased intracellular ceramide levels and initiated the apoptotic events in the cancer cell.

Purpose/Objective/Hypothesis : The main objective of this project is to develop inhibitors targeting SMS. The design of these analogs involve retaining the SMS substrate/cofactor/enzyme transition state structural features in these analogs. Analogs with a closer resemblance of an enzyme transition state might exhibit selectivity and potency.

Design/Methods/Scope: Utilizing advanced chiral intermediates from the total synthesis of Jaspine B, reported earlier, synthesis of enantiopure Jaspine B – Ceramide analogs was initiated. Synthesized, characterized analogs will be subjected to cell viability assays followed by SMS inhibition in resistant cancer cell lines.

Results: Jaspine B – Ceramide mimics will be synthesized as starting from a bicyclic lactol chiral intermediate. Sequential reductive amination of bicyclic lactol will afford a C-2 alkyl amine substituted intermediate. Subsequent Cbz deprotection followed by N- acylation affords ceramide-jaspine B SMS mimics.

Conclusions: In our earlier report, C-2 alkyl chain tolerated heteroatoms and exhibited comparable cytotoxicity in a resazurin cell viability assay. In the current study, we are incorporating a heteroatom “N” in the C-2 alkyl chain with an increased basicity. Synthetic endeavors will be discussed.

MICROGLIAL ALTERATION IN A VALPROIC ACID MODEL OF AUTISM

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Autism spectrum disorder (ASD) is a neurodevelopmental condition affecting approximately 1 in 70 children in North America. Valproic acid (VPA) is a multi-target drug widely used to treat epilepsy. It is also a histone deacetylase inhibitor and fetal exposure to VPA increases the risk of ASD. One important hallmark of ASD is an unusually large brain size that presents at around the age of 2 years. The cause of this enlargement is not known, but it is speculated that a lack of pruning of dendrites may be associated with the large brains seen in these toddlers. Even though, recent studies suggest that microglia are critical players in regulating neuronal numbers, dendrite and synapse formation during early brain development the effect of prenatal exposure to VPA on microglial survival during postnatal brain development has not been studied and may provide potential hints regarding the etiology of this disorder. Therefore, in this study, we determined the effect of prenatal exposure to VPA on microglial numbers during postnatal brain development in vivo. We found that VPA exposure during embryogenesis causes a reduction in the number of microglia in the primary motor cortex (PMC) at postnatal day 6 (P6) and postnatal day 10 (P10) in male mice. These data suggest that VPA alters the number of microglia in early postnatal brain development – particularly in male animals. Thus, the reduction in the number of microglia may be partly responsible for mediating the unusual brain size observed in the pathology of ASD.

**ENHANCING SELF-AWARENESS AND PHARMACOTHERAPY KNOWLEDGE BASE:
INTERPROFESSIONAL EDUCATION WITH NURSING AND PHARMACY STUDENTS PRIOR TO
GRADUATION**

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Objectives: The primary outcome of this study is to compare nursing student knowledge base, confidence, and value of interprofessional interaction at baseline and after 11 weekly pharmacotherapy reviews from 4th year pharmacy students.

Methods: Data will be collected and analyzed between 1/10/18 and 12/15/18. 4th year pharmacy students will be responsible for preparing 11 weekly educational reviews for undergraduate nursing students. There will be a new group of pharmacy students every 6 weeks and a new group of nursing students every 16 weeks. Educational topics include: polypharmacy, medication reconciliation, drug administration, IV compatibility, cardiovascular medications, diabetes therapeutics, pain management, mental health, infectious disease, gastrointestinal therapies, and special populations (pregnancy, geriatrics, pediatrics). A knowledge-based pre-test will be provided at the beginning of each class, and the post-test will be done at the end of each class. An optional survey will be administered on the first day of each new nursing group and at the end of each 11-week block. This study will utilize a knowledge-based pre-test and post-test for 2 different nursing groups. The voluntary and anonymous survey (Modified ISVS-9a) will help assess changes in confidence and overall value of the interprofessional experience.

Preliminary Results: Preliminary results from the modified ISVS-9a questionnaire showed that the ISU nursing students averaged 5.7/7 on their responses, which correlated with a scale and response of “to a fairly great extent” and “to a great extent”. This demonstrated the nursing students have a strong baseline in their comfort and belief in the importance of interprofessional teamwork. The nursing students averaged 6.7/7 on the modified questionnaire statement, “I feel that nursing and pharmacy have a synergistic relationship that can improve patient care”, which demonstrates their awareness of the importance of their relationship with pharmacists. Preliminary results for knowledge base pre and post-exams have shown overall improvement. There was a 35.4% increase in overall test scores for the pulmonary medications section, and an 88% overall increase in scores for the infectious disease section. For the CV1 section, there was an 85% overall increase, and CV2 section there was a 69.8% increase. Thus far, each review has been shown to improve nursing pharmacotherapy knowledge base.

KNOWLEDGE AND ATTITUDES OF PHARMACISTS REGARDING HOMEOPATHY

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Background: Complementary and alternative therapies and medicine are incredibly pervasive in the United States, and many pharmacists deal with alternative therapy use in their patient populations every day. It seems only reasonable that we should expect the same level of understanding and expertise for any therapy that we may recommend to a patient.

Objectives: The purpose of this study was to assess pharmacists' perceptions and knowledge of homeopathy and to determine what factors, including additional university education and demographic information, affect these outcomes.

Methods: A 22-question survey instrument was developed and distributed to Idaho State University College of Pharmacy graduates with an active university email address. Approval was obtained from the Idaho State University Human Subjects Committee. Questions addressed demographic information, perceived knowledge, actual knowledge, and perception regarding homeopathy. Statistical analyses using Mann-Whitney U and chi-squared tests were completed.

Results: Of the 475 potential respondents, 87 completed the survey (18.3%). Respondents were primarily inpatient (32%) or retail (27%) pharmacists. Most (65.5%) graduated in the last five years, and 50% currently practice in Idaho. About half (55%) of respondents took a CAM course during pharmacy school. Just over half (58.5%) of respondents feel adequately trained to discuss homeopathy with patients. The majority (75%) of respondents correctly identified the proposed mechanism of homeopathy, however, 62% feel they would benefit from further training. Only 17% recommend homeopathy to patients.

Conclusions: Pharmacists who graduated from Idaho State University are generally knowledgeable and have a generally unfavorable opinion regarding homeopathy. Most believe that complementary and alternative medicine education should be a mandatory part of a pharmacy student's curriculum. Most also believe that they would benefit from continuing education regarding complementary and alternative medicine. Pharmacists who took the complementary and alternative education course from Idaho State University have significantly more confidence and a higher comfort level when addressing homeopathy with their patients. Curricular and continuing education regarding complementary and alternative practices are imperative in ensuring that pharmacists are confident and provide high-quality recommendations to patients buying over-the-counter alternative therapies such as homeopathy.

EXTENDED-INFUSION OF PIPERACILLIN-TAZOBACTAM: PROTOCOL DESIGN, IMPLEMENTATION AND EVALUATION AT A COMMUNITY HOSPITAL

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Background: Currently, there are two well-known dosing strategies for piperacillin-tazobactam. The conventional dosing strategy provides a 30-minute infusion administered every 6 hours, while the extended-infusion dosing strategy provides a 4-hour infusion administered every 8 hours. Previously published studies have asserted that the extended-infusion dosing strategy is superior in efficacy and cost when compared to the conventional dosing strategy. Specifically, extended-infusion dosing improves patient outcomes, increases antibiotic efficacy, and decreases length of hospital stay and length of antibiotic therapy. Based on previous literature, the antimicrobial stewardship team at Eastern Idaho Regional Medical Center elected to pursue an extended-infusion protocol for piperacillin-tazobactam.

Purpose: This study involves design, implementation and evaluation of an extended-infusion protocol for piperacillin-tazobactam. The overarching goal of this study is to evaluate the effects of the extended-infusion protocol within Eastern Idaho Regional Medical Center (EIRMC.) Primary outcomes include length of hospital stay and costs associated with each dosing strategy. Secondary outcomes include length of antibiotic therapy and in-hospital mortality related to infection. We will also complete a subgroup analysis on patients within the intensive care unit (ICU) in regards to these outcomes.

Methods: The extended-infusion protocol will be designed based upon previously published literature and current methodologies. Prior to implementation, the extended-infusion protocol will receive approval from the antimicrobial stewardship team, the pharmacy and therapeutics committee, and the medical executive committee. Evaluation of the protocol will be performed through a pre-post implementation retrospective chart review of patients residing within EIRMC during a period of four months (11/9/17 – 2/28/18.) Data collection will consist of patient demographics, vital signs, sites of infection, culture and sensitivity data, as well as laboratory data including pro-calcitonin, complete blood counts, and C-reactive protein levels. In order to be included in this study, patients must be at least 18 years of age and receive piperacillin-tazobactam for at least 48 hours. Exclusion criteria includes those receiving intermittent, continuous, or peritoneal dialysis, those with cystic fibrosis, those who are pregnant, and those with a body mass index > 40. A subgroup analysis will be performed on patients residing within the ICU.

Results: The piperacillin-tazobactam extended-infusion protocol received approval from all necessary committees in November 2017. Nursing education was provided throughout December 2017 in regards to process changes, and the Alaris™ Intravenous Pump drug library was updated to include pre-programmed infusion rates for piperacillin-tazobactam extended-infusion dosing. On January 9th, 2018, EIRMC implemented the extended-infusion protocol. Institutional Review Board approval for the evaluation of outcomes was received on February 12th, 2018. Results of the evaluation are pending.

Conclusions: Not applicable

CHEMOTHERAPY STANDARDIZATION: ENSURING SAFETY, CONSISTENCY, AND USP 800 COMPLIANCE

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Background: Chemotherapy is one of the most actively growing classes of medications and currently accounts for 30% of new drug approvals. These agents have a narrow therapeutic index. In fact, from 1993-1998, chemotherapy accounted for 15% of fatal medication errors. Additionally, chemotherapy drugs present an occupational hazard to all those responsible for handling them. Consequently, vigilance is required when entering, verifying, and preparing chemotherapy orders.

Purpose: The purpose of this project is to standardize chemotherapy processes at our institution, in order to ensure patient and healthcare worker safety. This will be accomplished by analyzing and optimizing institutional chemotherapy processes, with a focus on standardization of order entry and verification and United States Pharmacopeia (USP) 800 compliance within the inpatient compounding area.

Design: First, a systematic process for order entry and verification was created and will be implemented. This systematic process was created by performing a gap analysis of current chemotherapy order management at our institution and comparing it to surrounding institutions' processes and policies, as well as the Quality Oncology Practice Initiative (QOPI) Certification Standards published by the American Society of Clinical Oncology (ASCO). As a result of the gap analysis, the PRONTO checklist (Patient, Regimen, Organ Function, Numbers, Toxicity, Order Verification) will be adopted for order management. This checklist has previously been implemented at two academic medical centers in North Carolina. Regimen-specific PRONTO checklists for the eight most common chemotherapy regimens at our hospital have been created, in line with NCCN guidelines, and include monitoring parameters, guardrails, and thresholds for contacting a provider. Chemotherapy workflow will also be modified to ensure implementation of critical elements of chemotherapy order entry, as dictated by QOPI Certification Standards. In particular, an independent pharmacist double check will be utilized. Additionally, an IV room compounding reference table for the eight most common regimens has been created, to ensure consistency between chemotherapy preparations. The success of new processes will be evaluated using a pharmacist Likert-scale survey administered both before and after implementation. IV room processes will be modified to achieve USP 800 compliance. Each month over the next year, a section of USP 800 will be reviewed and a corresponding institutional policy or standard operating procedure will be drafted. Standard operating procedures created by these policies will then be communicated through monthly staff meetings and Healthstream competencies. Once USP 800 policies and procedures are fully implemented, pharmacist and technician comprehension will be evaluated using a learning assessment tool. Results will be compared to baseline values. This project is exempt from review by the Institutional Review Board.

Results: Pending

Conclusions: Pending

A RETROSPECTIVE EVALUATION OF THE IMPACT OF SUGAMMADEX (BRIDION) VS. NEOSTIGMINE AND GLYCOPYRROLATE FOR REVERSAL OF NONDEPOLARIZING NEUROMUSCULAR BLOCKING AGENTS ON POST-OPERATIVE CARE UNIT LENGTH OF STAY.

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Background and Significance: Patients undergoing many types of surgery often require the use of nondepolarizing neuromuscular blocking agents (i.e., rocuronium, vecuronium, etc.). Because of the prolonged effects of these medications the patients often require reversal agents in order to restore normal use and functionality of their muscles. Traditionally the reversal agents most commonly used have been neostigmine in combination with glycopyrrolate. In December 2015 the FDA approved a new reversal agent called sugammadex (Bridion). Sugammadex has increasingly gained status as a preferential agent for providers and anecdotally offers faster and more-complete reversal when compared to neostigmine and glycopyrrolate. There is limited data on the comparison between these two types of therapies, especially from a pharmacoeconomic standpoint. These medication therapies have different mechanisms of action which allows for a discussion to take place of the possible benefits of one agent over another. As a novel agent, sugammadex comes with a significant cost increase when compared with traditional therapies. The significance of this study could show improved outcomes in patients associated with less time spent in PACU and thus cost justification for the increased price of medication therapy..

Hypothesis/Research Questions: Sugammadex (Bridion), even though a more expensive medication, will show a greater overall cost savings over the use of neostigmine in combination with glycopyrrolate for the reversal of nondepolarizing neuromuscular blocking agents after surgery by resulting in a decreased post-operative care unit length of stay.

Facilities involved: American Fork Hospital, Utah

Results/Conclusions: Pending

FEASIBILITY OF INCORPORATING A PHARMACIST-PRESCRIBED HORMONAL CONTRACEPTION PROGRAM INTO THE WORKFLOW OF A COMMUNITY PHARMACY

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Background: Although multiple states have passed legislation permitting pharmacists to prescribe hormonal contraception, uptake in practice has been low. Incorporation into the typical workflow of community pharmacy and a lack of guidance in supporting pharmacists' competence and confidence have all been major barriers to successful implementation of these programs.

Objective: To assess the feasibility of implementing a pharmacist-prescribed hormonal contraception program (PPHCP) in a community pharmacy using dispensing pharmacists.

Methods: This IRB-waived study will consist of two phases. In Phase 1, pharmacists in a single community pharmacy will complete training and pre- and post-training assessments. Pre- and post-training assessments include a questionnaire to assess confidence and perceived competence and an exam to assess actual competence. Phase 2 will consist of implementing a PPHCP into the daily workflow of a community pharmacy using mock patients with scripted profiles to assess potential harm to patients while avoiding actual harm. Each profile has a predetermined number of appropriate changes to the hormonal contraceptive regimen and a number of red flags the pharmacist will need to identify. Three rounds of rapid-cycle improvement will take place over six weeks. In each round, the mock patient will present to the pharmacist during a typical business day. The pharmacist will assess changes to the contraceptive regimen using a protocol and his/her clinical judgment, then create a new regimen. Data collected will relate to the impact of the service on workflow (pharmacist time, survey of pharmacy staff regarding workflow), pharmacist competence (percent of correct interventions made and red flags identified), and perceived service quality (mock patient questionnaires).

Results: Four pharmacists in the community pharmacy were identified for participation. Rapid-cycle rounds will be completed at the beginning of March.

Conclusions: Based on the results of this study, a training and protocol will be developed for the implementation of a PPHCP into a community pharmacy. This training and protocol will be appropriate for all community pharmacies and will be shared so that programs can be easily and properly implemented throughout the state. Additionally, the protocol should be applicable outside of hormonal contraception, so that new clinical programs can be easily implemented at the community pharmacy level, increasing healthcare access for our communities.

EVALUATING NALOXONE-BASED MISCONCEPTIONS AMONG UNIVERSITY HEALTHCARE STUDENTS

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Background: The opioid crisis has led to astronomical healthcare costs and increasing U.S. deaths. 115 Americans are dying each day from an opioid overdose. Naloxone is an opioid antagonist that has the ability to reverse opioid overdoses and save lives. Distribution of naloxone to the public is a relatively new idea and although the potential benefits are far-reaching, some healthcare providers may unintentionally hinder public accessibility by harboring misconceptions about its use. Our previous study and training program given to ISU public safety officers revealed some false beliefs about opioid use/abuse and naloxone administration. It was this initial survey that led study investigators to question whether healthcare students in this area entertain similar misconceptions.

Purpose: The intent of this study is to identify naloxone-related perceptions held by ISU health professions students. Information collected from our survey can be used to modify current and future curriculums to help future prescribers and healthcare providers feel more comfortable with enhancing public access to naloxone. Educating providers and removing barriers to naloxone will help save many more lives from opioid overdose.

Methods: A fourteen question Google Forms survey distributed to physician assistant, nursing, pharmacy and other healthcare students via email and Moodle course webpages. The survey consists of five demographic questions with the remaining questions aimed at naloxone use. Results will be analyzed to identify the presence of misconceptions and potentially uncover trends among the different health professions surveyed.

Results/Conclusions: Final results of the study will be determined once all of the intended subjects have completed the survey. A pilot study has been conducted with 12 dental hygiene students. Preliminary results revealed that students do not support the misconception that only addicts are likely to experience opioid overdose. However, one misbelief that was present in our pilot study was that naloxone administration encourages/enables addicts to continue abusing opioids. Some respondents agreed that this was true while others maintained that it was not. Another point of controversy related to naloxone being an over the counter product. Although most participants acknowledged that the benefits of naloxone outweigh its cost and potential side effects, 50% were uncomfortable with the thought of it being available as an over-the-counter product. These initial responses lead to a tentative conclusion that some misconceptions do exist among ISU's healthcare students. Specifically, these misconceptions are related to increasing naloxone's public availability and the potential for it to lead to more opioid abuse.

DEVELOPMENT OF PHARMACIST-LED MEDICARE ANNUAL WELLNESS VISITS IN A FEDERALLY-QUALIFIED HEALTH CENTER

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Background: Receipt of preventative care services improves clinical outcomes and reduces mortality. Providing optimal preventative care in the primary care setting has proven difficult, resulting in recent policy recommendations. In 2011, the Patient Protection and Affordable Care Act (ACA) created the Medicare Annual Wellness Visit (AWV), a zero-copay visit focused on preventative health screenings, vaccinations, medication reconciliation and overall wellbeing. To date, Medicare AWV's have not been widely implemented due to poor patient understanding and lack of resources, among other barriers. Therefore, innovative strategies are needed to maximize implementation of preventative care services in the primary care setting.

Purpose: The purpose of this quality improvement project was to integrate pharmacists into the Medicare AWV at a federally-qualified health center (FQHC).

Methods: A structured quality improvement methodology (i.e. Plan, Do, Study, Act) was used to implement pharmacist-initiated Medicare AWVs. The electronic medical record (EMR) was queried to identify all Medicare beneficiaries. The planning stage consisted of stakeholder engagement to identify current practices and perceived areas for improvement, workflow evaluation, and template optimization.

Results: 1928 patients were identified. Stakeholders cited AWV understanding as the primary reason for low utilization rates. Areas of confusion included the purpose of AWV's, AWV billing, and patient expectations. Recruitment scripts were created and disseminated. The EMR was streamlined and templates were integrated.

Conclusions: AWV's remain underutilized. Structured recruiting processes and workflows improve AWV utilization. AWV's remain untapped revenue streams for pharmacist integration in primary care settings. It remains unknown if pharmacist-led AWV's lead to improved patient outcomes.

PHARMACIST KNOWLEDGE, ATTITUDES, AND COMMITMENT TO QUALITY IMPROVEMENT ACTIVITIES

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The purpose of this cross-sectional survey was to determine pharmacist knowledge, attitudes and commitment to conduct quality improvement (QI). An online survey was developed that contained five domains: demographics, attitudes, perceived knowledge, self-efficacy, and intention to participate in future QI activities. The online survey was distributed by email to all pharmacists registered in Idaho in 2016. The study was approved by the Idaho State University Human Subjects Committee. Of the 2,626 pharmacists with an active email address, 359 (13.7%) initiated the survey and were included in analysis. The primary practice site of respondents included community pharmacy (46.6%), hospital pharmacy (23.1%), and ambulatory care clinics (11.4%). The majority (57.1%) of respondents had not attended a workshop or training on QI. However, 298 (83.0%) respondents believed QI has an important role in improving health care and 234 (65.2%) planned on participating in future QI activities. Increased pharmacist QI training may be warranted.

TITLE: POPULATION-BASED DIABETES MANAGEMENT UTILIZING EMPLOYED STUDENT PHARMACISTS AND RESIDENTS

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Background: Pharmacist-led population management of diabetes has been shown to lower hemoglobin A1c (HgA1c) by an average of 2.4 percent. Currently, one of the American Association of Colleges of Pharmacy's (AACCP) competencies states: students must participate in population-based treatment, prevention, and educational programs. Utilizing employed student pharmacists for the management of diabetes through a population-based approach may be both effective and sustainable. Additionally, there are no studies that evaluate non-APPE (Advanced Pharmacy Practice Experience) student's knowledge of the management of diabetes after receiving formal education in the endocrine coursework.

Objective: : This study aims to assess non-APPE/IPPE pharmacy students' knowledge of and ability to manage uncontrolled diabetes utilizing a population-based approach.

Design/Methods/Scope: An electronic medical query identified all patients with a hemoglobin A1C $\geq 9\%$ (n= X) at a federally qualified community health center. Pharmacy students will analyze each patient via a standardized data abstraction tool and provide recommendations to a pharmacist or provider prior to the patient's next appointment. Recommendations may address: glucose-lowering agents, statin therapy, antiplatelet therapy, appropriate laboratory monitoring, screenings, and vaccinations. Student pharmacists will contact patients to set up a diabetes appointment with either a pharmacy resident or the patient's primary care provider. Primary outcomes include: acceptance rate of pharmacy student's recommendations. Secondary outcomes include: analyzing the implementation of recommendations, evaluation of time and cost expenditure, and in improvement in HbA1c. IRB status: exempt.

Results: Data collection still in process.

RURAL FREE CLINIC MEDICATION FORMULARIES: WHAT ARE THE INFLUENCING FACTORS

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Background: Free health care clinics that dispense medications are a main source of prescription and over the counter medication for many people. Forming and maintaining a consistent medication inventory can be challenging when working with limited sources of medications, staff and finances. Having an insufficient medication inventory could mean patients are go without treatment; and having an inconsistent medication inventory can cause patients to switch between different therapies which can be confusing to patients and decrease compliance.

Objective: To survey rural free health care clinics in Western states to assess what factors determine medication formularies, what financial resources are used and what sources are available to form a generalized system for developing a medication formulary that can be applied to other Western rural free health clinics.

Methods: Health care clinics in Alaska, California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington and Wyoming were chosen from the Centers for Medicare and Medicaid Services (CMS) CASPER Report 0006D for Rural Health Care Clinics. The emails of the clinics were not given, so they were searched on the World Wide Web. The survey assessed sources of medication, financial aid for medications, personnel involved in making the medication formulary and the patient population that was most commonly served at each clinic. Each participant had two weeks to complete the survey once the email was sent.

Results: Of the 413 selected clinics from the CMS CASPER report, 114 clinics had an email listed on their website. Five emails were duplicates and 17 emails failed to send. Of the 93 successful emails that were sent, only six successfully responded within the two-week time frame that the survey was available and only one of those who responded dispensed medication at that clinic.

Conclusions: From the information we were able to gather, grants and donated medication were the main source of obtaining medication for free health care clinics. Somethings that were considered when making a formulary were storage, provider preference and treatment efficacy. Because there were not enough responses to our survey to extrapolate a system for developing a medication formulary there is still a need for research on how free clinic medication formularies should be developed to meet the needs of the population it serves.

STUDENT PHARMACIST RECOMMENDATION IN THE OUTPATIENT SETTING

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Background: Drug related problems (DRPs) are common in the ambulatory care setting. Examples of DRPs include medication discrepancies, unnecessary drug therapy, and a need for additional drug therapy. Several approaches have been utilized to identify and resolve DRPs, including pharmacist chart review with recommendations to primary care providers prior to a patient's clinic visit. Previous studies have determined that student pharmacists are able to identify and resolve medication discrepancies. However, few studies have evaluated the effects of employed student pharmacists on their ability to identify and resolve other types of DRPs in the ambulatory care setting.

Objective: The purpose of this quality improvement project is to improve patient outcomes and student pharmacist's confidence through the use of an evidence-based chart abstraction tool to identify and resolve DRPs prior to primary care provider clinic visits.

Methods: An evidence-based chart abstraction tool was developed through literature evaluation, dissemination of clinical recommendations from professional societies and organizations, and clinical pharmacist consensus. Pilot testing of the student pharmacist application of the chart abstraction tool was then performed with subsequent updates to the tool. Student pharmacists utilize the chart abstraction tool to perform pre-visit chart reviews and make recommendations to primary care providers while under pharmacist supervision. Primary outcomes will be measured by the acceptance of student pharmacist recommendations made to pharmacists. Additional outcomes include implementation of recommendations by primary care providers and overall student confidence in using the abstraction tool and generating quality recommendations.

Results: Development and pilot testing of the evidence-based chart abstraction tool has been completed. Initial results of types, frequency, and acceptance of recommendations will be presented.

Conclusion: Student pharmacist's play a beneficial role in reducing DRPs in the ambulatory care setting. The chart abstraction tool provided a beneficial guide in evaluating patient charts which led to quality recommendations, increased acceptance rates, and increased student confidence.

THE WAR ON DRUG[RELATED PROBLEM]S: OPTIMIZATION AND EXPANSION OF PHARMACOTHERAPY SERVICES IN A FAMILY MEDICINE CLINIC.

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Background: Clinical pharmacists, as integral members of the healthcare team in ambulatory care settings, are uniquely positioned to identify and resolve drug related problems (DRPs). DRPs are common, costly and associated with adverse patient outcomes. The clinical pharmacist priority score (CP2), a population-based risk prioritization tool, is a mechanism to identify patients at greatest risk for DRPs. This scoring system assigns points to patients through specific disease indicators, number of medications, and comorbidities with higher scores correlating to more risk. High scoring patients are in critical need of pharmacist intervention and would benefit greatly from an appointment with a clinical pharmacist. Application of this validated tool permits high risk patients to be identified, efficiently prioritized for pharmacist chart review, and referred for a pharmacotherapy appointment with a pharmacist.

Objectives: The primary objective of this quality improvement project is to systematically identify and resolve DRPs through prioritization of high risk patients. Secondly, pharmacists will increase appointments in pharmacotherapy clinic to facilitate DRP resolution. Finally, by creating a viable workflow, this process can be replicated and sustained in a comparable ambulatory care setting. The primary outcome measure is the proportion of drug related problems successfully resolved 3 months post initial chart review and intervention.

Methods: An electronic medical record (EMR) query was performed to identify active patients with one or more visits to an eight-clinic community health system between 11/2016 – 11/2017; criteria from a modified CP2 score was used to extract this data. Subsequently, patients were assigned a score ranging from 1 to 21 based on their CP2 criteria. Scores of 8 or higher represent the highest level of risk for experiencing DRPs and will be prioritized for pharmacist chart review. Utilizing the DOCUMENT tool, a validated tool used for categorizing and documenting resolution of DRPs, clinical pharmacists will perform chart review starting with highest scoring patients. Then patients will be contacted to schedule an office visit with a clinical pharmacist or their primary care provider to resolve any identified DRPs.

Results: The EMR query identified 596 patients who have a CP2 score of 8 or higher. The range of calculated CP2 scores eligible for pharmacist review was 8 – 14 with a median score 8 (Interquartile range = 8). Data compilation for drug related problems, referrals and resolution is currently underway.

Conclusion: Application of population-based patient risk tools may be an effective way for pharmacists to identify and resolve drug related problems especially in an ambulatory care setting. Preliminary results will be presented at a future time.

PERSPECTIVES ON PROBIOTICS IN ORAL HEALTH AND DISEASE

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Background: The World Health Organization defines probiotics as “live microorganisms which, when administered in adequate amounts, confer benefits to the host’s health”. *Lactobacillus rhamnosus* is the most widely studied probiotic bacterium and has been shown to produce a substance with potential inhibitory activity against several bacterial species. Suggested mechanisms of probiotic action in the oral cavity are drawn entirely from gastrointestinal studies, although bacterial flora is similar. Given that probiotics are increasingly available through local and online markets and widely discussed on social media, it is important that oral health professionals be informed about potential beneficial effects and be able to accurately advise patients and answer questions about their use.

Purpose: The purpose of this review is to summarize the currently available data on the potential benefits and mechanisms of action of probiotics in oral health and disease.

Method: The ClinicalKey, PubMed, and EBSCOhost databases were searched using the key words probiotics, oral health, dentistry, dental caries, periodontal disease, and microbiota. Only full text articles published in English within the last ten years were retrieved.

Results: The body of literature shows the mode of delivery is varied, and probiotics can be administered in chewing gum, drops, dust, and mouthwashes as well as in foods, particularly milk, cheese and yogurt. Probiotics are not recommended for patients who are immunocompromised or suffer from cardiac valve disease. Data is limited regarding the benefits of probiotics to oral ecology, however, studies have demonstrated clinical improvement in bleeding on probing, probing depth and gingival index, but no significant difference in reduction of colony forming unit (CFU) counts for periodontal pathogens. Indirect actions in oral cavity include modulation of systemic and local immune function, regulation of mucosal permeability, and colonization of oral microflora by less pathogenic species.

Conclusions: Probiotics may be beneficial in the maintenance of oral health due to multiple mechanisms of action against oral pathogens. However, randomized clinical trials with long-term follow-up periods are needed to confirm efficacy in reducing the prevalence/incidence of oral infectious diseases and other conditions and to determine exact dose, treatment time and ideal vehicles. Additionally, further research is needed to identify specific strains of bacteria with probiotic activity against caries, periodontal disease and halotosis.

CONVENTIONAL AND IMPLANT-SUPPORTED DENTURES IN EDENTULOUS PATIENTS: A COMPARISON OF FUNCTIONING AND PATIENT SATISFACTION

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Background: It is estimated there are 35 million edentulous persons in the U.S. Until the introduction of osseointegrated implant-supported prostheses in the mid 1980's, conventional dentures were the only available treatment for edentulous patients. Following full extractions in an arch, the alveolar process is reduced due to bone loss, leading to a lack of denture stability and retention, especially for the lower arch. Consequences include a decrease in patient comfort, ability to chew and speak clearly, facial aesthetics and oral health-related quality of life. One way to prevent or reduce loss of bone in an edentulous alveolar ridge is the placement of implants to secure prosthetics. Several factors play a role in deciding between conventional dentures and fixed or removable implant dentures, such as quality and quantity of bone available for implant placement, oral hygiene practices, cost, and patient preferences. For these reasons, dental hygienists must be well-informed and comfortable discussing replacement with a range of prosthetics.

Purpose: The purpose of this review is to evaluate and compare the clinical data on the functioning of conventional dentures and implant-supported dentures and to characterize patients' satisfaction with each.

Method: PubMed, MEDLINE and EBSCOhost databases were electronically searched to identify articles on conventional and implant-supported dentures with regards to function, patient satisfaction and oral health-related quality of life. The following key terms were used: masticatory efficiency, chewing efficiency, patient satisfaction, conventional dentures, implant-retained, implant-supported overdenture, and fixed prostheses. Only full-text articles published in English within the last ten years were retrieved.

Results: Evidence from the literature review indicated that implant-supported dentures produce a greater biting force and masticatory efficiency than conventional dentures, and patients' general satisfaction in terms of ability to speak and ease of cleaning was higher. Mandibular two-implant overdentures provide the highest long-term success and survival. Evidence was lacking regarding these same characteristics for implant-supported dentures in the maxilla. Consensus from a panel of experts suggests that implant-supported dentures should be considered as a first choice for the edentulous mandible. Additionally, patient satisfaction, improved oral functions and oral health-related quality of life was higher with mandibular implant-supported dentures.

Conclusions: Mandibular two-implant overdentures offer the most retention and oral function as well as the highest overall patient satisfaction. Future studies should focus on long-term results directed toward functioning and survival of maxillary implant-supported dentures.

NECROTIZING PERIODONTAL DISEASES: REVIEW OF ETIOLOGY, PATHOPHYSIOLOGY, AND MANAGEMENT

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Background: Necrotizing periodontal diseases (NPDs) are a group of infectious diseases that include necrotizing ulcerative gingivitis, necrotizing ulcerative periodontitis and necrotizing stomatitis and are classified according to the location of the tissue affected. The three classifications share common clinical features consisting of an acute inflammatory process and the presence of periodontal destruction. Although uncommon, NPDs are considered to be among the most severe inflammatory conditions associated with oral biofilm and bacteria. In the absence of immunodeficiency, NPDs primarily affect young, Caucasian adults (18–22 years of age), with 0.5% to 11% of the population estimated to be affected. Predisposing factors may include emotional stress, immunosuppression, cigarette smoking, poor diet and pre-existing gingivitis. Recently, prompt diagnosis of NPDs has become critical, not only due to the aggressive nature of the diseases, but also because NPDs have been identified as markers of disease progression in HIV-positive patients.

Purpose: The purpose of this review is to examine current literature and provide an up-to-date summary of the epidemiologic, etiologic, and therapeutic characteristics surrounding NPDs.

Methods: A literature search was carried out utilizing the Cochrane Library, EBSCOhost, and PubMed databases. Only English language articles were included from 2010 to the present day. The following key search terms were used alone, and in combination: necrotizing periodontal diseases, necrotizing ulcerative gingivitis, NUG, NUP, etiology, predisposing factors, and treatment.

Results: Based on current evidence, the following key points were identified: a) diagnosis of NPDs is based mainly on the clinical findings; b) the diseases progress rapidly and can cause severe tissue destruction; c) predisposing factors play a prominent role in manifestation of NPDs; d) NPDs can be successfully managed by adequate non-surgical periodontal therapy, effective oral-hygiene measures and control of predisposing factors; and e) patients with NPDs are frequently susceptible to future disease recurrence.

Conclusions: Management of NPDs is largely dependent upon evidence-based research that identifies the most effective diagnostic and therapeutic strategies. Treatment of NPDs must be provided promptly, and on a case-by-case basis, tailored to address individual predisposing factors and extent of the infection.

THE USE OF PHOTOACOUSTIC IMAGING FOR PERIODONTAL ASSESSMENT IN DENTAL PRACTICE

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Background: During a periodontal examination, the periodontium is examined for signs of inflammation or damage and is the basis for subsequent intervention. One key feature of this assessment is measurement of pocket depths, the distance from the epithelial attachment to the gingival margin. Probing depths, along with radiographs and oral examination, identify clinical attachment loss, furcation involvement and bone loss and are a primary mechanism of identifying periodontal disease and monitoring response to therapy. Unfortunately, measurements are highly prone to error, often uncomfortable or painful, and difficult to consistently reproduce. These technique-specific errors can result in less effective treatment and poor patient outcomes. Improved procedures are needed to enhance the quality of such an essential component of oral health care. Photoacoustic imaging (PAI) has been used in dentistry, on a limited basis, for implant characterization and caries identification. Recently, researchers used PAI in a porcine model to visually generate probing depths and compared results to measurements using a periodontal probe, the current gold standard.

Purpose: The purpose of this translational report is to inform oral health professionals about research involving a novel imaging technology for periodontal assessment and present comparisons to periodontal probe measurements.

Method: Databases searched were PubMed, CINAHL Complete, EBSCOhost and MedlinePlus. Keywords used to search included: photoacoustic imaging, ultrasound, periodontal exam, noninvasive, and dental.

Results: A method designed to image the entire pocket depth around teeth was employed using a combination of laser light, ultrasound and squid ink as a contrast medium. The model was tested in the laboratory using porcine jaws with a mix of shallow and deep pockets and replicated five times. The same teeth were also checked with a periodontal probe and compared to the PAI measurements. Results of the PAI were consistent across all five tests, while measurements with the periodontal probe varied significantly from one test to another. Researchers are currently using PAI in clinical trials with humans.

Conclusions: Photoacoustic imaging possesses unique advantages over traditional periodontal assessment modalities and holds great promise to move from the research phase into clinical practice. In the future, dental hygienists may be able to use PAI to efficiently and noninvasively measure probe depth and produce a highly accurate image of the entire periodontium.

APPLICATION OF SILVER DIAMINE FLUORIDE FOR MANAGING DENTAL CARIES: AN EVIDENCE-BASED INTERVENTION PROTOCOL

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Background: Traditional restorative treatment approaches in dentistry are expensive and are not available to all, indicating a need for alternative approaches that are both non-invasive and cost-effective. In 2014, silver diamine fluoride (SDF) was approved by the U.S. Food and Drug Administration as a treatment for dentinal sensitivity. However, it is commonly used off-label for caries arrest. The rationale for using a non-invasive treatment to arrest caries is to halt or slow down caries progression in order to minimize discomfort and potential pulpal damage. Studies shown that application of SDF is the most cost-effective option for those who do not wish to undergo more invasive treatment, cannot access care, or are medically unable to have treatment. **OBJECTIVE:** The purpose of this review is to provide evidence-based guidance on the use of 38% silver diamine fluoride (SDF) for dental caries management in children, adolescents and patients with special health care needs.

Methods: A database search was performed in PubMed, EMBASE, ScienceDirect, Cochrane Library and Cochrane Central Register of Controlled Trials for clinical studies and reviews investigating SDF for caries arrest. The search included the following key words: silver nitrate, silver diamine fluoride, dental caries, fluorides and caries arrest. Only full text articles published in English within the past eight years were retrieved.

Results: The evidence indicates SDF is effective at a high concentration (38%, 44,800 ppm fluoride) in arresting caries. Recommendations for application include placement of SDF at the diagnostic visit, at 1 and/or 3 month follow ups, then at semi-annual recall visits. An alternative protocol is to substitute SDF for any application of fluoride varnish to a patient with untreated carious lesions. It is not known whether application needs to continue after 2 or 3 years to maintain caries arrest. Isolation with gauze and/or cotton rolls is sufficient, and air-drying prior to application improves effectiveness. Indications for SDF application are based on a) extreme caries risk; b) patients who cannot tolerate standard treatment for medical or psychological reasons; c) patients who have more lesions than can be treated in one visit; d) lesions that are difficult to treat; and e) patients without access to dental care.

Conclusions: A caries treatment protocol using SDF is simple, painless, non-invasive, and low-cost. It is well accepted by many clinicians and patients and therefore appears to be a promising strategy for caries control, particularly for young children, adolescents, and patients with severe caries risk or special needs.

EVIDENCE-BASED INDICATIONS FOR THE USE OF ANTIBIOTICS IN DENTISTRY

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Background: Antimicrobial resistance (AMR) is a worldwide problem and constitutes a major threat to public health. Every year in the United States, at least 2 million people become infected with antibiotic-resistant bacteria and approximately 23,000 people die as a direct result. Evidence of the inappropriate use of antibiotics in dentistry is well documented and has contributed to the problem of increasing AMR. Indications for the use of systemic antibiotics in dentistry are limited, since most dental and periodontal diseases are best managed by operative intervention and oral hygiene measures. Another aspect of antibiotic over-prescribing is based on non-clinical factors such as the patient's expectation of an antibiotic prescription, convenience, and demand necessitated by the social background of patients. Due to widespread AMR and inappropriate use of antibiotics, every oral healthcare practitioner needs to be knowledgeable about exactly which clinical conditions warrant the prescription of antibiotics, as well as proper dosing regimens and professionally responsible prescribing practices.

Purpose: The purpose of this report is to identify evidence-based scientific literature on indications for recommending and prescribing antibiotics in the oral healthcare setting.

Method: Electronic searches of PubMed, MEDLINE and Cochrane Library databases were conducted using the following key terms: antibiotics, over-prescribing, antimicrobial resistance, recommended practice, and penicillin. Searches were limited to human studies published in English within the past ten years. In addition, the authors hand searched the bibliographies of all relevant articles.

Results: Clinical situations that require systemic antibiotic therapy are limited, and include oral infection accompanied by elevated body temperature, lymphadenopathy, and facial cellulitis. The type of antibiotic chosen and its dosing regimen are dependent upon the severity of infection and the predominant type of causative bacteria. Antibiotics should be prescribed at the correct frequency, dose, and duration so that the minimal inhibitory concentration is not exceeded, and so that side effects and the selection of resistant bacteria are prevented. The absolute risk rate following dental treatment (even in medically compromised patients) for bacterial endocarditis and prosthetic joint infection is considered very low and antibiotic prophylaxis is rarely indicated.

Conclusions: The best available clinical evidence suggests no indications for prescribing antibiotics preoperatively or postoperatively to prevent oral infection or pain unless the spread of infection is systemic, the patient is febrile, or both. Education regarding the responsible use of antibiotics will help practitioners to identify the circumstances when antibiotics are indicated, to choose the right antibiotic, and to prescribe it at the right dose for the right duration.

DIAGNOSTIC AND TREATMENT PROTOCOLS FOR EROSIVE TOOTH WEAR RELATED TO GASTROESOPHAGEAL REFLUX DISEASE

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Background: Dental hygienists and dentists are often the first health care professionals to identify systemic disease through documentation of the associated oral manifestations. One such disease is gastroesophageal reflux disease (GERD), which may be evidenced by dental erosion. GERD affects all age groups and is a relatively common condition worldwide, with prevalence rates in adults ranging from 21% to 56% in different countries. Dental erosion is defined as the loss of dental hard tissue by a chemical process that does not involve bacteria. The damaged dental surface is exposed to continued mechanical friction in connection with chewing, swallowing, mobilizing the soft tissues or brushing. Refluxed acid first attacks the palatal surface of the upper incisors followed by occlusal surfaces of the posterior teeth in both arches. Dental practitioners must develop a greater awareness of the problem and become more equipped to help manage their patients that are either at risk, or are already experiencing some level of reflux and erosive tooth wear.

Objective: The objective of this evidence-based report is to summarize the diagnostic and treatment protocols for management of GERD and associated dental erosion. .

Method: PubMed, Medline and the Cochrane Library databases were searched for review articles on dental erosion and GERD. Key search terms included dental erosion, gastroesophageal reflux disease, and GERD. Full text articles published in English within the last ten years were retrieved and the reference lists of the selected articles were hand-searched for additional articles of potential interest.

Results: If GERD is suspected, the patient should be questioned about the incidence of belching, heartburn, stomachache, metallic taste, etc. Antacid tablets increase the intraoral pH after an erosive challenge and chewing gum increases salivary flow rate and pH as well as the pH of plaque. Advise not to brush immediately after the teeth are exposed to acid because brushing can cause more enamel loss; wait 30 to 60 minutes. After reflux episodes, advise to rinse mouth with a baking soda solution (e.g., one teaspoon baking soda/8-ounce glass of water) to neutralize acid. Brush teeth with low-abrasive toothpaste high in sodium bicarbonate will aid in neutralization of acids and minimize abrasion. Avoid mint-flavored products; they relax the lower esophageal sphincter.

Conclusions: Dental practitioners may be the first to identify potential cases of GERD through diagnosis of dental erosion. Evidence-based protocols can be used minimize damage to teeth and manage discomfort associated with acid reflux.

INTERDENTAL CLEANING: A REVIEW OF CURRENT EVIDENCE

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Background: When teeth are positioned normally, the interdental papilla of the gingiva fills the embrasure between two teeth, apical to their contact point, creating a shielded area which is difficult to access. The most effective method for cleaning that area depends on characteristics of the interdental spaces, the size, shape, and whether the embrasure is open or closed. Based on expertise and access to evidence, dental hygienists are able to steer patients toward optimally effective devices that are tailored to their specific needs. However, success in delivering evidence-based healthcare advice is dependent on availability of current, best evidence. When there is a lack of high quality evidence, or weak evidence at best, dental hygienists must make recommendations based primarily on individual needs, values and preferences.

Purpose: The purpose of this review is to summarize and appraise the evidence regarding the efficacy of a water flossing device versus mechanical flossing for plaque control in managing gingivitis.

Method: The following databases were queried: PubMed, MEDLINE and Cochrane Library. Key search terms included oral irrigation, interdental flossing, plaque removal, water flosser, interdental cleaning, gingivitis and bleeding.

Results: The best available literature regarding interdental cleaning suggests interdental brushes are superior to floss with respect to plaque removal in patients with open interdental spaces. Water flossers have been shown to clean around overdenture abutments and bars, implant-supported fixed dentures, margins and abutments of bridges and veneers and orthodontic appliances more effectively than floss. Additionally, research has demonstrated that patients with existing gingivitis, diabetes or dexterity problems benefit more from using a water flosser over floss and interdental cleaners. Two separate studies compared the Waterpik Water Flosser to the Sonicare Air Floss Pro for reducing clinical signs of inflammation and found the Water Flosser to be significantly more effective at plaque removal. Flossing is not an effective interdental device for cleaning wide interdental spaces, root surfaces or concavities and routine recommendations to use floss are not supported by scientific evidence.

Conclusions: While traditional floss will always be the gold standard of interproximal cleaning in persons with closed embrasures, water flossing may be an effective alternative to traditional floss for implant management, orthodontic appliances, limited dexterity and existing gingivitis. The dental hygienist should therefore determine, based on available evidence, interdental space characteristics and individual preferences, the most effective type of interdental hygiene aid.

ESSENTIAL OILS FOR PREVENTIVE AND THERAPEUTIC MEASURES IN DENTISTRY: FROM BASIC RESEARCH TO CLINICAL APPLICATION

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Background: Essential oils (EOs), extracted from various medicinal and aromatic plants (MAPs), have been used for treatment of assorted medical and dental problems since ancient times. They are complex, volatile compounds synthesized naturally in different plant parts during the process of secondary metabolism and possess broad antimicrobial activity against many bacterial, fungal, and viral pathogens. Current antimicrobial agents used therapeutically can cause several side effects. Additionally, resistance of bacteria to antibiotics is increasing. Because of the adverse effects, increasing bacterial resistance, and high cost associated with standard therapeutic procedures, there is a need to explore EOs as a prospective source of alternative antimicrobial agents.

Objective: This review seeks to detail the antibacterial, antifungal, and antiviral potentials of essential oils extracted from MAPs as well as their preventive and therapeutic relevance in dentistry.

Methods: A literature search was performed using the Cochrane Library, Science Direct, PubMed, and PubMed Central (PMC) databases for clinical trials and review articles on EOs published within the last 10 years. The following key search terms were used: essential oils, medicinal aromatic plants, antimicrobial agents, oral health, and dentistry.

Results: Research findings directly and indirectly support the use of EOs for diverse applications in dentistry. Efficacy has been demonstrated through in vitro and in vivo studies where EOs have been used as antimicrobial agents in the management of caries, periodontal disease, candidiasis, herpes simplex virus and human papillomavirus infections, and as a preservative in multiple dental products.

Conclusions: There is considerable evidence that EOs have the potential to evolve as effective preventive and therapeutic agents for a variety of oral conditions. However, before including them in clinical practice, more clinical trials are needed that confirm the safety and efficacy of EOs and address issues such as adverse effects, toxicity, and interaction with other drugs.

SELF-EFFICACY OF COUNSELORS IN TRAINING USING MULTIPLE REGRESSION: AN EXAMINATION OF COUNSELING TRACK, LOCATION OF SUPERVISION, SUPERVISORY ACCESSIBILITY, AND SUPERVISORY ALLIANCE

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The role of counselor education programs is to train students to become competent counselors by equipping them with necessary clinical skills, knowledge and experiences (American Counseling Association, 2014; Bernard & Goodyear, 2013; CACREP, 2009). There is limited research in counseling literature that examines counseling trainee's development of self-efficacy across Clinical Mental Health, School Counseling, and Marriage and Family Therapy program areas of study. This research study aims to examine the relationship between predictor variables (location of supervision, supervision accessibility, supervision working alliance, and counseling track) on counselors-in-training Self-Efficacy through use of Self-Estimate Inventory (COSE) (Larsen, et al., 1992). A multiple regression test will be conducted with Master's counseling students in currently enrolled in internship to examine the predictive power of the previously stated factors in relationship to supervisee's COSE score. Future implications for research will outline program recommendations for supervision.

EFFECT OF DURATION OF CARBOHYDRATE LOADING ON ENDURANCE PERFORMANCE EXERCISE

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Background: Results from previous studies indicate that an increased carbohydrate (CHO) diet prior to endurance events causes an increase in glycogen and, therefore, prolongs the time to exhaustion (TTE). Glycogenesis, the formation and storage of glycogen in primarily liver and muscle, is triggered by an excess intake carbohydrate. Glycogen synthesis can be increased, or “superconcentrated” by depletion of glycogen stores through a glycogen depletion exercise followed by consumption of a high-CHO diet. Carbohydrate-loading schedules vary and their relative effectiveness in enhancing performance is not known.

Purpose: This study compares the effect of differing number of days of CHO-loading on endurance performance.

Design: Student athlete participants will undergo three sessions of glycogen depletion, CHO-loading and exercise performance testing, in random order, each separated by one week. Participants will complete one baseline TTE cycle ergometer test, three glycogen depletion cycle ergometer sessions, and three CHO-loaded (24, 48, and 72 hours) TTE cycle ergometer tests, for a total of seven tests. During the first baseline appointment, a 24- hour recall and food frequency questionnaire will be administered to assess dietary habits, average caloric intake and food preferences. Using these data, individualized CHO-loading menus for the 24, 48, and 72-hr CHO-loading protocols will be created. The primary outcome measure will be TTE as a percentage of baseline for each of the three exercise endurance trials for each participant. Analysis of Variance will be used to compare the effect of days of CHO-loading on percent baseline TTE.

Results: Findings will contribute to the creation of recommendations for CHO-loading regimens that optimize endurance performance.

BONE RESPONSE TO DIETARY CO-ENRICHMENT WITH GRAPE AND PROBIOTICS

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Background: Consumption of polyphenol-rich food such as grapes is associated with improved bone integrity in longitudinal studies. Dietary polyphenols are metabolized by intestinal bacteria, including probiotic species, to bioactive compounds that protect bone. Thus, adding probiotics to a grape-enriched diet might increase the production of bone-protective polyphenol metabolites and improve bone outcome measures of an intervention.

Purpose: This project tested the effect of long-term dietary enrichment with grape and probiotics on bone integrity in a mouse model of age-related osteoporosis.

Design: Groups (n=7 each) of 10-month-old (early middle age) male mice were fed one of six diets for 6 months (to age 16 months, advanced age): 10% (by weight) grape (10%G); 20% grape (20%G); 10% grape + 1% probiotic (10%G+1%P); 20% grape + 1% probiotic (20%G+1%P); 1% probiotic (1%P); and control (Con). Bone architecture was measured by micro-computed tomography to evaluate structural integrity of vertebrae, tibia, and femur. ANOVA was used to compare bone response across treatment groups.

Results: Aging exerted a significant effect on tibia metaphysis trabecular bone, with 10-mo-old mice having significantly higher bone volume/total volume (BV/TV) and trabecular number (TbN) measurements and lower trabecular spacing (TbSp) measurements than all 16-mo-old groups (p<0.001). Neither grape nor probiotic enrichment significantly improved microarchitecture during aging compared to control diet. The combination of 20%G+1%P exerted detrimental effects on tibia metaphysis BV/TV compared to 10%G+1%P, and TbN and TbSp compared to 10%G+1%P, 1%P and Con groups (p<0.05). Femur metaphysis displayed less pronounced aging effects than tibia, but also showed detrimental effects of the 20%G 1%P vs. most other diets for BV/TV, TbN, TbSp and pattern factor (p<0.05). Tibia and femur diaphysis cortical bone displayed neither aging nor diet effects (p>0.05). Vertebrae bone showed age-related deterioration in trabecular thickness (TbTh) and TbSp and a trend toward preservation of TbTh by grape and/or probiotic enrichment (p<0.05).

Conclusions: These findings demonstrate no benefit to bone of combined compared to independent supplementation with probiotics or grape powder and even suggest an interference of co-ingestion.

SCATTER RADIATION AND ROUTINE PORTABLE X-RAY EXAMS

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Objectives: Our main objectives were to determine what distances, based on the inverse square law, are appropriate for radiologic technologists and other healthcare professionals while performing portable x-rays in areas without lead lined walls, and to measure scatter at different distances in adjacent PACU bays and ER rooms.

Background: Scattered radiation is “all the radiation that arises from the interaction of an x-ray beam with the atoms of a patient or any other object in the path of the beam.” When increased distance, and the inverse square law (“the intensity of the x-ray beam is inversely proportional to the square of the distance from the source”) are implemented when dealing with scattered radiation, both patients and technologists have less absorbed dose.

Methods: STEP 1- Erased 17 imaging plates; one used as the control. STEP 2- Exposures made in two non-lead lined rooms. STEP 3- Performed chest x-ray (90 kVp at 5 mAs) shooting a backpack and pumpkin to imitate different densities, and a cross-table lateral knee, using a phantom knee (64 kVp at 4 mAs). STEP 4- Measured scatter by placing an imaging plate in 4 locations per exposure: 1. Where technologist stands for portable x-rays (5-6 ft behind portable). 2. Halfway between tube head and where a technologist would stand (2.25-3.5 ft). 3. Where technologist would stand to hold a patient (2.5-3.5 ft from tube head and 90° from patient). 4. Adjacent room where another patient might be laying on a stretcher (11 ft from tube head). All imaging plates were placed in cassette holders and students wore lead aprons for radiation safety during this experiment. Step 5- Anatomical side marker placed in the middle of each imaging plate exposed. Step 8- Processed imaging plates: Recorded S-value and image descriptions. Step 9- Took two exposures in a PACU bay (separated by curtains) repeating steps 4-8. Same portable used for all exposures.

Results/Conclusion: This experiment shows the relevance, and importance, of the inverse square law (and distance) in Radiographic Science. Our results were consistent with this law, in that when we doubled the distance, to approximately 6 feet, we did not have any exposure on the imaging plates. Conversely, when we decreased the distance to half (3 feet) we did have exposure on the imaging plates. Direction of the tube head also affected whether we got readings in adjacent rooms or not. Following the best radiation safety practices for both patients and healthcare workers is crucial, because scatter radiation increases absorbed radiation dose, and does not add diagnostic quality to the images.

SCATTER RADIATION

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Background: Portable radiography contributes significantly to technologist occupational dose, 95% when combined with fluoroscopy (Joyce Brusin). Not only does it contribute to the radiographer's dose, mobile imaging increases the dose received by nursing staff (Mansoor Dianati). Rooms for portable x-rays are not specially equipped for radiation; certain precautions must be taken as a result (Antonia Abrantes, 2017). The recommendation is a minimum of 6 feet away from the patient during mobile radiography (Jana Koth, 2016). Wearing lead aprons is an important part of maintaining a safe working environment (Jana Koth, 2016). During post-operative x-rays, patients are placed in the PACU and are often placed in close proximity to one another. Nurses are convinced 6 feet is a sufficient enough distance to avoid radiation exposure. We wanted to test this theory.

Objective: To investigate the amount of scatter radiation reaching different distances. The primary focus is post-operative hip x-rays using a Care-Stream portable machine.

Methods: Following total hip replacements, a 2 view portable hip x-ray is done in the PACU. Several CR cassettes are placed in various areas with different items on them to "catch" the scatter radiation. We measured the distance and documented the location relative to the DR plate. kVp, mAs, and x-ray views are noted. We did the same tests without a patient as a control. We used the LGM numbers from the AGFA CR system to determine the amount of radiation reaching each cassette

Discussion: Scatter radiation reached as far as 12 feet which is double the 6 foot rule many nurses have been using. Radiation reached the technologist pushing the exposure button utilizing the entire length of the exposure cord. As a result, the tech should be wearing a lead apron during mobile radiography regardless of how far away they are. The radiation also reached the PACU bay next to the patient. Therefore the moveable lead door needs to be utilized more.

Conclusion: The amount of scatter radiation decreased as distance increased, however radiation reached the cassette for every exposure. Time, shielding, and distance should be taken more seriously when using a portable x-ray machine. Doing the experiment actually made the nurse and techs more aware of the invisible radiation filling the room.

CORRELATION BETWEEN COLLIMATION AND PATIENT DOSE

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Background: The main goal in taking medical images is to follow ALARA: keeping patient's radiation dose as low as reasonably possible. Using a collimator device within the x-ray tube that regulates the area of the x-ray beam by adjusting lead shutters. Dose area product (DAP) is used to assess the radiation risk in diagnostic x-ray exams and fluoroscopy procedures. DAP is the absorbed dose multiplied by the area irradiated. Objective The objective is to determine the correlation between x-ray beam collimation and radiation dosage the patient receives.

Methods:

- 10 exposures were made using the same hand phantom.
- Peak kilovoltage (kVp) and milliamperage-seconds (mAs) remained the same for all exposures at 50 kVp and 1 mAs.
- Exposure size was increased one inch in width and height using collimation.
- Dose area product (DAP) number was recorded for each exposure.

Results: The exposed area is determined using the collimation tool. The graph demonstrates a correlation between collimation and patient dose. The dose was found to increase between exposures from as little as 0.12 $\mu\text{Gy m}^2$ to as much as 0.35 $\mu\text{Gy m}^2$.

Conclusion: Radiation dose does not have a safe limit, so ALARA is an important principle to follow to decrease as much dose as possible. Decreasing exposed area decreases radiation dose, however collimation should always be used with discretion to prevent exposures of undiagnostic imaging.

SCATTER RADIATION IN COMMON STANDING AREAS OF PRIMARY X-RAY ROOM

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Background: Scatter radiation is a type of secondary radiation. As soon as the primary beam hits an object, scatter radiation will result. This type of radiation will increase as patient size increases, higher kVp and higher mAs, and also the larger field of view.¹

Objectives: To determine radiation exposure levels in common standing areas in the primary x-ray room of a local hospital. Also, to compare exposure levels with different exposure techniques and tube positions.

Methods: Different exams were chosen based off of body habitus and exam type and performed on real patients with the appropriate exposure factors. Cassettes were numbered and placed in different areas of the room based off of where healthcare workers usually stand. After every exposure all cassettes were collected and processed under an AGFA CR reader system to avoid double exposures. The data from each of the 9 exposures was collected as an LgM number and subsequently documented.

Results: The results for cassette 1 were eye opening. Based off of this cassettes location and being partially blocked by the primary wall the expected exposure numbers would be much lower. Cassette 2 showed results a particular exposure of 0.5 LgM in a location where radiation shouldn't be reaching. Results for cassettes 3 and 4 were as expected. Neither of these cassettes were protected by the lead wall and were in the direct line of scatter radiation. These results prove a better primary wall needs to be constructed and that any non-essential healthcare workers need to remove themselves from the exam room during exposures.

Conclusions: A better primary barrier needs to be constructed to shield technologists or any other individuals in the exam room from direct line of scatter to the console. The technologist in charge of the exam should be the only individual at the console to initiate the exposure and all others should step outside of the room to avoid direct or indirect scatter radiation.

Resources: Data for experiment obtained at a local hospital. Sackett G. Radiation safety issues for radiologic technologists. PowerPoint slides. 2012. <http://issphysics.com/wp-content/uploads/2012/11/Radiation-Safety-Issues-for-Radiologic-Technologists.pdf>

OCCUPATIONAL EXPOSURE

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Background: Scatter radiation arises from the interactions of an x-ray beam with the atoms of a patient or object in the path or the beam. The larger the patient thickness the more scatter produced.

Objective: The objective is to determine if scatter radiation is leaking out of the x-ray room based on room design, reaching the employee work area, resulting in unnecessary and potentially harmful occupational exposure (radiation).

Methods: A 2 feet thick MRI quality testing water-ball phantom was placed in front of the x-ray room's wall bucky. 14x17 x-ray CR cassettes were placed outside of the x-ray room in the employee work area approximately 31 feet away from the wall bucky. For every exposure, a hand phantom was placed in front of each cassette. 2 sets of data were collected, with varying variables. The first experiment was made with a constant kVp technique and varying mAs factors. The second experiment was made with a constant mAs factor, and a varying kVp technique.

Results: With a constant of 75 kVp factor, scatter radiation began producing an image on the cassette placed outside of the x-ray room at 125 mAs, with increasing image detail as the mAs increased. With a constant of 125 mAs, an image was visible at 80 kVp. Image detail increased as kVp factors were increased.

Conclusion: Based on the images produced on the cassettes placed outside of the x-ray room in the employee work area, scatter radiation is leaking outside of the exam room. It is reaching the work area and unnecessarily exposing employees. Considering these results, the design of this exam room is not efficient and violating radiation safety factors.

COLLIMATION AND SCATTER RADIATION'S EFFECT ON PATIENT EXPOSURE AND DOSE

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Background: Radiation safety should be consistently and effectively utilized in every radiographic exam. An important responsibility of the technologist is to practice ALARA (as low as reasonably achievable), thus ensuring the patient receives the least amount of radiation possible. Collimation is the practice of limiting the radiation field size which reduces the amount of tissue irradiated. Shielding should be utilized to reduce the dose to patients, especially the radiosensitive organs such as the thyroid, eyes, reproductive organs, and breast tissue.

Objective: To determine the effect of collimation on patient radiation exposure and dose.

Methods: We used a Victoreen NERO mAx model 8000 to measure radiation doses. Seven exposures were made starting with a 3X3 inch collimation field up to a 15X15 field size at 65 kVp and 4.8 mAs. The DR detector plate was placed 18" from the dose measuring tool on a stool to represent the area of the reproductive organs and measure scatter radiation. The same process was followed with the DR detector plate lying on the table 24" away from the dose measuring tool with a technique of 70 kVp and 25.2 mAs.

Results: As collimation went from a 3X3" field size to 11X11" field size the amount of scatter radiation doubled at the DR detector plate. When the 15X15" field size was used, the scatter radiation was three times as much as with a 3X3" field size.

Conclusions: There is a correlation with radiation field size and the amount of scatter radiation produced. It's very important for radiologic technologists to understand this principle and minimize the area of a patient that they irradiate to keep the patient's dose as low as reasonably achievable. It's also very important to shield patient's radiosensitive areas because of the scatter radiation that reaches them.

OPIOID USE IN THE OLDER VETERAN POPULATION

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Background: Pain is a prevalent problem among the older veteran population. Veterans are diagnosed with chronic pain more frequently than the non-veteran older adults. Approximately 60% of middle-aged veterans, and 50% of older veterans are being treated with opioid medications for chronic pain. Older veterans that engage in non-medical use of prescription opioids (NMUPO) are at higher risk of abuse and transitioning to heroin use. Veterans are more than twice as likely to die from accidental overdose as the non-veteran population due to their dual enrollment in VA and Medicare benefits. Studies have shown that mental health disorders accompanied with chronic pain exacerbate problems with opioid abuse and accidental overdose.

Objectives: To evaluate the clinical and adverse effects of opioid use observed in the veteran population for the treatment of chronic pain. To evaluate comorbidities including mental illnesses related to opioid use. To evaluate current holistic approaches and non-opioid treatments available for chronic pain in older veterans.

Data Sources: CINAHL®, ClinicalKey, and EBSCOhost were searched from 2013 to 2018 for studies including the effectiveness and adverse effects of opioid use in the older veteran population; articles meeting these criteria were included.

Review Methods: We sought studies evaluating patient safety associated with opioid induced injury, dependency, overdose and mortality rates. Data were abstracted by a single reviewer and fact-checked by group members. Outcomes adhered to opioid induced injury, dependency, overdose and mortality rates in the older veteran population.

Results: The Society for the Study of Addiction found a strong association between prior or concurrent NMUPO and the initiation of heroin use in US veterans receiving care from the Veterans Health Administration (VHA). Older veterans are more than twice as likely to have a fatal overdose from opiates as opposed to non-veterans as result of comorbidities, such as post-traumatic stress, traumatic brain injuries, and severe mental illnesses. PBS reports that some VA centers have introduced programs to manage chronic pain through non-drug therapies that range from acupuncture, yoga, physical therapy, and meditation. The holistic treatment approaches have reduced consumption or entirely eliminated the use of opioids for pain management in older adult veterans. The VHA is taking positive strides in reducing the opioid problem by minimizing opioid prescriptions by 20%, increasing screenings for depression and potential substance abuse problems, as well as offering more holistic, non-opioid, and non-drug approaches for chronic pain.

Conclusions: Veterans with chronic pain commonly receive opioid medications¹ as treatment. Veterans are likely to have concurrent comorbidities such as mental illness that increases their risk for injury. Multi-disciplinary teamwork and collaboration between healthcare professionals is required to holistically manage chronic pain.

CRITICAL SHORTAGE OF PROVIDERS, TRAINING, AND FUNDING IN THE OPIOID EPIDEMIC

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Background: According to the National Rural Health Association (NRHA), 80% of people currently addicted to opioids started with prescription pain medications. Accidental deaths of Americans due to opioid and heroin overdose are estimated at 47,055 in 2014 alone and have been steadily increasing (Hancock et al. 2017). Education about this crisis is limited to 0.3% of formal medical curriculum, leaving healthcare providers underprepared to treat addiction patients. Hancock et al (2017) find rural population barriers include long travel distances, health workforce shortages, and stigma related to mental health/substance abuse treatment.

Furthermore, they found that nationally 65% of rural counties do not have a psychiatrist, 47% lack a psychologist, and 81% lack a psychiatric nurse practitioner (Hancock et al. 2017).

Objective: To explore factors related to the disparity of treatment providers in opioid addiction. Research focuses on training physicians, nurses, and other multidisciplinary team members on how to identify and treat populations at risk for addiction. The literature also demonstrates how to improve efficiency in treating addiction and use of effective means to obtain funding and more emergent treatment.

Data Sources: The databases from the CDC, NAMI, CINAHL, MEDLINE and EBSCO were investigated with dates between January 2015 to January 2018. Filter parameters included peer-reviewed academic journals and government reports regarding topics such as lack of education provided to nurses and doctors concerning treating drug addiction, inadequate treatment availability to rural areas, and vulnerable populations at increased risk in the opioid crisis. Articles meeting selection criteria were included.

Review Methods: Studies were sought that demonstrated improved patient care and efficiency regarding the opioid crisis. Peer reviewed articles were researched regarding disparity of provider numbers, training, and funding. Group review for quality and dependability was completed and the strength of evidence was based on source reliability, study design, adequacy of reports, and post-intervention effects.

Results: Competency-based training for a multidisciplinary approach to pain management and prescribing opioids is a major concern in the opioid epidemic. Provider to patient ratios are a vital aspect to achieving positive outcomes. When all healthcare workers are trained in evidence-based healthcare, patient outcomes are improved and quality care is achieved.

Conclusions: The opioid epidemic can be properly confronted with more providers and treatment options. Nurses and other multidisciplinary team members need to be adequately trained in evidence-based assessment and treatment to help fill gaps for rural treatment areas. Evidence-based guidelines are being established by the CDC, but more specific and widespread education is needed. With consistency in evidence-based training and adequate funding quality care can be provided to decrease negative outcomes.

ALCOHOL ABUSE IN THE NATIVE AMERICAN ADOLESCENT POPULATION

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Objective: To update the public with an emphasis towards the Native American people of the Pacific Northwest of alcoholism in adolescents in accordance with (1) alcohol trends in Native American youth, (2) substance abuse and mental health services administration (SAMHSA) and (3) the correlation between mental illness and alcoholism. This is in order to raise awareness of health disparities and socioeconomic instability due to alcohol abuse in the Native American youth.

Data Sources: Peer reviewed research articles published between the years 2005 to 2017 were examined and summarized to provide the most comprehensive look at the presence of alcoholism in adolescents in the Native American population. Prevention practices were reviewed looking at the effectiveness of the methods. Programs targeting substance abuse in the adolescent Native American population were examined, and the most applicable were reviewed and included in this project.

Review Methods: We sought studies that discuss the factors that influence the occurrence and trends of alcoholism in adolescent Native Americans. We also searched for reliable resources provided to Native American teens searching for help in managing alcohol addiction. Data was selected out of a compilation of resources chosen by group members. The selected articles were chosen based on accuracy, currency, and effectiveness. Multiple sources for outreach were assessed as it is understood that one mode has not proved more successful than others.

Results: The prevalence of alcohol abuse by Native American youth according is much higher than their non-native counterpart. 27% of Natives have begun drinking by 8th grade, while only 13.8% of non-natives have tried alcohol at that point. The one difference was that this was a steady rate of growth for Native Americans, while non-Natives show a spike in 12th grade. It seems early interventions may be the best way to stop the trend of early alcohol abuse for Native Americans. A one search report was run on Native American youth and alcohol abuse in the Pacific Northwest and returned 4,515 peer reviewed articles dated from 2007 to 2018. We pulled 8 articles specifically pertaining to Native American Youth, alcohol abuse, and within the Pacific Northwest and reviewed the statistics and information to create a proposal that will hopefully make a difference in the Native American community. Additionally, we reviewed multiple websites including the NCBI, the SAMHSA, and Mental Health America, to support our data showing the trends in alcohol abuse in the Native American Youth.

Conclusion: On average, Native American adolescents begin drinking earlier and in greater quantities than youth of other races. They have the highest rate of substance abuse of all other races. The high availability, acceptability, prevalence, and rate of mental illness in Native American tribes contribute to this problem. Alcohol use is deeply rooted into many lives on the reservations and decreasing the prevalence will be very difficult. However, we believe early intervention and education may be the best way to combat the trend of alcohol abuse by Native American Youth. Education will not only be for the youth, but also for the family to look for signs and symptoms of alcohol abuse.

EXERCISE FOR CHRONIC PAIN: FINDING ALTERNATIVES TO OPIOIDS THROUGH HOLISTIC PAIN MANAGEMENT

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Background: Opioids have been front and center of one of the rising epidemics over the last few decades. This addiction has contributed to many altered lifestyles, as well as deaths, but the shocking thing is that there hasn't been a lot done to combat this epidemic. In this presentation, we will propose an alternative holistic way of dealing with pain, one that has benefited us all in our lives. Exercise has always been a constant in our lives for dealing with all sorts of pain, whether it be mental, physical, or emotional. Spreading awareness to this type of holistic treatment is our goal for this presentation.

Objective: The objective of this research is to explore the potential of exercise as an alternative treatment to excessive opiate use/prescriptions.

Hypothesis: Our hypothesis is that a conjunct therapy of non-opiate analgesics and exercise therapy can effectively replace and prevent over prescription of opiates and therefore opiate addiction, as well as successfully manage pain in many cases.

Design/Methods/Scope: The methods of this research will revolve around data obtained from previous studies demonstrating the effectiveness of exercise therapy in conjunct with non-opioid analgesics or low dose opioids, rather than high doses of opioids, which often leads to opiate addiction. The design of studies primarily revolve around patients self report of pain after attending scheduled physical activities and exercise regimens.

Results: Our results show that exercise has many benefits to the human body. It has been proven to lower anxiety, relieve stress, and provide coping mechanisms to combat depression. (NCBI) Exercise can also reduce the chances of needing pain medications, with such examples as possible weight loss preventing issues such as knee osteoarthritis and many more problems associated. (Move Forward)

Conclusion: Multiple studies by various health professionals have shown the efficacy of exercise therapy as an adjunct treatment for chronic pain as an alternative to opioids. Patients with chronic pain who have started and consistently adhered to an exercise regimen as simple as walking have been able to decrease and even stop their use of opiate medications. "Research has shown that a simple education session with a physical therapist can lead to improved function, range of motion, and decreased pain." (CDC)

FATHERS OF PREVIOUSLY HOSPITALIZED INFANTS AND THEIR LONG-TERM INVOLVEMENT, CONFIDENCE, AND ROLE BELIEFS: A QUALITATIVE STUDY

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Background: One in ten children in the U.S. is born prematurely, and a growing number of infants of all weights are entering the neonatal intensive care unit (NICU). The literature demonstrates that while fathers are important in children's lives, much remains unknown regarding fathering of their medically fragile infants in the neonatal intensive care unit (NICU). In the NICU, father visitation is associated with infant weight gain and improved psychosocial behaviors of the infants at 18 months. Fathers in the NICU desire to be involved in care despite feeling reluctance due to their infants' fragile conditions. NICU nurses believe that it is important to provide family-centered care and to encourage fathers to participate in care.

Purpose: The purpose of this study is to fill a gap in the state of the science by exploring and describing involvement, confidence, and beliefs of fathers of infants who were hospitalized in the Neonatal Intensive Care Unit (NICU) and discharged home.

Design: A descriptive, exploratory design will be used. This follow-up study will include participants from an initial study of father involvement, confidence and beliefs during acute hospitalization of an infant in the NICU conducted between 2013 and 2014. These fathers voluntarily provided contact information for follow-up at the time of the initial study. Guided questions using the qualitative methodology and grounded theory will be used to conduct interviews with fathers. Along with demographic information, fathers will be asked about NICU family-centered care practices experienced while their infant was hospitalized in the NICU. Institutional Review Board approval has been obtained from Idaho State University. After being consented and agreeing to participate, subjects are being interviewed using the guided questions. Interviews are being recorded and transcribed. The transcripts of the interviews will be coded independently by several coders. Coders will look for emergent and recurrent phrases and themes. We will organize emergent themes into categories. These categories will then be sought after in other categories of data across the interview. Grounded Theory is not designed to test hypotheses, rather it is meant to generate hypotheses and further the development of theoretical concepts. Therefore, no definitive hypotheses have been formulated.

Results: The data collection for this study is ongoing. To date, 10 interviews have been conducted. We will attempt to contact all fathers who provided follow up contacted information and interview all fathers who are willing to participate.

Conclusion: The findings of this study will provide evidence about fathering practices, confidence, and beliefs three to four years after prolonged newborn infant hospitalization. It is important to know more about how NICU nurses can help to support and influence long-term parenting of fathers through initial engagement in the NICU and the effect of this interaction on later father involvement, confidence and role beliefs.

CHILD SURVIVORS OF SCHOOL GUN VIOLENCE: EMPATHY IMPACT FROM LIVED EXPERIENCES

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Objectives: Describing the lived experience phenomena from narrative interviews of children and family members that have experiences surviving “their school” shooting. Interview children and family members from ten different schools that have had a school shooting with or without fatalities. Looking at the child’s global view and knowledge regarding the world gained through direct, first-hand involvement in surviving a school shooting.

Data Sources: CDC, US Department of Justice, US Department of Homeland Security, US Department of Education, National Center for Educational Statistics, Federal Bureau of Investigation, MEDLINE®, CINAHL®, EBSCO® were searched from January 2012 to February 2018 for the phenomena of lived experience in childhood and family trauma, gun violence, and school safety programs.

Review Methods: Studies, articles and statistics were evaluated to obtain how self-reporting, interviews, and other reports looked at the phenomena of lived experiences of survivors in school shootings. Literature review of tools utilized for interviewing child survivors and family members surviving school shootings.

Results: Child and family self-reporting of thoughts, feelings and behaviors were obtained in news articles, radio interviews, and law enforcement reports. The phenomena of the “lived experiences from children and family members that survived school shootings impacted news reporters, law enforcement personnel, politicians, faith based community leaders, and numerous other community stakeholders. These groups became opinionated in advocacy issues regarding school safety reform, gun violence reform and more.

Conclusions: Oxford’s dictionary defines a lived experience as a “personal knowledge about the world gained through direct, first-hand involvement in everyday events.” After a child survives “their school” shooting they perceive the world differently. A significant number of these children become stronger in communicating thoughts and feelings and establishing improved coping skills such as hyper vigilance and warning sign intuition. They often become more articulate about change in “their school “safety policies. They voice their thoughts and feeling quite often in popular social media that attracts national and world wide attention.

DEVELOPING A COMMUNITY GOVERNANCE STRUCTURE FOR PRE-DIABETIC RURAL LATINOS IN IDAHO

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This poster presentation will discuss the process for identifying and networking with community partners in southeastern Idaho, the Mexican Consulate, and clinical providers to facilitate inclusion of pre-diabetic community members on a Steering committee and developing a governance structure. The purpose of the steering committee, meetings, decision making, voting, and rules of operation will be presented. Determination of member composition and reporting responsibilities will be provided. Responsibilities of each of the members will be discussed. Outcomes related to lessons learned will be discussed regarding member expectations, time needed, technology issues, language needs, and project staff following through on project assignments.

BIOFEEDBACK A HELPFUL ALTERNATIVE TO OPIOID ADDICTION

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Objectives: To inform and demonstrate that biofeedback is a helpful form of treatment in cases of opioid addiction. We also want to persuade multidisciplinary healthcare providers to use this type of treatment with their mental health patients as a form of treatment. 116 people die every day from opioid overdose (Secretary, H. O). With the increasing use of opioids and their addictive quality more patients are suffering than ever. Implementation of a biofeedback system in mental health cases will help aid in the opioid epidemic.

Data Sources: Ebsco Host and Pubmed databases were searched from February 18- February 28 2018 for studies showing biofeedback as an alternative to opioid use. Two peer reviewed studies published within the last five years were found and were included in this report. **Review**

Methods: We sought studies that had been peer reviewed and were published within the last five years. Studies had to show that biofeedback was a good intervention to use for mental health patients who are using opioids. Reliable databases were used and the authors of the studies all have degrees in the health sciences.

Results: The two studies were both peer reviewed articles proving their quality and validity. The studies displayed how that patients benefited from biofeedback therapy. Participants concluded with positive outcomes and less desire to use opioid substances. These individuals also showed improvement in depression and overall mental health status after receiving multiple biofeedback sessions. The results also displayed that patients who took opioids and used biofeedback had good results and less of an urge to use the opioids. Individuals in the heart-rate variability study used biofeedback to induce relaxation and restore autonomic balance of the body. This proved to be an effective intervention to aid patients who are opioid addicts.

Conclusion: There is sufficient evidence that displays the effectiveness of biofeedback as a form of intervention for mental health, especially those who use opioids. Data within the previous articles indicate the effectiveness of biofeedback on heart rate variability and respiration rate which leads recovery towards autonomic balance.

NURSE STAFFING STANDARDS AND STAFFING LEVELS IN NURSING HOMES

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Objective: To examine the levels of nurse staffing levels in nursing homes (NHs) and determine the impact of staffing standards (SS) on actual staffing levels (SL). The study will also determine whether there is a difference in adherence to staffing standards and/or actual staffing levels between for-profit (FP) and not-for-profit (NFP) NHs.

Background: The 1987 Omnibus Budget Reconciliation Act (OBRA) addressed the minimum nurse SS in the Nursing Homes Reform Act (NHRA). The law specified a registered nurse (RN) director of nursing, at least one RN for eight hours/day for seven days/week, and a licensed nurse (LN), either RN/licensed practical nurse (LPN)/licensed vocational nurse (LVN) for 24 hours/day (Center for Medicare and Medicaid Services [CMS], n.d; OBRA, 1987). In terms of hours per resident day (HPRD), this requires 0.08 and 0.30 of RN and LN hours/day. However, the CMS recommended a total nurse (TN) of 4.1 (0.75 RNs, 0.55 LVN, & 2.78 CNAs) HPRD for maintaining residents' wellbeing, dignity, and preventing of harm occurrences (CMS, n.d). The CMS is also using a national average TN HPRD of 4.0309 and RNs of 0.7472 HPRD to calculate staffing quality in its Five-Star Quality Rating system (CMS, 2015). According to the law, RNs must assess, and, in collaboration with other LNs, implement care plans, treatment, and evaluate residents' health outcomes while the certified nursing assistants (CNAs)/nurse aides (NAs) provide activities of daily living care under the LNs' supervision (CMS, n.d; Chen & Grabowski, 2015; Matsudaira, 2016).

Data Sources: CINAHL Plus, Medline Complete, Academic Search Complete, ProQuest Dissertation, ProQuest Nursing, Allied Health Source, CMS, Google Scholar, and American Nurses Association website were used as information sources.

Review Methods: Research studies were searched and reviewed for information on nurse SS and/or regulations, SLs, and adherence to staffing standards in nursing homes. Data were also reviewed on for-profit and not-for-profit NHs.

Results: States with higher/stronger staffing standards have higher actual staffing levels than states with lower staffing standards; overall increases were lower than SS and TN levels improved better than LNs; and Medicare NHs had higher SL (Bowlis & Gahttas, 2016; Chen & Grabowski, 2015; Harrington et al., 2012; (Matsudaira, 2014; Paek et al., 2016). RN and LN hours were found to be negatively associated to standards, NFP NHs had increased SL compared to FP NHs (Harrington et al., 2014).

Conclusion: Nurse SS have not yielded the expected outcome for the required RN, RN skill-mix, LN, and TN SLs in many NHs nation-wide. Insufficient SLs continue to impact on the residents' wellbeing. Stronger staffing enforcement is required for adequate SLs and NHs quality of care outcomes.

MDFT UTILIZATION IN IDAHO ADOLESCENT OPIOID ADDICTION

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Background: The opioid epidemic is prevalent in Idaho. 226, 213 adolescent and young adult Idahoans, ages 15-24, (approximately 14% of Idaho's total population) have been significantly impacted by opioid addiction. "On average, there are 134 individuals age 15-24 per 1,000 persons in the state" who were addicted to opioids. (Idaho Department of Health and Welfare, 2017). These numbers are significant in loss of lives and family function.

Purpose: The multidimensional family therapy approach (MDFT) has significance in improving outcomes of adolescents with opioid addiction and demonstrates increased family functionality. A planned intervention to reduce opioid use by the State of Idaho is to incorporate family therapy in each region such as family recovery support services (State of Idaho, 2018). The Idaho Office of Drug Policy has established a goal to reduce Idaho youth opioid abuse 10% by 2021. This goal may be attainable through implementation of MDFT. Review of the literature is favorable of MDFT in rural communities with disparities.

Design/Methods/Scope: MDFT is a community based, holistic, cost effective, and family based treatment for utilization in opioid addiction. This model focuses on aspects of adolescent life development with cognitive behavioral therapy, family therapy, risk and protective factors, adolescent development, and developmental psychophysiology (MDFT, 2018).

Results: Review of the literature demonstrates that MDFT is effective on primary prevention, education on adolescent addiction, as well as recidivism into addiction treatment. and ongoing assessment of addiction risk factors. "Research shows that family-based treatments are highly efficacious; some studies even suggest they are superior to other individual and group treatment approaches" (NIDA, 2014). The results were collected using a combination of sources of quantitative data to determine trending statistics. The National Survey on Drug Use and Health, Youth Risk Behavior Survey, Idaho Healthy Youth Survey, and Behavioral Risk Factor Surveillance System were utilized (State of Idaho, 2018)

Conclusions: Utilization of the MDFT can increase the likelihood of decreasing Idaho youth opioid use to assist in meeting the goal put forth by the Idaho Office of Drug Policy. Idaho families can to healthier future by decreasing the use of opioid youth addiction by utilizing MDFT. The future of Idaho is dependent on our children and youth, which can be helped with the use of MDFT. Opioid use in adolescents is prevalent in Idaho. It is essential to utilize effective interventions in order to decrease statistics. The involvement of family members contributes to positive treatment outcomes.

PAIN MANAGEMENT IN THE OPIOID CRISIS: A HOLISTIC APPROACH

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Background: Pain and pain management have always been at the top of the patient and medical professionals' list of treatment priorities. One of the oldest and most effective ways to treat pain is through the use of opioids. The National Institute of Drug Abuse defines opioids as a class of drugs that includes heroin, fentanyl, oxycodone, hydrocodone, codeine, morphine, and many others (2018). According to the Idaho Office of Drug Policy, "in 2015, 233 Idahoans died from drug overdose...opioids were related to 93 of those deaths..." (Revoczi, 2017). These shocking death rates have coined this situation as the 'Opioid Epidemic'. In this light, holistic care can be a vital tool in developing non-addictive pain treatment plans for patients.

Objectives: To obtain evidence-based, peer-reviewed research that identifies ways to holistically approach the encroaching opioid epidemic. The information gained will allow researchers to identify alternative techniques that are still effective for pain management without the use of opioids. This approach will focus on the avoidance of the serious side effects associated with opioid use.

Design/Methods: We sought evidence-based, peer-reviewed studies that were published within the last five years regarding alternatives to opioid use for the management of pain. These studies discussed holistic ways to treat pain that avoided the detrimental side effects that accompany opioid use, particularly risks of abuse, dependence, and addiction. They also included a variety of suggested improvements to pain management.

Results: We found that use of complementary medicine and practices is becoming more prevalent as Americans seek more holistic treatments. According to Clark, Black, Stussman, Barnes, and Nahin (2015), "Overall, 34% of adults used any complementary health approach in 2012." However, these approaches are typically used in conjunction with conventional therapies, not as replacements (Clark et al., 2015). Multidisciplinary approaches may include physical therapy and exercise, different types of electrical stimulation and electromagnetic energy therapy, and even therapeutic lasers (Knutson, 2017). Other holistic approaches include massage, acupuncture, mindfulness, hypnosis, guided imagery, cognitive behavioral therapy, and the use of music for distraction and relaxation. Centers for Disease Control and Prevention (CDC) Guidelines recommend using a combination of non-pharmacologic and non-opioid pharmacologic therapies to control pain, particularly chronic pain (Dowell, Haegerich, & Chou, 2016).

Conclusion: There are an abundance of non-pharmacological therapies to treat pain in various patient populations. Some of the shortcomings in combating the opioid crisis stem from the lack of education and lack of time spent with patients in discussing other options.

Multidisciplinary and holistic therapies, paired with non-opioid pharmacological therapies, seem to produce effective alternatives that meet Patient Centered Care and Teamwork and Collaboration QSEN competencies.

DEPRESSION IN ADOLESCENT OBESITY

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Objectives: There is an overwhelming support of evidence related to obesity and depression in adolescents and how they are tied together. By identifying the possible indicators, psychological and physical support can be given to help those suffering from this condition.

Data Sources: Psychology and Behavioral Sciences Collection, PsychINFO, Medline and APA PsychNET were all searched from January 2012 to current date, with an emphasis on adolescent obesity and depression. There were specific results and studies demonstrated on each database supporting evidence of this current issue. Each article used within the research were read and properly supported by evidence of depressive indicators in adolescent obesity. Most study samples were longitudinal studies with varying population sizes.

Review Methods: We sought after articles that specifically targeted early onset obesity in adolescents and how it increased the risk for depressive symptoms. Vice versa early onset depression in adolescents was also targeted showing an even higher risk for potential obesity. Articles were gathered from notable databases and scholarly journals which have been peer reviewed and published.

Results: Approximately 70 articles were yielded with the search of adolescent obesity and depression. Out of those 70 articles approximately 35 of them supported evidence of both obesity and depression being related in adolescents, 20 of them pertaining to just adolescent obesity and 12 supporting adolescent depression. The remaining didn't correlate with either criteria. Around 16 results came from Psychology and Behavioral Sciences Collection (22%), 11 of those were acquired from APA PsychNET (16%) and the remaining 43 were collected from PsychInfo (62%).

Conclusion: There is a high supporting level of evidence showing how adolescent obesity and depression are bi-directional and support the other as a co-morbidity. Results show that this co-morbidity is more prevalent in adolescent girls as opposed to boys. Early detection of either obesity or depression tend to prove continuation of the symptoms throughout a child's adolescent period.

THE CURRENT STATUS OF IDAHO AUDIOLOGIST'S KNOWLEDGE OF THE DEAF COMMUNITY AND CULTURE

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Background: According to Robert Trace in 1996, Deaf individuals are willing to have interactions with audiologists despite the perception that audiologists want nothing to do with their community and culture. Since then, the rift between audiology and the Deaf community continues, leading many to assume they are opposing sides.

Objective/Hypothesis: To study Idaho audiologist's knowledge about the Deaf community and culture, how much interaction they have, and how they implement experiences and knowledge into their job. The hypothesis stated that Idaho audiologists had little to no knowledge about the Deaf community and its culture.

Methods: First, a Qualtrics survey was designed to test the hypothesis and other related questions. It contained 17 questions using multiple choice, all that apply, and open-ended. These questions were divided into four overarching questions: 1) Did audiologists have any exposure to the Deaf community and culture at the academic level? 2) How often did audiologists interact with the deaf in a work setting? 3) Did audiologists attend any events created by, or for, the Deaf community? 4) What options did audiologists provide to patients, and/or patients' families, regarding their local Deaf community? Second format, review of previously published material to compare data and draw relevant and appropriate suggestions for application of this research. Sources used varied from peer-reviewed articles to national organization websites of the Deaf culture and community. The survey was sent out to 74 audiologists across Idaho via an email link to the Qualtrics survey. Of these, 25 responded.

Results: The results found that Idaho audiologists had limited exposure and knowledge about the Deaf community and its culture through their academic studies and desired to learn more if they could coordinate around their busy schedules. Data also found that audiologists had no to little interaction with the Deaf in a work setting, though which work settings had more interaction was not evaluated. Thirdly, the results indicated that audiologists rarely, if ever, participate in events created by, or for, the Deaf community. Combined, the results showed that audiologists provide options relating to the Deaf community and culture to their patients and believe that it is important to provide this information to families and patients. **Conclusion:** Based on the results, the conclusion created is that audiologists could benefit from more exposure to the Deaf community and culture, either through continuing education or community interaction. Perhaps, with more knowledge, audiologists can demonstrate that they are not opponents to the Deaf community, and create a more collaborative relationship.

A CASE OF LATE ONSET STUTTERING: ANALYZED THROUGH AN EXPANDED CASE HISTORY INTERVIEW

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Introduction: Ninety-five percent of individuals who stutter begin before the age of 5 (Yairi & Ambrose, 2005). Individual cases of late-onset stuttering are rare and present an opportunity to increase understanding regarding the disorder. The current single-case study involved a 14-year-old male experiencing persistent stuttering after sudden-onset. Analysis of an expanded case history interview was used to explore statements of lived experiences and the personal, social, and emotional impacts on the individual's quality of life.

Materials and Methods: Quantitative and standardized measures were used to evaluate the client's levels of overt and covert stuttering. An expanded case history interview was completed individually with client and the client's mother to evaluate further the behaviors and impact aspects of stuttering. Interviews were transcribed and individually coded by multiple reviewers before arriving at a consensus through triangulation of aligned statements and themes reflecting the client's world view.

Results: Quantitative results indicated a moderate to severe category of overt stuttering and moderate category for impact experiences of stuttering (covert features). A number of themes arose through analysis of the expanded case history interview demonstrating the client's difficulty with late onset of stuttering. These findings affirm the statements of the client's lived experiences and explore the relationship of behaviors, self-perceptions, and the experiences of stuttering.

Conclusion: This study gives added understanding of the personal, emotional, and social impacts experienced with late onset stuttering. These findings allow for increased knowledge regarding the transformation of an individual's self-conceptualization as a fluent communicator to a self-conceptualization as an individual that stutters.

A SURVEY OF MENTORSHIP PROGRAMS IN GRADUATE SCHOOL

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Background: Mentoring in the academic setting has been a longstanding strategy to assist in the development of leadership, professionalism and expertise among higher education (Mills, 2008). One strategy that has become gradually more popular in academia is mentoring of first-year students by senior students (Rodger & Tremblay, 2003). A designated formal mentoring process is largely believed to contribute to notable positive outcomes for both the mentor and mentee (Ragins & Cotton, 1999).

Purpose/Objective/Hypothesis: The purpose of this study was to survey students' experiences with and opinions of mentoring in the graduate school setting for health science programs. The data collected from this research is intended for use as a basis for composing a formal mentoring handbook that will be used in the Idaho State University (ISU) Doctor of Audiology (AuD) program, as there is not currently one in place. For the purpose of this study, the following questions were addressed: 1. What health profession programs on the ISU campus currently implement a formal or informal mentorship program? 2. What do health profession graduate students perceive as important aspects of a mentorship program? 3. Are graduate students more satisfied with their overall graduate school experience when they participate in mentorship programs? 4. Did graduate students report noticeable benefit from participating in a mentorship program? As part of this study, investigation included one research hypothesis: Graduate students who participate in mentorship programs are more satisfied with their educational experiences, and report noticing benefit from their participation in the program.

Methods: Participants included in the study were students currently enrolled in various health science graduate programs at ISU. These participants voluntarily completed an anonymous, electronic survey, which addressed their experiences with graduate school and focused primarily on the perceived benefits and/or downfalls of graduate school mentoring. Data was analyzed using the Qualtrics software available through ISU. 186 responses were obtained.

Results: Results are expected to reveal that a majority of students report receiving benefit from participating in mentoring programs, and are in favor of graduate programs implementing them. While some drawbacks may be identified, it is expected that most students will report that the benefits outweigh the downfalls.

Conclusion: Considering the literature and the data obtained from this research, it was concluded that mentoring programs in graduate school are perceived as beneficial, and many students support their implementation and use. These data support the application of a formal mentoring handbook in the ISU AuD program, and will, therefore, act as the basis when the manual and program are developed.

IDAHO AUDIOLOGISTS' PERSPECTIVES ON THE IMPACT OF UNTREATED HEARING LOSS AND INSURANCE COVERAGE FOR HEARING AIDS

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Background: Research indicates that untreated hearing loss can lead to challenges and difficulties in regards to education, overall health, employment, socioeconomic, and overall quality of life. Currently, Idaho legislation does not mandate that private insurance companies and Medicaid policies offer coverage of hearing aids for its policyholders. While children under the age of 21 who receive Idaho Medicaid services are eligible for hearing aid cost coverage, children on private insurance and adults do not typically receive coverage. Due to risks of untreated hearing loss, providing access to complete or even partial coverage of the costs associated with hearing aid devices would be beneficial to the people of Idaho who have hearing loss.

Purpose: The purpose of this document is to demonstrate the importance of treating hearing loss as well as the need for Idaho insurance companies to provide access and/or coverage assistance to affordable hearing aids and devices to Idahoans with hearing loss.

Methods: An anonymous 23-question survey was sent to 75 practicing audiologists in Idaho via email and 43 audiologists responded. Questions inquired about audiologist's knowledge and experience with financial assistance programs for hearing aids and their interest in using these programs with patients.

Results: Results indicated that Idaho audiologists acknowledge a connection between untreated hearing loss and its effects on education, employment, income, and quality of life. Additionally, it was indicated that there is an interest and willingness to utilize hearing aid assistance programs, however, some are limited by time, knowledge, and financial resources.

Conclusion: Untreated hearing loss has a global effect on an individual's overall well being. Access to private insurance coverage for both adults and pediatrics is limited in Idaho. Insurance coverage of hearing aids is expected to increase the number of individuals seeking audiology services and addressing their hearing and communication needs. The societal impact of untreated hearing loss justifies the necessity of insurance companies provision of hearing aid coverage in the state of Idaho.

A CASE REPORT OF VOCABULARY GROWTH IN A CHILD LEARNING BOTH ASL AND SPOKEN ENGLISH

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Background: This case study describes the initial stages of vocabulary growth across languages in a 2-year, 11-month-old female with delayed language development. The home languages of the child were English and American Sign Language (ASL), with the most-frequent language used with the child reported to be ASL. Her spoken vocabulary was 12 words upon admission to speech-language therapy, while her signing vocabulary was slightly higher. Fitzpatrick, Stevens, Garritty, and Moher (2013) have stated that there is no agreement among clinicians that establishes what is optimal intervention for teaching spoken language to signing children. Other research has shown that when two languages are taught in similar amounts, that balanced bilingualism can develop (Brice & Wertheim, 2004/2005). However, when exposure to one language is limited, language loss can occur (Anderson, 1999). The clinical purpose of tracking the ASL vocabulary was to verify that no language loss was occurring. Purpose/ Research Questions: To determine how signed vocabulary growth compares to spoken vocabulary growth in a child receiving oral language intervention and to determine if regression will occur in ASL with an increase of oral language expression.

Materials and Methods: Quantitative and standardized measures were used to evaluate the participant's language and vocabulary levels in English, prior to any language intervention. Her use of ASL was documented via a standardized parental reporting instrument. Individualized, 50-minute treatment sessions which targeted spoken language were provided twice weekly. After 11 weeks of intervention, the subject's expressive vocabularies in both English and ASL were measured. Data were analyzed for either growth or loss in each language.

Results: Preliminary results indicated that after an initial period of oral language treatment, the participant showed gains in both spoken English vocabulary and in the number of ASL signs produced.

Conclusion: The participant's spoken English vocabulary increased several weeks of direct language intervention. Her productive signed vocabulary also showed gains. The increased focus on oral language provided by intervention did not appear to have a negative impact on the participant's ASL vocabulary. No language loss was suspected.

WIDEBAND ACOUSTIC IMMITTANCE AND AGE EFFECTS OF THE MIDDLE EAR

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With the recent commercialization of wideband acoustic immittance (WAI) technology, the need to translate research work to clinical practice, including the creation of normative data, has been accelerated. Aims of the present study were to identify age related differences in WAI and further develop a WAI normative database across the age spectrum. WAI absorbance data from individuals in six age groups were examined, including 6 – 12 months; 2 – 5; 10 – 15; 20 – 30, 45 – 55, and 65 – 75 years. Absorbance was similar for the two oldest age groups across the entire frequency range (250 – 8000 Hz). However, significant age effects were found for absorbance with the 20 – 30 year group. With the pediatric groups, trends toward more significant age effects were found with the youngest group; in particular, absorbance for the 6 to 12 month children was lower than all of the older groups for approximately 600 through 3000 Hz. Overall, these results suggest more significant differences in WAI for the youngest and oldest groups along with a trend toward decreasing middle-ear stiffness with age. They also hold relevance for the establishment of normative data for WAI measurements and for understanding the aging process in the peripheral auditory system.

EXAMINING THE EFFECTS OF ANKYLOGLOSSIA ON SWALLOWING FUNCTION

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Background: Ankyloglossia is an oral anomaly characterized by a short lingual frenulum. Oral-pharyngeal dysphagia (OPD) is a deficit in one or more of the stages of swallowing that causes difficulty moving food from the mouth to the stomach. Ankyloglossia has been linked to deficits in breastfeeding, but swallowing problems later in life have not been thoroughly investigated (Francis, Krishnaswami, & McPheeters, 2015).

Purpose and Objectives of the Study: The purpose of the present study was to replicate Olive's (2016) study to add more evidence indicating whether individuals with ankyloglossia differ from individuals without ankyloglossia on various measures of oral pharyngeal dysphagia. **Objectives of the Study:** Researcher will compare masseter contraction, articulator strength, and oral-pharyngeal transit time measurements to age matched norms; Researcher will identify a possible trend relating to variables associated with ankyloglossia and those associated with oral-pharyngeal dysphagia.

Methodology: This study included 8 subjects, 3 males and 5 females. Participants were evaluated for tongue tie using the Lingual Frenulum Protocol. The Iowa Oral Performance Instrument (IOPI) was used to measure strength of the tongue dorsum, tip, and lips. A Two channel Electromyography (EMG) was used to measure masseter contraction activity for all presented food/liquid stimuli. Oral-pharyngeal transit time was measured using a hybrid approach with swallow onset indicated by a sharp rise in EMG reading and offset indicated by palpable depression of the larynx. The bolus consistencies were ½ tsp pudding, 1 ½ tsp pudding, 10 cc water, and a "typical" bite of Triscuit cracker.

Results: Data for each objective variable (EMG and IOPI trials) were compared with the age matched Holzer (2011) normative data for swallowing function using z-scores. An arbitrary criterion of 50% of participants displaying a significant finding was established as the threshold for identifying a variable as demonstrating a strong trend toward presence in individuals with ankyloglossia. All IOPI measurements met the criterion, as did all masseter contraction measures except one. Notably, none of the oral-pharyngeal transit measurements met the criteria. By this metric, individuals with ankyloglossia show consistent reductions in articulator force, as well as masseter activity for all boluses. Data from this study supports Olive (2016) findings that articulator force and masseter activity is reduced in people with ankyloglossia. His findings of significantly delayed oral-pharyngeal transit time were not supported.

Conclusion: Oral-pharyngeal dysphagia has many indicators such as delayed oral-pharyngeal transit time and reduced oral musculature strength. Individuals with ankyloglossia may be at risk for OPD due to the presence of tongue weakness and reduced masseter activity. Although future research is still warranted, these findings encourages health professionals to address ankyloglossia due to its indicated relationship to OPD.