Expansion of a multi-disciplinary immunization program to improve influenza vaccination rates among assisted living home residents: a pharmacy student-driven initiative
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Background: According to the Centers for Disease Control, each year approximately 100,000 adults, 70 percent who are over 65 years of age, die of vaccine preventable diseases. Despite clinical evidence supporting vaccination, many elders, especially those living in small assisted living homes (ALHs), remain unvaccinated due to limited: access, financial resources, and transportation. This clinical demonstration project currently supported by in-kind influenza vaccine donations can not address the growing community need. Not all eligible individuals are receiving influenza vaccine.

Objective/Methods: To address this unmet and growing need, a student-led pharmacy organization (American Pharmacist Association - Academy of Student Pharmacists “Operation Immunization”), partnered with a multidisciplinary team of volunteer healthcare providers from Providence Health and the community to: 1) administer influenza vaccine to ALH residents, 2) increase the number of eligible healthcare providers to administer vaccine, and 3) collect and analyze vaccination administration data from the past 10 years to use as pilot data to apply for programmatic funding.

Results: In 2017, only 9 percent of all ALH residents in the Municipality of Anchorage received influenza vaccine through the ALH Immunization Program despite a program high of approximately 30 volunteers and 64 homes served that year. Based on vaccine administration pilot data, GIS, and census data 76 percent of homes, which reside in primarily poor and racially diverse communities remain unsupported.

In 2018, Operation Immunization participation increased pharmacist participation by 300 percent and over 1/3 of the local college of pharmacy students travelled to homes and administered vaccines during the influenza clinics, resulting in approximately 44 percent more elders having access to and receiving vaccinations in 2018 than in 2017. In addition, Operation Immunization leaders, recruited volunteers from other College of Health professions.

Conclusion: Vaccine-preventable disease remain a significant health problem for elderly people. Seniors in small assisted living homes greatly benefit from outreach services that increase access and adherence to preventive vaccines shown to decrease expensive hospital visits and untimely death. Pharmacists should continue to seek out opportunities, working with interdisciplinary teams, to change the public perception of what their role in healthcare is, working within the ALH Immunization Program and College of Pharmacy to identify and apply for available programmatic funds to support similar vaccination programs in underserved and underrepresented communities.
Outcome measures for the use of automated feedback in language sample transcription training to improve clinical efficiency and accuracy
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Background: Language sample analysis is an important part of a comprehensive assessment of language skills in children (e.g., Haynes & Pindzola, 1998; Owens, 2004) 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 speech-language pathologists (SLPs), Pavelko et al. (2016) concluded that many do not regularly use language sample analysis in practice. The most frequent barriers to language sampling that were identified were limited time and limited training/expertise. These barriers appear to be related. Language sample analysis is a skill that requires feedback and practice to become proficient and efficient. Once one is efficient with a skill, limited time may not be a prohibitive barrier. 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 transcription and coding may be one way to address its limited use in 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 analyze, and how comfortable they are with this skill in their future practice.

Purpose: The purpose of the present study was to identify the extent to which multiple practice opportunities with automatized feedback would decrease the amount of time needed for language sample transcription and coding, while increasing student accuracy and confidence in these tasks.

Method: Twelve students completed an online training program for the software program, Systematic Analysis of Language Transcripts and they were provided with additional materials. After training, the students were randomly assigned audio-recorded language samples produced by children with specific language impairment or typical language. Students then transcribed and coded these language samples and self-recorded the time spent on each transcript. Accuracy was measured using the Quiz tool in Moodle.

Results: Thus far, the students have demonstrated an increase in accuracy and a decrease in time for language sample transcription and coding.

Conclusions: Use of automated feedback in language sample training is an effective way of increasing new clinicians’ skill and accuracy in this important language assessment task. It will also increase the likelihood that trained clinicians will use this tool more frequently and effectively in their clinical practice.
Hemoglobin A1c Point-of-Care Testing Implementation in Primary Care
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Background: Diabetes mellitus is a chronic disease that affects millions of people and costs billions of dollars worldwide. In the care of patients with diabetes mellitus, many clinicians utilize the hemoglobin A1c assay for screening, diagnosing, and managing the disease. This assay is a retrospective calculation of average blood sugar levels over a two to three-month period and can be collected via point-of-care testing or non-point-of-care testing. In successful diabetes mellitus management, patients get their hemoglobin A1c tested two to four times per year and more frequently during pregnancy. In addition, patients with a body mass index equal to or greater than 25 kg/m² are recommended to be screened for diabetes with a method such as the hemoglobin A1c assay. Point-of-care testing provides the clinician with immediate information for the management of the patient.

Purpose: The aim of this Doctor of Nursing Practice scholarly project is to determine how hemoglobin A1c point-of-care testing impacts diabetes mellitus management in the primary care setting.

Methods: To meet this aim, hemoglobin A1c point-of-care testing was implemented into a clinical practice site. Supported by the evidence collected in a literature review, a protocol for utilizing point-of-care testing in clinical practice was created and implemented into a one provider clinic. The collection of data began in August 2018 and concluded in November 2018. The Iowa Model was utilized to translate the identified evidence into practice and the Normalization Process Theory is being used to determine the success or failure of the implementation, as well as, to evaluate the implementation results.

Outcomes: Evaluation of the project will be done by measuring two main elements: 1) the impact on clinical decision making related to medication management and 2) the impact on disease outcomes as defined by changes in hemoglobin A1c levels. Secondary measurements include the identification of prediabetes in patients ages 40 to 70 years presenting for wellness exams with a body mass index equal to or greater than 25 kg/m² based on the U.S. Preventive Services Task Force (2015) recommendation and evaluating the implementation of the intervention specific to the one provider clinic. Data is currently being analyzed and will be available by the first week of April.

Conclusions: This project’s results will guide the practice change for the clinic and may provide a model for other clinics of similar size for the implementation of hemoglobin A1c point-of-care testing into clinical practice.
Retrospective review of complaints filed by Deaf users of American Sign Language regarding communication access to healthcare

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Background: Healthcare providers are mandated to provide sign language interpreters for Deaf users of American Sign Language (ASL) in the majority of encounters. Provision of these services improves access and provider/patient communication.

Objective: To describe the types, frequency, severity, and trends in healthcare access complications experienced by Deaf users of ASL.

Methods: A six-year retrospective review of complaints (n=108) filed regarding sign language interpreter provision in healthcare settings with the Idaho Commission of the Deaf and Hard of Hearing by Deaf users of ASL was conducted and summarized. An analysis of demographic and language factors associated with interpreter-related barriers and whether the complaint was resolved, was performed using multivariate logistic regression.

Results: Reasons for complaints of interpreter-related barriers to care included: 48.2% were “told an interpreter was not available”, 28.7% received an unqualified interpreter, an interpreter was promised but not provided (18.5%). Factors independently associated with having been promised an interpreter were: medical clinics (vs. dental) (OR 3.92 95%CI 1.18-12.98), and complaints filed later in the study period (OR 1.55 per year 95%CI 1.19-2.01). For each additional year during the study period, complaints were 1.6 times (95%CI 1.15-2.22) more likely to have an interpreter promised but not provided. Patients from rural/frontier areas were less likely to have their complaints satisfactorily resolved (OR 0.18 95%CI 0.06-0.55).

Conclusion: Deaf users of ASL experience various interpreter-related barriers throughout the process of accessing healthcare and communicating with providers/staff, though further regional and nationwide documentation is warranted.
Drug-induced hearing loss prevention through integrative drug repurposing and screening
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Abstract forthcoming
Implementing Practice-Based Reminder/Recall to Improve Childhood Immunization

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Background: A long history of diligent vaccination has significantly reduced the disability and death associated with vaccine-preventable diseases. Although coverage for childhood vaccines in the U.S. remains relatively high overall, gaps exist. The percentage of two-year-old children who are up to date on recommended immunizations remains below target levels for several vaccines. This is significant because missed childhood vaccines can contribute to increased morbidity and mortality, reduced preventative care opportunities, and increased health care costs. A comprehensive review of the literature revealed that patient reminder/recall is an effective strategy to increase immunization rates. Although evidence supports using mailed patient reminders, the number of practices utilizing reminder/recall systems remains low.

Purpose: The purpose of this Doctor of Nursing Practice project is to implement a reminder/recall system that utilizes a statewide immunization information system, at a community health center, to improve early childhood immunization coverage. Primary aims are to increase the number of children who receive recommended childhood immunizations and to evaluate the process of implementing a practice-based reminder/recall system.

Methods: The project took place from November, 2018 to February, 2019 at a community health center in Idaho. The primary intervention involved using Idaho’s Immunization Reminder Information System to send a reminder/recall postcard. Postcards were mailed to the parents of children, two-years old and under, who were due for one or more of the ten recommended childhood immunizations. The Iowa Model, the Health Belief Model, and the Quality Implementation Tool were used to guide project implementation and process evaluation.

Outcomes: Data analysis is currently underway. Analysis includes both process and outcome measures. Process measures include operationalizing the concepts of fidelity, dose, reach, quality of implementation, project differentiation, and adaptations made. Qualitative data from field notes was collected to document and describe the implementation process. Primary outcome measures include receipt of a vaccine and the percentage of children who are up-to-date for each of the recommended vaccines. Data was collected from immunization information system reports and chart reviews. Descriptive statistics will be used to report results.

Conclusion: Increasing immunization coverage can improve health outcomes among children, families, and communities. Findings from this project will provide valuable information on implementing a practice-based reminder/recall system using a statewide immunization information system. Reporting barriers to implementation, as well as successes and strategies for sustainability, could help healthcare providers to successfully implement efficient patient reminder systems to improve immunization practices in primary care.
**MERIDIAN POSTER PRESENTATION ABSTRACTS**

**Statins and Drug-Induced Ototoxicity Prevention**
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Background: Ototoxicity can occur in a wide variety of ways with drug-induced ototoxicity being one of the most common, occurring from several different drug classes and drugs. The nine ototoxic drug agents of interest include aminoglycosides (tobramycin, gentamicin, amikacin, kanamycin, plazomicin), antineoplastics (oxaliplatin, cisplatin, carboplatin) and an amebicide (paromomycin). There are different medications that are being considered to help reduce or inhibit ototoxicity. One of these agents being the HMG-CoA reductase inhibitors, also known as statin therapy, is mainly used to lower cholesterol in patients with dyslipidemia, have also been found to have potential effects on decreasing ototoxic events.

Purpose/Objective/Hypothesis: Determining the effects of simvastatin, fluvastatin, lovastatin, pitavastatin, pravastatin, rosuvastatin, and atorvastatin on protecting the hair cells inside the ear cochlea is significant. We hypothesize that statin therapy, while used concurrently with one of the nine ototoxic agents, will help reduce ototoxic events. These seven statins could also potentially have neurite elongating activity that may even reverse hearing damage which is the purpose of this research.

Design/Methods/Scope: The FDA Adverse Reporting System (FAERS) will be used to perform the cross sectional study. This is a voluntary reporting system of adverse events and medication errors from healthcare professionals and consumers. Manufactures are required to report an adverse event to the FDA (mandatory). This will allow the use of events related with ototoxicity and statin therapy to be investigated. A list of hearing loss related reactions in FAERS will be included which is: hearing aid user, hearing disability, hearing impaired, sudden hearing loss, otoacoustic emissions test abnormal, ototoxicity, acoustic stimulation tests abnormal, auditory disorder with or without nerve disorders, brain stem auditory evoked response, ear disorder, conductive deafness, deaf mutism, deafness either bilateral, neurosensory, permanent, transitory, or unilateral, mixed deafness, and cochlear implant. Specifically looking at the nine ototoxic drugs, cross referencing this with statin therapy, to hopefully find statistically and significantly relevant data showing improvement of ototoxicity.

Results: These three statin therapy medications showed strong evidence of preventing ototoxic effects that include pravastatin, atorvastatin, lovastatin, rosuvastatin and simvastatin. Possible effects with fluvastatin, and pitavastatin which could have beneficial effect.
The unadjusted odds ratio for carboplatin and atorvastatin is 0.55 and 0.1% chance of ototoxicity while cisplatin alone is 1.32 and has 0.25% chance of ototoxicity.

Conclusions: Given the strength of evidence, there is a strong and persuasive outlook for decreasing ototoxic events when using atorvastatin therapy concurrently verses using nothing at all. Some statins have stronger levels of evidence than others but atorvastatin has shown the greatest benefits when used with our nine ototoxic drugs. More testing will be done shortly in the future with zebrafish testing.
ezLigPlot: An ezCADD Web Application for Rapid and High-Quality 2D/3D Visualization of Protein-Ligand Interactions
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Background: Understanding the interaction characteristics between ligand and protein plays a fundamental role in exploring protein function, optimizing lead compound, and determining drug design strategy. Although chemists are well trained to perceive the interactions given a 2D molecular sketch, it will be more accurate to analyze the detailed binding mode from 3D coordinates with the assistance of computational tools. There are several tools available to help researchers display interactions of complexes. However, most of them is limited to interpret interaction only by 2D diagram or 3D pattern. Besides, many of these tools are not automatic enough in terms of input file preparation, molecule protonation, ligand selection, and interactive presentation.

Objective: To facilitate comprehensive displaying protein-ligand interactions in both 2D and 3D presentation, we developed ezLigPlot in a web-based environment ezCADD, which enables 2D/3D visualization. It also provides multiple options for protonation, selecting ligand, cofactors, and water molecules in a convenient and automatic manner.

Features: ezLigPlot was implemented with OpenEye toolkit to generate 2D diagram, while for the 3D pattern generation, it offers two methods either for displaying hydrogen bonds or not. It allows users to provide the protein structure by a file in PDB format as well as four-letter PDB ID from RCSB database. Ligand structure can be provided by uploading a file in PDB, MOL2, SDF/MOL format or entering PDB ID. It detects and presents the molecules in protein and ligand structure automatically and allows users to select the molecules that are possibly involved in interactions. The selected molecules will be protonated on basis of user’s decision by providing options for keeping or deleting hydrogens in original structures. Upon completion of a job submitted by users, interactions between ligand and protein will be presented.

Results: In order to assess performance and user experience, we assigned a task to pharmacy students, which requires to analyze drug-receptor interaction with the assistance of ezLigPlot and complete a survey based on their experience. Results from survey showed that among 91 participants with response, 94% completed the interaction analysis without any training, 89% of them considered ezLigPlot as easy to use and user friendly, and over 95% agreed that it helped them to understand the drug-target interactions. The student experience in interaction visualization was significantly improved to higher level.

Conclusion: ezLigPlot can be a valuable tool for analyzing protein-ligand interactions. The results from survey demonstrate that it will facilitate researchers involved in drug industry.
ezCADD: A Rapid 2D/3D Visualization-Enabled Web Modeling Environment for Democratizing Computer-Aided Drug Design
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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 three most widely used CADD applications, binding site detection (ezPocket), structure-based small molecule docking (ezSMDock) and protein-protein docking (ezPPDock), through a WebGL-based modeling environment named ezCADD. ezCADD 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 ezCADD modeling environment. For ezPocket, 3 different methods are provided to detect the potential binding pocket for protein. For ezSMDock, 4 different input methods (2D, 3D, SMILES, and InChI) for ligand structure are available. PubChem Sketcher is integrated in ezSMDock window to allow users to draw and modify 2D structure of ligand. 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. To assess user experience and the effectiveness of our implementation, we introduced ezCADD to first-year pharmacy students as an active learning exercise in the Principles of Drug Action course.

Results: The web service robustly handled 95 simultaneous molecular docking jobs. Our survey data showed that among the 95 participating students, 97% completed the molecular docking experiment on their own at least partially without extensive training; 88% considered ezCADD easy and user-friendly; 99% agreed that ezCADD enhanced the understanding of drug-receptor structures and recognition; and the student experience in molecular modeling and visualization was significantly improved from zero to a higher level.

Conclusions: The student feedback represents the baseline data of user experience from noncomputational researchers. It is demonstrated that in addition to supporting drug discovery research, ezCADD is also an effective tool for promoting science, technology, engineering, and mathematics (STEM) education. More advanced CADD applications are being developed and added to ezCADD, available at http://dxulab.org/software.
Inappropriate benzodiazepine prescribing practices in Idaho
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Background: The American Geriatrics Society Beers Criteria recommends against the use of benzodiazepines in those over age 65 due to increased fall risk, CNS depression, cognitive decline, an increase in all-cause mortality. Short-acting benzodiazepines are associated with falls and fractures. Long-acting benzodiazepines are associated with residual daytime drowsiness and cognitive impairment. Recent guidelines recommend limiting the duration of benzodiazepine use to 2 weeks. Lowest doses of benzodiazepines should be used for the shortest duration possible.

Objectives: To quantify the number of Idaho patients over age 65 received prescriptions for benzodiazepines and identify which agents they were prescribed. To assess the number of patients in Idaho who were prescribed benzodiazepines for an excessive duration of therapy.

Methods: Study Type and Data Collection: Cross-sectional observational study of benzodiazepine prescribing trends in Idaho. Data was gathered using an Idaho Prescription Drug Monitoring Program (PDMP) dataset which contained data from all controlled prescriptions filled in Idaho from January 1st 2017 to December 31st 2017.

Statistical Analysis: Benzodiazepine medications were isolated from the full PDMP dataset by National Drug Code (NDC). The number of benzodiazepine prescriptions dispensed in 2017 in Idaho was separated by agent. The number of benzodiazepine prescriptions were stratified by patient gender and patient age. The number of benzodiazepine prescriptions dispensed to those over the age of 65 was separated by agent. The days supply dispensed per patient was calculated and stratified to assess the appropriateness of duration of therapy.


Conclusions: Despite risks, more than 170,000 Idahoans over age 65 received prescriptions for benzodiazepines in 2017. Despite recommendations that benzodiazepine use be limited to 2 weeks, many patients in Idaho were prescribed extended durations of benzodiazepine drugs. Nearly 7,000 patients receiving benzodiazepines received more than a full year’s supply in 2017. These patients received multiple benzodiazepines for excessive durations.
Proton-Pump Inhibitors and Drug-Induced Ototoxicity Prevention
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Background: 466 million people worldwide are suffering from hearing loss. Drug-induced hearing loss (DIHL) contributes to a major portion of those cases. Several beneficial pharmaceutical drugs have been reported to cause hearing loss including platinum-based antineoplastic drug and aminoglycoside antibiotics, which cause irreversible hearing damage. There is no FDA-approved drug for prevention of drug-induced hearing loss. In-vitro studies have shown that some Proton Pump Inhibitors (PPI) have a protective role in DIHL. In this study, we used the FAERS (FDA’s Adverse Events Reporting System) database to evaluate the effect of combinational use of Proton Pump Inhibitors with an ototoxic drug in DIHL.

Objective: In this study, we analyzed the clinical data to identify the protective effect of 6 PPIs (pantoprazole, esomeprazole, lansoprazole, omeprazole, rabeprazole & dexlansoprazole) against some known ototoxic drugs.

Methods: A cross-sectional observational study was conducted on clinical deidentified toxicity data obtained from FAERS. Drug-induced ototoxicity related terms were identified from the FAERS database like hearing disability, hearing impaired, sudden hearing loss, etc. to identify exposed and non-exposed group. Individuals taking any of the 10 ototoxic drugs were considered the exposed group. Individuals taking any drug from the 6 PPIs concomitantly with 1 ototoxic drug, were considered the outcome group. We calculated the Odds Ratio (OR) of each combination of ototoxic drug and mitigating drug.

Results: Our study found the protective effect of two PPI drugs in DIHL. Both lansoprazole and omeprazole showed mitigating effects on ototoxicity resulting from cisplatin (OR 0.58, CI 0.08 - 4.13 and OR 0.45, CI 0.11 - 1.8, respectively).

Conclusions: Our study showed two FDA approved drugs (lansoprazole and omeprazole) having a significant reduction in ototoxicity when taken in conjunction with cisplatin. A further in-vivo study is required to repurpose these drugs in DIHL.
**Prescribing Trends of Antibiotics in the ED and Upon Admission at Saint Alphonsus Regional Medical Center: a Retrospective Chart Review**

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Antibiotics play a crucial role in providing quality healthcare, however, it is important that they are started appropriately as they have risks associated with their use including: side effects, drug interactions, and contribution to antibiotic resistance. Antibiotic stewardship has been highlighted as a focal point for patient care by organizations such as the CDC, JCAHO, and ASHP. This initiative includes monitoring antibiotic prescribing and resistance patterns, implementing policies and interventions to aid providers in the proper use of antibiotics, and appointing leaders (including pharmacists) to improve a facility's use of antibiotics. Ensuring responsible and correct use of antibiotics will optimize treatment and improve patient outcomes. The purpose of this project is to evaluate antibiotic use based on the IDSA guidelines and the Saint Alphonsus antibiogram and look for trends in antibiotic prescribing in both the emergency department and at the time of admission to inpatient care for patients admitted to Saint Alphonsus Regional Medical Center from the hospital’s emergency department.

The objective of this study is to evaluate the appropriateness of empiric antibiotics started in the emergency room for patients being admitted to the hospital at Saint Alphonsus Regional Medical Center in Boise, Idaho with a presumed infection using Infectious Diseases Society of America guidelines and the Saint Alphonsus Antibiogram as appropriate. A retrospective analysis of electronic medical records of 300 randomly selected patients admitted to the hospital over a time period of 3 months will be performed for the following infectious diseases: pyelonephritis, cystitis, community acquired pneumonia, cellulitis, diverticulitis, appendicitis, meningitis, febrile neutropenia, and sepsis.

Data collection for this project is still in process. After data collection, the statistics collected will include the percentage of patients with antibiotic therapy change at the time of admission, percentage of patients with de-escalation of antibiotic therapy at the time of admission, and percentage of patients with escalation of antibiotic therapy at the time of admission both as a whole study group and per ICD10 code. Trends in antibiotic prescribing will be assessed in both the emergency room and inpatient settings. Additionally, any areas of inappropriate antibiotic prescribing will be identified and addressed.
A retrospective view of the prevalence of childhood obesity in children whose mothers took metformin during pregnancy
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Background: The prevalence of childhood obesity in the United States remains at an alarming 17% of children and adolescents between the ages of 2-19 years. A closer look at age groups 2-5, 6-11, and 12-19 years revealed a prevalence of 8.9%, 17.5%, and 20.6%, respectively based on data collected between 2011-2014. Childhood obesity is defined as having a body mass index (BMI) within the 95th percentile or greater in the same age category and sex. While there is a decline in incidence from 13.9% in 2003-2004 to 9.4% in 2013-2014, childhood obesity affects roughly 12.7 million children and adolescence.

A recent Medscape article reported on the findings of a follow up randomized controlled study involving children whose mothers were treated with metformin during pregnancy for PCOS. In 182 children, the occurrence of overweight or obesity was two times more likely than children whose mothers who were given placebo during pregnancy. These findings were seen between ages 6 months and 4 years. For an additional case of overweight or obesity at age 4, the number needed to harm with metformin was 7.42. The significance of addressing this issue early in life becomes more apparent as the adult obesity rate reaches 1/3 of the U.S. population.

Objective: To evaluate the prevalence of childhood obesity in 2-year-old children whose mothers who took metformin during pregnancy and received their care from a local community health center.

Methods: Retrospective analysis of all pregnant women of childbearing age, 15-45 years old who were established patients in 2015 and the children born to these mothers. Women who were not pregnant in 2015 or delivered a live infant will be excluded. Charts will be reviewed to determine pregnancy status and further verify the delivery of a child(ren) in 2015. Analysis will compare mothers who received metformin and mothers who did not receive metformin, and further assessing by the obesity status of the child at age 2. Additional secondary endpoints will be evaluated.

Results: Study in progress.
Traumatic Brain Injury Screening and Referral for Southeastern Idaho’s Homeless Population

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Background: Traumatic Brain Injuries (TBI) can have devastating effects on individuals’ cognitive, physical, and behavioral/emotional health. In addition, they may be difficult to diagnose due to the lack of visible signs of injury, which can translate into individuals not receiving the necessary treatment for their injuries. Recent reports have not only shown that sustaining a TBI increases the risk of becoming homeless, but that individuals who are homeless are more likely to sustain a TBI, and often lack the care and support they need to fully recover. To further understand how these findings affect Idaho, we conducted a series of TBI screenings specifically aimed at southeastern Idaho’s homeless population.

Purpose/Objective: To investigate and address the effects of TBI and homelessness in Idaho, an interdisciplinary team of student health professionals was trained by the Institute of Rural Health to administer a TBI screening tool and refer individuals who screen likely for TBI to medical care.

Methods: The Ohio State University TBI Identification Screening Method (OSU-TBI) was used to screen homeless individuals. TBI screenings were performed at the annual Southeast Idaho Homeless Stand Down hosted by ISU from 2015-2018. Over the past four years, homeless individuals were screened for their likelihood of TBI. All individuals who screened likely were offered a primary care referral.

Results: From 2015-2018, 130 unduplicated individuals were screened during a series of four Homeless Stand Down events. The median age was 52 (63% male). Of those screened, 58% screened “likely” to have sustained a TBI. Additionally, 11% of respondents reported receiving both their first and second injury to their head within one year. The three highest causes of injury reported were falls (31%), violence (28%) and motor vehicle accidents (27%). Of those that screened “likely”, 15% were already receiving help or were not interested in a referral.

Conclusion: ISU’s Institute of Rural Health continues to be at the forefront of identifying and coordinating TBI needs and resources for unserved and underserved individuals, including the homeless in the community. The TBI program’s involvement in the Homeless Stand Down events has 1) increased the knowledge and skills of future health care professionals with interdisciplinary trainings 2) raised awareness of the need for further screening for lifetime history of TBI in homeless populations and 3) identified individuals’ reasons for not following though or acting on a referral for care.
Antidepressants and Drug-Induced Ototoxicity Prevention
Shaikh Emdadur Rahman, Yuying Huang, Grayson Bosen, Binhyen Tran, Melanie Hackett, Kofi Ansah, Matthew Caylor

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Background: 466 million people worldwide suffer from hearing loss with drug-induced hearing loss (DIHL) being a major contributing factor. Several beneficial pharmaceutical drugs have been reported to cause hearing loss including platinum-based antineoplastic drug and aminoglycoside antibiotics, which causes irreversible hearing damage. There is no FDA-approved drug to prevent drug-induced hearing loss. In-vitro studies showed that some antidepressant agents (SSRI, SNRI, TCA) have some protective role in DIHL. In this study, we used the FAERS (FDA’s Adverse Events Reporting System) database to evaluate the effect of combinational use of antidepressant with an ototoxic drug in DIHL.

Objective: In this study, we analyzed the clinical data to identify the protective effect of several selective serotonin reuptake inhibitors (SSRIs), Serotonin-norepinephrine reuptake inhibitors (SNRIs), Tricyclic antidepressants (TCA) and Monoamine oxidase inhibitors (MAOI) against some known ototoxic drugs.

Methods: A cross-sectional observational study was conducted on clinical deidentified toxicity data obtained from FAERS. Drug-induced ototoxicity related terms were identified from the FAERS database like hearing disability, hearing impaired, sudden hearing loss, etc. to identify the exposed and unexposed group. Individuals taking any of the 10 ototoxic drugs were considered the exposed group. Individuals taking any drug from the 32 antidepressants concomitantly with 1 ototoxic drug, will be considered the outcome group. We calculated the Odds Ratio (uOR) of each combination of ototoxic drug and mitigating drug, and then adjusted the OR based on age, gender, and reporting calendar year to get the aOR.

Results: Our study identified the protective effect of antidepressant drugs on DIHL by comparing the aOR of combinations and the corresponding ototoxic drugs. The results showed that Fluoxetine significantly reduce the ototoxicity of carboplatin (combination aOR 0.03, CI 0.01-0.05, P < 0.05, vs Carboplatin aOR 0.80, CI 0.65-0.97, P < 0.005). Citalopram is found to reduce Tobramycin induced ototoxicity significantly (aOR 0.08, CI 0.03-0.17, P < 0.05, vs Tobramycin aOR 0.198152, CI 0.24-0.16, P < 0.05).

Conclusions: Our study showed four FDA approved drugs (Fluoxetine, venlafaxine, citalopram, and mirtazapine) having a significant reduction in ototoxicity against carboplatin and tobramycin. A further in-vivo study is required to repurpose these drugs in DIHL.
The Effects of Interprofessional Communication Between Physician Assistant Students And First Year Pharmacy Students On ICCAS Scores
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Introduction: This interprofessional activity was designed to simulate an interaction between a provider’s office and a community pharmacy. The goals were to: demonstrate appropriate verbal communication with information exchange skills, gain knowledge of different areas of medical expertise and how it complements one’s practice, and foster openness for collaboration and respect for other professions.

Methods: Students were given a pre and post-activity survey that included a modified version of the Interprofessional Collaborative Competency Attainment Survey (ICCAS) designed for students to self-assess their ability and level of comfort with working in a patient-centered, team-based, collaborative care model. For the activity, physician assistant students were randomly paired with first year pharmacy students to complete a mock telephone order. The telephone order was designed to allow both students to use interprofessional communication, problem-solving skills, drug information resources, and medication knowledge to assess and address problems with the prescribed medications. The Wilcoxon signed-rank test was used to determine the median difference between the pre and post-survey ICCAS question responses.

Results: Overall, the median scores on ICCAS increased between the pre-activity and post-activity. Statistically significant improvements in median scores were identified in 16 of the 20 questions which indicates an improvement in students’ ability and level of comfort with the interprofessional team model.

Conclusion: This interprofessional activity allowed students to develop and improve their ability to work with other professionals in providing patient-centered, team-based, collaborative care.
A retrospective chart review to evaluate and identify risk factors and causes of subsequent readmission of patients following initial pneumonia hospitalization within 30, 60, and 90 days
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Background: Hospital readmission rates within 30 days of discharge is a growing problem for the health care that has become a multibillion dollar burden on both payer and payees. Pharmacist interventions have been shown to reduce readmission rates, however further research is necessary to identify and target resources for high-risk populations and establish effective interventions.

Objective: To conduct a retrospective review of patients initially hospitalized for pneumonia at Saint Alphonsus Regional Medical Center in Boise, Idaho who are at high risk of readmission and to determine factors contributing to a subsequent readmission within 30, 60, 90 days.

Methods: Utilizing electronic patient health record system, to conduct a retrospective review of patient profiles with initial hospitalization for pneumonia with recurrent hospitalization within 30, 60, 90 days of discharge over 1 year utilizing 2015-2016 data.

Results: TBD

Conclusion: TBD
Impact of student- versus instructor-led learning on student pharmacists’ performance in a self-care module
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Background: The Accreditation Council for Pharmacy Education (ACPE) strongly endorses developing critical thinking and problem-solving skills through active learning that includes self-directed and collaborative learning. As a result, almost 90% of college of pharmacy professors in the United States report using active learning strategies in the classroom.

Student perceptions of these learning strategies are generally positive, with improvement in critical thinking, problem solving, communication skills and information retention being the most commonly identified benefits. In previous studies, performance on evaluations has not been shown to be significantly different between student-led and faculty-led instruction.

Previous analysis of student-directed learning has shown that students tend to respond better to such approaches when they are implemented early in their pharmacy education. Over-the-counter (OTC) medication and Self-Care modules are well-suited to a student-led instructional format for those just beginning their pharmacy education, as the majority of information regarding OTC products is meant to be understandable to the general public.

Objective: To evaluate the impact of student-led versus instructor-led self-care module facilitation on student pharmacists’ ability to identify appropriate over-the-counter recommendations and counseling technique.

Methods: A retrospective cohort study of first-year professional student pharmacists who completed the self-care module during an introductory course in the Fall semesters of 2017 and 2018. The 2017 Fall semester involved student-led presentations for 15 common self-care topics such as heartburn, cough/cold remedies, insomnia, etc. The 2018 Fall semester cohort was faculty-led presentations covering the same self-care subjects. Students then completed a case-based patient counseling session by identifying an appropriate over-the-counter recommendation to treat the patients presenting symptom. Evaluations utilized a 10-item rubric on students’ ability to identify the appropriate recommendation and counseling technique (discussed in an earlier section of the same course). The impact of the module on student performance was compared between student-led and faculty-led cohorts.

Results: 164 pharmacy students completed the self-care module in the Fall 2017 and Fall 2018 semesters. A chi-squared analysis will be utilized to compare evaluation data. Approval granted by the Idaho State University Institutional Review Board.

Implications: This study will provide insight on the impact of student-led versus instructor-led facilitation of material in the self-care module. Knowledge gained from this study could apply to any course that employs traditional classroom learning modules or an educational program that aims to develop clinical application skills. Limitations of this study include year-to-year variability of students and rubric evaluators.
Creating successful interprofessional healthcare research collaboration: A qualitative approach to efficiently identify and address group needs

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Background: Establishing and sustaining successful interprofessional healthcare research collaborations is important for researchers, providers, and patients. Interprofessional collaborations can be challenging, especially in states with limited funding and resources. To identify and address group needs, the newly-formed, pharmacy and public health expansion research group (PPHERG), with faculty members on a branch campus, across three departments (pharmacy, public health, research), conducted a multi-site focus group, to identify and address training needs, opportunities for collaboration/partnership, and supports necessary for collaboration. Goals were to: 1) describe how and why PPHERG formed, members’ lived experiences, 2) identify barriers and opportunities to support PPHERG research, and 3) establish a shared vision for PPHERG.

Methods: A moderator’s guide was used during the two-hour, external researcher moderated, two-site, distance learning system led, focus group, to explore the experience of PPHERG members, identify unmet needs, and solicit guidance from the group.

Results: Six PPHERG members participated in the focus group. Qualitative, thematic analysis revealed group conception was due to shared interests and need for support mechanisms with individual roles formed based on group/project needs. Thematic barriers to PPHERG’s success included unclear departmental goals, siloed individuals and resources, and climate and trust issues. A discussion of these results is ongoing and will be used to facilitate opportunities to address needs and guidance on how best to move PPHERG forward.

Conclusions: Formation of interprofessional research collaborations is beneficial, especially in resource limited environments. Understanding group conception and barriers to success can help support the ongoing work of a research group.
The development of brief health condition specific modules to augment community health workforce training in Idaho
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Background: In collaboration with the Idaho Department of Health and Welfare, and with funding from the Centers for Medicare and Medicaid Innovation, Idaho State University developed training for, and trained, over 100 community health workers (CHWs) and 18 community emergency medical technicians (CEMTs) throughout Idaho. Given the variety of functions that CHWs/CEMTs in Idaho have, allowing students to tailor their training through health-specific modules (HSMs) was deemed important by stakeholders.

Approach: To date, 25 self-paced online HSMs that include resources for Idahoans covering chronic/infectious disease and abuse/injury prevention and screening have been developed by content experts amongst community partners. Each HSM takes ~2.5 hours to complete, and are embedded within statewide CHW/CEMT trainings. Evaluation was conducted of pre- and post- self-rated: 1) having sufficient knowledge to serve as a resource to patients, 2) feeling comfortable discussing screening methods, 3) ability to identify risk factors, and 4) ability to develop an action plan with a patient to address barriers. Also, overall module satisfaction was gathered and open-ended feedback on what was liked/could be improved.

Results: Between 2016-2019, there were 427 HSM post-test completions by CHWs and 124 by CEMTs. In terms of CHW/CEMT satisfaction with the HSMs, on average, all agreed with the statement “Overall, I am satisfied with my learning experience in this module” (m=6.2 and m=6.2, respectively, range 1-7). CHWs somewhat disagreed with statements of competencies in the Pre-Test for all HSMs (m=3.8), whereas CEMTs had higher self-rated Pre-Test competency (m=4.9). Across all HSMs, CHWs and CEMTs indicated a marked improvement throughout the module (gains of m=2.2 and m=1.3 points, respectively) to the point where, on average, CHWs/CEMTs similarly agreed with competency statements in the Post-Test survey (6.0 and 6.2, respectively). Based on written comments, ways to improve included ensuring that quizzes better reflect actual learning, and that all information is up-to-date. Some, especially CEMTs, felt level of information was basic. Aspects of HSMs that student enjoyed included: incorporating individual/real-life stories to the health topic, presented cases, videos, printable resources (i.e. quick-reference guides), opportunity to quickly review/update previous learning.

Conclusion: CHWs and CEMTs were satisfied with HSMs and self-efficacy related to knowledge and ability to develop an action plan increased with training. Further research on utility of HSMs in actual practice following the training is needed. Batching related modules to create content area certification or badges (e.g. cancer screening, geriatric) may provide sustainability in HSMs offerings in the community.
**Nurses Preventing Adolescent Vaping**
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**Background:** Electronic cigarette use among youth is rising at alarming rates: high school use increased 78% from 2017-2018, middle school use increased 48% during the same period. Adolescent development and wellness are particularly vulnerable to the effects of nicotine and prevention of nicotine use earlier in life is significant. Additionally, some added flavors and chemicals used in e-cigarettes are known to be harmful when inhaled, including metals, such as lead and cadmium, heated from the cigarette’s elements, are known to cause respiratory distress and disease. Limited and conflicting information exists within our communities about the dangers of e-cigarettes among youth and adults, and nurses are in a prime position to respond to this emergent need of accurate health information.

**Purpose/objective/hypothesis:** This study aimed to identify the effectiveness of nurses in educating adolescents on vaping prevention.


**Results:** Nineteen studies representative of the criteria were selected, including 1 meta-analysis, 2 systematic reviews ranging in size from 1-49 RTCs (1,357-142,447 participants), 2 systematic reviews of 76 articles (sample sizes 72,304 and 87,498), 3 cross sectional studies (2,664-101,111 participants), 4 surveys (1,729-18,385 adolescents, , 2 RTCs (1,504-1,546 participants), 1 quasi-experimental study (7,733 participants), 1 integrative review of 35 articles and 1 pilot study of 357 high school students.

**Conclusions:** Nicotine is harmful to the development of the adolescent brain and even non-nicotine e-cigarettes have been shown to include nicotine substances. E-cigarette users are more likely to escalate into use of other substances and delinquent behaviors. The public, especially adolescents, must be educated about potential health effects. When social competence training and negotiation skills are emphasized, smoking prevention training for adolescents is especially effective. Nurses are effective counselors and educators of a range of health topics, including nicotine prevention. Communicating with teens requires the health professional to provide a sense of trust, nonjudgment and emotional safety, of which nurses are known as one of the most trusted professionals and in a prime position to take immediate action for this health crisis.
**Nursing education to increase midwife use**  
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Background: Births attended by midwives have reduced medical interventions and produced better outcomes during delivery than those attended by physicians, yet physicians are utilized more than midwives. Nurses are effective patient educators and can improve patient outcomes by educating women on the benefits of midwife-led care.

Objective: Promote nurse-led education to assist low risk expecting mothers in considering midwife-led care as a safe alternative.

Methods: PubMed, CINAHL, Google Scholar, and Cochrane Library databases were searched from 2013 to 2018 for clinical trials, randomized controlled trials, systematic reviews, and qualitative studies with the terms midwifery care, patient outcomes, birth, childbirth, childbirth education, birth preparation, educational interventions.

Results: Fifteen research articles met criteria and were evaluated. Five articles addressed the nurse role as an effective educator regarding the benefits of midwife-led care. Ten articles addressed midwife-led care during the labor process which resulted in reduced medical interventions and better outcomes during and after delivery compared to obstetrician-led care.

Conclusions: There is a need for nurse directed educational efforts to promote the benefits of midwife-led care to patients. Nurses are in a position to effectively do this, particularly by educating patients who are in the planning phase prior to conception.
Management of Wound Care Complications Utilizing Telehealth Medicine
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Background: Telemedicine has been used as a health resource since 1960 as a form of healthcare delivery due to the needs of National Aeronautics and Space Administration, with positive results in health outcomes. The use of telemedicine in wound care has been described in the literature, though studies that specifically address the frequency of telemedicine for wound care follow-up that relates to improved wound healing with fewer complications is not found to have been studied.

Purpose: This research study has looked at evidence for post discharge wound care and follow up by telemedicine, and its correlation to improved outcomes such as fewer wound complications and more efficient detection and early intervention.

Methods: A systematic search identified related articles in various electronic databases including CINAHL Complete, Google Scholar, PubMed, and MEDLINE complete. References were excluded in cases of chronic wounds such as diabetic foot ulcers or pressure ulcers, as well as serious burns. Nine peer-reviewed studies were identified which fit the inclusion and exclusion criteria of the PICO question.

Results: The study includes one systematic review of 24 articles which evaluates the implementation of image-based telemedicine systems for injury and wound emergency care, supporting valid diagnosis and positive influence of patient management. Two literature reviews included over 100 articles providing evidence to support benefits of telemedicine and eHealth applications in wound care and follow-up. Retrospective cohort studies and case-control studies found strong evidence supporting accurate diagnosis of image-based assessment of wounds, improved ability to detect and intervene with wound complications, and enhance patient management of acute wound care. Qualitative evidence supports enhanced wound assessment into a postoperative follow-up care pathway showing statistically significant data supporting positive outcomes in wound management. The studies included sizeable numbers of images, ranging from 24 to 60,400, as well as expert provider input. Gold standards and statistical tests were not always used when assessing diagnostic validity and patient management.

Conclusions: The evidence supports the use of telehealth visits by nurses trained in wound care for follow-up on days 1 and 3 post discharge with patients having moderate to severe traumatic and surgical wounds in addition to receipt of standard, written wound care instructions received at the time of inpatient or Emergency department discharge, for improving wound healing outcomes, with fewer complications. Evidence suggests incorporating image-based wound assessment may save patients and clinicians from unnecessary hospital visits, particularly when conducting health research.
Vitamin D Supplementation and Prevention of Cognitive Decline
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Background: Studies show that there is a link between dementia and vitamin D. People who have developed dementia and Alzheimer’s have been studied and a possible correlation between low levels of vitamin D and the occurrence of dementia and Alzheimer’s is reported. Sun exposure is a source of vitamin D that may slow the deterioration of cognition. Daily sun exposure has the possibility of equating to an appropriate dose of vitamin D.

Purpose/Objective/Hypothesis: The purpose of this research is to determine whether there is a correlation between daily exposure to vitamin D via supplementation and a decreased risk of cognitive deterioration consistent with Alzheimer’s when compared with those with clinical levels of vitamin D deficiency. The intent is to analyze research that qualifies the use of vitamin D supplementation to prevent age-related cognitive deficits. The original hypothesis estimated that vitamin D supplementation at a young age would prevent cognitive decline later in life.

Design/Methods/Scope: Adults age fifty-five and older were given cognition tests to determine baseline cognitive and neurological status and baseline serum vitamin D levels were drawn. The patients were re-evaluated in five to ten years. Some studies incorporated vitamin D supplementation during that time period, others focused on the changes in cognitive status over those years and serum vitamin D levels. A check-up was usually performed part-way through the trial, with a serum level evaluation and cognitive and neurological re-evaluation at the end of the trial.

Results: Although there was a strong statistical correlation between low vitamin D levels and decreased cognition later in life, there was not a clear benefit seen from Vitamin D supplementation and prevention of dementia. Researchers have suggested that vitamin D supplementation prior to age 55 may reduce cognitive decline, thus future research should include age of supplementation as a parameter for study.

Conclusion: In conclusion, research has shown that vitamin D supplementation helps to delay cognitive decline. Further research is needed to determine whether vitamin D supplementation can help to prevent dementia and/or Alzheimer’s disease. Another area that needs researched further is the age at which vitamin D supplementation begins and if that impacts the outcome of cognitive delays and/or dementia disease processes.
Pre-surgical education on opioid use
Trisha Wineman¹, Carolyn Blasch¹, Kathryn Rice¹, Samuel Butters¹, Chad Thomas¹

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Background: In the United States, the over-prescribing of opioids is one contributing factor to the epidemic increase of opioid addictions and deaths (Opioid Overdose, 2017). Between 2003 and 2011, opioid prescriptions increased from 149 million to 238 million (Syed et al., 2018). Managing post-surgical pain is one reason that patients are prescribed and introduced to opioids. Orthopedic surgeries have some of the highest narcotic doses with close to 42% of their prescriptions being for opioids in order to manage post-surgical pain (Syed et al., 2018).

Hypothesis (PICOT question): In post-surgical patients at a regional surgical center, who are naïve to opioid pain management, will pre-surgical educational interventions by nurses reduce the use of opioids for pain management, as opposed to only prescribing opioids without the education intervention, over a 12 week period.

Review Method: Studies for this research include use of pre-surgical education in relation to the use of opioids for pain management. Thirteen (13) studies were found related to post-surgical pain management, seven (7) of which included pre-surgical education on the use of opioids. Study quality was assessed and considered with five (5) of seven (7) studies as randomized control trials rated level II. All education methods were considered.

Results: Seven (7) studies found a direct correlation to education and decreased use of opioids. Education methods varied from face-to-face surgeon education sessions, videos, written handouts, informational medication cards, medication specific leaflets, and specific therapy education by nurses. In addition, educating nurses (who then educated patients) had a positive effect on patient knowledge of opioid use and pain management. Follow-up of surgical patients ranged from one days to three months.

Conclusion: Evidence suggests pre-surgical education on opioids and pain management, both formal and informal, reduces the amount of opioids used and the duration of their use, regardless of patient follow up. Pre-surgical education on opioid use is an important strategy in self-management and reducing the potential of opioid addiction in patients.
Art Therapies to Reduce Stress, Anxiety, and Pain During Cancer Treatment
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Background: Supplemental therapies to enhance oncological treatments

Purpose/Objective/Hypothesis: To showcase art therapy as an effective means to reduce stress, anxiety, and pain related to disease and treatment process of cancers.

Design/Methods/Scope: Cross comparison of various studies utilizing supplemental art therapy in medical care as an effective means of reducing stress, anxiety, and pain

Results: Evidence data, with graphs and text descriptions supports the value of art therapy in the reduction of pain and stress in cancer patients and increases in functional activity to the brain, and psychological resilience in oncology patients receiving art therapies.

Conclusions: This studies’ conclusions support the hypothesis (show a positive correlation . . .) that significant increases in functional activity to the brain, reduced anxiety and subjective pain, and improved overall psychological resilience are noted in oncology patients receiving art therapies.
Institutionally Initiated Mindfulness Based Interventions and Nursing Stress

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Background: The nursing profession is associated with stress, job dissatisfaction, and a high burnout rate. Mindfulness based interventions (MBI) are interventions that enhance the ability of individuals to focus on the present moment in a non-judgmental way. Examples of specific interventions include meditation, relaxation techniques, group discussions, and exercising. Institutionally initiated MBI have been piloted as a method to reduce stress in nursing.

Hypothesis: The use of institutionally initiated MBI will reduce the incidence of nursing related stress, job dissatisfaction, and burnout rate.

Methods: Articles from 2017 to 2019 were gathered using Web of Science, Google Scholar, and One Search; 119 articles were found that included the key words “mindfulness and nurse and stress”. The abstracts of these articles were read in order to find articles that: 1) included post-licensure nurses, 2) included data from the United States, 3) reported qualitative data about nurses perception of mindfulness interventions, and/or 4) reported quantitative data about a direct mindfulness intervention either in a single study or as a meta-analysis of multiple studies. The quantitative studies had to have an appropriate control group in order to be included. A final number of 15 articles were included that met the above listed criteria. All of these articles were evaluated and given a quality score by three independent reviewers based on the quality of the research conducted. Finally, the results from all of the chosen articles were compiled and summarized.

Results: Positive changes in nurses perceived level of stress and a reduced level of symptoms related to burnout were reported with institutionally initiated MBI. Nurses received these interventions well. The studies published to date are small institutionally based pilot studies with varied approaches.

Conclusions: MBI reduce the incidence of nursing related stress, job dissatisfaction, and burnout rate. There could be an overall hesitancy of institutions to adopt MBI because of a lack of large studies that apply to a wide range of nursing specialties and that define a specific MBI. To improve the applicability of the results across a range of nurse specialties, it could help to define nurse stress through an individualized approach by using a tool like the Patient Generalized Index as a quality of life measurement. Future research could identify a standardized approach to MBI and rigorously test it across a hospital system while measuring individualized outcomes related to nurse stress and burnout.
Idaho Collaborative Assessment Program - Comparison of Audiology Outcomes
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Background: Through interprofessional collaboration, ISU researchers from CSD together with service providers from the IESDB are completing the Idaho Collaboration Assessment Project (ICAP). ICAP’s purpose is to collect, analyze, and develop a transparent way of reporting outcomes of children who are Deaf/Hard-of-Hearing (DHH) across the state of Idaho. All families of children with diagnosed hearing loss from English- and Spanish-speaking homes can participate in the ICAP. Assessments are completed biannually and include MacArthur: Words & Gestures; Hearing Aid Use Inventory; Family Outcomes Survey; LittlEARS; Language Use Inventory; annual audiological evaluation report. The project not only collects data from families of children who are DHH, but also compiles this information in an easily understood way, readily available to end users (i.e., providers, administrators, and families). This presentation focuses on the audiological evaluation reports.

Methods: To date, 41 families are taking part in ICAP. From these participants, 33 audiological reports were collected. This presentation will review those audiological reports and compare them to best pediatric clinical practices.

Results: Audiological reports were compared as a group and across the seven state regions. Comparison revealed the type of hearing loss was stated in only 16 reports while over half did not indicate hearing loss type. For those reports indicating completion of behavioral testing, two used pure-tone stimuli, four used narrowband noise, two used pediatric noise, one used noise makers, while majority (73\%) did not specified. Additionally, behavioral testing was completed utilizing insert earphones on six participants, in the soundfield for 21 participants, and not specified on five reports. Bone conduction testing was reported on only one participant.

Following analysis of the audiological evaluation reports, families were provided individualized outcome reports focused on their child’s performance with talking points to discuss with service providers. Additionally, regional outcome reports were created for service providers to highlight the strengths as well as present opportunities for improvements in services compared to best clinical practices. This presentation will share example reports.

Discussion: The goal of pediatric audiologic assessment is to determine hearing sensitivity of each ear across frequencies and determine the type of hearing loss (ASHA, 2018). The reports reviewed in this population did not clearly state most information necessary to meet this goal for best clinical practice. Findings provide many opportunities for improvements in services provided compared to best clinical practices. Future steps for this project will include satisfaction surveys completed by families and providers evaluating the ICAP outcome reports.
Training Effects on Coaching Behaviors of Speech-Language Pathology Graduate Students
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In a 2017 survey, 60% of providers indicated that they had not enrolled in a degree or certificate program with specific coursework or training for serving children ages birth to 3 and their families in early intervention (American Speech-Language-Hearing Association [ASHA], 2017). Coaching, or an interactive method by which providers partner with caregivers to improve caregiver competence in using specific strategies (Rush, Shelden, and Hanft, 2003), in early intervention has shown the most positive long-term outcomes in terms of child language, parent engagement, and skill generalization. However, while often framed as an integral component of early intervention, many providers do not apply coaching techniques when serving families. This is potentially due to the lack of formal training opportunities. Given the fact that telepractice has recently surfaced as a successful way of not only reaching more families, but also of enhancing providers’ coaching skills,

Ten graduate students from Idaho State University’s speech-language pathology program participated in a web-based module on four basic coaching techniques: Teach, model, coach, and review. Additionally, coaching behaviors were analyzed from two mock therapy sessions completed by the participants in both a telepractice and in-person condition. All students completed confidence surveys at each time point of the study: prior to training (Time 1), following training (Time 2), following first mock session (Time 3), following second mock session (Time 4).

A statistically significant difference in participants’ self-confidence was seen from Time 1 to Time 2, showing that online training did impact confidence levels in coaching. There was no statistically significant difference between telepractice and in-person behaviors, however, there was a slight advantage in parent reflection and constructive feedback skills in the telepractice modality. In summary, interactive online learning courses may offer significant learning opportunities for providers in the field.
Relationships between norm-referenced test scores and narrative language sample measures in school-aged children with specific language impairment

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Background: Norm-referenced tests and language samples are the primary methods of assessment used to evaluate the language skills of school-aged children (Ebert & Scott, 2014). However, language sample analysis is not always used in the determination of diagnosis and eligibility (Pavelko, et al., 2016). Standardized test measures provide information about how a child performs on decontextualized language tasks in comparison to the norming group. These skills can be an important aspect of academic and metalinguistic language (Ebert & Scott, 2014). In contrast, language sample analysis is a purposeful elicitation of language with contextualized support, important for academics, social interactions, and daily use of language (Pavelko et al., 2016).

Purpose: The purpose of this study was to examine the relationships between language subtests of the Clinical Evaluation of Language Fundamentals, fourth edition (CELF-4) and microstructure components of narrative language samples elicited using the Test of Narrative Language (TNL) in early school-age children with specific language impairment (SLI) and their peers with typical language (TL). Hypotheses: 1) Scores on norm-referenced tests of expressive language will correlate with norm-referenced language sample measures to a limited degree; 2) The strength of those correlations would be weaker for children with SLI than those with TL. Understanding the relationships between the two types of measures will help improve identification of the components of contextualized and decontextualized language skills of children with SLI.

Methods: The data of 14 children with SLI and 14 with TL was drawn from the results of the CELF-4, the TNL, and narrative transcripts on the Oral Narration (ON) portions of the TNL. CELF-4 subtest scores for the expressive language index (ELI) composite and TNL–ON score with narrative transcript measures were extracted and examined for correlations within groups.

Results and Discussion: Partial Spearman correlations were calculated between ELI composite score and language transcript measures and between TNL-ON with language transcript measures. Only one significant (p<.05) partial Spearman correlation was found between NDW and TNL-ON in the TL group. There were no significant correlations in the LI group, suggesting that the tests and the language sample measures did not assess the same constructs. Varying degrees of effect sizes (ρ) indicated marked differences in strength of relationships between norm-referenced test measures and language sample measures for children with SLI vs. TL. Overall, TL group resulted in a greater number of medium and large effect sizes when compared to SLI group.
Vocabulary Development of Preschool Children who are Deaf/Hard-of-Hearing
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Background: Preschool is a time of rapid vocabulary growth for children who are normal hearing. For example by age 5 or 6, children with normal hearing are expected to have an average lexicon of 15,000 words or more (Boyd & Bee, 2010). Children who are Deaf/Hard-of-Hearing often fall behind their peers in rate of vocabulary growth. They typically have a smaller lexicon and a slower rate of word acquisition than their hearing peers (Luckner & Cooke, 2010). While explicit word learning tasks have been found to be helpful in vocabulary development (Blaiser, Nelson, & Kohnert, 2014) they are often not the norm in practice.

Purpose: To examine the rate of vocabulary growth of preschool children who are DHH in a classroom setting where vocabulary is targeted within the classroom setting (i.e., incidental exposure through book reading, social play, adult interaction) as measured by calculating the number of different words (NDW) and number of total words (NTW) used by preschool children who are DHH in monthly language samples.

Designs/Methods: Undergraduate and pre-professional students in Communication Sciences and Disorders students obtained monthly language samples from 13 children in a Listening and Spoken Language (LSL) preschool class of children who are DHH. These language samples were analyzed for NDW and NTW as well as the different components of language.

Results: On average, there was a positive trendline over time for most children in terms of number of different words over time. In contrast, more children had a negative trendline over time in terms of number of total words. In addition to the counts of different and total vocabulary, proportion of nouns, verbs, adjectives, and prepositions was analyzed over time. Interestingly, the percentage of nouns grew steadily over time, while the other parts of speech did not grow at the same rate.

Conclusions: Preschool is an important time for vocabulary growth in children, particularly those who are DHH. This study offers an important longitudinal look at vocabulary development of children who are DHH receiving services in a classroom setting.
Measuring Language Development of Children who are Deaf and Hard-of-Hearing through Language Samples via Telepractice
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Background: Previous studies analyzing the effectiveness of telepractice in providing intervention and assessment within the field of speech-language pathology found telepractice to be an effective alternative manner to provide services to children who are Deaf/Hard-of-Hearing (DHH). Children who live in rural and remote areas often lack access to experienced providers due to challenges such as adverse weather conditions, geographical distance and minor illnesses, and travel expenses for the provider.

Purpose/Objective/Hypothesis: The purpose of this study was to identify the language assessment methods used by the Idaho Educational Services for the Deaf and Blind providers that work with children who are DHH. A questionnaire was asked to be completed by providers from the Idaho Educational Services for the Deaf and the Blind (IESDB). The purpose of the questionnaire was to identify challenges with the use of language samples as an assessment method with children who are DHH and to identify if assessment methods differentiate between children living in urban/suburban regions and those living in rural/remote areas. The second part of the study focused on identifying the feasibility of obtaining language samples for language assessment via telepractice technology via Zoom Video Communications application.

Design/methods/Scope: 15 providers from (IESDB) throughout the state of Idaho completed a questionnaire to identify the current practices and barriers for assessing the language of preschool children who are DHH and reside in rural/remote regions. The IESDB providers included professionals with various educational training including speech-language pathologists, preschool teachers, audiologists, teachers of the Deaf and early childhood specialists. Three separate language samples were collected from 6 preschool children who are DHH. The language samples obtained were analyzed through the Systematic Analysis of Language Transcripts to identify if children’s language differed between the three different contexts.

Results:

Conclusions:

*Study data is in the process of being collected and will be completed by the middle of March, therefore the results and conclusion section of this abstract is not fully completed at this time.
Atypical neural responses associated with inaccurate speech production in children with speech sound disorders
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Introduction: Children with speech sound disorders (SSD) may have poorly specified phonological representations, which are the result of inaccurate speech sound perception. In this view, SSD treatment aimed at improving sound production might lead to changes in neurocognitive processing associated with sound perception as well, including enhanced sensitivity post-treatment to the phonological properties of treatment sounds. To explore this prediction, the present study analyzed modulations in electroencephalographic (EEG) power and event-related potentials (ERP) elicited by auditory presentation of syllables in children with SSD prior to, and after completion of, a speech treatment program. It was expected that speech treatment would lead to changes brain responses associated with cognitive effort and acoustic feature encoding in conjunction with post-treatment speech production improvements.

Methods: Participants: Twenty children with speech sound disorders (SSD) (7 male; 3.83-6.58 years). Stimuli and Procedure: Two oddball stimulus sets, each containing four consonant-vowel (CV) syllables: one standard (ba/treated sound) and three deviants (ba/treated sound, da, one other CV) were presented. EEG Analyse: Source level contributions to channel EEG were decomposed and clustered on the basis of dipole locations. Event-related spectral perturbations (ERSPs) were computed from activations of each IC in each cluster. ERSP theta band power (3-6 Hz) analyses focused on IC clusters localized approximately to right and left IFG. ERP P2 Amplitude Analyses: Nine electrodes were divided into three groups: (1) Left: F5, FC5, C5; (2) Central: Fz, FCz, Cz; and (3) Right: F6, FC6, C6. The P2 was measured from 100-200 ms.

Results: ERSP Theta Band Power: Post-treatment, theta band oscillations to the treated sound decreased in ICs localized in and near the right IFG (F(1,8) = 8.133, p = 0.021, Œ² = .504). ERP P2 Amplitude. The P2 elicited by treated sounds decreased in amplitude from pre-to-post treatment while the P2 elicited by /b/ increased (F(1,19) = 4.767, p = 0.042, Œ² = .201).

Discussion: In response to treated sounds prior to treatment, children with SSD exhibited greater theta responses in areas of cortex associated with the right IFG, suggesting that sounds the children could not say required more cognitive processing effort; theta activity decreased post-treatment. Decreased post-treatment P2 amplitudes indicated that more specified neuronal populations responded to acoustic features of treated sounds. One potential neural deficit in SSD could be impaired right hemisphere theta oscillatory networks, which could impact the integration of acoustic features that allow for accurate phoneme perception and phonological development (Goswami, 2011).
Minimal detectable change for gait initiation in individuals with Parkinson's disease
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Background: Three-dimensional analysis of kinetic and kinematic outcomes has become one of the most powerful tools in evaluating abnormalities in gait initiation for persons with Parkinson’s disease (PD). Surprisingly however, the psychometric properties of spatial and temporal measures of gait initiation for persons with PD have not been established using force-platforms.

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

Methods: An investigator-blinded randomized controlled study assessed and calculated the MDC of temporal and kinematic variables of postural stability during gait initiation. 17 individuals with mild-moderate PD (avg age 68.4 ± 11.8 years) participated in this study. Data were collected using a VICON™ motion analysis system and 2 AMTI force platforms. 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, 3 On medication. Reliability was estimated by calculating the Intraclass Correlation Coefficient (ICC). MDC scores were calculated for 8 components of gait initiation, On and Off medication. 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%.

Conclusion: MDC values help to determine whether change in patient performance is reflective of true change beyond measurement error. Between-group differences 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. Our results demonstrate that psychometric properties of gait initiation may differ between On and Off-medication conditions. We suggest that testing patients during peak optimal performance (on-medications) should be complemented with ecologically valid assessments (off-medications).
Analysis of the Effects of Fermented Dairy Consumption on Women's Bone Health
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Objectives: The objective of this research was to examine the effects of fermented dairy product consumption (e.g., fermented milk and ripened cheese) on markers of bone health in women. Markers analyzed included bone mineral density and calcium absorption.

Data Sources: PubMed, Cochrane Library, Google Scholar and Clinical Trials were searched for English-language studies in a 15 year range with sample sizes >20 patients, a defined baseline period, and reported statistical analysis for adherence and serum parathyroid hormone variation. This search resulted in twelve articles, of which five met criteria; all participants of the five studies were conducted with women only.

Review Methods: To better understand how fermented milk products affect bone health in a wide range of individuals studies were sought that, collectively, represented multiple ages and backgrounds with varying pre-existing illnesses and chronic diseases. Article selection followed the protocol developed by the Academy of Nutrition and Dietetics’ Evidence Analysis Library. This protocol includes formulating an analysis questions, gather and classify evidence, critically evaluate each article, summarize and lastly grade and draw a conclusion. The protocol required searching a minimum of three different databases.

Results: Of the four articles analyzed, one provided moderate evidence, two provided weak evidence, and one found no evidence to support a direct relationship between between fermented dairy and bone mineral density. Several of the studies were short in length and had small sample sizes. No direct relationship was found between consumption of fermented dairy and bone mineral density. There was moderate evidence to suggest a relationship between fermented dairy and several factors relating to bone density and calcium metabolism and absorption including PTH levels, intestinal calcium absorption, deoxypyridinoline levels, and overall calcium levels.

Conclusions: Based on a review of these studies, fermented products do not demonstrate a direct influence on the increase of calcium absorption or bone density. However, there appears to be an indirect relationship and an unclear protective effect. Specifically, with regards to maintaining the calcium level and, thereby, bone density by preserving high serum PTH, inhibiting bone resorption, and decelerating bone turnover in postmenopausal women. More studies are needed to better elucidate the effect of fermented product on calcium level and bone density. Another gap in the literature is the types of bacteria that promote fermentation, which may be prophylactically protective on calcium level and bone density.
POCATELLO PODIUM PRESENTATION ABSTRACTS

The Effect of Questions in Caregiver Input to Infants on Later Vocabulary Development
Laila Samaha¹

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Background: Infant vocabulary development is heavily influenced by caregiver language input. Numerous studies have investigated the quality of caregiver input relating to later infant vocabulary size; however, caregiver use of questions has not been investigated as a quality input measure.

Purpose/Objective/Hypothesis: The purpose of this study is to determine how the quantity of caregiver input, caregiver use of wh-questions and other question forms, and caregiver use of statements presented to infants relates to later vocabulary skill. It was hypothesized that types of questions posed by caregivers to infants between 6 to 18 months of age would support later vocabulary development (expressive and receptive vocabulary size at 1.5 years of age and expressive vocabulary size at 2 and 3 years of age).

Methods: Archived data for this project were obtained from 14 caregiver/infant dyads video/audio recorded during hour-long, monthly sessions between 6 and 18 months of age in a longitudinal study conducted by Ramsdell-Hudock at East Carolina University. Correlation and multiple regression analyses were conducted to examine the relationship between all criterion and predictor variables. The criterion variables of interest were expressive and receptive vocabulary at 1½ years of age, and expressive vocabulary at 2 and 3 years of age. The predictor variables of interest were the total number of words spoken to the infant, the number and type of questions posed by caregivers to infants (wh-questions versus other question forms), the number of statements posed by caregivers to infants, and infant age from 6 to 18 months. A significance level (p) was set at 0.05 for the purpose of this study.

Results: Results indicated some statistical significance between groups, and effect size values suggested substantial clinical significance.

Conclusions: Findings from the study can be used by speech-language pathologists to provide caregiver education regarding the impact of question forms on potential vocabulary development in infants. Clinical implications, study limitations, and future directions will be discussed.
Ecological Association Between Arsenic Concentration in Drinking Water and Physiological Health Symptoms in American Falls, Idaho
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Background: Arsenic is a contaminant endemic to Idaho that is typically tested for in ground water. Chronic arsenic exposure can lead to a number of physiological health symptoms including skin pigmentation, gastrointestinal issues, and various types of cancer (ATSDR, 2010). American Falls, Idaho has reported higher levels of arsenic in recent years than it has in the past (IDEQ, Sample History Report, 2018).

Aims: The aims of the project were: 1) to determine levels of arsenic in American Falls drinking water, 2) to describe the prevalence of residents of American Falls with >1 self-reported physiological health symptoms and compare with state and national data, and 3) to determine if there is an association between levels of arsenic and occurrence of physiological health symptoms in the city of American Falls from 2015-2018.

Methods: Water samples were collected from participant’s homes who had opted to receive free tap water testing through an online survey about physiological health conditions, water consumption and demographics. Analyses used water sample data collected from participants’ at-home tap and self-reported physiological health data to determine potential significant relationships between level of contaminant in the water and presence of experienced physiological health symptoms.

Results: The levels of arsenic in sampled tap water were greater than 0 mg/L but less than the Maximum Contaminant Limit (MCL) of .01 mg/L (M= .004mg/L). Overall prevalence of participants reporting >1 physiological health symptom was 43.3%. Logistic regression analyses showed no significant relationship between presence of physiological health issues and levels of arsenic measured from at-home tap water in 2018 (p=.59; B= -.129). Specific prevalence comparisons will be further discussed.

Conclusion: It is important to continue monitoring water sources in American Falls for arsenic levels that may be above the MCL, because this area is at high risk for arsenic contamination.
The Effect of Mindfulness Training and Practice on Student Clinicians’ Clinical Experience and Skills
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Background: Mindfulness can be described as nonjudgmental attention and acceptance of the present moment. The practice has become increasingly accepted in recent years as an effective treatment intervention for various conditions including anxiety, depression and pain management. In the realm of Speech-Language Pathology, mindfulness training has been shown to be beneficial for treatment of fluency disorders, autism spectrum disorder, ADHD, and others. Historically within the Speech-Language Pathology literature, research concerning mindfulness in clinical practice has primarily focused on client experiences and outcomes. Only a small number of studies have been conducted to investigate the effects of mindfulness training on clinician experiences and outcomes. In contrast the field of Counseling Education has a long-standing documented history of examining mindfulness training and practice on students’ professional experiences and skills. Recent evidence from studies that applied commonly used methodologies from the counseling education literature to examine speech language pathology and counseling students during an interprofessional education and practice experience of the Northwest Center for Fluency Disorders Interprofessional Intensive Stuttering Clinic (NWCFD-IISC) at ISU have revealed much personal and professional benefit from these practices. The purpose of the current study is to investigate Speech-Language Pathology and Counseling Graduate Students’ personal and professional experiences with mindfulness through their participation in the NWCFD-IISC. The proposed methods for this study include utilizing a single-subject design with student clinicians before, during, and after their participation in the 2019 NWCFD-IISC. It should be noted that the NWCFD-IISC incorporates an Acceptance and Commitment Therapy (ACT) informed framework throughout the two-week clinic. One of the foundational elements of the ACT approach is present moment awareness, or mindfulness. ACT principles are presented during pre-clinic student training and group-based learning before the student practitioners apply the concepts individually with their clients. Standardized measures will be used to assess elements of mindfulness, thought control, state level of emotion and reactivity, other personal features, and professional experiences and skill developments.
Treating to the Guidelines: A Quality Improvement Project to Improve Diabetes Management for Rural Native Americans
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Purpose: Perform a quality improvement project using a retrospective chart review of Community Health Center treatment plans implemented for pre-diabetic and diabetic Native American patients. Assess treatment plan consistency with American Diabetes Association (ADA) guidelines, utilization of tribal diabetic resources and compliance with Health Resources and Services Administration (HRSA) clinical measures to identify areas for improvement. Develop a clinical tool that can be used by clinic staff to deliver improved care in these areas.

Background: Native Americans are at increased risk for diabetes and complications of diabetes. This leads to risk for loss of quality and quantity of life. Financial costs of diabetes for Native American tribes in the United States is excessive. Effective management of this disease is a matter of great concern for tribal leaders on a reservation in the Intermountain West. Tribal leaders want to optimize care for diabetic patients in a Community Health Center on their reservation and support this project.

Methods: Convenience sampling using a list of patients participating in a Community Health Center incentive wellness program between 10/1/17 and 9/30/18 was used to select charts of patients 18 years and older with a documented Native American race and hemoglobin A1c (HbA1c) of 5.7 or greater to evaluate implemented treatment plans. 79 charts were included in the review with 30 charts meeting inclusion criteria. Treatment plan data related to recommendations from ADA, HRSA and local tribal diabetic resources were analyzed in Microsoft Excel.

Results: Among the 30 charts meeting inclusion criteria, 12 had an HbA1c of 5.7-6.4, 10 had an HbA1c of 6.5-8.9, and 8 had an HbA1c of 9.0 or greater. Among all charts, 10% demonstrated a lowering of HbA1c during the timeframe evaluated, all of which had treatment plans meeting some recommendations from all treatment categories; ADA, HRSA and tribal resources. Treatment plan strengths included, lifestyle changes (66%), hypertension management (85%), tobacco use screening (83%), metformin (63%), depression screening (86%). Areas for improvement included, lab analyses (16-20%), smoking cessation intervention (12%), specialty referrals (3-16%), depression intervention (40%), referrals to tribal diabetic resources (10-16%).

Conclusions: Results of the review demonstrate areas where the Community Health Center is excelling in diabetic treatment planning, as well as areas where improvements can be made. After implementing a clinical tool to guide treatment planning, a follow up study would be warranted in order to measure change over time.
The Oral Healthcare Needs of Individuals with Down Syndrome
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Background: As the life expectancy among people with Down syndrome (DS) is increasing, the demand for dental care is also growing. Numerous oral manifestations have been described in DS individuals including low incidence of dental caries, high incidence of periodontal diseases, mouth breathing resulting in dry mouth, fissured tongue and lips, high incidence of mucosal ulcers, candidiasis and acute necrotizing ulcerative gingivitis. However, periodontal disease is the most significant oral health problem, and it is common to see alveolar bone loss in persons with DS age 6-16 years. This heightened incidence of periodontal disease is not related to an increased amount or more virulent plaque; but thought to be directly related to the reduced immunologic response to infections and inflammatory disease. Consequently, large numbers of people with DS lose their permanent anterior teeth in their early teens.

Objective: The objective of this evidence-based review is to identify key strategies for safe and effective oral care and treatment planning in people with DS.

Method: PubMed, Medline and the Cochrane Library databases were searched for review articles on oral health and disease in people with DS. 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. Key search terms included Down syndrome, periodontitis, oral health, oral manifestations and management.

Results: Due to the frequency and severity of oral manifestations, prevention and early intervention are of paramount importance. Regularity of appointments, implementation of adjuvant plaque control methods, careful instruction in oral hygiene and continuous motivation are more substantive practices than selected therapeutic procedures. Research indicates significant positive effects from participation of parents or caregivers in the supervision of oral hygiene procedures of people with DS.

Conclusion: Healthcare practitioners must have a clear understanding of the unique characteristics that influence oral care for patients with DS. It is of primary importance to introduce DS patients to preventive programs as, as well as encourage parents or caregivers to supervise performance of daily oral care.
The Bi-Directional Relationship Between Periodontal Disease and Rheumatoid Arthritis: A Look at the Evidence
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Background: Periodontal disease (PD) is a chronic inflammatory disease destroying the supporting structures of the teeth, and has been linked to diabetes, cardiovascular disease, adverse pregnancy outcomes and other diseases. Rheumatoid Arthritis (RA) is an autoimmune disease leading to chronic inflammation and destruction of the synovial joint/cavity, cartilage and bone. Despite differences in etiology, both PD and RA show similarities in terms of pathogenesis and the inflammatory conditions and mechanisms for bone destruction, and a common comorbidity in RA is PD.

Purpose: The aim of this review is to examine relevant evidence showing a bi-directional relationship between PD and RA.

Method: 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: periodontal disease, rheumatoid arthritis, relationship and autoimmune inflammatory responses.

Results: Both RA and PD involve chronic inflammation fuelled by pro-inflammatory cytokines, connective tissue breakdown and bone erosion. Research findings show periodontitis may be a triggering factor for RA eruption and could also be a factor in the initiation and maintenance of the autoimmune inflammatory responses that occur in RA. Compared to the general population, people with PD are at an increased risk of developing RA, and vice versa. The key pathogen in the development of PD is the bacterium porphyromonas gingivalis, which has also been shown to trigger and/or drive autoimmunity and autoimmune disease in a subset of RA. Additionally, studies confirm that the non-surgical treatment of PD improves the biomarkers and clinical activity of RA.

Conclusion: Bi-directional mechanisms linking PD to the development of RA may offer treatment objectives that influence the courses of both inflammatory conditions. However, despite the abundance of evidence showing a link between RA and PD, the exact mechanisms involving this association have not been fully elucidated.
Novel Drug Targeting Approach for Sustained Delivery of Angiotensin Receptors Blockers Using Skeletal Bone as a Reservoir
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Background: The Renin-Angiotensin System (RAS) is a physiological regulator of blood pressure, homeostasis, and cell proliferation. It is composed of two opposing proliferative and anti-proliferative axes which are in balance in normal physiological condition. The activation of Angiotensin II Type I receptors (AT1R) with Angiotensin (Ang II) switches the balance toward the proliferative axis and results in vasoconstriction, inflammation, angiogenesis, and proliferation. Ang II receptors blockers (ARBs) are indicated in pathological conditions associated with activated RAS such as diabetic nephropathy, stroke, and cardiovascular disorders alone or in combination with other medications. ARBs exert their action by competitively binding to AT1R and inhibiting its activation by Ang II. This results in vasodilation, reduction in secretion of vasopressin and aldosterone along with inhibition of growth, promotion, inflammation and, CNS activation effects of Ang II. However, short half-life and poor bioavailability and need for frequent use have been limited their widespread therapeutic applications.

Hypothesis: We have proposed that the prodrug approach by targeting bone drug delivery can be used to alleviate their shortcoming for efficacy and expand their indication spectrum for other disorders such as cancer, inflammatory disorders, and neuroinflammatory disorders such as Alzheimer disease.

Material and methods: ARB prodrugs will be synthesized by using a cross-linking agent for conjugation with bone targeting moiety bisphosphonate. The intermediate and final products will be characterized using High-Performance Liquid Chromatography (HPLC)/Mass Spectrometry (MS). The binding propensity of these compounds to the bone will be analyzed by Surface Plasmon Resonance using hydroxyapatite coated surface. The in vitro efficacy of prodrugs will be evaluated using relevant cell lines. The pharmacokinetics and pharmacodynamics studies will be carried out using animal models for different disorders along with the establishment of a safety profile.

Results: An HPLC assay method for simultaneous determination of some selected ARBs in solution and rat plasma has been developed and validated. The synthesis of prodrugs is in progress and in vitro and in vivo studies will follow.

Conclusion: This proposed prodrug strategy and utilization of bone as a reservoir for drug delivery could prolong the half-life of the ARBs and consequently improve their pharmacological efficacy. Apart from being more beneficial to existing diabetic nephropathy and cardiovascular disorders treatment, their prolonged systemic circulation half-life will increase brain tissue accumulation and make them effective against inflammatory conditions such as cancer and Alzheimer’s disease.
Deletion of ARID1A in Osteosarcoma enhances aggressive cell phenotypes.
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Background: Osteosarcoma is a form of bone cancer that primarily affects children and young adults. 30 years ago survival rates went from 20% survival to 75% survival with the introduction of aggressive chemotherapy combined with surgery. For the past three decades, the survival rate has remained the same despite the increase in targeted therapies to treat other cancers.

Our research is aimed at discovering new drugs that can treat patients that do not respond to traditional chemotherapy. With recent cancer discoveries, osteosarcoma has been identified as a genetically complex disease. In a forward genetic screen using the transposon piggyBac, we discovered a strong correlation between Arid1a gene repression and increased osteosarcoma rates. The ARID1A protein plays a role in epigenetics by directing chromosomes to unwind from histones.

Methods: In an attempt to discover whether ARID1A contributes to Sarcomagenesis, Osteosarcoma cell lines were grown in culture dishes. Using CRISPR/Cas9 gene editing, the ARID1A gene was disrupted from the main sequence and various methods were used to test proliferation rates. Not only are we testing gene disruption in cell lines, but we are also testing mouse models that have had Arid1a knocked out to determine if osteosarcoma growth rates increased.

Our long term goal is to provide a therapy that can be tested in humans with osteosarcoma to help those who do not respond to traditional chemotherapy and provide an alternative therapy with potentially fewer side effects.
The Exploration of Bone-Seeking Conjugate of GLP-1 for Enhancing Efficacy Through Prolongation of Its Half-Life
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Background: GLP-1 (glucagon-like peptide), a known biological incretin, releases from the gut in response to nutrient ingestion. It effects peripherally on gut motility and inhibits gastric acid and glucagon secretion and centrally induces satiety. Within the pancreas, it augments insulin secretion in a glucose-dependent manner which does not induce hypoglycemia. GLP-1 agonists are indicated in safe and effective treatment of Type 2 diabetes. However, their limitations due to short half-life and need for multiple invasive dose administration restricts their wide application. New long-acting GLP-1 agonists have been recently introduced on the market but still do not completely resolved their shortcomings.

Hypothesis: In this project we propose targeting skeletal bone using transdermal delivery of bone-seeking conjugates of GLP-1 or its agonists and utilizing it as sustained drug reservoir for non-invasive, safe and effective treatment of type 2 diabetes.

Materials and Methods: Our research aims to find an effective conjugation method for GLP-1 utilizing a non-immunogenic linker to conjugate the GLP-1 or its agonist peptides to a bone-targeting moiety, i.e. bisphosphonate (BP), in order to utilize bones as a natural reservoir for delivery of our GLP-1 conjugate. We aim to characterize these conjugates utilizing High Performance Liquid Chromatography (HPLC) and matrix-assisted laser desorption ionization time-of-flight mass spectrometry (MALDI-TOF-MS) methods, and Surface Plasmon Resonance on a novel hydroxyapatite (HA) coated chip in order to characterize the binding kinetics and affinity of our bone-targeting conjugate. We will confirm efficacy of the compound using in vitro and in vivo testing on cell lines and animal models and then will develop a novel, non-invasive transdermal delivery system.

Results: GLP-1-BP conjugates are successfully synthesized and structurally characterized using HPLC and MALDI-TOF methods. Initial testing is performed to develop HA coated chips for SPR monitoring, with successful binding of bisphosphonate occurring on the surface of the chip.

Conclusion: The conjugation of GLP-1 with BP resulted in effective bone-targeting which can be concluded from current SPR results. The feasible prolongation of half-life of active peptide using this conjugation approach, and non-invasive transdermal delivery could translate to introduction of a more efficient therapeutic option for type 2 diabetes as one of the major health issues that our modern society faces.
Sustained Delivery of Effective Concentration of Antimalarial Drugs for Prevention of Drug Resistance Using Bone as a Reservoir
Sana Khajeh Pour1, Ali A. Habashi1, Matthew Kirkham1

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Introduction: Nearly 3 billion people live at risk of malaria across the world. Primaquine (PQ) and tafenoquine (TQ) are used for prevention and treatment of malaria. Globally, drug resistance due to lack of patient adherence resulting in subtherapeutic plasma concentration and using sub lethal doses to avoid toxicity are those of the major challenges in battle against malaria. Bone targeting strategy, using bone as a drug delivery reservoir could provide sustained plasma levels above the effective concentration which can prevent drug resistance, increase the efficacy, eradicate the malaria eventually leading to higher patient compliance all together.

Materials and Methods: PQ and TQ conjugates are synthesized by conjugation with bone targeting moiety bisphosphonate (BP). The intermediate and final products are separated and characterized using HPLC and MALDI-TOF. The bone binding capacity of these conjugates will be tested using Surface Plasmon Resonance on gold chips coated with hydroxyapatite. Anti-parasite activity against malaria parasite will be tested in infected red blood cells. Pharmacokinetic (PK) and pharmacodynamic (PD) studies will be conducted using animal model of malaria.

Results: PQ-BP and TQ-BP conjugates were synthesized and characterized using MALDI-TOF. An HPLC method is developed for assessment of PQ, TQ and their conjugates in solution and plasma. After final validation, this method will be used for PK and PD studies of these conjugates.

Conclusion: Targeting of antimalaria drugs to the bone and using it as reservoir will provide an effective sustained plasma concentration which can eliminate the major obstacle of drug resistance in antimalarial drug therapy. This applies to current or new antimalarial agents. Through controlled release of drug from bone-bounded conjugate, this approach will prolong drug circulation half-life and increase its mean residence time in blood and body exposure. Consequently, it can translate to superior efficacy, less dosing frequency, better patient compliance and finally better management of malaria infection around the globe.
Development of a bench-top invitro assay towards quantification of cellular Ceramide Sphingolipid

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Background: Sphingolipids are a class of biomolecules that play a crucial rule in several cellular events like cell growth, proliferation, migration, differentiation, apoptosis, cell senescence etc. Ceramide (Cer) is at the center of the sphingolipid biosynthesis and metabolism. Sphingomyelin (SM) is one of the major phospholipids which is synthesized from the Ceramide by the enzyme Sphingomyelin Synthase (SMS). In regular cells, there is a balance between the amount of ceramide and sphingomyelin in the body. But in cancer cells, this balance is significantly altered. Previous works of literature have shown that an increase in the ceramide content in cancer cells leads to the death of the cells. Our goal is to increase the ceramide level by inhibiting the SMS enzyme.

Hypothesis: Ceramide quantification would be an important tool to detect the effect of the small molecules which would inhibit ceramide metabolizing enzymes such as Sphingomyelin Synthase (SMS). SMS is a transferase enzyme which converts CerÔÉ†SM. Our hypothesis involves utilizing a fluorescent SMS substrate C6-NBD-ceramide towards quantification of cellular ceramide. Quantification of these fluorescent labels will provide the insight of SMS kinetics.

Design and Methods: The cell lines used in this assay were from Synovial Sarcoma (Fuji, Yamato-SS), Renal cell carcinoma (FU-UR-1), Osteosarcoma (SJSA-1, U-205), Neuroblastoma (SK-N-SH) & Schwann cells (S-42). The assay involves the treatment of cells with Jaspine B for 30 min. and challenging the SMS kinetics. Then, the cellular lipid is extracted using methanol. The lipid extraction is loaded on the TLC plate to elute in a solvent system consisting of Toluene, Pyridine, and Water. The Fluorescent image of the TLC plate is taken using Gel imager and AUC (Area under Curve) is measured by using ImageJ software.

Results: The preliminary results have shown that cells treated with Jaspine B have increasing ceramide compared to the standard, confirming the SMS inhibition using the small molecule Jaspine-B.

Conclusion: Compared to the other cellular ceramide quantification assays, this is a non-radioactive, fast and easy benchtop assay. This in-vitro assay will be utilized towards Ceramide quantification using Jaspine B - ceramide analogs. The optimized assay will be utilized towards studying the progression of aggressive cancers.
Sustained Drug Delivery Using Bone-Seeking Anti-malarial Drug Conjugates Aiming at Prevention of Drug Resistance
Sana Khajeh Pour1, Ali A. Habashi1, Matthew Kirkham1

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Introduction: More than 40% of people live at risk of contracting malaria around the world. The most recent estimates indicate several hundred million clinical cases and more than 600,000 deaths in 2010 of which the large majority are children below 5 years old. These alarming statistics calls for effective malaria disease prevention and management. There are several species of Plasmodium involved in the pathogenesis of malaria but P. falciparum is the most deadly of them and responsible for sever malaria cases. Primaquine (PQ) and tafenoquine (TQ) are used for prevention and treatment of malaria. Globally, drug resistance due to lack of patient adherence resulting in subtherapeutic plasma concentration is one of the major challenges in battle against malaria. Bone targeting strategy, using bone as a drug delivery reservoir could provide sustained plasma levels above the effective concentration which can improve patient compliance, increase the efficacy, prevent drug resistance, and eventually can leading to eradication of the malaria all together.

Materials and Methods: PQ and TQ conjugates are synthesized by conjugation with bone targeting moiety bisphosphonate (BP). The intermediate and final products are separated and characterized using HPLC and MALDI-TOF. The bone binding capacity of these conjugates will be tested using Surface Plasmon Resonance (SPR) on gold chips coated with hydroxyapatite. Anti-parasite activity against malaria parasite will be tested in infected red blood cells. Pharmacokinetic (PK) and pharmacodynamic (PD) studies will be conducted using animal model of malarial.

Results: PQ-BP and TQ-BP conjugates were synthesized and characterized using MALDI-TOF. An HPLC method is developed for assessment of PQ, TQ and their conjugates in solution and plasma. After final validation, this method will be used for PK and PD studies of these conjugates. The kinetic study using SPR could prove the capacity of bone-targeting conjugates. Similar to the results of our other bone-targeting drug applications, the release profile of the anti-malaria agents form the bone and in vivo PK and PD studies results can prove the effectiveness of this approach.

Conclusion: Through controlled release of drug from bone-bounded conjugate, this approach will prolong drug half-life and increase its mean residence time and body exposure. Consequently, it can translate less dosing frequency, lower side effect, higher patient compliance, superior efficacy and finally better management of malaria infection. The achievement of sustained effective plasma concentration through this proposed drug delivery approach could improve the drug efficacy and result in reduction of drug resistance chance.
Epigenetic regulation of the Birc5 promoter explains mechanism of action of YM-155 in synovial sarcoma
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YM-155 is an anti-cancer therapy that has advanced into 11 different human clinical trials to treat various cancers. This apoptosis-inducing therapy indirectly affects the protein levels of Survivin (Gene: Birc5), but the molecular underpinnings of the mechanism remain largely unknown. Synovial sarcoma is another cancer with high protein expression of Survivin. We investigated whether YM-155 would be a viable therapeutic option to treat synovial sarcoma. We, therefore, applied YM-155 therapy to human synovial sarcoma cell lines and a genetically engineered mouse model of synovial sarcoma. We discovered that YM-155 exhibited nanomolar potency against human synovial sarcoma cell lines and the treated mice with synovial sarcoma demonstrated a 50% reduction in tumor volume compared to control treated mice. We further investigated the mechanism of action of YM-155 by looking at the change of modifications of the histone tails that were near the Birc5 promoter. Using chomatin immunoprecipitation (ChIP) we discovered that the histone epigenetic marks of H3K27 for the Birc5 promoter changed upon YM-155 treatment. H3K27me3 increased whereas the H3K27ac decreased, highlighting the decrease of the protein Survivin occurs through epigenetic silencing of the gene’s promoter. The treatment of YM-155 was accompanied by an increase in NFkB protein expression, which indicates an attempt of the cell to initiate a positive feedback due to the decrease in Survivin expression. This combination of molecular events eventually resulted in Caspace 3/7/8 upregulation and death of the sarcoma cells.
Student perceptions of faculty on end of course evaluations at a school of pharmacy utilizing distance education
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Compared with traditional learning, distance education facilitated by e-learning is an increasingly common alternative teaching modality. Idaho State University College of Pharmacy utilizes distance education at three independent sites in Pocatello ID, Meridian ID, and Anchorage, AK. Despite ample literature on student performance and perception of course quality in distance education there is a paucity of data regarding student perception of faculty quality. Using end of course surveys, determine if student perceptions of faculty quality differ based on whether students share a campus with the evaluated faculty member. A retrospective review of student evaluations was completed. Pocatello and Meridian student evaluations during academic years 2015-2016 through 2017-2018 were collected for the pharmacotherapeutics modules of the pharmacy school curriculum. Anchorage-based student evaluations were excluded due to small class size. Evaluations for faculty who had not taught a course for the entirety of the review period and students who switched campuses were also excluded. The primary outcome was the composite score of a 15-question evaluation using a 4-point (1-4) Likert-Scale score comparing faculty evaluations depending on whether campus is shared or not shared with students. Secondary outcomes were average individual question score for same vs. opposite campus and 15-question composite score of Pocatello vs. Meridian students. A total of 3565 student evaluations on 16 faculty members were included. Composite score for faculty on the same campus averaged 0.16 points higher than faculty on the opposing campus (3.66 vs. 3.50; p <0.0001). Individual question scores for each question showed higher scores for the same campus vs. opposite (range 0.13-0.19; p <0.0001). Students in Meridian did not score differently compared to Pocatello (p = 0.084). A difference was found between scores depending on faculty member’s location relative to the student. Any observed differences are small enough to be considered clinically insignificant. Distance education does not have an impact on student perceived quality of faculty and is an acceptable model for colleges of pharmacy to utilize.
Identifying medication management confidence and gaps in training among community health workers in the United States
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Background: Community Health Workers (CHWs) are a group of trained health professionals who advocate for members within their communities on social and health care issues. CHWs are highly utilized due to their affordability, accessibility, and ability to communicate and relate to patients in vulnerable populations. Evaluating overall confidence and identifying current medication management practice and possible training gaps among CHWs may provide a better understanding of areas for improvement in CHW training programs.

Purpose: The purpose of this cross-sectional survey was to assess CHW confidence in medication management, describe medication management services, and identify areas of focus with regard to medication management in CHW training.

Methods: A 32-item survey was developed to assess CHW overall work and training history. The survey was provided to CHWs in Idaho, Indiana, Nevada, and Oregon through their state’s CHWs email listservs. The survey content covered four domains: 1) demographic information 2) work history 3) experience with medication management and 4) CHW training including specific questions regarding medication management training. Two free-response questions assessed whether medication management training was beneficial and collected respondents suggestions for improving medication management-specific training.

Results: A total of 77 CHWs completed the survey of which, 90.9% (70) were female, 38.9% (30) worked as CHWs between 1-3 years, and 89.6% (69) received instate CHW training. Over three-fourths of respondents (79.2%) provide medication-related services and 57.1% rate their confidence in medication management as ‘poor’ or ‘fair.’ Overall, many CHWs reported a need for additional medication management training within CHW certificate and continuing education programs.

Conclusion: CHW confidence in providing medication management services is low and many identified a need for greater emphasis on medication management in CHW training programs.
Bringing pharmacogenomics to rural communities
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Pharmacogenomics is a broad field of study about the role of the genome in drug response. It analyzes how genes affect the way drugs respond. Current efforts are to increase clinical utility (Ji Y, 2016) of pharmacogenomics and thus optimize patient care. Despite the potential utility of pharmacogenomics, it is still underutilized. In this study we will pilot a custom gene panel for pharmacogenomic sequencing that will be as cheap or cheaper as current sequencing services and to increase the ability of pharmacists in rural Idaho to counsel patients about pharmacogenomic testing.
Implementation of procalcitonin use protocols to decrease inappropriate testing, minimize antibiotic exposure and regulate antibiotic prescribing
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Background: Numerous studies have investigated the impact of implementing procalcitonin (PCT) protocols upon duration of antibiotic therapy. Some focused on utilization in the primary care setting, while others analyzed utility in emergency departments or intensive care units. A meta-analysis titled Procalcitonin Algorithms for Antibiotic Therapy Decisions, published in the Journal of the American Medical Association in August 2011, reviewed 14 randomized controlled trials. The trials demonstrated reduced antibiotic prescribing in lower-acuity patients and shorter antibiotic therapy in moderate to high-acuity patients. All studies were conducted in Europe, but findings have been implemented throughout the United States.

Purpose: Evidence suggests that up to 50% of inpatient antimicrobial use is unnecessary. The only FDA-approved indications for PCT assay are lower respiratory tract infections and sepsis. At our facility, PCT assay utilization is excessive and not evidence-based. In a period of 12 months, 6,280 PCT assays were performed for total patient charges of $1,097,995.

Objective: To implement PCT protocols for lower respiratory tract infections and sepsis that provide guidance regarding appropriate use of the PCT assay, antibiotic prescribing, and discontinuance; implementation should result in decreased cost due to the elimination of inappropriate assay orders.

Methods: This project was classified as exempt by the Institutional Review Board. Primary endpoints are net effect of protocol implementation on total number of PCT assays performed (statistical analysis using chi-squared test), average duration of antibiotic therapy for patients diagnosed with sepsis or lower respiratory tract infections (statistical analysis using independent t-tests), and effect on hospital cost and patient charges associated with all PCT assay orders regardless of diagnosis. PCT protocols for lower respiratory tract infections and sepsis, which will provide guidance regarding appropriate use of the PCT assay, antibiotic prescribing and discontinuance, have been developed using current evidence and provider input. Inclusion criteria: patients 18 years of age or older with diagnosis of lower respiratory tract infection and/or sepsis identified by admission diagnoses using ICD-10 codes. The pharmacovigilance operating system will be used to determine the total number of PCT assays performed pre- and post-intervention. Hospital cost and patient charges associated with PCT assay orders will then be calculated. Electronic health records will be utilized to collect patients’ age, gender, date of antibiotic initiation, and duration of antibiotic therapy. Mean average antibiotic duration will be calculated using Excel.

Results: Pending

Conclusions: N/A
Extended-infusion dosing protocol for piperacillin/tazobactam: design, implementation, and evaluation at a community hospital
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Piperacillin/tazobactam has traditionally been administered as an intermittent bolus infusion. Extended infusion dosing, when compared to intermittent bolus infusion dosing, has been shown to provide increased bactericidal coverage, including for more resistant bacterial strains. Extended infusion dosing has been shown to improve patient outcomes through decreased mortality and increased rates of antibiotic therapy success. This study was designed to build upon a preliminary study performed at Eastern Idaho Regional Medical Center, by expanding data collection to one year pre and post implementation of a new extended infusion protocol for piperacillin/tazobactam dosing. To evaluate effectiveness, a retrospective chart review will be conducted examining length of hospital stay and costs associated with each dosing strategy; as well as length of antibiotic therapy and mortality related to infection between dosing strategies. Chi squared analyses will be used to compare dosing strategies. Clinical outcomes are pending; however, preliminary results suggest an improvement in patient outcomes. This study has received IRB approval as exempt status.
Antibiotic Prescribing Trends Following Suppression of Fluoroquinolone Susceptibilities
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Background: Current Antimicrobial Stewardship guidelines suggest utilizing cascade reporting for antibiotic susceptibility test results, however; recommendations supporting this are weak due to insufficient evidence. Additionally, there are strong recommendations to reduce fluoroquinolone use due their association with Clostridium difficile infections and extensive adverse effects. A previous study in this facility found that suppressing fluoroquinolones susceptibilities reduced prescribing at the beginning of 2018 while total antibiotic use remained constant.

Purpose: The purpose of this study was to further assess the prescribing trends of antibiotics during this intervention and to identify any change in use of narrower or broader spectrum agents.

Methods: Fluoroquinolone susceptibility reporting was suppressed January 1, 2018. Hospital wide antibiotic use was retrieved from a real time surveillance system in units of total defined daily dosage (DDD) for the first six months of both 2017 and 2018. The DDD for each antibiotic group was corrected based on the hospital census for each month to determine the DDD per 1,000 patient days for each group reviewed. The total DDD per 1,000 patient days post intervention was compared to pre-intervention numbers during the same months of the prior year and analyzed for statistical significance using the student’s t test. The change in DDD per 1,000 patient days between January 1 through June 30 in 2017 and 2018 for fluoroquinolones was the primary outcome, and the change in other antibiotic groups was the secondary outcome.

Results: The total fluoroquinolone DDD per 1,000 patient days in January through June of 2018 was 146.99, a 32.6 percent reduction (P equals 0.018) from January through June in 2017 (217.93). In 2017, fluoroquinolones represented 8.3 percent of all antibiotics prescribed versus 5.2 percent in 2018. The average monthly DDD per 1,000 patient days for all antibiotic use in 2018 was 474.55 and in 2017 was 518.43 (P=0.214). During the same time nitrofurantoin DDD per 1,000 patient days increased 33.2 percent (P equals 0.301), macrolides 13.4 percent (P equals 0.484), and aminopenicillins with a beta lactamase inhibitor 3.5 percent (P equals 0.869). Other antibiotic DDD per 1,000 patient days that simultaneously decreased during the intervention time included clindamycin 22.1 percent (P equals 0.158), aminopenicillins 31.2 percent (P equals 0.441), third generation cephalosporins 16.6 percent (P equals 0.196), sulfamethoxazole-trimethoprim 9.4 percent (P equals 0.637), first and second generation cephalosporins 5.3 percent (P equals 0.619), and cefepime/piperacillin-tazobactam 5.3 percent (P equals 0.600).

Conclusion: The initiation of cascade reporting that suppressed fluoroquinolone susceptibilities resulted in a 32.6 percent reduction in fluoroquinolone prescribing that was statistically significant while total antibiotic use remained constant. Review of other antibiotic prescribing trends found that nitrofurantoin prescribing increased 33.2 percent, though not statistically significant, is consistent with antimicrobial stewardship alternative recommendations for uncomplicated cystitis. The increased macrolide and aminopenicillin-beta lactamase inhibitor use may possibly be due to the decreased fluoroquinolone prescribing. Other prescribing trends were otherwise un-substantial suggesting that cascade reporting with suppressed fluoroquinolone susceptibility did not cause alternative prescribing that may contradict other stewardship goals at this facility.
Trends in women’s authorship in pharmacy literature
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Objective: The purpose of this evaluation was to determine whether the percentage of women as first authors in pharmacy journals has continued to increase over the past decade.

Methods: Key pharmacy practice journals were identified from the American Association of Colleges of Pharmacy Core List of Journals for Pharmacy Education. Articles were analyzed from January 2007 through December 2017. The outcome of interest was the proportion of articles having feminine names as the first author. Femininity was determined for first authors by matching first name to data from the U.S. Social Security Administration or genderize.io. The Cochrane-Armitage trend test was used to determine differences in proportion of women as first authors over time.

Results: Listed first author over the past decade was 52.7% female for all studied journals from 2007 through 2017. All but one journal demonstrated a significant increase in the proportion of female first authors over the time period studied. Sub-analyses of journals containing 1) greater than 90% gender-identifiable articles, 2) focused predominantly on contemporary drug therapy or pharmacy practice and did not typically include pharmaceutic- or pharmacokinetic-related topics, and 3) did not focus predominantly on contemporary therapy or practice and included pharmaceutic- or pharmacokinetic-related topics and were significant.

Conclusion: Women first authorship in pharmacy practice journals appears to have increased in the recent decade but may potentially be reaching a plateau. The proportion of female first authorship is close to reaching that of women in the U.S. pharmacy workforce when compared over the same time period.
Facilitators and Barriers of Medication Synchronization Implementation at a Rural Telepharmacy with Five Locations
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Background: Poor adherence to medications can negatively impact patient health; decreased access to medications has been linked to poor adherence. The appointment-based model of medication synchronization proactively synchronizes drug refills for patients’ chronic medications and allows patients to pick them up in a single visit to the pharmacy. Although studies have demonstrated patient satisfaction and cost-benefit of this service, medication synchronization in telepharmacy is not discussed in the literature.

Objective: The objective of this project is to explore the facilitators and barriers of the implementation of medication synchronization at a telepharmacy with five rural, remote locations.

Methods: This project consisted of a questionnaire-based survey and small-group interviews. An eight-question survey was created with five, five-point scale, Likert-style questions related to perceived collegiality and confidence in, perception of, knowledge of and efficiency of medication synchronization. There were also three open-ended questions asking participants to describe attitudes regarding pros, cons, and ways to improve the service. The questionnaire was administered electronically via an online platform. After the questionnaire was completed, open forums with staff at each pharmacy location were scheduled.

The forums consisted of semi-structured interviews with pharmacy staff containing four questions about general opinions, facilitators, barriers, and workflow related to the implementation of medication synchronization along with two questions addressing major themes identified as barriers from the questionnaire. Forums were conducted via videoconferencing by the lead researcher who also took notes and recorded the sessions. Notes were reviewed for completion using the recordings. When complete, forum notes were assessed for themes. The lead researcher identified themes separately from a secondary researcher and then identified themes were compared. Themes were categorized into like groups.

Results: Results from the questionnaire include participation from 21 out of 29 (72.4%) pharmacy staff. Of these responses, eight (38.1%) came from pharmacists, five (23.8%) from pharmacy interns, and eight (38.1%) from pharmacy technicians. Weighted averages for Likert question responses were as follows: perceived collegiality (3.53), positive perception (3.11), confidence (2.83), knowledge (2.67), and efficiency (2.31). Major barriers identified in the free response section included staffing, inventory, cross-training, and sharing responsibility for the service. Five out of five (100%) telepharmacy sites completed the recorded video interviews. Thematic analysis is underway, and final results are pending.

Conclusion: This quality improvement study will contribute to the literature regarding feasibility and value of medication synchronization in the telepharmacy setting.
Classifying an endemic problem: analyzing the cause behind failure to document hemoglobin A1c in a federally qualified health center
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Background: Centers for Medicare & Medicaid (CMS) uses quality measures as tools to quantify elements of quality patient care provided to their beneficiaries. One such measure evaluates diabetes control by requiring patients have hemoglobin A1c documented yearly and maintained below a threshold of 9%.

Purpose: The purpose of this quality improvement project was to determine and classify why diabetic patients in a single federally qualified community health center did not have a hemoglobin A1c documented within the last year.

Methods: Through EMR query we identified all patients of a single federally qualified health center who met the following inclusion criteria: office visit in the last year and diagnosis of type I or type II diabetes without a hemoglobin A1c documented in the last year. We performed detailed chart analysis of a randomized sample of patients to determine the reason for no documented hemoglobin A1c and then categorized our findings.

Results: Of the 642 patients with a diagnosis of diabetes who had an office visit during the project period, 73 met inclusion criteria. Of the 32 patient charts reviewed, two patients were deceased, two were attributed to clinician oversight, three were being managed for diabetes elsewhere, four had a hemoglobin A1c drawn at an outside lab, five were not appropriately migrated from a previous electronic medical record, seven had a hemoglobin A1c documented between data query and abstraction, and nine patients may not qualify for a diabetes diagnosis.

Conclusions: The available data demonstrates that the failure to document yearly hemoglobin A1c measures lies primarily with technical and administrative issues rather than clinician oversight. Furthermore, most patients whose hemoglobin A1C is not routinely being monitored are in that position due to ambiguity surrounding the nature of their initial diagnosis. Improving hemoglobin A1c documentation will require clinic-wide awareness of the underlying causes of the current problem and technical improvements to the current methods of hemoglobin A1c documentation once results have been obtained.
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 was 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 utilized the chart abstraction tool to perform pre-visit chart reviews and make recommendations to primary care providers while under pharmacist supervision. The primary outcome is proportion of student pharmacist recommendations accepted by the pharmacist as appropriate. Additional outcomes include proportion of student pharmacist recommendations implemented by primary care providers and number of recommendations provided per patient.

Results: Over a three month period, 69 patients charts were reviewed by pharmacy students prior to their appointment. There were a total of 417 recommendations presented to the pharmacist with 95% of those recommendations being accepted. 111 recommendations were presented to the provider with 43% of recommendations implemented. On average, 6 recommendations per patient were provided prior to his/her primary care visit.

Conclusion: Student pharmacists are a potential avenue to reduce DRPs in the ambulatory care setting. An evidence-based chart abstraction tool serves as a systematic guide for student pharmacists to evaluate for DRPs.
Pharmacy resident feedback through interdisciplinary clinic video review
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Background: Video review (VR) is a commonly used teaching method in family medicine resident education where residents are evaluated on their interactions with patients. Research suggests that VR and feedback by experts can improve medical resident performance. To date, there is no literature surrounding the utilization of VR in pharmacy resident education. Furthermore, pharmacy residents and students receive minimal to no behavioral skills training. The profession of pharmacy has long recognized the importance of adopting a uniform patient care process. Hence, Joint Commission of Pharmacy Practitioners (JCPP) Patient-Centered Process for pharmacists was developed to establish a consistent process for the delivery of care. The Idaho State University Pharmacotherapy Residency Program recently introduced VR into their curriculum, however, no formal or systematic review process exists for VR of pharmacist-patient encounters.

Purpose: The primary objective of this project is to evaluate and improve patient-centered care during pharmacy resident patient encounters by utilizing a standardized review form.

Methods: We adapted the Patient-Centered Observation form (PCOF) - an assessment tool used in family medicine encounters to develop communication and relationship skills - to align with the JCPP Patient-Centered Process for pharmacists. The new form was pilot tested by the program’s behavioral scientist and clinical pharmacist during video review of patient visits with current first and second year pharmacotherapy residents. During the visit, the form was completed and reviewed for ease of use. Changes to the form were implemented following each pilot visit after which, a final version was established.

Conclusion/Future Directions: The interdisciplinary assessment approach allowed for teaching of both clinical pharmacy skills and patient-centered care improvement opportunities including, agenda setting of the visit, behavioral skills, and documentation efficiency. The adapted PCOF sets minimum criteria for patient-centered care and allows for tracking of progress. Additionally, utilization of the form during VR allowed for consistent, constructive, and specific feedback. Finally, the form would allow pharmacy residency programs to establish a standardized way to improve patient-centered care through utilization of the Patient Care Process.
Implementation of a pharmacist-driven penicillin allergy skin testing protocol in a community hospital

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Background: Penicillin allergy is the most reported drug allergy in the United States with approximately 10% of the population reporting a penicillin allergy. However, 90% of these patients will not have a current allergic reaction to penicillin and penicillin skin testing (PST) is the optimal method to evaluate a penicillin allergy. Allergic reactions to penicillin are mediated through IgE antibodies which decline by 80% over 10 years in patients with a history of penicillin allergy. The PST has a negative predictive value of 97-99%. Patients with a labeled penicillin allergy experience increased rates of antimicrobial resistance including 23% increased incidence of Clostridium difficile infections, 14% increased incidence of methicillin resistant Staphylococcus aureus, and 30% increased incidence of vancomycin resistant Enterococcus. Further penicillin allergic patients have increased intensive care unit admissions, hospital readmissions, and mortality.

Purpose: To determine the prevalence of reported penicillin allergy at our institution, report the number of positive compared to negative penicillin skin tests in the inpatient population, and assess for delayed reaction to penicillin skin testing.

Methods: Using the electronic medical record (EMR), patients 18 years or older with a documented penicillin allergy who are also receiving non-beta-lactam antibiotics, aztreonam, or carbapenem antibiotics will be identified. These patients will then be interviewed by a pharmacist using a predetermined penicillin allergy screening questionnaire to assess the significance of their penicillin allergy and determine if the patient meets inclusion criteria for a PST. Consenting patients will receive a PST from a trained pharmacist. The PST consists of a scratch test and, if the scratch test is negative, an intradermal test. The result of the PST will be documented in the EMR and be communicated to the patient’s primary care provider and outpatient pharmacy. The following data will be collected: number of patients assessed through PST, patient’s age, allergy history, results of the scratch test, results of the intradermal test, and results of the 3-day follow up to assess for any delayed reactions after the PST. The data collected will be reported using descriptive statistics. This project received full review and approval from Institutional Review Board.

Results: Pending

Conclusions: Pending
Assessing Speech Language Pathologists’ (SLP) Level of Knowledge and Experience with Cluttering
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Background: One population frequently seen by SLPs are people with fluency disorders; however remarkably, decades of research consistently reveals that SLPs report being underprepared and lacking adequate training and experience to effectively assess and treat people with fluency disorders, often rating fluency disorders as the number one most feared disorder to treat. Some of this apprehension is thought to be due to limited classroom and clinical exposure to people with fluency disorders, while others contribute it to a failure of SLPs. The two main types of fluency disorders are stuttering and cluttering. Stuttering, a speech-motor based disorder, chronically affects approximately 1-4% of the world’s adolescent and adult populations, whereas cluttering, a language-based disorder frequently co-occurring with stuttering, affects approximately .01 -.12%. Knowledge and familiarity with stuttering is more well known than cluttering, however it is important to understand SLPs’ knowledge and experiences regarding these types of fluency disorders in comparison to other more prevalent disorders to understand the broader implications from the state of knowledge, or lack of it, within speech language pathology.

Purpose: As fluency disorders are one of many areas in which SLPs practice, their knowledge related to fluency disorders, specifically cluttering, is historically limited. The purpose of the current study is to assess the level of knowledge and experience SLPs have with fluency disorders, specifically cluttering as compared to more common disorders such as phonological disorders.

Design/Methods/Scope: This study proposal is based on a developed questionnaire designed to assess the level of knowledge and experience SLPs in the intermountain west have with fluency disorders, specifically cluttering. The questionnaire includes various multiple choice, categorical, and yes/no questions and video presentations to identify speech characteristics for diagnostic purposes. Demographic information such as age, gender, number of years employed as a certified SLP, highest degree obtained, area of clinical specialization and place of primary employment will be collected on the questionnaire. Participant’s knowledge and clinical experience related to assessing and treating cluttering and stuttering will be assessed with specific questions concerning academic course work, and their ability to identify characteristics of people who stutter, clutter and have a phonological disorder in presented videos.
Examining Caregiver Report of Infant Vocalizations and Later Vocabulary Ability
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Phonetic repertoires in babbling are an important marker of prelinguistic development. Typical phonetic development, however, is difficult to identify given variability within and across infants. Prior to 18 months of infant age, preliminary research suggests caregiver report of prelinguistic vocal development may be particularly informative for clinical practice and early intervention. As a continued step toward understanding the utility of caregiver report of babbling, the purpose of this exploratory study will be to determine how the phonetic makeup of sounds reported by caregivers in infant babbling relate with later vocabulary ability. Caregiver/infant dyads from two longitudinal studies will be explored; one study of 15 infants who were typically developing and one of 11 infants who were at risk for a speech and/or language disorder/delay. Infants were recorded monthly from 7 to 18 months of age, during which time caregiver report of infant vocalizations was gathered. Vocabulary ability was tracked via the MacArthur Bates Communicative Development Inventory bimonthly from 10 to 18 months. It is hypothesized that infants aged 7 to 12 months who are producing more variability as reported by caregivers will have larger expressive and receptive vocabularies at 18 months. Clinical implications, study limitations, and future directions will be discussed.
Gaze Direction and Vocabulary Development: Part III
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Background: It is well documented that gaze following on the part of the infant is a predictor of future language development. However, more clinically applicable methods could be implemented to inform about infant gaze direction toward specific stimuli, such as a person or an object, as it relates to later vocabulary development.

Hypothesis: We hypothesize that later vocabulary development (expressive and receptive vocabulary size at 1 and expressive vocabulary size at 2 and 3 years of age) will vary dependent upon the duration of gaze directed towards people versus objects at 8, 12, and 16 months of age.

Methods: Data will be obtained from a longitudinal study of 15 infants from 6 to 18 months of age, with follow-up measures of vocabulary development in the same children at 1, 2, and 3 years of age. Gaze direction will be coded with an observer-based classification system, while vocabulary ability documented through standardized parent report.

Results: Results indicated that infants at 8 months of age who looked more often toward toys or books were found to have larger expressive vocabularies at 2 years of age. Duration of gaze at all ages has found to have a strong relationship with expressive vocabulary at expressive vocabulary at 1 year of age. Frequency of gaze at all ages was found to have a larger effect on receptive vocabulary at 1 and expressive vocabulary at 2 and 3 years of age than the duration of gazes.

Conclusion: Results provide further evidence that eye gaze has an impact on future vocabulary. Specifically, this research identifies valuable variables which can influence language development through gaze. Strategies to facilitate vocabulary development through early gaze direction can then be established in future research. Clinical implications, study limitations, and future directions will be discussed.
Assessment in Children with ASD: Does Testing Modality Matter?
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Background: Effectively assessing children with ASD’s language abilities is a commonly reported difficulty. Many factors contribute to this difficulty, which consists of atypical behaviors, lack of engagement in the task, and social anxiety that makes it difficult them to be assessed by an unfamiliar clinician. Research has demonstrated the reliability and effectiveness in using computer-based testing and instruction in academic settings. Another common limitation that research has found children with ASD to have is reduced receptive language abilities. This further complicates testing and limits other areas of communication development, specifically expressive language and literacy development.

Purpose: The current study discusses the potential effect testing modality has on receptive language test scores, testing duration, and amount of atypical behaviors observed on school-aged children with autism spectrum disorder (ASD).

Methods: Twenty-two children recruited from public schools and a private speech and language clinic participated in the study. The CELF-5 Word Classes subtest was administered in two modalities, computer-mediated and speech language pathologist (SLP)-mediated formats.

Results: Participants’ raw scores and total amount of behaviors per interval did not show statistically significant difference. However, a significant difference was observed in testing duration and the mean number of atypical behaviors in 30 s interval.

Conclusions: The fact that no difference was observed in test raw scores is consistent with research and also suggests testing reliability. Although the results of the testing duration were significant, extraneous factors impacting the methods of administration do not make these results clinically significant. However, the mean number of atypical behaviors was significant and demonstrated that the format of assessment administration may impact children with ASD’s performance.
Data Collection and Factor Analysis of Three (C)APD Tests for Normal Hearing 8 and 9 year-old Children
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Background: In the absence of a gold standard test for assessment of auditory processing disorder (APD), despite the availability of many tests (and screening tools), there continues to be questions regarding the appropriateness of these tools for use in assessing all aspects of APD.

Purpose: 1) Compare the performance of 8 and 9 year-old participants on all three tests. 2) Determine if the LISN-S and GIN will factor in the same areas, different areas, or show no relationship.

Methods: Otoscopy was performed and hearing was screened bilaterally at 500-4000 Hz at 20 dB HL. Once hearing within normal limits and favorable parent report was obtained, the three APD tests were administered:
- Multiple Auditory Processing Assessment (MAPA-2)
- Listening in Spatialized Noise- Sentences (LiSN-S)
- Gaps in Noise (GIN)

Results: Data indicates the MAPA-2 holds a 3-factor structure and is considered consistent with many other findings in previous research (Schow, et al., 2018). Further, factor analysis results show that the LiSN-S is doing something different, perhaps, measuring the binaural interaction domain. Finally, temporal processing measured in PP, TAP, DP and GAP is different than gap detection as measured by GIN.

Conclusions: MAPA-2 and LiSN-S are providing assessment of expected domains, while GIN results are not factoring clearly under the MAPA-2 temporal domain. This is unexpected and will require further study. Ongoing research will expand the age range of the population, as well as utilize the Scale of Auditory Behaviors.
Neural Processes of the Mu-Rhythm of the Primary Motor Cortex During Fluency-Enhancing Conditions in People who Stutter (PWS) and Non Stuttering (NS) Adults
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Background: Speech is a complex, multimodal process that requires encoding, integrating, testing, comparing, revising, and executing motor and sensorimotor feedforward and feedback signals across a number of neural regions and networks (Bowers et al., 2018; Hickok et al., 2011; Houde & Nagarajan, 2011; Jenson, et al., 2018). Stuttering is a disruption of the forward flow of speech that is theorized to be a neural sensorimotor speech disorder affecting the dorsal-auditory stream (Salmelin, et al., 1998, 2000; Sommer et al., 2002), which causes deficits in the timing and sequencing of speech production (Alm, 2004; Etchell et al., 2015; Etchell et al., 2016; Falk et al., 2015). Overt speech disruptions can be altered and/or minimized through different fluency enhancing conditions. For example, choral speech (speaking in approximate unison with other speakers) reduces stuttering 90%-100% (Bloodstein & Bernstein-Ratner, 2007), and pantomime (mouthing without vocalization) reduces stuttering by 100% (Perkins, Rudas, Johnson, & Bell, 1976). These fluency enhancing conditions have been shown to differentially affect activity in various neural regions, suggesting that such fluency enhancing conditions aided in the facilitation of fluent speech production (Braun et al., 1997); however, the mechanism by which they affect neural activity and to what extent is poorly understood. EEG is an ideal neuroimaging technique to examine speech processing and feedforward and feedback aspects (Bowers et al., 2013; Ingham et al., 2012). Time frequency decompositions of EEG reveal changes in sensorimotor control reflective of feedforward and feedback processes in fluency-enhancing speech manipulations (Kittlesved et al., 2018). Independent component analysis (ICA) is one method of analyzing and interpreting raw EEG data that allows the creation of components of neural activity due to the time-frequency analysis. EEG measures time-frequency changes via event-related spectral perturbations (ERSP).

Hypothesis: The purpose of this exploratory study is to examine neural processing of speech production during fluency-enhancing conditions in people who stutter and typically fluent controls.

Methods: Participants included twenty adults who stutter who were age, gender and handedness matched to typically fluent speaking adults. Participants produced eighty, three-syllable length words spoken in three conditions. Conditions consisted of a baseline (production) condition, direct imitation condition, and pantomime condition. Six trial blocks were presented to the participants, each block lasting approximately six minutes and fourteen seconds. Independent component analysis (ICA) was used to identify sensorimotor components from EEG recordings. Time-frequency analyses measured event-related synchronization (ERS) and desynchronization (ERD) during experimental conditions.

Results and conditions are in progress.
Perspectives Following an Interprofessional Case-Based Learning Experience of Health Professions Students
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Background: Based on the World Health Organization’s Framework for Action on Interprofessional Education and Collaborative Practice, interprofessional practice (IPP) “occurs when two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes.” Interprofessional education (IPE) “occurs when multiple health workers from different professional backgrounds provide comprehensive health services by working with patients, their families, carers (caregivers), and communities to deliver the highest quality of care across settings.” IPE and IPP can be essential ingredients for adding value in medical care, providing patient-centered care, and improving community health. A case-based training model can provide students in the health professions with the knowledge and ability to work collaboratively with other health and rehabilitation disciplines. This study analyzed student perspectives on IPE and IPP utilizing a video case study format.

Methods: Health professions students from eleven health backgrounds participated in an interprofessional case-based learning experience. Students watched a brief video presentation about an older adult who was experiencing difficulty managing his chronic health conditions while living independently. Following the 6-minute video, students discussed their perspectives in small interprofessional groups of 8-10 students. The IPEC Competency Self-Assessment Tool and two open-ended questions were used to survey the students’ perceptions of IPP immediately following the small interprofessional discussions and two weeks after the event.

Results: Analysis of survey data indicated a decrease in student self-perceptions for the IPEC Interprofessional Values domain when ratings between the two time points were compared. Qualitative responses supported the integration of IPE and IPP and pointed to improved patient quality of life, holistic care, and patient outcomes as potential byproducts of IPE and IPP. Students reported that patients, families, and communities can help improve healthcare by: supporting one another, advocating for patients and better health care, and collaborating to establish better communication.

Conclusion: Collectively, these results indicate that students felt comfortable with their knowledge and application of IPE and IPP immediately following the case-based experience. Two weeks later, students reported a slight decrease in both knowledge and ability to apply the IPE and IPP principles measured via the IPEC Values Domain. Future directions include implementing additional case-based experiences using a variety of formats, varying follow-up timing, and applying assessment measures with increased sensitivity. Additionally, including patients or community members in the case-based learning experience may positively impact students’ self-perceptions of their ability to apply the principles of IPE and IPP.
Comparing the between sport differences in landing mechanics of female collegiate athletes
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Background: Dynamic genu valgum is a major risk factor for ligamentous injury of the knee, especially the anterior cruciate ligament (ACL). Females are found to experience higher valgus forces at the knee joint and are 1.6 times at greater risk for ACL injury compared to their male counterparts during sport. Different sports are associated more frequently with ACL injuries than others with female athletes ACL injury risk highest in soccer, followed by basketball and lacrosse. The drop jump test (DJT) is effective in replicating sport specific functional tasks of jumping and landing on either one or two feet in an aggressive manner.

Purpose: The purpose of this study was to investigate the lower extremity biomechanics of the knee in female collegiate athletes of various sports while performing a DJT.

Methods

Subjects: Female athletes who were current members of Idaho State University women’s athletic teams, including basketball, soccer, and softball, were evaluated for this study.

Procedure: Participants performed the drop jump test wearing reflective markers on the lower extremities to record knee valgus angles on the Vicon Bonita Motion Capture system. These angles were measured and compared between groups to determine the differences in functional knee valgus between sport groups.

Results: Female athletes of different sports displayed statistically significant differences in knee angles for both right and left knees. Basketball players utilized a more valgus right knee angle compared to both soccer and softball players and a more varus left knee angle compared with softball players.

Conclusion: Our study suggests that collegiate-level female basketball players have an increased risk of right leg non-contact ACL injury during landing mechanics when compared to collegiate level softball and soccer players. Collegiate-level basketball players may benefit from intervention designed to decrease right knee valgus moments in jumping and landing to decrease their risk of injury.
Outcomes Following a Novel Virtual Reality Intervention and Task-Based Intervention in an Adult with Mild Hemiparesis: A Case Study.
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Background: Action observation of a real task promotes neuroplasticity in the observer’s brain. Physical and occupational therapists have used an actual mirror to provide opportunities for people with hemiparesis to use the intact arm to perform a task while perceiving the reflected image as the involved arm to promote functional recovery. A virtual reality environment with a reflected image of the intact arm has the potential to expand the extent of the working environment and the number of virtual tasks to engage in action observation.

Purpose: The purpose of this case study is to describe the outcomes of one adult with chronic hemiparesis after receiving an intervention using a novel virtual reality device that provides action observation followed by a conventional task-based intervention.

Method: Once the participant provided consent and was found to meet all of the inclusion criteria and none of the exclusion criteria for the study, she was initially tested using the Fugl-Meyer Assessment, Box & Block test, active and passive range of motion, and the Stroke Impact Scale. She attended nine 30 minute sessions (3x/week for 3 weeks) using her intact arm to perform virtual tasks while perceiving her involved arm in the virtual reality environment. This was followed by nine 30 minute sessions (3x/week for 3 weeks) of a task oriented approach. We retested the participant after the virtual reality intervention sessions, after the task oriented intervention sessions, and one month later.

Results: The study is currently underway and graphic representations of the outcomes will be provided.

Conclusions: This case study describes one participant’s outcomes following use of a novel virtual reality intervention designed to increase neuroplasticity through action observation. Further research with a larger sample is needed. The implications of the outcomes will be discussed when all of the data within the case are available.
Potential Contributing Factors and Barriers to the Experience of Maternal Depression in the Latina Community
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Depression has the potential to significantly and negatively impact individuals, families, and communities. Yet, how it impacts these individuals and communities varies across gender and culture. Latinas, one of the fastest growing populations in the US, experience higher rates of depression and yet are not adequately treated. Understanding the higher rates of maternal depression and identifying barriers to treatment seeking are imperative to improving care for Latinas. Two factors that may contribute to the experience of depression in Latinas are acculturation and mental health stigma. Specifically, these factors may keep Latinas from identifying symptoms or believing it is acceptable to acknowledge depression. Additionally, mental health stigma often leads to avoidance of seeking treatment due to associated ideals and fear of others finding out. While studies have looked at maternal depression among Latinas on a larger scale, few have examined maternal depression and barriers to treatment from a community perspective. Given the current social and political climate, it is imperative to understand the experience of maternal depression and related barriers to identification and treatment among Latina mothers. This study uniquely uses a qualitative design including interviews with key stakeholders in the community to capture perspectives on rates of depression, the role of acculturation status, and influential aspects of mental health stigma on the experience of maternal depression among Latinas in western Oregon. Preliminary findings will be presented.
**Profit Maximization and Nurse Staffing Standards/Levels in For-Profit and Not-For-Profit Religious-Based Nursing Homes**

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**Purpose:** The purpose of this study is to determine the relationship between profit maximization and nurse staffing standards/levels with a focus on the difference between for-profit (FP) and not-for-profit religious-based (NFPRB) nursing homes (NHs).

**Background:** Profit maximization is a significant factor affecting adherence to adequate nurse staffing standards and actual staffing levels in many NHs. In NHs, as in other social and health care services organization, the goals for the enterprise may or may not include maximizing profit for the investors and shareholders. In accounting, maximization of profit translates to operating an industry at a level of surplus difference between total revenue and total cost or where the marginal cost is equal to marginal revenue (Harrington, Stockton, & Hooper, 2014; Park & Stearns, 2009; Weech-Maldonado et al., 2012). Maximizing profits in NHs involves adopting the strategies that focus on increasing revenue and containing operating costs and expenses (Weech-Maldonado et al., 2012). Health care labor cost incurred on staffing is the most expensive operating cost (Harrington, Olney, Carrillo, & Kang, 2012; Park & Stearn, 2009). Therefore, the decisions to increase profits have involved reducing or maintaining lower nurse staffing levels, increasing patient-nurse staff ratio, and substituting cheaper lower skill staffers for higher skilled licensed nurse staffing that are more expensive. (Bos, Boselie, & Trappenburg, 2016; McDonald, Wagner, & Castle, 2013; Gichungeh & Kim, 2015; Harrington et al., 2012; Hsu, Berta, Coyte, & Laporte, 2016; Park & Stearn, 2009; Paul III, Godby, Saldanha, Valle, & Coutasse, 2016).

**Methods:** Using the 2016 cycle survey data, data were collected from the Center for Medicare and Medicaid Services’ (CMS) Nursing Home Compare and Medicare Cost Record on 11,022 NHs. Profit measures include patient profit margins and total profit margins while staffing standards measures include registered and licensed nurse CMS’ recommended staffing hours per resident day. The Statistical Package for the Social Sciences was used for analysis.

**Results:** Compared to not-for-profit religious based NHs, for-profit NHs did better financially but worse on adherence to staffing standards. RN/LN staffing standards were significantly related to the profit measures in the FP NHs whereas the opposite was the case for the NFPRB NHs.

**Conclusion:** All NHs residents deserve optimal quality of care outcomes and life. Jeopardizing adequate staffing levels at the expense of profit maximization, is immoral. It is important that NHs regulators enforce strict adherence to staffing standards for residents' optimal quality of care outcomes.
Idaho Healthcare for Children and Families: Dialogues in Action Impact Report
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Background: Many Idaho residents are from rural, low income, and underserved areas, and as a result face significant healthcare challenges. Families from low-income backgrounds are often uninsured, may have language barriers, and frequently lack access to healthcare. Since 2008, the Idaho Healthcare for Children and Families (IHCF) program has provided healthcare education and screenings to Idaho’s underserved by partnering with placement sites across the state. The needs addressed by IHCF include: (1) lack of adequate access to healthcare due to poverty, (2) childhood obesity, (3) lack of preventative healthcare, (4) homelessness, (5) dental health professional shortages, and (6) mental health professional shortages. AmeriCorps members are immersed in community-based settings to provide experiential learning, health education, and health screenings to the public. As such, members play an integral part of the program and positively impacting the community’s health needs.

Purpose/Objective: To identify the type and quality of impact the IHCF program was having on active members. To understand this, two broad research questions were explored: (1) What type and quality of impact is the program having on active members? (2) What aspects of the program are causing this impact?

Methods: An in-depth interview protocol was designed to gather data about the structural, qualitative changes resulting from the program. A purposeful, stratified sampling technique was used to select a representative sample of AmeriCorps members from the population of members.

Results: Interview results revealed that AmeriCorps participants were more aware of the impact of making healthy choices. Because of this, they began making healthier choices for themselves. In addition, through their service projects, they felt more responsible for meeting community needs and were more likely to participate in future community service projects.

Conclusion: In addition to finding impacts that the AmeriCorps program had on its members, the project also revealed important conclusions about improvements that could be made to the program. The project also revealed factors that members found important and had valued from their experiences, which included: (1) improving organization, (2) decreasing documentation and paperwork, (3) increasing connectedness, (4), and improving feedback. In the future, the AmeriCorps program will use this feedback to make improvements. In addition, participant surveys also revealed important experiences and factors that were valued about the program, including: (1) making healthier choices, (2) making a difference in the community, (3) developing awareness of community needs, (4) building confidence, (5) expanding knowledge/experience, and (6) taking action to help others.
Photovoice: Patient Experience with Medication Use Study
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Introduction: The purpose of the Patient Experience with Medication Use Study is to develop trainings for healthcare staff on how they can work with patients to improve appropriate medication use. To do this are implementing a photography research method called photovoice, which is a way to gather information from community members from their point of view. Methods: Through our collaboration with Health West, we are recruiting 25 patients who are taking three or more medications for participation in the photovoice project. Participants attend an initial meeting during which research staff orient them to the photovoice project, give them cameras, as ask them to take pictures that answer the following questions 1.) What keeps you from taking medications as it is prescribed by your healthcare provider? 2.) What helps you take medication correctly?. A debriefing is scheduled with each participant one month later to discuss the photos and what they mean to each participant. Results: Eight participants have competing the orientation and three having completed the Photovoice project. Preliminary results indicate that participants encounter the following barriers: forgetting to take medication, complicated prescribed information, and knowledge about proper medication storage. Due to increased awareness, participants have also reported increased problem solving and behaviors to address the barriers to medication use. Conclusion: Recruitment of participants is ongoing. The information from all interviews will be used to develop training for healthcare staff in how they can work with patients to improve medication use.
Technologist Exposure in Surgical Cases with C-Arms
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Background: Radiographic technologists are involved in many types of medical exams. Technologists are involved in surgical procedures to assist the surgeon with visualization at the surgical site. During these live radiological exams, those involved are exposed to higher levels of radiation. It is important for the technologist to implement the best practices for radiation safety.

Objective: The primary objective was to determine which tube orientation is safest for a technologist during surgical cases. The secondary objective was to determine the difference in exposure values with and without proper shielding.

Methods:
- Control cassette 14X17 at approximate head to chest height
- Tech simulated as standing at right side of C-arm by control panel
- All values calculated with cassette exposed at 75 kVp and 2.5 mA for 30 seconds
- MRI QC ball used to simulate patient and create comparable scatter radiation
- Shield used is .5 mm of lead equivalent placed directly in front of cassette
- S-value of 5000 is minimal exposure value, S-value of 0 is complete saturation
- Tube positions:
  - Tube on top
  - Tube on bottom
  - Tube facing tech
  - Tube facing away from tech

Discussion: Dose to the technologist is usually at the overall highest during fluoroscopy procedures because of the constant radiation exposure. Dose to the tech mainly arises due to scatter radiation coming from the patient.¹² Shielding is the number one way to reduce tech exposure during fluoroscopic procedures.³ The position of the tube varies case to case and with surgeon preferences, and the preferred tube position is not always possible. This experiment demonstrates the tube positions that will expose the tech to the least amount of radiation and also demonstrates the values of shielding.

Conclusion:
Tech dose with shielding is minimal – best practice is to always shield!
AP/PA Projections: Optimal tube position is underneath table, if feasible, for procedure.
Lateral Projections: Optimal tube position is having tube facing tech on opposite side of patient, if feasible, for procedure.
Effectiveness of Fluoroscopy Safeguards in Myelogram Procedures
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Background: Fluoroscopy is a process in which real-time radiographic images are produced onto a display monitor.¹ It’s used for verification of needle placement and contrast studies such as myelograms. One drawback of fluoroscopy is the increased radiation dose to the patient and radiology personnel.² As such, worker protections have been specifically designed for fluoroscopy equipment such as lead drape shields and a Bucky slot shield.³ Theoretically, these protections should reduce exposure to the personnel. We tested the effectiveness of these shields.

Objective: To determine the effectiveness of radiation protection when using the attachable lead curtain shield and the Bucky slot gonadal shield.

Methods: During lumbar myelograms the personnel are in close proximity to the patient and the tower. A hemostat and marker were taped onto CR cassettes to visualize the scatter radiation. A cassette was placed to mimic the position of a radiologist at a 90-degree angle to the patient. Another cassette was placed to mimic the position of the radiologic technologist who was at a 45-degree angle to the right of the radiologist. There were two images taken for each safeguard with and without shielding. The first experiment tested the attachable lead curtain and cassettes were placed to represent thyroid dose. The second experiment tested the Bucky slot cover but the cassette was lowered to represent the gonadal dose. We kept constant factors of SSD, patient density (with a backpack), technique, exposure time, SID, and position of those performing the procedure. The LGM reading from the cassettes was used to determine the exposure received by each person.

Discussion:
• The decrease of scatter radiation to the radiologist with the lead curtain in place had a fairly significant reduction.
• It was unexpected to find the lead curtain provided little protection for the radiologic technologist. However, the position of the technologist is in an area of high exposure and represents an unideal location to stand.³
• There was no significant difference recorded between the exposures with the Bucky slot cover in place and without it in place.
• While the lead curtains provided increased protection for the radiologist, the use of the curtains is often times impractical, especially during sterile procedures such as myelograms.

Conclusion: The extra safeguards for personnel in fluoroscopy vary in their effectiveness of radiation protection. These built in safeguards provide minimal radiation protection. The three principles of time, distance, and shielding should remain the primary strategy of reducing radiation exposure.
Portable X-ray Scatter to Secondary Persons in a Recovery Room
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Radiation safety is of utmost importance when taking a portable x-ray. In a recovery room setting post-operative x-rays are taken after a knee replacement surgery. Oftentimes the room is occupied with more than one person. Nurses and other patients are in the room. When taking AP and Lateral views of the knee secondary persons receive scatter radiation. The amount of scatter was demonstrated with a simulated recovery room. Cassettes were exposed and processed to show enough scatter is received by non-target persons in the room to show an image on the processed cassettes. The effects of scatter radiation can be reduced by making changes to the time, distance, and shielding elements during a portable exam.
Scatter Radiation in a Surgical Setting
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Background: Intraoperative imaging is required during OR cases. Surgeons and OR staff should be aware of the exposure from scatter radiation. Scatter radiation is a secondary type of radiation that occurs when the beam intercepts any object causing some x-rays to become scattered.

Objective: To determine the amount of scatter radiation at different distances when using a C-arm fluoroscopy during a surgical procedure also the use of lead versus non lead use.

Methods:
Step 1: 1 GE OEC 9900 Elite C-arm and monitor was set up with 2 sandbags placed between the tube head and image intensifier to create density. The technique on the C-arm was set to 80 kVp @ 2 mAs.
Step 2: One cassette was placed 1 foot away from the tube head (directly in front of). The second cassette was placed 6 feet away from the tube head (directly behind). The third cassette was placed 6 feet away from the tube head (at a 45 angle). The final cassette was placed in 12 feet away from the tube head (directly behind).
Step 3: The C-arm was left in the AP position. The students took the hand switch and stood behind a lead wall to fluoro for 15 seconds. The cassettes were then removed from the room and processed with an AGFA cassette processor. The LGM value was then obtained.
Step 4: The procedure was repeated, with the addition of 4, .35mm lead aprons draped over the cassettes.
Step 5: The C-arm was moved into a lateral position and the procedure was repeated with no lead aprons.
Step 6: The C-arm was kept in the lateral position and the procedure was repeated, this time the lead aprons were draped over the cassettes.

Discussion: In the medical field employees know the understanding of scatter radiation but proceed to not take the proper precautions to prevent exposure. In a surgery case, people are not aware of the radiation amount used in cases. All surgery cases vary due to the anatomy being exposed and the views needed.

Conclusion: The results from this research were as expected. When someone wears a shield the amount of scatter radiation exposure is less. The farther an individual is from the C-arm also results in less amount of exposure. Whether someone decides to wear a lead apron or not.
The Effect of Shielding in Reducing Patient dose
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Background: Radiation dose can be reduced by following the ALARA principle. The As Low as Reasonably Achievable principle recommend to follow the three safety major.
Time: to use short exposure time
Distance: to keep a distance of at least 6ft from the radiation source
Shielding: to use a recommended 0.5mm of Pb apron for shielding

Objectives: the objective of this experiment was to answer the following question
• Does shielding provide protection from radiation?
• To test the effectiveness of shielding in reducing radiation dose to the patient (scatter/ leakage).
• To compare which apron (shielding methods) is more effective in reducing dose (Wraparound, Apron, Half Apron for chest x-ray )

Methods: Different x-ray exam were taken for different body part and positioning.
First step of this experiment was to establish the relationship between shielding and leakage or scatter radiation.
Determine how effective shielding is against preventing scattered radiation?
Determine how effective shielding is in preventing leakage radiation?

Technique used chest = KVp110, mAs 4, knee =KVp65, mAs 4; Hand KVp 55, mAs 2.5
Exposure LGM#
1st chest 2.56; leakage 1.35
2nd chest 2.59; back scattered 1.76
3rd chest 2.62; shielded cassette 0.8
4th knee 2.47; shielded cassette 0.09; cassette not shielded 0.1
5th hand 1.63; shielded cassette .01; cassette not shielded 0.02

Discussion: The result of the experiment showed the importance of shielding in providing protection against leakage radiation. Since the main source of scattered radiation is the patient, shielding doesn’t provide radiation protection against back scatter radiation but shielding also give peace of mind to the patient by showing how much the technologist care about patient safety.

Conclusion: Shielding not only provide protection to the patient but also it provide radiation protection to the technologist by absorbing the back scatter radiation which comes from the patient. Also shielding brings peace of mind to the patient by showing the technologist care about the patient’s safety. Proper uses of shielding reduces patient’s dose by absorbing the leakage radiation. Shielding also provide radiation protection to the technologist by absorbing scatter radiation which is coming from the patient. Shielding also provide peace of mind to the patient by showing the technologies care about patients safety.
Technologist Dose: Lead and Position Dependent “Where to Stand While Performing a X-ray”
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The relationship between distance from radiograph source and exposure follows the inverse square law; doubling the distance from the source reduces radiation exposure to one-fourth of the original dose. It’s important when positioning oneself to understand that scattered radiation intensity is highest at radiograph beam entrance side of the patient. The technologist should be positioned on the side opposite the tube when possible, and shielded from the primary beam. Aprons are available in one-piece and two-piece vest/skirt options, and have a lead equivalency of 0.25 to 0.5mm.

To determine the amount radiation exposure to technologists with and without lead.
To compare exposure level in regards to four different positions during a lateral chest x-ray.

Five CR cassettes are were deep erased and placed in 4 locations around the Bucky. The 5th cassette was placed inside the Bucky as a control. The 4 locations were based on the patient being the center point. These locations were 90°, 45°, 15°, and all were six feet away. The 4th location was at 90° and 21 inches from the center point.
Each position was exposed with no lead and 0.5 mm of lead. Each position was exposed three times to ensure consistent S-values. All cassettes were the same level as the test subject which was 36 inches and exposed at 120 kVp @ 16 mAs. All cassettes were collected, processed in numerical order. All S-values were recorded for each exposure and position.

S-Value: The lower the number is equivalent to the higher the dose and vice versa. The numbers were averaged from 3 separate exposures. The control group had no lead throughout the entire experiment. This shows the technique remained consistent with low S-values equal to full/ high exposure/radiation levels. Positions 1, 2, and 3 remain constant with lead and vary slightly without lead. Position 4, next to the patient, has the highest technologist dose with and without lead.

This experiment showed an equivalent of how much radiation exposure a technologist could receive when standing in the room or holding a patient at 90° for a lateral chest x-ray with and without lead. Taking the inverse square law into consideration and the recommended distance of six feet had less radiation exposure to the technologist without lead. The technologist had the most protection from scatter radiation. This experiment helped us gain awareness of the exposure we are receiving when performing portables or holding a patient.
Evidence-Based Considerations for Dental Implant Therapy in Patients with Diabetes Mellitus

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Background: Oral implants have become a mainstream treatment for the replacement of missing teeth, even for patients who are medically compromised. According to the Centers for Disease Control and Prevention (CDC) more than 100 million U.S. adults are now living with diabetes or prediabetes. Studies in different populations have demonstrated that diabetes is an important risk factor for tooth loss and edentulism. Moreover, it has been estimated that up to 50% of patients with diabetes lack good glycemic control, having glycated hemoglobin (HbA1c) levels greater than 9.0. Consequently, diabetes is currently classified as a relative contraindication for dental implant treatment.

Purpose: The purpose of this review is to investigate whether dental implant placement in diabetic vs. non-diabetic patients yields any detrimental effects on postoperative complications, peri-implantitis, and implant failure rate.

Method: Given the importance of using evidence as a basis for care, this review critically examines the evidence available for the use of implant therapy for patients with diabetes mellitus. We aimed to answer the PICO question “Do diabetic patients with dental implants have a higher complication rate in comparison to healthy controls?” The following search terms were used: dental implants, diabetes, glycemic control, implant survival and peri-implantitis.

Results: Research indicates the success rate of dental implants in well/fairly controlled diabetic patients ranges between 86-100% and is comparable to non-diabetic patients. Uncontrolled diabetes has been shown to interfere with various aspects of the healing process although, high success rates are achievable when dental implants are placed in diabetic patients whose disease is under control. Additionally, prophylactic antibiotics and the use of 0.12% chlorhexidine improves the success rate.

Conclusion: The potential benefits of implant therapy may be important for diabetic patients in that glycemic control depends in large part on proper dietary management. Oral health and, specifically, functional tooth replacement must be considered in the overall dietary and nutritional management of patients with diabetes. Implant therapy may be an important contributor to diabetic patients’ overall well-being.
Enhancing Oral Healthcare of People Living with HIV/AIDS
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Background: Oral health care is an important component in the medical management of people living with HIV/AIDS (PLWHA). High rates of unmet oral health care needs and low utilization of oral health services have been reported in this population. A poorly functioning dentition can adversely affect quality of life, complicate the management of medical conditions, and exacerbate nutritional and psychosocial problems. HIV-related oral conditions occur in a large proportion of HIV-positive individuals and are frequently misdiagnosed or inadequately treated. The lack of standardization in oral health care for PWLHA results in the absence of reliable, evidence-based information for dental providers treating patients with HIV/AIDS.

Objective: The purpose of this review is to address important clinical considerations helpful in managing the oral healthcare needs of PLWHA.

Method: PubMed, MEDLINE and EBSCOhost databases were electronically searched to identify articles on oral healthcare for PLWHA. The following key terms were used: HIV/AIDS, oral manifestations, oral health and quality of life. Only full-text articles published in English within the last ten years were retrieved.

Results: Candidiasis is the most common opportunistic infection among PLWHA and recurrent infections can be a sign of disease progression. Key predisposing factors for oral lesions include CD4 counts less than 200 cells/mm³ and viral load greater than 3,000 copies/mL. However, current recommendations suggest that no antibiotic premedication is needed based on CD4 count or viral load. Evidence-based research demonstrates that provision of routine dental care, as well as incidence of post-procedural complications for the vast majority of PLWHA is no different than the general patient population. Finally, the addition of a dental case manager (DCM) facilitates access to oral healthcare.

Conclusion: Standardization of care through implementation of evidence-based information facilitates management of oral care. The inclusion of a dental case manager (DCM) as part of a multidisciplinary approach to increasing access to oral health care for PLWHA.
Managing Oral Hygiene Using Threat Reduction Strategies for People Living with Dementia
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Background: Poor oral health has been a persistent problem in long-term care residents for decades, with severe health outcomes. Inadequate oral hygiene is a critical risk factor for aspiration pneumonia because it increases the volume and infectious nature of secretions from the mouth and throat. Older adults with dementia often resist caregiving activities associated with mouth care. Care-resistant behavior (CRB) remains one of the primary reasons for the omission of oral care in people living with dementia. The inclination to hit in response to another’s intimate approach, or to bite down on the toothbrush if it is forced into the mouth, is a natural and justifiable reaction.

Purpose: The purpose of this literature review is to identify strategies that care providers can employ to help prevent/minimize CRBs to oral care, or enable/motivate residents to perform their own oral care.

Method: PubMed, Medline and the Cochrane Library databases were searched for review articles and intervention studies. Key search terms included long-term care, dementia, Alzheimer’s disease, care-resistant behaviors, oral care and interventions. Full text articles published in English within the last ten years were retrieved for critical appraisal and data extraction.

Results: Evidence suggests that shifting the focus of care to the individual, whose concerns often involve their quality of life or the ability to function or care for themselves, may improve health outcomes for people living with dementia. These strategies are multifaceted, and include practices such as establishing rapport; providing care in a calm manner with slow movement, a gentle touch and verbal reassurance; and employing other approaches such as hand-over-hand guidance, gentle massage of the cheek and distraction by singing or talking.

Conclusion: Dental professionals, care providers and family members can implement individualized, patient-centered protocols to either prevent/overcome CRBs to oral care, or enable/motivate residents to perform their own oral care.
Impacting the Quality of Life in Head and Neck Cancer Patients Through Delivery of Evidence-Based Oral Care
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Background: Treatment of head and neck cancer (HNC) affects patients’ general health, mental health, appearance, employment, social functioning, and family interactions, in addition to the recognized effects on upper aerodigestive tract functioning. All treatment modalities for HNC produce oral complications, including surgery (e.g. mutilation and physiologic changes), radiation therapy (e.g. mucositis, dysphagia, xerostomia, osteoradionecrosis), and adjuvant and/or concurrent chemotherapy (e.g. mucositis, taste changes, immune suppression). These oral complications include severe, acute, and long-term problems resulting in difficulties eating, sleeping, talking and an overall reduction in quality of life. Of these, long-term oral health problems consistently rate among the most detrimental to patient quality of life (QoL).

Purpose: The purpose of this literature review is to identify the most effective oral care protocols recommended prior to, during and after HNC therapy.

Method: 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: head and neck cancer, oral cancer, complications, interventions and quality of life.

Results: Identification of risk factors and early onset of symptoms are key to minimizing therapy-associated complications. Use of reliable and widely-accepted indices to evaluate severity of complications facilitates timely and adequate interventions. Eating problems due to xerostomia and poor oropharyngeal functioning and persistent pain are the most prevalent problems that HNC survivors face, resulting in a significant reduction in QoL. Collaboration with other members of the oncology team can optimize oral care, as well as to increase knowledge of preventive and therapeutic options for oral health maintenance.

Conclusion: The effective prevention and treatment of oral complications involves monitoring and care provided by dental professionals throughout all stages of HNC treatment and recovery. Optimum oral health can help prevent or reduce the severity of oral complications associated with HNC therapy.
**Sjögren’s Syndrome: Updated Evidence for Healthcare Providers**

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**Background:** Sjögren’s syndrome (SS) is a systemic autoimmune disease affecting approximately 3 million Americans, primarily perimenopausal women. The syndrome is characterized by dysfunction and destruction of exocrine glands leading to oral and ocular complications. The predominant oral manifestation of SS on the oral cavity is xerostomia. Lack of saliva causes problems in oral function and increases caries risk. Patients with SS often complain that their lips stick together and they have difficulties eating, speaking, chewing and swallowing.

**Purpose:** The purpose of this review is to provide evidence-based guidance on the management of SS for improved patient outcomes.

**Method:** The ClinicalKey, PubMed, EBSCOhost and Cochrane Library databases were searched using the key words Sjögren syndrome, autoimmune disorder, xerostomia, sicca and interprofessional. Only full text articles published in English within the last ten years were retrieved.

**Results:** The management of SS from the perspective of the dental practitioner is that of symptom control and prevention/treatment of oral complications of dry mouth. Based on available evidence, incidence of caries in patients with SS can best be reduced with the use of topical fluoride; all patients with SS should receive fluoride as the first line of therapy. Other preventive strategies considered as adjunctive treatments, include salivary stimulation, antimicrobials such as chlorhexidine, and nonfluoride remineralizing agents. A preventive oral health plan should include meticulous oral hygiene instructions, dietary counseling, a complement of chemotherapeutic agents and more frequent recall care to avoid oral complications and improve quality of life.

**Conclusion:** Due to the aging population and increased use of medications and treatments that cause xerostomia, health professionals are encountering higher numbers of patients with xerostomia and SS than ever before. Dental practitioners play a crucial role in the early diagnosis and management of the oral manifestations of patients with SS.
Oral Management Considerations and Challenges for Patients with Parkinson’s Disease
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Background: Parkinson’s disease (PD) is a progressive neurodegenerative disorder affecting adults in middle and late life. People with PD typically present with motor signs of tremor/involuntary movement (dyskinesia), slow movement (bradykinesia) and muscular rigidity (akinesia). Non-motor and behavioral complications include variations in blood pressure, cardiac dysrhythmias, sleep disturbances, depression and dementia. There is no cure for PD and medications are used exclusively for symptom management. Anticholinergic medications used for neurodegenerative diseases produce multiple adverse effects in the oral cavity including xerostomia, dry throat, glossitis and abnormal taste. Along with adverse effects of medications, the motor and cognitive deficits associated with PD increase the progression of oral disease, impair oral home care regimens and complicate in-office dental care.

Purpose: The purpose of this review is to identify considerations and challenges of oral healthcare for patients with PD.

Method: The following databases were queried: PubMed, MEDLINE and Cochrane Library. Key search terms included Parkinson’s disease, dental management, oral hygiene, oral health and complications. Only full text articles published in English within the past ten years were retrieved.

Results: Patients with PD should be scheduled for short appointments (no longer than 45 minutes) in the morning when symptoms are at a minimum and when their medication is most effective. The peak effectiveness of most PD medications begins within 60 to 90 minutes after administration. Reduced oral muscle control may impair the ability to swish; patient/caregiver should be instructed to either dip the toothbrush in an antimicrobial rinse before and during brushing or use a cotton-tip applicator to swab the oral cavity. Dysphagia and impaired gag reflex increase the risk for aspiration of oral and irrigation fluids, and high-speed evacuation of fluids is important in reducing the risk for aspiration pneumonia. Finally, dental treatment is often hampered by the patient’s inability to keep his or her mouth open, manage saliva, restrict tongue movements and keep his or her head from moving.

Conclusion: Dental professionals who are familiar with the manifestations of the illness and its medical management can confidently offer patients with PD effective and appropriate dental treatment options.
The perceptions of physician assistant students towards opioid MAT training
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Background: The threats posed by the misuse of prescribed opioids has risen significantly in the US since 2000 (1) and drug overdose is currently the leading cause of accidental injury death in the nation (2). There has been a 300\% increase in deaths due to heroin from 2010-2014 (3). In Idaho, there have been similar increases with the overall annual number of drug induced deaths more than doubling from 2000 to 2013 (4,5). Prescription opioids pain relievers were the most frequently mentioned drugs on death certificates (6). Idaho has also experienced an increase in the availability of heroin, leading one newspaper to describe it as a “Heroine Tsunami” (7). These national and local statistics match our clinical experience. Patients reach out for help but are unable to find access to a clinician who can provide medication assisted treatment for opioid addiction.

The Comprehensive Addiction and Recovery Act of 2016 (CARA) expanded access to medication-assisted treatment (MAT) by granting the prescribing authority to Physician Assistants (REF). PAs wanting to help address the crisis by working in addiction medicine and provide MAT for opioid addiction are required to complete 24 hours of continuing education and obtain a waiver to medically manage opioid addiction. In order to increase the number of local providers who were eligible to apply for the waiver, we developed an elective course to help prepare future PAs to provide MAT for opioid addiction.

Purpose: The purpose of the study is determine PA student perceptions towards a hybrid online MAT course.

Methods: At the end of the course, the PA students were required to write a reflective essay about their experience. Researchers reviewed the essays and independently coded for themes. Afterwards consensus codes were determined.

Results: There were 5 themes which emerged: increased knowledge of addiction (83.6\%), MAT therapy (63.9\%), and use of MAT during pregnancy (42.6\%); a major or minor shift in the student’s bias towards people with addictions (88.5\%); and whether or not the student intended to apply for the DEA MAT waiver (maybe = 47.5\% and yes = 29.5\%).

Conclusions: The course was effective in teaching new knowledge, but perhaps the most important outcome was that individuals’ biases were challenged and transformed by a 24 hour educational process. This has important implications for addiction medicine training.
Dietary assessment capturing spice and herb intake: Validation of an online questionnaire
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Background: Consumption of spices and herbs is associated with improved health outcomes. Evidence supports the protective effects of culinary spices and herbs against oxidative damage, inflammation, cancer, infection and neurodegeneration. Many of these protective effects are attributed to the high concentration of beneficial plant-derived compounds called polyphenols in spices and herbs. For example, curcumin, a polyphenolic yellow pigment in turmeric (curry powder), directly interacts with cell molecular targets to upregulate tumor-suppressor genes and inhibit inflammatory signaling pathways. Cinnamon inhibits in-vitro tumor cell proliferation and in-vivo melanoma tumor growth. Short-term human intervention trials demonstrate significant acute benefits of spice and herb intake; however, few reports describe habitual intake of spices and herbs in relation to health outcomes. Since the health benefits of spices and herbs likely result from long-term, consistent intake in small amounts, measuring their consumption requires a dietary assessment tool that is detailed and precise. This study seeks to address the need for a tool that measures spice and herb consumption for the purpose of advancing research linking culinary spices and herbs to health outcomes.

Objective: This study is designed to determine the validity of an online dietary questionnaire that captures measures of spice and herb intake.

Design: This active project is examining the accuracy of a new online dietary questionnaire for measuring spice and herb intake. The questionnaire is a Qualtrics-based survey that collects information on frequency and amount of consumption of 28 spices and herbs over the past month. Using ISU student, staff and faculty volunteers, spice and herb intake measurements from the questionnaire are being validated against those collected using a gold-standard dietary assessment method, 7-day food records. Agreement between the two methods will be determined using Bland-Altman plots, in which good agreement is indicated by >95% of data plots being within two standard deviations of the mean.

Expected results: Findings will determine whether the new questionnaire demonstrates acceptable validity as a measurement tool of spice and herb consumption. A goal is to incorporate the spice and herb questionnaire into an established online diet history survey for research purposes. Information on long-term consumption of bioactive compounds in spices and herbs is expected to expand understanding of diet-health relationships.
Applying the MAP-IT Program Planning Model to a Community Nutrition Fair
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Background: Healthy People (HP) Objectives are national goals developed by health experts founded on evidence-based research. The Objectives are aimed at improving the health of Americans through promotion of chronic disease prevention. The MAP-IT framework was developed by HP as a program planning model to help communities and health professionals successfully plan and implement programs that support HP Objectives.

Purpose/Objective: Multiple HP Objectives address both Nutrition and Weight Status, as research consistently indicates a positive relationship between a healthy diet, normal weight, and chronic disease prevention. Registered Dietitian Nutritionists (RDNs), food and nutrition experts, are health professionals who are well equipped to plan and implement a program aimed at reaching any of the 22 different HP 2020 Nutrition and Weight Status (NWS) Objectives.

The Pocatello Dietitians group, in partnership with students in the Dietetics program at Idaho State University, implemented a nutrition-themed Wellness Fair in 2016. All fair activities were collaboratively planned and implemented by RDNs and dietetic students. Activities were designed to educate community members about the significant impact nutrition has on health, wellness, and the prevention of chronic disease. The fair had over 100 participants and was well received by RDNs, students, and community members. Based on the success of the 2016 fair, the Pocatello Dietitians group applied for and received a grant from the Academy of Nutrition and Dietetics to implement a 2019 Nutrition Fair.

Design: HP 2020 NWS Objectives were used to plan content for activities, and the MAP-IT framework (Mobilize, Assess, Plan, Implement, and Track) was applied to the event program planning process.

The Nutrition Fair is scheduled for Saturday, March 2nd on the ISU campus. The project is a collaboration between RDNs, dietetic students, and dietetic interns. Activities are designed to target NWS Objectives related to Weight Status and Food and Nutrient Consumption among individuals of all ages. Participants will be invited to complete a survey intended to assess the success of the fair at addressing the HP 2020 NWS Objectives.

Results/Conclusion: Data for the Nutrition Fair will be analyzed after the fair and will be available to report on during KDHS Research Day. Due to a successful marketing plan and the incentive of a grand prize worth over $300, event planners anticipate increased participation from the 2016 fair and a significant rate of survey completion.
The Science for Dietary Fiber in the Intervention for Patients with Gastrointestinal Disease Management
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Objectives: Identify the effects of whole-food fiber and/or dietary fiber supplementation on gastrointestinal health and diseases; in order to improve disease prevention and healthcare practices in the nutrition setting.

Data Sources: PubMed, MDPI, and Wiley Online Library were searched from January 2013 to February 2019 for English language studies with adults over 18 years of age and over 10 participants per study. Our search terms included “gastrointestinal disease and fiber”, and “gastrointestinal health outcomes with the additions of fiber.” Five authors conducted primary screening of 16 articles and reached consensus on final six included articles.

Review Methods: Studies that investigated treatment or alleviation of gastrointestinal symptoms were selected. The quality of the studies were determined by looking at study design, study class, statistical analysis, length of study, population size, and number of articles included and identified. The strength of evidence was assessed against Evidence Analysis Library Guideline, Recommendation Rating and Quality Criteria Checklist.

Results: Review of sixteen articles resulted in six publications evaluated. Types of intervention and outcomes investigated included global populations of both adult males and females. Types of studies and reviews consist of randomized control trials, crossover random control studies, single-arm control study, pilot studies, longitudinal studies, cross-sectional studies, cohort and/or case control studies, health studies, meta-analysis studies, and systematic reviews. Mixed results were found from these different studies, however the majority of studies suggested a positive association for fiber intake with gastrointestinal outcomes.

Conclusions: There is insufficient data available to support the efficacy of fiber as an intervention for all cases of gastrointestinal diseases. A theme throughout the articles emphasizes the ability of dietary fiber intake to alter gut microbiome therefore influencing gastrointestinal health. Due to several weaknesses identified in each of the articles related to lack of specific criteria, this research resulted in a weak recommendation rating with a grade III conclusion. As a mean of intervention, the intake of dietary fiber, whether through dietary sources or supplementation, should be tailored to each individual with a gastrointestinal issue.
Vitamin B-12 Status and Cognition in Older Adults
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Background: Current research indicates that vitamin B-12 deficiency causes neurological and cognitive delay that may improve with B-12 supplementation, but the health impact of moderately low or adequate B-12 nutrition status is unclear. There is little evidence indicating that vitamin B-12 supplementation impacts cognitive function in elderly with moderately low or adequate B-12 levels. Holotranscobalamin and serum B-12 complex are chemical indicators used in assessing B-12 status.

Purpose/Objective/Hypothesis: The purpose of these studies were to analyze the serum levels of B-12, holotranscobalamin and/or homocysteine and their effects on cognition and/or motor function of older adults. The various studies analyzed the effect of vitamin B-12 supplementation on healthy older adults and hypothesized that increased serum levels of B-12 and holotranscobalamin, and/or decreased homocysteine levels would improve cognition and motor function.

Design/Methods/Scope: The 6 studies included in this review consisted of 3 randomized control trials, 1 cohort study, 1 cross-sectional analysis and 1 secondary analysis. The 3 randomized control trials involved B12 supplementation, while the cohort study involved analyzed blood levels of B-12 in participants, and the cross-sectional/secondary analysis re-analyzed data from previously done studies. The majority of these studies analyzed cognitive function tests to assess the participants B-12’s level on cognition, while the cross-sectional analysis tested B-12 levels effect on electrophysiological indexes of neurological function.

Results: Of the 6 studies included in this review, 1 cohort study showed a significantly faster cognitive decline with lower holotranscobalamin status over 10 years. One study showed a statistically significant improvement in cognitive status with vitamin B-12 supplementation. Another study found increased serum vitamin B-12 and holotranscobalamin with vitamin B-12 supplementation, but no evidence of an effect on cognitive function. An additional 3 studies showed little to no association between cognitive function and vitamin B-12 supplementation or different measures of vitamin B-12 status.

Conclusion(s): There current evidence is weak to suggest that supplementing vitamin B-12 improves cognitive function in healthy older adults. The six studies examined holotranscobalamin, homocysteine, and cognitive tests to determine if vitamin B-12 supplements improve cognitive function in healthy older adults. One study showed serum B-12 levels decline with age. Four studies showed no improvement to cognitive function with B-12 supplementation, while one did. Further research is needed to determine if vitamin B-12 has an impact on cognition in older adults.