with X-rays, process the data, and determine the structure of protein and AI. RESULTS/ANTICIPATED RESULTS: We anticipate finding the structure of the CqsR CACHE domain to a high resolution in addition to the identity of its autoinducer. Previous results found that the structure is homologous to another V. cholerae chemoreceptor, Mlp37, and we expect the results from this project to confirm this. In addition, we know that the autoinducer weighs approximately 62 daltons, the same as the known ligand, ethanolamine. Given that CACHE domains bind specifically to their ligands, we anticipate that the autoinducer will be structurally similar to ethanolamine. DISCUSSION/SIGNIFICANCE: The results will reveal the structure of the CqsR CACHE domain and its autoinducer. This knowledge will better allow researchers to treat cholera, as both autoinducer identity and receptor conformational changes will be uncovered, allowing for drug development to inhibit cell growth.

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The Aging Exposome: Characterizing Bidirectional Effects of Exposures and Aging

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OBJECTIVES/GOALS: The objective of this study is to synthetically generate and use records of exposure, and so that we can understand the effects of exposure on aging and vice-versa. METHODS/STUDY POPULATION: Quantifying bidirectional effects of environment and aging requires time series of data from all contributing exposures which can span endogenous processes within the body, biological responses of adaptation to environment, and socio-behavioral factors. Gaps in measured data may need to be filled with computationally modeled data. Essentially, the challenge in generating aging exposome is the absence of readily available records for individuals over the course of their life. Instead, these would need to be assimilated from historic person reported data (e.g. residential location, durations, behaviors) along with publically available data. This could lead to potential gaps and uncertainties that would need inform on how the exposomic records can be used for aging research. RESULTS/ANTICIPATED RESULTS: We present a pragmatic approach to generation of longitudinal exposomic and aging records as required for different study archetypes. Such records can then be used to understand the bidirectional effects of exposures and aging. DISCUSSION/SIGNIFICANCE: Effects of a lifetime of environmental and lifestyle exposures on aging or age-associated diseases are not well understood. Characterizing differential, additive and intense sporadic multi-agent exposures require advanced big data and artificial intelligence methods.

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The Prospective Geriatric Patient Reported Outcomes (GERI-PRO) Study: Understanding Post- Traumatic Injury Recovery from the Patient's Perspective

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OBJECTIVES/GOALS: Patient reported outcomes (PROs) provide unique insight to the patients experience with their healthcare related quality of life QoL. This study aims to 1. Characterize geriatric trauma patients'(GTPs) perceived QoL, at time of injury vs. 3- and 6-months post-injury. 2. Introduce and validate a PROs tool, known as the Five Favorite Activities. METHODS/STUDY POPULATION: This is a prospective cohort study of older adults (≥65) presenting to our trauma center with mild traumatic brain injury and/or mild spine, thoracic or extremity fractures. Participants will be asked to complete the NIH-validated Patient-Reported Outcome Measure Information System (PROMIS)-29, PROMIS Cognitive and Functional Abilities, Life-Space Levels and Five Favorite Activities assessment (a list of the five favorite overall and daily activities) tools. Cognitive function will be measured using Montreal Cognitive Assessment tool. Physical function will be evaluated using the Activity Measure for Post-Acute Care 6-click tool. Patients will be contacted at 3- and 6- months post discharge and asked to complete the assessment tools listed above to evaluate changes in QoL during the recovery process. RESULTS/ANTICIPATED RESULTS: We hypothesize that geriatric trauma patients will experience a decline in QoL, physical and cognitive function post-injury. This decline will be associated with a decrease in return to the ability to participate in their pre-injury Five Favorite Activities . DISCUSSION/SIGNIFICANCE: First, this study is one of the first to evaluate PROMs in GTPs. Second, the Five Favorite Activities PROM, will provide a unique, direct and individualized characterization of what GTPs find important to their recovery post injury compared to the current generic PROMs. This information can be utilized in the future to align goal of care with expectations

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Topical adenosine treatment inhibits inflammation and mucus production in viral acute rhinosinusitis

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OBJECTIVES/GOALS: Viral acute rhinosinusitis (ARS), a.k.a, the common cold, affects millions every year. The symptoms caused by viral ARS dramatically affect the general well-being and functional levels of patients, causing work and school absence, and antibiotic abuse. In this study, we examined the therapeutic potential of topical adenosine in viral ARS METHODS/STUDY POPULATION: Rhinosinusitis was induced in WT and adenosine receptor (AR) knockout mice by respiratory syncytial virus (RSV) infection in the upper airways. Mice were subjected to adenosine or vehicle control within the sinuses. Adenosine receptor expression, inflammatory cytokine expression, and histologic mucus and inflammation score was assessed. The effect of endogenous adenosine accumulation within the sino-nasal tract was assessed in adenosine deaminase knockout (ADA-/-) mice. RESULTS/ANTICIPATED RESULTS: Topical administration of adenosine significantly inhibited the expression of pro-inflammatory cytokines, mucus production, and cell damage in the nose of mice with viral ARS, without prolonging virus clearance. This inhibitory effect was primarily mediated by the A2A adenosine receptor (AR). We also examined and compared the

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expression of ARs in the nasal tissue, trachea, and lungs. The nasal tissue exhibited the lowest baseline expression of ARs as compared to the lung and trachea which was further downregulated following adenosine treatment. Additionally, accumulation of endogenous adenosine in ADA-/- mice showed no signs of inflammation within the nasal tissue. Together, we demonstrated that topical adenosine effectively decreased inflammation and mucus production in a mouse model of viral ARS. DISCUSSION/SIGNIFICANCE: Previously, we found that topical adenosine dramatically enhances mucociliary clearance in the nose and sinuses. In this study, we found that nasal topical adenosine effectively decreased inflammation and mucus production in viral ARS. Our data suggest that nasal topical adenosine is an effective topical therapeutic option for viral ARS.

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Use of Implementation Science to Identify Implementation Determinants of Chronic Obstructive Pulmonary Disease Practice Guidelines

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OBJECTIVES/GOALS: COPD is a progressive airways disease that results in death or disability. There is poor uptake of clinical guidelines (CPG) to manage COPD and studies to bridge this implementation gap have shown inconsistent results. Using implementation science principles we aim to understand COPD-CPG implementation determinants from providers'perspective. METHODS/STUDY POPULATION: The study is being conducted in ten VA Primary Care Clinics. Guided by the Consolidated Framework for Implementation Research (CFIR), a conceptual framework developed to guide systematic assessment of multilevel implementation contexts, we are using semi-structured guides to conduct key informant qualitative interviews (physicians, physician extenders and nurses), to support a formative evaluation. CFIR domains relevant to the study were determined by a multidisciplinary team. Informants are identified through online outreach and voluntary participation. Sampling adequacy will be assessed by achievement of code saturation. A qualitative template analysis will be used to summarize the barriers and facilitators of each component of COPD-CPG organized by CFIR-domain. RESULTS/ANTICIPATED RESULTS: We anticipate a list of modifiable and non-modifiable contextual, recipient (provider and patient), and COPD CPG content (innovation) barriers to implementation. Many settings do not have critical elements of these CPG, such as a standardized inhaler education/assessment pathway, patient education material, or pulmonary rehabilitation referral pathway. Existing literature indicate reasons behind the insufficient uptake of COPD CPG include low familiarity with guidelines, perception of minimal value of guidelines by physicians, and time constraints; we will present contextual, recipient and innovation determinants specific to our setting. DISCUSSION/SIGNIFICANCE: This comprehensive assessment of barriers and facilitators to COPD-CPG will inform tool development and implementation strategies identification to improve COPD CPG uptake. COPD is the most common veteran lung disease. Improvement in COPD care has enormous potential for benefit for local veterans, as well as potential for wider dissemination.

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A Study of Cortical Thickness in Bilingual Children with Reading Disability (Dyslexia)*

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OBJECTIVES/GOALS: Dyslexia is a common Reading Disability (RD) affecting 7-12% of the population and is associated with less cortical thickness (CT) in bilateral brain regions. However, the interaction between RD and a bilingual experience on CT is unknown, even though bilingualism is also associated with altered CT. METHODS/STUDY POPULATION: We studied 48 Bilinguals assigned to the Typical Reader group based on Oral Reading Recognition Test (ORRT) scores above 90 (avg=107 ± 14), 47 Bilinguals assigned to the RD group based on ORRT scores below 85 (avg=77 ± 5), 45 English Monolingual Typical Readers with ORRT scores above 90 (avg=102 ± 13) and 47 Monolinguals with RD based on ORRT scores below 85 (avg=78 ± 5). Participants (all from the Adolescent Brain & Cognitive Development Study) were 11.9 ± 0.7 years of age and the 4 groups were matched for sex, self-ratings of English, nonverbal reasoning, and combined household income. Structural magnetic resonance images were analyzed using CAT12 and all four groups were entered into a factorial analysis. RESULTS/ANTICIPATED RESULTS: Surprisingly, the main effect of Reading Ability did not reveal any regions where RD manifested less CT than Controls (raising the possibility that the findings from the only two prior reports were due to small samples). The main effect of Language Background revealed less CT in bilinguals in bilateral perisylvian regions (inferior frontal gyri, superior temporal gyri, and left Heschl's gyrus) consistent with prior reports. There was no interaction of Reading Ability by Language Background. Taken together, we found no differences in CT in those with RD relative to Typical readers and no evidence that the dual language experience affected this result in any way. DISCUSSION/SIGNIFICANCE: The lack of interaction between Reading Ability and Language Background indicates that a dual-language experience does not affect CT differently in those with RD and reduces concerns that RD in those who are bilingual needs to be given separate consideration in studies of CT neuroanatomy.

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AMG487, A CXCR3 Antagonist, changes the Inflammatory Milieu in Familial Hemophagocytic Lymphohistiocytosis (FHL) Hepatitis

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OBJECTIVES/GOALS: Familial Hemophagocytic Lymphohistiocytosis (FHL) is a systemic inflammatory disease, causing acute liver failure (ALF). Elevated Interferon gamma (IFN-γ) results in increased hepatic transcription of the chemokines CXCL9 and

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