

data warehouses to deliver EHR data provides a valuable tool for completing retrospective precision medicine projects. The validation of definitions for clinical outcomes identifiable retrospectively are necessary and provide novel guidance for future studies.

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### Decreasing Inappropriate STAT Image Ordering

Michael Cui<sup>1</sup>, Jonathan Chung<sup>1</sup>, Pritesh Patel<sup>1</sup>, and Ingrid Reiser<sup>1</sup>  
<sup>1</sup>University of Chicago

**OBJECTIVES/GOALS:** Currently physicians are able to order CT Chest/Abd/Pelvis images as STAT or Routine. STAT images denote an emergency and are done immediately. We aim to determine the percentage of CT images that are inappropriately ordered as STAT, determine physician image ordering habits, and develop targeted interventions to encourage appropriate STAT image ordering. **METHODS/STUDY POPULATION:** A fishbone diagram helped reveal possible causes of inappropriate STAT image ordering. Based on the fishbone diagram, a survey was created to assess CT image ordering habits amongst radiology and internal medicine residents and attending physicians. All CT Chest/Abd/Pelvis images ordered over a 3 month period of time (July-Oct 2017) was obtained. The dataset included whether the image was ordered Stat vs Routine, time of image order, physician name and location, and reason for the imaging study. The STAT images were evaluated based on the explanation provided in the CT image order. Currently 2 radiology residents, 2 internal medicine residents, and 2 internal medicine hospitalists are evaluating all STAT CT images to determine appropriateness and how long they are willing to wait for the image to result in a read. **RESULTS/ANTICIPATED RESULTS:** Analysis of all CT Chest/Abd/Pelvis imaging orders revealed that 51% (1710/3345) of them were ordered as STAT. The preliminary analysis of 227 STAT images showed that 6% were inappropriate. We anticipate results of our survey to show differences in how long a STAT vs Routine image orders should take amongst Radiology and Internal Medicine clinicians. We also anticipate our survey to show differences in factors that warrant STAT imaging amongst the different medical fields. We anticipate that the clinician manual evaluation of all STAT CT image will reveal a large percentage of imaging orders to be inappropriate. All STAT imaging that were flagged as inappropriate will be characterized by the department who ordered the image and the reason provided for the imaging to assess for common themes. **DISCUSSION/SIGNIFICANCE OF IMPACT:** STAT images are the new routine with more images ordered STAT than Routine. Inappropriate STAT imaging results in truly urgent patients not getting the medical care they need. Many images ordered stat could potentially be switched to routine. By evaluating why clinicians are ordering STAT CT image inappropriately, we will be able to develop targeted interventions to decrease inappropriate STAT CT imaging.

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### Defining the relationship between kidney structure and function in patients with and without diabetes and hypertension

Ghazal Zekavat Quinn<sup>1</sup>, Matthew Palmer<sup>1</sup>, Jordana Cohen<sup>1</sup>, Xin Sheng<sup>1</sup>, and Katalin Susztak<sup>1</sup>

<sup>1</sup>University of Pennsylvania School of Medicine

**OBJECTIVES/GOALS:** Histopathological descriptions of kidney tissue provide more information about kidney disease severity and

prognosis than serum measures, yet most patients with chronic kidney disease do not undergo kidney biopsy. We aim to develop a method to determine the degree of renal injury in patients with diabetes and hypertension without the need for biopsy. **METHODS/STUDY POPULATION:** Clinical data and renal tissue samples were collected from 864 patients undergoing tumor-associated nephrectomy in seven medical centers in the United States. Exclusion criteria included age < 18, presence of pyelonephritis or non-diabetic or hypertensive renal disease or incomplete clinical or histopathologic data. 19 histologic parameters were scored in a blinded manner by one renal pathologist. We examined the relationship between and functional variables (such as estimated glomerular filtration rate (eGFR)). Polynomial regression analysis was performed to model histopathologic variables and important clinical parameters such as eGFR. **RESULTS/ANTICIPATED RESULTS:** 607 samples met inclusion criteria and were stratified as: control (no history of diabetes or hypertension, n = 160), hypertension alone (n = 224) and both diabetes and hypertension (n = 223). Interstitial fibrosis (IF) and glomerulosclerosis (GS) had the strongest correlations with eGFR. Regression analysis was used to model histopathologic score for a given eGFR. We found that diabetes and hypertension modified the relationship between tubulointerstitial fibrosis and eGFR. For example, while hypertensive patients without diabetes had 33% IF at an eGFR of 30 ml/min/1.73m<sup>2</sup> (r<sup>2</sup> = 0.64, p<0.01), hypertensive patients with diabetes had 32% IF at an eGFR of 30 ml/min/1.73m<sup>2</sup> (r<sup>2</sup> = .43, p<0.01) and control patients had approximately 23% IF at an eGFR of 30 ml/min/1.73m<sup>2</sup> (r<sup>2</sup> = 0.22, p<0.01). **DISCUSSION/SIGNIFICANCE OF IMPACT:** Here, we describe the relationship between renal structural changes and renal function and show that hypertension significantly modifies the relationship at a given eGFR. These data can be used to reasonably predict renal structural changes given clinical information without the need for renal biopsy and may provide prognostic value.

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### Discrepancies in flavor preferences among adult ever users of various tobacco products in the US – Findings from The Population Assessment of Tobacco and Health Study (2015-2016)

Liane M Schneller<sup>1</sup>, Dongmei Li<sup>1</sup>, Zahira Quiñones-Tavárez<sup>1</sup>, Maciej Goniewicz<sup>1</sup>, Amanda Quisenberry<sup>1</sup>, Zidian Xie<sup>1</sup>, Irfan Rahman<sup>1</sup>, Scott McIntosh<sup>1</sup>, Richard O'Connor<sup>1</sup>, and Deborah J. Ossi<sup>1</sup>, PhD<sup>1</sup>  
<sup>1</sup>University of Rochester Medical Center

**OBJECTIVES/GOALS:** Flavorings differ between brands and tobacco products, potentially altering the sensory perceptions. This study aimed to examine discrepancies in flavor preference across various non-cigarette tobacco products among a national representative sample of US adult regular tobacco users. **METHODS/STUDY POPULATION:** Data from the Population Assessment of Tobacco and Health (PATH) Study Wave 3 (W3) were used. Weighted prevalence of flavor preference for various tobacco products, including electronic nicotine delivery systems (ENDS), traditional cigars, cigarillos/filtered cigars, hookah and snus/smokeless, was presented for 9,037 adult current and new former users of multiple flavored tobacco products. Within-subject flavor discrepancies were assessed using generalized estimating equations (GEE) models considering the complex sampling design of the PATH study. **RESULTS/ANTICIPATED RESULTS:** Most regular users of a flavored tobacco products reported using one flavor category per product. Fruit flavors, followed by tobacco, were the most common flavor categories among ENDS

(32% and 25%, respectively) and hookah users (44% and 36%, respectively). Tobacco flavor was the most common among regular users of traditional cigars (80%), cigarillos/filtered cigars (55%), and smokeless tobacco (79%). Poly tobacco users of ENDS and traditional cigars had the largest discrepancy, where about 68-76% used different flavor categories when switching products. Conversely, poly tobacco users of traditional cigars and cigarillos/filtered cigars had the lowest discrepancy (23-25%). **DISCUSSION/SIGNIFICANCE OF IMPACT:** Many consumers of multiple tobacco products had different flavor preferences when switching between products. In the event of a partial or full flavor ban for ENDS, these findings raise questions about consumer loyalty to a particular tobacco product or a particular flavor category. **Conflict of Interest Description:** MLG serves as a paid consultant for Johnson & Johnson and has received research grant from Pfizer, manufacturers of smoking cessation medications. The other authors have no conflicts to declare. **CONFLICT OF INTEREST DESCRIPTION:** MLG serves as a paid consultant for Johnson & Johnson and has received research grant from Pfizer, manufacturers of smoking cessation medications. The other authors have no conflicts to declare.

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### Effects of Injectable, Erythropoietin and Glucocorticoids Combinational Therapy on Erythrocyte Sedimentation Rate Following Spinal Cord Injury

Anna Nia<sup>1</sup>, Kamil Khanipov<sup>1</sup>, and George Golovko<sup>1</sup>

<sup>1</sup>University of Texas Medical Branch

**OBJECTIVES/GOALS:** Inflammation following traumatic injury to the spinal cord persists long after the primary insult and is known to increase complication rates and prolong recovery time. We investigated the effects of Erythropoietin (EPO) in combination with Glucocorticoids on the levels of erythrocyte sedimentation rate (ESR), an overall measure of inflammation. **METHODS/STUDY POPULATION:** Electronic medical records from approximately 38 million patients in 27 Healthcare Organizations were analyzed using the TriNetX Analytics platform. Patients with spinal cord injuries (SCI) were defined with the ICD-10 code, G95 and two unique cohorts were defined for patients treated with injectable EPO in combination with injectable Glucocorticoids within 6 months of SCI or only injectable Glucocorticoids with no injectable EPO. ESR rates were queried from patient cohorts to evaluate the potential effects of the two treatment pathways on the ESR. Most recent lab results within 6 months before initiating treatment and 1-year post-treatment were defined as "before" and "after" treatment, respectively. Changes in ESR lab results were evaluated using unpaired t-test with Welch's Correction. **RESULTS/ANTICIPATED RESULTS:** A total of 14,370 patients satisfied the inclusion criteria. 89 patients were treated with injectable EPO in combination with Glucocorticoids within 6 months of SCI. The ESR lab results were available for 33 patients before treatment with a mean of 63±33 mm/h. The ESR lab results were available for 22 patients after treatment with a mean of 51.7±34.1 mm/h. 14,281 patients were treated with Glucocorticoids (no injectable EPO) within 6 months of SCI. The ESR lab results were available for 2,042 patients before treatment with a mean of 29.2±30.5 mm/h. The ESR lab results were available for 2,184 patients after treatment with a mean of 32.6±30 mm/h. Patients treated with combinational therapy showed a reduction in ESR of 11.3 mm/h, while those treated with only Glucocorticoids showed an increase in ESR of 3.4 mm/h. **DISCUSSION/SIGNIFICANCE OF IMPACT:** The present results demonstrated that combinational therapy with injectable, EPO and glucocorticoids exhibited a significant reduction in ESR level. The study suggests that EPO

and glucocorticoid might have a synergistic effect on reducing the inflammation following SCI. This approach might help reduce the therapeutic dose of glucocorticoids. **Conflict of Interest Description:** The authors declare that they have no competing interests. **CONFLICT OF INTEREST DESCRIPTION:** The authors declare that they have no competing interests.

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### Estimates of Dose Response using the Dixon Up-and-Down Method and BOIN study designs

Charles Gene Minard<sup>1</sup>

<sup>1</sup>Baylor College of Medicine

**OBJECTIVES/GOALS:** The Dixon up-and-down method (U/D), originally developed for testing explosives, is especially common in anesthesia research studies. The objective of this research is to compare the performance of the U/D method for obtaining and analyzing sensitivity data with that of the Bayesian Optimal Interval (BOIN) method. **METHODS/STUDY POPULATION:** A simulation study will compare the performance of the U/D method with the BOIN design. The two study designs offer alternative decision-making algorithms with respect to the dose at which the next experimental unit is treated. These alternative decisions may impact the precision of point estimates of the mean and standard deviation of the effective dose to elicit a response. Transition probability matrices are developed, and maximum likelihood estimates of the unknown parameters assessed for accuracy. For simulation, the effective dose is assumed to be randomly distributed with a known mean and standard deviation. Fixed dose levels are defined, and decisions for what level the next experimental unit should be treated at are defined by the Dixon up-and-down method and the BOIN design. For the U/D method, the stimulus is increased by one level in the absence of a response or decreased if a response occurs from an initial stimulus. A target toxicity probability of 0.50 is used to define the dose escalation or de-escalation rules for the application of the BOIN design. **RESULTS/ANTICIPATED RESULTS:** A feature of both methods is that the consecutive observations are concentrated about the mean value of the effective dose. However, the BOIN design tends to be more concentrated between these two dose levels. In the presence of severe adverse events, the BOIN design can choose to eliminate doses that are too toxic whereas the U/D design cannot eliminate any dose levels. Transition probability matrices are defined and parameters for the distribution of the effective dose are estimated using maximum likelihood estimation. Mean squared errors for the estimated mean and standard deviations compare the two study designs. **DISCUSSION/SIGNIFICANCE OF IMPACT:** The BOIN design offers an alternative method for decision-making compared with the U/D method. The BOIN design tends to concentrate dose levels about the mean more than the U/D. This may provide better estimates of the mean and standard deviation of the effective dose for eliciting a response in some circumstances.

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### Harnessing the Power of the Electronic Medical Record in Interstitial Lung Disease

Erica Farrand<sup>1</sup>, Eric Vittinghoff<sup>1</sup>, and Harold Collard<sup>1</sup>

<sup>1</sup>University Of California, San Francisco

**OBJECTIVES/GOALS:** Harnessing the EHR to support clinical research is critical for the study of rare diseases such as interstitial lung disease (ILD). However no studies have compared EHR and