

1. Identify the most important elements in managing post-operative pain
2. Identify the most informative procedure or population-based targets to focus collection of additional, labor-intensive detail surrounding adequacy of pain control (i.e., Patient Reported Outcome Measures (PROMs)).

METHODS/STUDY POPULATION: Our study population includes all children, ages 1-18 years, captured in the National Surgical Quality Improvement Project-Pediatric (NSQIP-P) from 2019 to 2021. We plan to apply statistical (regression modeling) and DSD methods to accomplish the aims listed above. **RESULTS/ANTICIPATED RESULTS:** For Aim 1, we expect to identify patient, procedure, and perioperative pain management practices that influence postoperative pain. For Aim 2, we will focus on outcomes such as PROMs that are challenging to obtain. By applying DSD methods, we will identify specific procedure and/or population-based cohorts to capture PROMs and decrease data collection burdens, while maintaining power, as the project is scaled nationally to all of NSQIP-P. **DISCUSSION/SIGNIFICANCE OF IMPACT:** Data from this study will inform expansion of NSQIP-P to collect novel outcomes of clinical and societal importance without prohibitively increasing data collection burden.

4066

In Teenagers Who Smoke Cigarettes Are Nicotine Patches as Compared to Placebo Effective to Decrease the Number of Cigarettes Smoked? – A Systematic Review

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OBJECTIVES/GOALS: The aim was to examine whether nicotine patch was more effective in encouraging abstinence from cigarettes smoking compared to placebo. **METHODS/STUDY POPULATION:** Randomized controlled trials involving the general teenage age group smokers who were current smokers-“smoked less than 100 cigarettes over their lifetime and smoked at the time of the interview. Databases were searched for relevant studies reported in English that employed a randomized design published since 2000. Two authors extracted data and assessed quality. The primary outcomes and prioritization were continuous abstinence at 3, 6 and 12-month follow-up or more for the number of patients who responded to treatment, defined as a reduction/abstinence. Heterogeneity between studies did not preclude combined analyses of the data. **RESULTS/ANTICIPATED RESULTS:** 4 of 266 publications were included. Four studies reported positive effects on smoking cessation at end of treatment: (1) nicotine patches improved continuous abstinence at 6 weeks – 9 weeks months; (2) nicotine patch improved continuous abstinence at 3 to 6 months; (3) nicotine patches improved continuous abstinence 6 and 12 months; (4) nicotine patches improved continuous abstinence at 6 months – 12 and 24 months (5). All studies showed, continuous abstinence at follow up differed in percentage between groups both at 6 weeks through 24 months, with NRT (Nicotine patch) intervention groups achieving higher rates in most of the studies compared to placebo intervention group. **Conclusions:** NRT intervention methods seem to increase smoking abstinence in those treated for smoking cessation. Further and larger sample size studies are required to make stronger the base of evidence. **DISCUSSION/SIGNIFICANCE OF IMPACT:** Four

randomized controlled trials investigating the effectiveness of smoking cessation interventions, for teenagers who smoke cigarettes were identified for inclusion in this review. Four of the studies reported significant effects on smoking cessation, providing evidence of effectiveness of NRT (nicotine patch), behavioral support and combinations of the two, although not all trials intervention treatments found an effect. The four studies reported important intervention effects at both the short and long follow-ups required: 6 weeks up to the 24 months, thereby, providing stronger evidence to support the effectiveness of NRT intervention on smoking cessation. All studies showed some evidence of improved smoking abstinence outcomes. The four studies had in common that the smoking cessation interventions provided a combination of intent to treat prevention, and of all the clinical trials none of them suggested a negative effect of smoking cessation treatment on substance use outcomes using NRT. However, the studies used reliable methods and reported their cases properly, but the small number of studies reviewed for the systematic review makes the conclusion about the effectiveness of these interventions uncertain. The papers visibly stated how the trials protected against bias, as indicated by the Yes (low risk). No (high risk) and U as “unclear risk.” All four studies conducted a random sequence generation of participants enrolled into the study sample.

4021

Learning from Patient Experience to Improve Diagnosis: a Pilot Study

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OBJECTIVES/GOALS: Leveraging Patient’s Experience to improve Diagnosis (LEAPED) is our proposed method of measuring diagnostic error through seeking patient feedback on their understanding of their diagnosis and health status following emergency department discharge. To pilot test LEAPED’s feasibility, we deployed and determined patient uptake of LEAPED. **METHODS/STUDY POPULATION:** To test LEAPED, we employed a longitudinal cohort study design at emergency departments across one academic health system in the Mid-Atlantic region. Patients consented to complete questionnaires regarding their understanding of their diagnosis and/or follow-up steps and their health status at 2 weeks, 1 month, and 3 months following emergency department discharge. People aged 18 and older who were seen at the emergency department within the past 7 days with at least one chronic condition (hypertension, diabetes, history of stroke, arthritis, cancer, heart disease, osteoporosis, depression, and/or chronic obstructive lung disease) and one or more of the following common chief complaints: chest pain, upper back pain, abdominal pain, shortness of breath/cough, dizziness, and headache were eligible to join the study. **RESULTS/ANTICIPATED RESULTS:** Of those enrolled (n = 59), 95% (n = 53) responded to the two week post-ED discharge questionnaire (1 and 3-month ongoing). Of the 6 non-responders, 1 had died and 3 were hospitalized at two weeks. The average age was 50 years (SD 16) and 64% were female. Over half of participants (53%) were white and 41% were black. Almost one-third (27%) reported they were not given an explanation of their health problem on leaving the ED, and of those, a third did not have an understanding of what steps to take after leaving the ED. Participants reported a new health problem was identified after ED discharge (19%), worsening health status (12%), and health status stayed the same (16%). **DISCUSSION/**

SIGNIFICANCE OF IMPACT: Patient uptake of LEAPED was high, which suggests that patient-report is a feasible method of evaluating diagnostic decision making and delivery to patients and yields insightful information beyond administrative data. The next steps are to validate the accuracy of patient-reported diagnostic error by comparing with administrative data.

4077

Listening with the HEAR-QL: Quality of Life in Children with Hearing Loss

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OBJECTIVES/GOALS: This study evaluates the utility of self-reported quality of life measure in children with hearing loss. We will compare self-reported HEAR-QL scores with parent-reported HEAR-QL scores. We will then test the relationship between HEAR-QL scores and scores on a standardized assessment of cognition, the NIH Cognition Battery. **METHODS/STUDY POPULATION:** We will administer the HEAR-QL questionnaire to children with hearing loss and their parents. We will then administer the NIH Cognition Battery to the child. We will include in our population children ages 7 to 14 with hearing loss of any severity or side. We will exclude those with intellectual disability, disorders of speech or language, or those who would be unable to complete the questionnaires for any reason. Children will be recruited from Otolaryngology clinics at St. Louis Children's Hospital based on ICD diagnosis of sensorineural hearing loss between 01/2015 – 03/2020. **RESULTS/ANTICIPATED RESULTS:** We will aim to recruit 44 patients in total, which is the sample size needed to detect a moderate correlation ($r=0.4$) with a 1-sided $\alpha=0.05$ and $1-\beta=0.8$. HEAR-QL scores and NIH Cognition Battery scores will be reported using descriptive statistics. Linear regression as well as correlation analysis between HEAR-QL scores and cognitive testing scores will be performed using a 1-sided $\alpha=0.05$, with $1-\beta=0.8$. If recruitment is sufficient, we will adjust for demographics that are significantly correlated with the outcome on multivariate analysis. Finally, we will test for agreement between parent report and child report by calculating a Kappa statistic. **DISCUSSION/SIGNIFICANCE OF IMPACT:** There is little clarity on the necessity of amplification in children with hearing loss, yet the child's perspective is not routinely assessed in clinical practice. This study employs self-report in a pediatric population with hearing loss to find out if children provide new and reliable information.

4221

Lower Serum TWEAK Concentration is a Biomarker for Mortality in Community Acquired Pneumonia

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OBJECTIVES/GOALS: To determine the relationship among serum concentration of tumor necrosis factor (TNF)-like weak inducer of

apoptosis (TWEAK) and mortality in community-acquired pneumonia (CAP) patients. **METHODS/STUDY POPULATION:** This is a multicenter 2-year cohort study in Spain, designed to better understand the role of sTWEAK concentrations in CAP patients. CAP patients were prospectively enrolled in two University hospitals and sTWEAK was measured within the first 24 hours of ICU admission. Samples were collected and stored for laboratory analyses. To detect sTWEAK in human samples, we used a commercially available ELISA kit following manufacturer's instructions. Demographic patients' characteristics and ICU mortality were prospectively collected. Descriptive statistics and logistical regressions were used to assess the proposed aims. **RESULTS/ANTICIPATED RESULTS:** A total of forty-three patients were included in the study (10 healthy users, 10 uninfected controls and 23 CAP patients). In comparison to healthy volunteers, patients admitted to the hospital (both, infected and non-infected) had lower level of sTWEAK. During hospital admission, 7 (17%) patients died. Patients whom died during ICU stay due to CAP, had significantly lower levels of sTWEAK when comparing with patients whom survived (Median [IQR]; 509.35 [357.49, 953.92] Vs 1103.03 [716.93, 1663.16]; $p=0.015$). In contrast, patients that developed shock did not have different concentrations of sTWEAK (Median [IQR]; 1008.04 [531.87, 1390.80] Vs 1062.29 [575.24, 1598.83], $p=0.84$). **DISCUSSION/SIGNIFICANCE OF IMPACT:** Community-acquired pneumonia (CAP) is the first cause of death in underdeveloped countries. CAP is a pulmonary infection that creates a proinflammatory environment not just locally but also systemically, secondary to upregulation of molecular cascades with a wide variety of proteins being released perpetuating this inflammation and tissue damage. Several of these molecules have been described and linked to a greater risk of inhospital complications, longer length of hospital stay and mortality. TNF-like weak inducer of apoptosis (TWEAK) is a member of the TNF-alpha superfamily, involved in immune response, cell growth, angiogenesis, NF-kB activation and apoptosis induction in tumor cells. It is known that serum-TWEAK plays a role in inflammatory processes, however, its behavior is unknown in patients with CAP. Therefore, this study aims to identify whether there is a relationship between serum concentration of TWEAK and prognosis in CAP patients. To our knowledge, this is the first study to shown that concentration of sTWEAK within the first 24 hours of ICU admission is lower in patients with CAP. Moreover, patients whom died during ICU admission due to CAP, have lower sTWEAK levels. This biomarker may identify patients at higher risk of dying due to CAP and may represent severe CAP. However, further studies are needed to confirm these findings.

4379

MARCKS protein is altered in naturally occurring model of asthma in horses

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OBJECTIVES/GOALS: Asthma is a significant health concern that affects people of all ages worldwide. EAS demonstrates many of the pathophysiological characteristics of nonatopic human asthma, which has led EAS to be used as naturally occurring model. Previous work from our lab determined that MARCKS (Myristoylated Alanine Rich C Kinase Substrate) protein is an essential regulator of cellular inflammatory functions. In the current study, we hypothesized that