stages as you do better). Participants selected one of three response options: 1=would make me less interested in the game, 2=doesn't matter, 3=would make me more interested in the game. Descriptives and frequencies assessed interest in different game features. Chi-square tests were used to identify potential differences in game feature preferences by gender identity, age group (early/mid-adolescence vs. late adolescence), and race and ethnicity. RESULTS/ANTICIPATED RESULTS: Of 83 participants who completed surveys, the mean age was 15 years old (12-18; SD=1.73), 55% were male, 79% were Non-Hispanic White, and 70% were interested in video games for gaining CHD management skills. The top-rated game features were: levels (78%; unlock advanced stages), conflict (74%; face challenges), personalization (70%; create avatar), and story (70%; journey-based). The three lowest-ranked features were: time (29%; restricted time to complete challenge), competition (47%; score/play against others), strategy (53%; plan to reach goal). No significant differences in game feature preferences were found by demographic characteristics. DISCUSSION/SIGNIFICANCE: Most AYAs with CHD were interested in games, offering a promising avenue for future healthcare interventions. Given no significantly different preferences by demographics, the game may not require tailoring game features for certain groups. However, additional research with diverse participants is needed to fully inform game development.

79

Flexible Support Materials Maintain Disc Height and Support the Formation of Hydrated Tissue Engineered Intervertebral Discs in Vivo

Alikhan Fidai[1], Byumsu Kim[1], Marianne Lintz[1], Pravesh Gadjradj[2], Sertac Kirnaz[2], Blake Boadi[2], Ibrahim Hussain[2] and Roger Hartl[2]
[1]Cornell University and [2]Weill Cornell

OBJECTIVES/GOALS: We evaluated the long-term success of tissue engineered intervertebral discs (TE-IVDs) cultured in flexible (FPLA) or stiff (PLA) support materials, hypothesizing that FPLA would maintain disc height and tissue hydration in the minipig spine. METHODS/STUDY POPULATION: TE-IVD: NP cells were encapsulated in alginate and NP plugs were placed in the center of FPLA cages. AF cells were encapsulated in type I collagen and pipetted around NP plugs. Implantation: Empty FPLA cages (n=4), and TE-IVDs cultured in FPLA (n=4) were implanted at C3-4 or C5-6 following complete discectomy (DX) in skeletally mature minipigs (n=4). Imaging and Quantification: Terminal disc height indices (DHI) were calculated from weekly x-rays using a previously described method, and results were compared to the PLA pilot study. T2 MRI scans were taken of levels treated with TE-IVDs to quantify disc hydration as previously described. RESULTS/ANTICIPATED RESULTS: FPLA cages restored DHIs to native levels until endpoint. In contrast, PLA cages fractured, and terminal DHIs were statistically similar to DX levels. Of the four levels treated with TE-IVDs, 2 were displaced from the disc space. Stabilized levels yielded DHIs which were statistically similar to native IVD and greater than displaced and DX levels. Displaced levels yielded DHIs which were significantly lower than native and stabilized levels, but greater than DX levels ($P<0.05$). T2 MRIs of stabilized TEIVDs revealed that levels treated with a construct maintained tissue hydration which was significantly greater than levels treated with an empty cage or DX levels ($P<0.0001$), but which was about half the hydration of native disc tissue. DISCUSSION/SIGNIFICANCE: Implanting TE-IVDs with FPLA support cages leads to disc height maintenance and the stabilization of hydrated tissues in the spine, enhancing the long term success of TE-IVD implants and providing a basis for clinical translation.

80

Venous thromboembolism diagnosis definition in claims data: implications for research

Mario Schootman[1], Ashlynn Fuccello[2], Seana Corbin[2], Bradley Martin[1] and Michail Mavros[1]
[1]University of Arkansas Translational Research Institute and [2]University of Arkansas for Medical Sciences

OBJECTIVES/GOALS: Venous thromboembolism (VTE) is a major cause of morbidity and mortality. Due to its relatively low incidence, prospective studies are limited. This makes administrative claims a promising data source to study VTE. We sought to examine the reproducibility of results using different VTE definitions from the published literature. METHODS/STUDY POPULATION: We conducted a retrospective analysis of a random 10% sample of the 2010-2022 IQVIA LifeLink PharMetrics Plus™ database, an administrative claims database representative of the commercially insured population of the United States. We selected cancer patients undergoing major gastrointestinal surgery, who have a higher risk for postoperative VTE (deep venous thrombosis [DVT] and/or pulmonary embolism [PE]). VTE was defined using ICD-9-CM and ICD-10-CM codes using definitions from 4 individual published studies. We compared the 4 definitions with respect to the incidence of VTE and factors associated with post-discharge VTE using standard univariate and multivariable logistic regression models. The same logistic regression models were used for each of the 4 definitions. RESULTS/ANTICIPATED RESULTS: There were substantial differences in VTE coding among the 4 definitions (range 107 to 225 ICD-9/10 codes for DVT and 12 to 24 codes for PE). The eligible population comprised 2,360 patients (49% female) with a median age of 49 years (interquartile range 47-52 years). During the index surgery hospitalization, a total of 58, 62, 63, and 83 patients developed VTE using the 4 definitions. In the 2,126 patients eligible for VTE prophylaxis, a total of 108, 68, 73, and 107 patients developed post-discharge VTE (range for DVT 35 to 81, range for PE 39 to 76). On multivariable analysis, factors independently associated with VTE included age using 1 of 4 definitions, esophageal surgery type using 3 of 4 definitions, and liver surgery type and Elixhauser score using all 4 definitions. DISCUSSION/SIGNIFICANCE: The incidence of VTE is directly affected by differences in ICD-9/10 codes used. Definitions for important clinical outcomes should be standardized when using administrative claims data in order to improve reproducibility of findings.

81

A rapid-cycle application of the Consolidated Framework for Implementation Research allows timely identification of barriers and facilitators to implementing the World Health Organization's Emergency Care Toolkit in Zambia

Taylor Burkholder[1], Julia Dixon[2], Morgan Broccoli[3], Natasha Chenga[4], Patricia Chibesakunda[5], Winnie Kunda[5], Kephas E Mwanza[6], James Nonde[4] and Mwiche Chiluba[5]
[1]University of Southern California; [2]University of Colorado; [3]Brigham & Women's Hospital; [4]Ndola Teaching Hospital; [5]University Teaching Hospital and [6]Solwezi General Hospital

OBJECTIVES/GOALS: Implementation science evaluations are often too time-intensive to provide actionable feedback during

https://doi.org/10.1017/cts.2024.82 Published online by Cambridge University Press

implementation, suggesting the need for more agile methods. We present an evaluation of the World Health Organization's Emergency Care Toolkit implementation in Zambia using rapid qualitative methods to provide timely feedback. METHODS/STUDY POPULATION: We evaluated the implementation of the Emergency Care Toolkit in eight general and referral hospitals in Zambia in 2023 using a rapid-cycle, qualitative template analysis approach grounded in the Consolidated Framework for Implementation Research (CFIR). We gathered qualitative data from operational field notes, focus groups, and key informant interviews of administrators, clinicians, nurses, and support staff in all eight hospitals in Zambia. We parsimoniously applied CFIR constructs and tool-specific codes, focused on barriers and facilitators, to allow for rapid but comprehensive cross-case analysis. The results were used to generate a matrix of stakeholder-relevant, plain-language barriers and facilitators for each tool. RESULTS/ANTICIPATED RESULTS: We completed eight site visits with focus groups and interviews following initial implementation in September 2023 to gather firsthand knowledge related to implementation of the Toolkit. The CFIR-focused coding accelerated analysis by centering on barriers and facilitators for each tool while maintaining a comprehensive evaluation framework. Summary tables of barriers and facilitators were easily interpreted by lay stakeholders. Visualization in tables allowed for identification of common themes across tools and hospitals, making comprehensive recommendations to the implementation and dissemination process quickly possible. We anticipate the study findings will empower implementing partners to make timely, actionable improvements. DISCUSSION/SIGNIFICANCE: Rapid-cycle qualitative implementation evaluations allow for rigorous yet timely feedback on the implementation process compared to traditional methods. This efficient strategy is particularly important in resource-constrained environments where inefficient implementation wastes limited resources and create delays that cost lives.

83

Automated PDMS Engraving and Assembly of a Prototype Microfluidic Artificial Lung*

Andrew Zhang[1], Andrew Zhang[2,3], Jennifer Wang[2], Gabriele Seilo[2], Kartik Tharwani[2] and Joseph A Potkay[2,3]
[1]University of Michigan (MICHR); [2]Department of Surgery, University of Michigan, Ann Arbor, MI and [3]VA Ann Arbor Healthcare System, Ann Arbor, MI

OBJECTIVES/GOALS: We report an automated manufacturing system, and a series of cylindrical multi-layer microfluidic artificial lungs manufactured with the system and tested for fluidic fidelity and function. METHODS/STUDY POPULATION: A Roll-to-Roll (R2R) system to engrave multiple-layer devices was assembled. A 100 um-thick silicone sheet passes through an embedded CO2 laser engraver, which creates patterns of any geometry on the surface. The sheet is plasma-activated to create an irreversible bond, and rerolled into a processed device. Unlike typical applications of R2R, this process is synchronized to achieve consistent radial positioning. This allows the fluidics in the device to be accessed without being unwrapped. The result is a cylindrical core surrounded by many layers of microfluidic channels that can be accessed through the side of the device or through fluidic vias. This core is cut to expose the microfluidic layers, and then installed into a housing which routes the fluids into their respective microfluidic flow paths. RESULTS/ANTICIPATED RESULTS: To demonstrate the capabilities of the R2R manufacturing system, this method was used to manufacture multi-layer microfluidic artificial lungs (μALs). Gas and blood flow channels are engraved in alternating layers and routed orthogonally. The close proximity of gas and blood separated by gas-permeable PDMS permits CO2 and O2 exchange. Three μALs were successfully manufactured. Their flow paths were visualized using dyed water and checked for leaks. Then they were evaluated using water for pressure drop and CO2 gas-exchange. The top performing device had 15 alternating blood and gas layers. Test with whole blood demonstrated oxygenation from venous (70%) saturation levels to arterial (95%) saturation levels at a flow rate of 3 ml/min. DISCUSSION/SIGNIFICANCE: The ability to cost-effectively produce high surface area microfluidic devices would bring many small-scale technologies from the realm of research to clinical and commercial applications. In particular, most microfluidic artificial lungs only have small rated flows due to a lack of manufacturing processes able to create high surface area devices.

84

Using Opportunistic Sampling and Remnant Blood Samples to Develop Pediatric Pharmacokinetic Models to Inform Antidepressant Dosing

Jeffrey R. Strawn[1], Ethan A. Poweleit[2], Zachary L. Taylor[3], Tomoyuki Mizuno[3], Samuel Vaughn[4], Zeruesenay Desta[5], Stephani Stancil[6] and Laura B. Ramsey[6]
[1]University of Cincinnati; [2]Department of Biomedical Informatics, College of Medicine, University of Cincinnati, Cincinnati, OH, USA; [3]Division of Clinical Pharmacology, Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA; [4]Division of Child and Adolescent Psychiatry, Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA; [5]Division of Clinical Pharmacology, School of Medicine, Indiana University, Indianapolis, IN, USA and [6]Division of Pediatric Clinical Pharmacology, Children's Mercy Hospital & Clinics, USA

OBJECTIVES/GOALS: Developing pharmacokinetic (PK) models to guide selective serotonin reuptake inhibitor (SSRI) dosing in youth is costly, time-intensive, and requires large numbers of participants. We evaluated the use of remnant blood samples from SSRI-treated youth and developed precision PK dosing strategies. METHODS/STUDY POPULATION: Following IRB approval, we used a clinical surveillance platform to identify patients with routine phlebotomy within 24 hours of escitalopram or sertraline dosing. Remnant blood samples were obtained from youth aged 5–18 years, escitalopram and sertraline concentrations were determined, and clinical characteristics (e.g., age, sex, weight, concomitant medications that inhibit sertraline or escitalopram metabolism) and phenotypes for CYP2C19, the predominant enzyme that metabolizes these SSRIs, were extracted from the electronic medical record (EMR). A population PK analysis of escitalopram and sertraline was performed using NONMEM. The influence of clinical variables, CYP2C19, and dosing was evaluated from simulated concentration-time curves. RESULTS/ANTICIPATED RESULTS: Over 21 months, we

https://doi.org/10.1017/cts.2024.82 Published online by Cambridge University Press