

environmental exposure; (2) geospatial and demographic inequality (historic and current) around housing/neighborhood conditions contributing to disproportionate environmental exposures for low-income and minoritized residents; (3) health implications of environmental exposures; (4) prior policy addressing the connections between housing/neighborhoods and environmental risk; and (5) future policy recommendations to improve housing/neighborhood quality and minimize environmental exposures for residents. **DISCUSSION/SIGNIFICANCE:** This project will illuminate connections between housing conditions and environmental exposures, health implications of these exposures, and contribute to advancing understanding of potential policies to reduce adverse environmental health impacts of poor housing conditions for residents (particularly for low-income, minoritized groups).

415

### **Impact of Pennsylvania Medicaid payment policy change on rural versus non-rural hospital implementation of immediate postpartum long-acting reversible contraception**

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**OBJECTIVES/GOALS:** To apply implementation science strategies to evaluate the impact of the 2016 Pennsylvania (PA) Medicaid payment policy change on hospital-level access to immediate postpartum long-acting reversible contraception (IPP LARC), an evidence-based strategy to increase contraceptive access; to identify differences by rurality and academic status. **METHODS/STUDY POPULATION:** We conducted a web-based, IRB-exempt survey of Labor and Delivery (L&D) leaders at all PA hospitals in Summer-Fall 2022, assessing hospital characteristics, contraceptive practices, and facilitators/barriers to IPP LARC implementation, using concepts from health services studies of small subsets of implementing hospitals; we translate these concepts into policy evaluation by sampling the complete population of Pennsylvania hospitals with active L&D units. L&D hospitals were characterized as sustainers if they implemented by 2019 and continued to provide IPP LARC, as implementers if they implemented IPP LARC in 2020-22, and non-implementers if they had not started the process. We use the Center for Rural Pennsylvania definition of rural: counties with **RESULTS/ANTICIPATED RESULTS:** We collected data from 48/74 (64.9%) hospitals with L&D units. Hospitals were heterogeneous with 18/48 (37.5%) in rural counties and 15/48 (31.3%) identifying as academic. A minority of hospitals provide IPP LARC, with 17/48 (35.4%) offering implants and 16/48 (33.3%) offering intrauterine devices (IUD) immediately postpartum. Before the PA Medicaid payment policy change, few offered implants [4/48 (8.3%)] or IUDs [1/48 (2.1%)]. Non-rural hospitals implemented IPP LARC more often and on an earlier timeline than rural hospitals: [7/30 (23.3%) v 3/18 (16.7%)] sustainers, [5/30 (16.6%) v 2/18 (11.1%)] implementers. Common facilitators include clinical champions, meeting patient needs, and adequate knowledge. Planned analyses include implementation barriers, and impact of external implementation support. **DISCUSSION/SIGNIFICANCE:** Despite unmet need in rural populations for evidence-based contraception, rural hospitals were less likely to implement IPP LARC. Implementation support should

be designed to meet the needs of rural hospitals. Implementation science methods can be translated to evaluate the impact of healthcare policy on access to care.

## **Team Science**

416

### **A Comparison of Bone Stresses in Transtibial and Transfemoral Osseointegrated Prostheses**

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**OBJECTIVES/GOALS:** This investigation aimed to develop and validate a subject-specific finite element analysis (FEA) model with subject-specific mechanical loads during walking and to use this method to compare mechanical stresses between transfemoral and transtibial osseointegrated (OI) implants. **METHODS/STUDY POPULATION:** One patient with a unilateral transtibial OI prosthesis and one with a unilateral transfemoral OI prosthesis participated in motion analysis to collect kinematics and ground reaction forces during overground walking. Subject-specific musculoskeletal models were created, and static optimization was used to estimate muscle and joint reaction forces throughout walking. 3D FEA models of the tibia, femur, and implants were created using ScanIP and exported into ABAQUS CAE. Muscle forces were applied at corresponding origin/insertion locations, determined from the musculoskeletal models [7]. Fixed boundary conditions were applied at proximal joint centers, and bone stresses throughout gait were calculated. OpenSim and FEA derived estimates of joint reaction forces were compared for validation. **RESULTS/ANTICIPATED RESULTS:** A maximum stress of 65.53 MPa and 60.70 MPa was observed at the bone-implant interface for the transtibial and transfemoral patients (respectively) in the late stance phase of the walking task, corresponding to terminal stance and heel off. Averaged root mean squared errors of the walking task (in the anterior-posterior, inferior-superior, and medial-lateral directions, respectively) for the transtibial and transfemoral patients were (124, 152, 80) N, (71, 80, 30) N, and (190, 62, 30) N, respectively. **DISCUSSION/SIGNIFICANCE:** The purpose of the above study was to develop a methodology for determining subject-specific mechanical loads during walking using finite element analysis and compare mechanical stresses in patients with transfemoral and transtibial OI. Similar stresses between the two implant types were found.

417

### **A CTS Team Approach to Developing an Effective Vaccine for Non-Typhoidal Salmonella\***

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**OBJECTIVES/GOALS:** Non-Typhoidal Salmonella causes over 95 million infections globally each year, and no effective vaccine exists to combat infections in humans. The goal of this study is to determine the immune protection provided by a novel extracellular