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A longitudinal study on the effects of diabetes on the neurodevelopment of infants

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OBJECTIVES/GOALS: An association has been found between maternal diabetes and neurodevelopmental disorders (NDDs), such as autism spectrum disorders (ASD), attention-deficit/hyperactivity disorder (ADHD), and intellectual disabilities. Our objective is to observe the effects of type 2 diabetes mellitus (T2DM) on the neurodevelopment of infants. METHODS/STUDY POPULATION: A prospective study was performed on thirty infants who were evaluated using four neonatal neurodevelopmental assessments. Thirteen of these infants were from mothers with T2DM and seventeen of them were from mothers without diabetes. We used the Hammersmith Neonatal Neurological Examination (HNNE), Dubowitz exam, The Capute Scales, and The General Movement Assessment (GMA) to assess the neurodevelopment of these infants. HNNE assesses posture, reflexes, tone, and movement of infants. The Dubowitz exam is used to measure tone and reflexes to get an estimated gestational age (GA) of the infant. The Capute Scales has two subsections, one measures language (receptive and expressive) and the other measures visual-motor development. Lastly, the GMA was used to observe the general movements of the infant. RESULTS/ANTICIPATED RESULTS: Cochran–Mantel–Haenszel determined between-group differences. HNNE, Dubowitz, and the Capute Scales had no significant difference between groups. HNNE results: 4 T2DM below cutoff; 9 controls below cutoff. DISCUSSION/SIGNIFICANCE OF IMPACT: Offspring of T2DM mothers show a risk of motor delays in infancy and later language/cognition delays. Offspring of T2DM mothers should be followed due to the risk of motor delays. Early intervention could mitigate delays. This would be the first novel use of these four tools to evaluate 1-month-olds.

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Who you gonna call? The Data Group: Creating a team and process for responding to evolving data needs of a limited health benefits program

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OBJECTIVES/GOALS: The World Trade Center (WTC) Health Program (Program) Data Group was formed to address the increasing volume and complexity of analytics requests and to improve the Program's data management capacity. Over time, the Group's role expanded to include comprehensive data leadership and providing data-based support for decision-making. METHODS/STUDY POPULATION: The Program provides medical monitoring and treatment for WTC-related conditions to those directly affected by the 9/11 attacks. These activities generate an abundance of administrative and surveillance data. The Data Group was formed to establish structures and processes that would be adaptable and efficient in leveraging these data. We created a unified workflow including a shared inbox, a standardized request form, and a request-managing tracker. We established communication channels to distribute requests efficiently. We designed a request form to balance the administrative burden on requestors with the need to gather useful information for analyses. We also developed a documentation system to extract key details from forms and incorporate other relevant data to support evaluation and record-keeping. RESULTS/ANTICIPATED RESULTS: From November 2021 through the end of 2023, the Data Group processed and fulfilled 93 data requests. These requests covered a multitude of functional areas essential to the administration of a limited health benefits program. The following top five functional areas made up two-thirds of all requests: Contract Management (n = 30), Research and Quality (n = 15), Operations (n = 11), Medical Policy (n = 10), and Communications (n = 7). Leveraging data collected through our request tracker, the Group conducted annual evaluations and developed visualizations to analyze trends in these requests. The evaluations helped us identify knowledge gaps, highlight areas for improvement – across the Program and within our own processes, and continue to guide and support future Program priorities. DISCUSSION/SIGNIFICANCE OF IMPACT: The creation of the Data Group and unified workflow fulfilled the Program's increasing analytic needs, enhanced oversight of data quality and usage, and facilitated data-driven Program decision-making. Continual optimization of the group's processes enables opportunities to identify gaps in and support a range of health care delivery initiatives.

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Feasibility of the MyIBD care plan to improve care quality in pediatric IBD practice

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OBJECTIVES/GOALS: Youth with IBD have preventive, psychosocial, and acute care needs beyond those of peers, yet receipt of services does not match those needs. Our objectives are to assess the feasibility of (1) an individualized care plan intervention to improve perceived and measured care quality and (2) a pragmatic trial design embedded in pediatric IBD practice. METHODS/STUDY POPULATION: This is a pilot rollout-design randomized trial (n = 60) at a regional academic medical center. Eligible patients are 13–19 years old with IBD for at least 3 months and scheduled for a follow-up visit during the trial. Research staff recruits from one cluster at a time until goal enrollment (14–16). Enrollees are randomized 1:1 to intervention (MyIBD now) or control (MyIBD after the trial). MyIBD combines a tabular summary of individualized acute, chronic, and preventive care needs with nurse facilitator support for patients to use the information. Surveys at baseline, 6 and 12 months measure care quality (Patient Assessment of Chronic Illness Care scale, vaccines, health services) and patient self-management skills (Partners in Health scale). Implementation outcomes are collected via chart review. RESULTS/ANTICIPATED RESULTS: To date, 44 subjects have been randomized. Among subjects, the mean

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age is 16 years; 73% have Crohn's disease, 77% have commercial insurance, 75% receive anti-TNF therapy, and 14% live in a rural area. Mean baseline perceived care quality (PACIC scale) is 76.9 (sd 16.3; out of 100); mean baseline perceived self-management skill (PIH scale) is 78.1 (sd 13.4; out of 96). On objective care quality measures, 59% have completed the HPV vaccine series, 32% have received an additional pneumonia vaccine; in the past year 68% have had a screening for mood disorders, 20% an emergency department visit for IBD, and 18% an IBD hospitalization. To date, the IBD clinical team has achieved 100% completion (intervention subjects receive MyIBD plus nurse facilitation) and 0% contamination (control subjects inappropriately receive MyIBD). DISCUSSION/SIGNIFICANCE OF IMPACT: Study results to date support the feasibility of the pragmatic, embedded trial design and indicate opportunities for improvement in care quality as perceived by patients and as measured by common preventive and acute care quality indicators. An individualized care plan supported with nurse facilitation may improve pediatric IBD care quality.

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Low kidney mass contributes to enhanced fractionated irradiation-induced renal hemodynamic dysfunction in mice

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OBJECTIVES/GOALS: Radiation nephropathy results in morbidity and mortality in patients receiving cancer treatment. In addition, low birth weight and low nephron number are associated with increased risk for chronic kidney disease. This study examined the development and severity of radiation-induced renal hemodynamic dysfunction in a low renal mass mouse model. METHODS/STUDY POPULATION: Male mice (C57Bl/6, 8–12-weeks) were used to determine a suitable radiation dose regimen. Mice were subjected to fractionated bilateral kidney irradiation with 5–6 fractions of an X-ray dose of 0, 6, 8, and 10 Gy at 24-hr intervals using a CT-image-guided irradiator. Body weight and mortality were monitored for 5 weeks in mice. In a separate set of experiments, the low renal mouse model, ROP Os/+, and their normal counterpart, ROP +/+ mice were subjected to 5 fractionated bilateral kidney irradiations at 24-hr intervals with an X-ray dose of 6 Gy. Renal blood flow was assessed from renal artery resistive index (RRI) over 5 weeks post-irradiation using an ultrasound system. Transcutaneous measurement of FITC-sinistrin clearance was used to determine glomerular filtration rate (GFR). RESULTS/ANTICIPATED RESULTS: The C57Bl/6 mice that received 5–6 fractions of 8 and 10 Gy had more than 50% mortality, while 100% of the mice exposed to 5 fractions of 6 Gy survived for 5 weeks. Body weight was also significantly decreased in mice exposed to 5 or 6 fractions of 8 or 10 but not 6 Gy radiation. Nonirradiated C57Bl/6, ROP +/+, and ROP Os/+ mice had similar baseline GFR and RRI. Irradiation of 5 fractions at 6 Gy decreased GFR and increased RRI in C57Bl/6 and ROP +/+ mice. Interestingly, following 5 fractions at 6 Gy irradiation ROP Os/+ mice had 25% lower GFR than wild-type ROP +/+ mice (946.3 ± 50.3 vs. 1232.9 ± 69.3 μL/min/100g BW, p DISCUSSION/SIGNIFICANCE OF IMPACT: Our study determined a suitable fractionated bilateral kidney irradiation dose regimen to evaluate radiation nephropathy. Data demonstrated that fractionated bilateral kidney irradiation leads to decreased renal hemodynamics in mice. We also demonstrated that irradiation caused greater renal hemodynamic dysfunction in low renal mass mice.

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Promotion of team science training for early career investigators: Evaluation and response to team science opportunities

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OBJECTIVES/GOALS: Given the challenges that early career research scientists face, especially preparing for promotion and tenure, the decision on whether to join a research team can be fraught. We developed a novel training to support informed decision-making regarding new scientific teaming opportunities. METHODS/STUDY POPULATION: A team science workshop entitled "Should I join this research team" was designed for early career investigators from varied disciplinary backgrounds. Learning objectives for attendees included 1) describing the role of team science in translational research, 2) determining if teaming opportunities are a good fit, and 3) crafting thoughtful responses to requests. The training was initially delivered to 38 attendees (11 K scholars) during a virtual national meeting. We adapted this training for in-person delivery to K and T scholars at our CTSA regional partners. Instructional methods shared across virtual and in-person modalities included self-reflection, think and share activities, and scenario application. In-person delivery also included short video clips and small group discussions. RESULTS/ANTICIPATED RESULTS: Multiple Likert-scale items were completed by workshop participants before and after completing the workshop to evaluate attendees' confidence in their perceived abilities to explain strengths and limitations of team science, identify characteristics of effective science teams, evaluate a team invitation, assess costs and benefits, negotiate collaborative team invitations, etc. Preliminary data from the virtual workshop suggests that 54.6% of scholars were either not at all or only slightly confident in evaluating a teaming invitation. After the workshop, 45.5% reported being very confident, and 9.1% reported extreme confidence in evaluating a team invitation. Evaluation of the in-person training, along with a comparison of virtual and in-person learning outcomes will also be presented. DISCUSSION/SIGNIFICANCE OF IMPACT: Our multimodal training is designed to equip early career investigators with the tools needed to evaluate and respond effectively to research team invitations. We believe this novel training will result in informed teaming decisions for early career research scientists.

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