Department of Obstetrics and Gynecology Research Day

April 12, 2023

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OBGYN Research Day

Welcome!

Thank you for joining us for the 2023 Department of Obstetrics and Gynecology Research Day.

Our theme this year is Health Equity, and we are honoring Black Maternal Health Week. We are thrilled to welcome a special guest, Mrs. Ella Greene-Moton. Mrs. Greene-Moton is the President-Elect of the American Public Health Association and the first community member to serve in this position. Dr. Courtney Townsel will moderate a conversation with Mrs. Greene-Moton and Dr. Erica Marsh.

This program contains a sampling of abstracts, visual abstracts, and posters presented by faculty, fellows, providers, residents, collaborators, and others in OBGYN, over the past year.

When the Research Advisory Committee formed several years ago, community building was one of our top priorities and this departmental research day is the first step toward bringing the many talented people in our department together to share and build collaborations. We are excited for this opportunity to learn from each other and look forward to many more Research Days in the future.

Special thanks to our panel leads, Dr. Courtney Townsel, Dr. Maya Hammoud, and Dr. Molly Stout.

Vanessa Dalton
Associate Chair for Research

Julie Tumbarello
Senior Research Manager

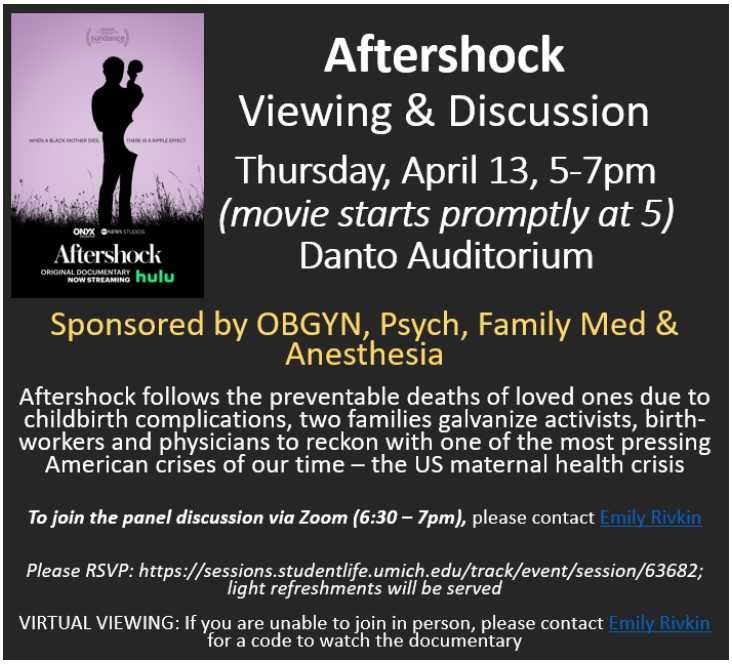
Black Maternal Health Week 2023

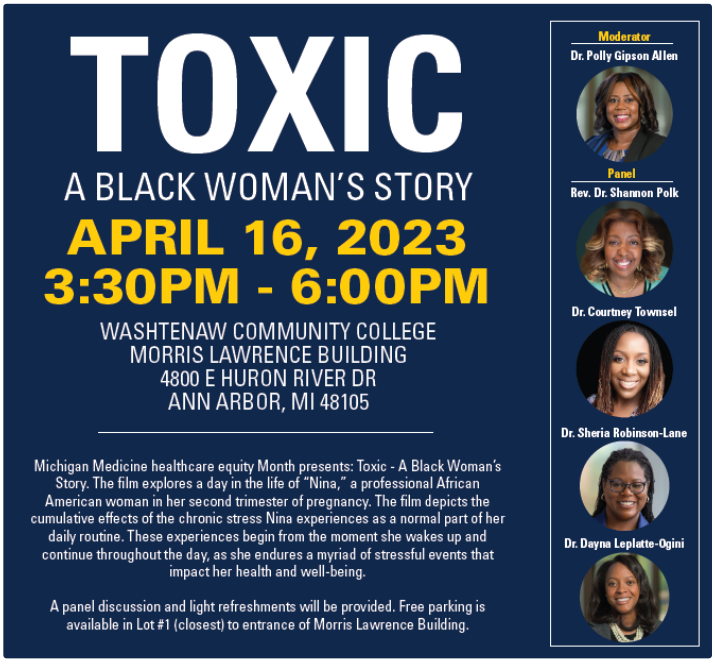
- **Tuesday, April 11:** Twitter Takeover by OBGYN Student Interest Group
- **Wednesday, April 12 (8:10 – 9:30am, Palmer Commons Forum Hall 4th Floor & Zoom):** "Centering Equity through Inclusive Recruitment and Community-Based Participatory Research" – panelists include Ella Greene-Moton (American Public Health Association-President Elect) and Dr. Erica Marsh, moderated by Dr. Courtney Townsel
- **Thursday, April 13 (7:45 – 8:30am, MCHC Auditorium/F2305 and Zoom):** Grand Rounds – Birthing Justice and Equity in Black Maternal Health Outcomes
- **Thursday, April 13 (5 – 7pm, Danto Auditorium and Hybrid Panel Discussion):** *Aftershock* Viewing and Discussion (co-hosted by Obstetrics and Gynecology, Family Medicine, Anesthesia, and Psychiatry)
- **Friday, April 14:** "Black Maternal Health Matters" Celebration on L&D
- **Sunday, April 16 (3:30 – 6pm, Washtenaw Community College):** *Toxic* Screening and Panel Discussion
- **Monday, April 17:** Highlights from Black Maternal Health Week and Call to Action

For all Zoom links and additional information check out the Health Equity Month website: https://sessions.studentlife.umich.edu/track/event/13104

Michigan Medicine will celebrate Healthcare Equity Month from March 20-April 17 to raise awareness, encourage action, and showcase Michigan Medicine- and U-M-led efforts around systemic healthcare inequities experienced by historically marginalized and underrepresented groups.

April 11-17 has been designated Black Maternal Health Week nationally since 2020 and was officially recognized as such by The White House in 2021. This week will feature special events from the Department of Obstetrics and Gynecology and other clinical departments, Certified Nurse Midwives, and Community Health Services of Michigan Medicine. Session 1 of OBGYN Research Day is one of multiple events taking place.





OBGYN Research Day 2023

Welcome

7:30-8:00 AM: Continental Breakfast – Palmer Commons Great Lakes South Central

8:00-8:10 AM: Welcome & Announcements – *Vanessa Dalton and Dee Fenner*

Session 1: Black Maternal Health/Equity Panel

Moderator: Courtney Townsel

8:10-8:50 AM: Panel Discussion – *Ella Greene-Moton and Erica Marsh (moderated by Courtney Townsel)*

8:50-8:55 AM: Region 9 Perinatal Quality Collaborative: Field notes from the trauma informed care workgroup – *Deb Rhizal*

8:55-9:00 AM: An Agenda for Research: Addressing Gaps in the Reproductive Health of Arab American Women – *Rieham Owda*

9:00-9:05 AM: Designing more equitable prenatal care: lessons from patients and the people caring for them in Detroit – *Alex Peahl*

9:05-9:10 AM: The **G**enetic **R**isk **A**ssessment with **M**obile **M**ammography (**GRAMM**) Project: Providing Genetic Counseling Referrals in Tandem with Mobile Mammography for At-Risk Black Women and Reclassification of VUS across race and ethnicity for patients at risk for breast cancer – *Versha Pleasant*

9:10-9:15 AM: Addressing Inequities in Maternal Morbidity and Mortality – *Lindsay Admon*

9:15-9:30 AM: Discussion

Session 2: Fellows

Moderator: Maya Hammoud

9:30-9:38 AM: Variations in structural support site failure patterns by prolapse size on stress 3D MRI – *Chris Hong*

9:38-9:46 AM: Obesity-induced luteal phase endometrial profile changes in a well-phenotyped population – *Ali Bazzi*

9:46-9:54 AM: Mullerian Anomalies among Individuals with Congenital Heart Disease – Should we be screening? – *Mina Farahzad*

9:54-10:02 AM: Patient Reported Opioid Usage Following Vulvar Surgery in Gynecologic Oncology – *Katelyn Tondo-Steele*

10:02-10:10 AM: Black Women and Queer Individuals' Experiences with IVF – *Breonna Slocum*

10:10-10:18 AM: Effect of Pregnancy Level Hormones on Coronary Artery Smooth Muscle Cells: An In Vitro Study of Spontaneous Coronary Artery Dissection - *Ajleeta Sangtani*

10:18-10:26 AM: Oophorectomy at the time of gender affirming hysterectomy in young adults – *Katie O'Brien*

10:26-10:34 AM: Short and Long-term Testosterone Administration Impairs IVF Outcomes with Improvement Following Washout in a Mouse Model of Gender-Affirming Hormone Care – *Amanda Schwartz*

10:34-10:42 AM: Venous Thromboembolism Prophylaxis during Neoadjuvant Chemotherapy for patients with ovarian Cancer – *Hannah McLaughlin*

10:42-11:00 AM: BREAK

Schedule continues on next page

Session 3: Research Insights and Lessons Learned

Moderator: Molly Stout

11:05-11:15 AM: Integrating Quality Improvement Research in a Busy Clinical Practice – *Shitanshu Uppal and Alli Straubhar*

11:15-11:22 AM: The experience of shared decision making during and the context of hospital care for families having their first births in a state wide maternity quality collaborative – *Lisa Kane Low*

11:22-11:29 AM: Respecting autonomy and enabling diversity: Patient preferences and privacy in datasharing – *Kayte Spector-Bagdady*

11:29-11:36 AM: Perspectives on interdisciplinary research in the field of women's health research - *Luyun Chen*

11:36-11:43 AM: Obesity-related alterations in protein expression in human follicular fluid from women undergoing in-vitro fertilization (IVF) – *Samantha Schon*

11:43-11:50 AM: Bringing Implementation Science methods to maternity care quality improvement: A statewide multiple case study - *Michelle Moniz*

11:50 AM-Noon: Discussion- Key Learning/Tips Summary

Thank You!

Contents

The following selections of abstracts, visual abstracts, and posters presented today and at conferences over the past year are organized alphabetically by first author. An index of OBGYN faculty and fellows is on pages 162-163.

MHPAEA/ACA Policy Implementation and Severe Maternal Morbidity Among Commercially Insured Individuals, 2008–2019

Lindsay Admon, Vanessa Dalton, Giselle Kolenic, Anca Tilea, Stephanie Hall, Kara Zivin

Introduction: We aimed to identify rates and trends in severe maternal morbidity (SMM) in relationship to implementation of the Mental Health Parity and Addiction Equity Act (MHPAEA) and Affordable Care Act (ACA).

Methods: We conducted a serial, cross-sectional analysis among individuals with continuous commercial coverage in the year preceding and following an inpatient livebirth using data from Optum Cliniformatics Data Mart. We identified hospital deliveries and cases of SMM using standard methods. We excluded cases of SMM in which blood transfusion represented the only indicator of SMM. We evaluated rates and trends in SMM in both the implementation (2008–2014) and post-implementation (2015–2019) periods using an interrupted time-series model fit with generalized estimating equations for the overall population and compared those with and without perinatal mood and anxiety disorders (PMAD). The University of Michigan Institutional Review Board deemed this study exempt from review.

Results: The sample included 681,616 births. SMM decreased by 53.2% from 195.8 (95% CI, 188.1–203.3) to 91.6 (95% CI, 85.7–97.6) per 10,000 hospitalizations for birth between 2008 and 2019. We identified decreasing SMM rates in both periods, with a larger decrease in the post-implementation period (implementation marginal effects [ME], −0.0012; post-implementation ME, −0.0015; P <.001). We observed decreasing SMM rates in both periods for those with and without PMAD, with the steepest decline among those with PMAD in the post-implementation period.

Conclusion: These data suggest that implementation of the MHPAEA and ACA may have had a role in decreasing rates of SMM among childbearing individuals with commercial insurance.

Overall and Racial-Ethnic Disparities in Severe Maternal Morbidity Among Medicaid Enrollees By State of Residence

Lindsay Admon, Jamie Daw, Katy Kozhimannil, Eugene Declercq, Sarah Gordon

Research Objective: Severe maternal morbidity (SMM) encompasses unexpected outcomes of labor and delivery that may result in adverse short and long consequences for a mother's health. SMM is rising, particularly among Medicaid enrolled and Black mothers, yet data to inform tailored interventions for the populations at greatest risk are lacking. We used the newly available Transformed Medicaid Statistical Information System (T-MSIS) to evaluate variation in SMM among Medicaid enrolled mothers by state 1) overall and 2) among non-Hispanic Black (Black) compared to non-Hispanic white (white) individuals.

Study Design: We conducted a pooled, cross-sectional analysis of the 2016-2018 T-MSIS Analytic Files (TAF). Inpatient liveborn deliveries were identified using ICD-10-CM diagnosis and procedure codes and Diagnosis Related Groups. We included 39 states, after excluding ten states in which the annual birth volume for Medicaid-enrolled mothers identified in the claims data differed by more than 20% from the National Vital Statistics System (NVSS) and one state due to data quality concerns. To generate state-level estimates of SMM rates among Black compared to white individuals, we excluded an additional 21 states in which the proportion of births to Black and/or white individuals enrolled in Medicaid differed by more than 20% relative to the demographic distribution of births in the NVSS. The primary outcome of overall SMM was defined using coding algorithms published by the Centers for Disease Control and Prevention and excluded cases in which blood transfusion was the only indicator of SMM.

Population Studied: 3,771,548 individuals with liveborn deliveries in the 2016-2018 T-MSIS TAF

Principal Findings: Among Medicaid enrollees in the 39 states in our primary sample, the overall SMM rate was 69.0 (range by state: 39.4-115.1) per 10,000 livebirths. Four states had rates greater than 100 per 10,000 livebirths: Hawaii, Washington, Virginia, and Vermont. Four states had rates lower than 50 per 10,000 livebirths: Delaware, Idaho, Montana, and South Carolina. The top SMM indicators were disseminated intravascular coagulation, eclampsia, and renal failure. The rank order of SMM indicators varied by state. In the subgroup of 18 states with reliable race and ethnicity information, the overall SMM rates were 93.2 (range by state:46.7-380.2) compared to 60.6 (range by state:19.8-102.4) per 10,000 livebirths among Black compared to White mothers. The overall rate difference was 32.6 (range by state: 10.5-227.9) per 10,000 livebirths.

Conclusions: This study provides evidence of wide state level differences in SMM rates overall and within and across states by race and ethnicity among Medicaid beneficiaries. Our findings also highlight the limitations of T-MSIS for measuring racial disparities in maternal health due to the high proportion of states with discrepancies in Black and white birth volume compared to vital statistics data.

Implications for Policy or Practice: There stark state level and racial disparities in SMM among Medicaid enrollees; these findings should guide targeted clinical and policy strategies for addressing maternal health equity. Future research should be directed at understanding the drivers of the variability and racial inequities identified. Improvements in data quality are needed to maximize the utility of T-MSIS data to study maternal health disparities among Medicaid enrollees.

The Association Between Fibroids, Obesity and Adiposity in a Latina/Latinx Population

Ali A. Bazzi, Samantha B. Schon, Charley Jiang, Felix Valbuena Jr., Donna D. Baird, Erica E. Marsh

Objective: Previous studies suggest that BMI is positively associated with the risk/prevalence of fibroids. Furthermore, case control studies demonstrate that waist-hip ratio can be used as screening tool to identify groups at high risk for uterine fibroids. This and similar studies conclude that an increase in body mass index (BMI), waist-hip ratio (w/h) and visceral fat, increase the risk of uterine fibroids. However, few studies have assessed this relationship in the Latina/LatinX population. The objective of this study was to assess the relationship between obesity/adiposity (utilizing a multiparametric approach) and fibroid incidence in a large cohort of Latina/LatinX women.

Materials and Methods: This is a cross-sectional analysis of data collected as part of a prospective longitudinal cohort study. The Environment, Leiomyomas, Latinas, and Adiposity Study (ELLAS) follows 603 Latina/LatinX women over a 5-year period. All participants in this study were between the ages of 21-50 at the time of consent. Participants underwent a baseline pelvic ultrasound to assess for the presence of fibroids. Bioelectrical impedance analysis was performed to assess adiposity via several measurements. The association between fibroids and BMI, w/h, percent body fat and percent visceral fat, were assessed as both continuous and categorical variables. Statistical associations were determined using Chi-squared test, Wilcoxon rank-sum test and Linear or Logistic regression analysis as appropriate.

Results: Data from 603 participants was available for analysis. A total of 68 participants were noted to have fibroids (11.3%), while 535 participants did not have fibroids at time of the initial study visit (88.7%). The mean age of the participants was 37.4± 6.95 years. There was no difference in BMI between participants with and without fibroids (30.9 kg/m2 vs 30.0 kg/m2, respectively, (p=0.125-). Similarly, there was no difference in w/h ratio or percent body fat between the women with or without fibroids (0.9 for both groups, p=0.768). The percentage of visceral fat was significantly higher in women with fibroids compared to those without fibroids (7.9% vs 6.8%, p=0.009); however, this association was no longer significant when adjusted for age.

Conclusions: Among a large cohort of Latina/LatinX women, body weight and adiposity were not associated with fibroid prevalence.

Impact Statement: This stresses the importance of utilizing diverse study populations and the need for future research among minority populations that are often not represented in research studies.

Adverse Financial Outcomes before and after COVID-19 Diagnosis

Nora Becker, Erin Carlton, Michelle Moniz, John Scott, John Ayanian

Research Objective: COVID-19 survivors may experience financial hardship, but objective measurements of financial outcomes after COVID-19 infection have not yet been examined. Our objective was to compare financial outcomes among COVID-19 survivors before and after their COVID-19 infection.

Study Design: Individuals enrolled in a large statewide commercial insurance plan were linked to their January 2021 Experian credit report data. We identified two cohorts of COVID-19 survivors: a "pre-infection" cohort with infections diagnosed February-October 2021 (individuals with credit outcomes observed prior to their infection) and a "post-infection" cohort with infections diagnosed March-July 2020 (individuals with credit outcomes observed >=6 months after their infection). The post-infection cohort was limited to >=6 months after infection because medical debt cannot appear on an individual's credit report until that time. COVID-19 infection severity was characterized using a binary variable for COVID-19 hospitalization. Logistic regression models were used to compare financial outcomes between the pre- and post-infection cohorts. Primary outcomes included the probability of having medical debt in collections, non-medical debt in collections, or a low credit score. All models were adjusted for age group, gender, and COVID-19 severity, and included an interaction term between cohort and COVID-19 severity.

Population Studied: 132,109 adults ages 21 and above enrolled in a commercial insurance plan in Michigan in January 2021, with a confirmed COVID-19 diagnosis between February - October 2021 (pre-infection cohort) or March - July 2020 (post-infection cohort).

Principal Findings: The pre-infection cohort included 111,090 adults with COVID-19 diagnosis, of whom 11,115 (10.0%) were hospitalized. The post-infection cohort included 21,019 adults, of whom 2,636 (12.5%) were hospitalized. All three primary outcomes were statistically significantly more likely to occur in the post-infection cohort compared with the pre-infection cohort (all $p<0.001$), among hospitalized COVID-19 survivors (all $p<0.001$), and among hospitalized COVID-19 survivors in the post-infection cohort relative to the pre-infection cohort (all $p<0.001$). Among non-hospitalized COVID-19 survivors, the post-infection cohort had higher adjusted probabilities of medical debt in collections (17.5% vs 16.2%), non-medical debt in collections (15.9% vs 13.4%), and a low credit score (33.0% vs 29.1%). Among hospitalized COVID-19 survivors, the post-infection cohort had higher adjusted probabilities of medical debt in collections (29.3% vs 20.1%), non-medical debt in collections (26.5% vs 17.0%), and a low credit score (48.1% vs 35.8%).

Conclusions: Adverse financial outcomes were significantly more common among individuals after COVID-19 infection compared with individuals prior to COVID-19 infection, particularly among individuals hospitalized with COVID-19. To our knowledge, our study is among the first to use credit report data linked to insurance claims data at the individual level to examine financial outcomes before and after COVID-19 infection.

Implications for Policy or Practice: Additional research into financial outcomes following COVID-19 infection, particularly among those who experience more severe illness, is critically needed to inform policies to protect COVID-19 survivors from financial hardship.

The Association of Chronic Disease with Patient Financial Outcomes

Nora Becker, John Scott, Michelle Moniz, Erin Carlton, John Ayanian

Research Objective: The bidirectional relationship between health and financial stability is increasingly recognized. Our objective was to describe the association between chronic disease burden and patients' economic hardship.

Study Design: Commercial insurance claims were linked at the patient level to Experian credit report data in January 2021. We then examined the association between economic hardship and patients' chronic disease burden among thirteen common chronic conditions. Primary outcomes included the probability of having medical debt in collections, non-medical debt in collections, any delinquent debt, a low credit score, or recent bankruptcy, adjusted for age group and gender. Secondary outcomes included the amount of medical and non-medical debt in collections among individuals with non-zero debt.

Population Studied: 2,854,481 adults ages 21 and above, enrolled from January 2019 to January 2021 in a commercial insurance plan in Michigan, including 61.4% with zero chronic conditions, 17.7% with one chronic condition, 14.8% with 2-3 chronic conditions, 5.4% with 4-6 chronic conditions, and 0.7% with 7-13 chronic conditions.

Principal Findings: Among individuals with zero vs 7-13 chronic conditions, the predicted probabilities of having any medical debt in collections (7.6% vs 35%), any non-medical debt in collections (7.2% vs 26%), any delinquent debt (14% vs 45%), a low credit score (17% vs 47%) or recent bankruptcy (0.4% vs 1.7%) were all significantly higher for individuals with more chronic conditions, and increased with each additional chronic condition (all $p<0.001$). Among individuals with medical debt in collections, the estimated amount increased with the number of chronic conditions ($893 for individuals with zero conditions vs $1738 for individuals with 7-13 conditions) (all $p<0.001$). Among individuals with non-medical debt in collections, the estimated amount of non-medical debt did not vary significantly by the number of chronic conditions ($2030 for individuals with zero conditions vs $2095 for individuals with 7-13 conditions).

Conclusions: This cross-sectional study of commercially-insured adults linked to patient credit report outcomes demonstrates a strong association between increasing burden of chronic disease and economic hardship. To our knowledge, our study is among the first to use administrative financial data linked at the individual level to examine the relationship between objectively measured financial outcomes and chronic disease diagnoses.

Implications for Policy or Practice: Some portion of this relationship is likely explained by poor financial health leading to the development of additional chronic conditions, while another portion may be due to chronic disease causing additional financial burden and worsened credit outcomes, as reflected by the rise in medical debt in collections among individuals with more chronic disease diagnoses. Further research in this area is critically needed. If poor financial wellbeing leads to additional chronic disease, policymakers should incorporate improved health outcomes as a benefit when considering the costs of anti-poverty initiatives. If, in contrast, chronic disease diagnoses directly contribute to financial distress, improving commercial insurance benefits and implementation of other social safety net policies would be warranted to protect patients from out-of-pocket medical expenses and recoup lost income after illness.

Development and launch of text based postpartum support program

Carrie Bell, Faith Horbatch, and Elizabeth Seif; and the Postpartum Care Collaborative

Background: Traditional postpartum care consists of one or two visits in the first six weeks after the birth of a child. After the first six weeks, patients conclude care with their obstetrical provider until their next well woman exam in a year. There is mounting evidence that postpartum depression and anxiety can present anytime in the 12 months after the birth of a child with maternal suicide peaking between 7 and 8 months postpartum. This 11-month gap in care results in a delay in identification of mood disorders. Additionally, pelvic floor dysfunction, traumatic birth experiences, pregnancy outcomes which increase lifelong cardiovascular risk or recurrence in subsequent pregnancies, and satisfaction with family planning may not be discussed until a year after birth. When surveyed, providers and patients expressed dissatisfaction with the current state of postpartum care. Traditional postpartum care no longer provided the necessary support for patients. A quality improvement initiative leveraging in person, virtual, and text-based platforms during the first year after birth began.

Methods: In June of 2020, a group of stakeholders from five departments gathered to identify and prioritize key elements of postpartum care in the first year. This multi-disciplinary team created the outline from which our postpartum care plan stems. Recommendations for focused visits for blood pressure, mood or surgical site evaluation were formalized. A 2-month optional virtual check in for parent and baby was created and led by the ambulatory social work team. The well women exam was shifted to 4-6 months post birth. The content of this annual exam focused on assessment of mood, the pelvic floor (leaking, healing, and pain), pregnancy outcomes which result in lifelong cardiovascular risk and potential recurrence, traumatic birth experience, and discussion of family planning. Finally, overarching these elements was a text-based support system titled Pregnancy to Parent Wellness (PTPW) using the Michigan Medicine texting platform, MPOTA. The birth parent is enrolled on Labor and Delivery. The person receives weekly texts for the first 13 weeks after birth and monthly until 12 months. Each text has a link to online resources collated on the Michigan Medicine website. The resources were collected, vetted, and grouped together over the 12 months postpartum, timing the resource with the anticipated need. The resource links are available any time e.g., a person could see the resources for month twelve in week one if they chose. In addition to the texting the resources, participants in the PTPW program are asked three questions every other week in the first 3 months and monthly thereafter which focus on physical concerns, mood, and infant care/concerns. A positive response to any question results in a call to the patient from the appropriate clinical team to follow up on their concern and arrange a visit if needed.

Results: The PTPW launched in Oct of 2022. Deliveries have ranged from 460 (Oct 2022) to 372 (Feb 2023). Enrollment in the program has increased from 10% in Oct to 24% in Feb 2023. Patient response rate has ranged from 25-30% with 0-10 people opting out in any given month. Alerts (positive responses to a texted question) have increased from zero in the first month to twenty-nine across the entire institution in Feb.

Conclusion: Enrollment has increased however remains less than 50% five months into the program. Identification of barriers to enrollment may increase participation. New parents have concerns which are being addressed with the PTPW program.

Colpodynamic Imaging: A Novel Three-dimensional Ultrasound-based Assessment of Vaginal Capacity and Distension

Allie Blokker, Shufei Zhang, Ali Borazjani, Christopher Hong, Michael Chaikof, Humara Edell, Maria Giroux, Golafsoun Ameri, Colleen McDermott

Introduction: Objective, quantitative assessment of vaginal capacity and distension may aid in pessary selection and the design of patient-specific pessaries for women with pelvic organ prolapse (POP). This work presents a novel imaging technique, colpodynamic imaging (CDI), that provides a quantitative evaluation of the vagina under distension. CDI integrates three-dimensional (3D) transintroital ultrasound with a modified urodynamics system to capture vaginal shape, volume, and pressure changes during intravaginal distension with a hypoechoic fluid (e.g., water) (Figure 1).

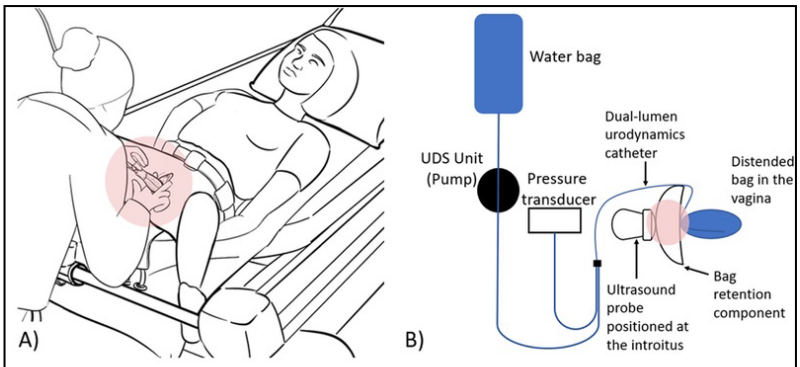


Figure 1. (A) A schematic of a clinician inserting the bag in preparation for the colpodynamic imaging (CDI) exam while the patient is in supine position. (B) A schematic of the 3D ultrasound and modified urodynamics system used to perform CDI. The bag used in this study was designed to be greater than predicted maximal vaginal capacity (maximum volume of 850 mL).

Objective: To assess the feasibility and preliminary repeatability of CDI.

Methods: Patients using a vaginal pessary for symptomatic POP were recruited for this pilot study. All patients first underwent 3D transperineal ultrasound in the supine position to establish the location of the pubic symphysis, bladder, urethra, rectum, and levator plate. An ultrathin, oversized bag (thermoplastic polyurethane, 0.076 mm wall thickness, Figure 1B) was inserted into the vagina and filled with water through a urodynamics catheter that was part of a modified urodynamics system. A novel bag retention device was placed over the introitus to prevent dislodgement of the bag during filling while providing a window for ultrasound imaging. The total instilled water volume and intravaginal pressure were recorded during filling. At maximum vaginal capacity, indicated by a sensation of vaginal fullness by the patient, 3D transintroital ultrasound of the distended vagina and surrounding pelvic structures was performed. Baseline

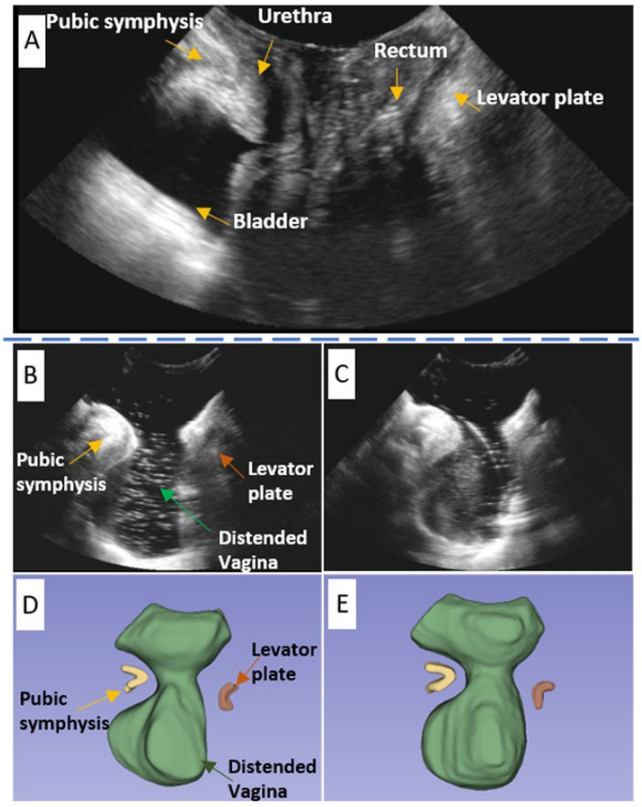


Figure 2. (A) Midsagittal view of a 3D transperineal ultrasound image without vaginal distension (i.e., baseline ultrasound). (B) and (C) the midsagittal CDI images of the distended vagina in Round A and Round B, respectively. The images were captured two hours apart in the same patient. (D) and (E) 3D surface model segmentation of the distended vagina (in green) relative to the pubic symphysis (in yellow) and levator plate (in brown) in Round A and Round B, respectively.

ultrasound and CDI sequences were performed twice for each patient, two hours apart (Round A and Round B). Using 3D Slicer software, a 3D surface model of the distended vagina was created from each ultrasound scan (Figure 2) and the following measurements were obtained: segmented volume, anterior-posterior diameter, lateral diameter, maximum and minimum diameter, and vaginal length. To assess repeatability between measurements in Round A vs. Round B, the within-subject standard deviation (SD) normalized to the mean was calculated for each measurement.

Results: Sixteen patients with POP completed both rounds of imaging (median age 72 years, range 44-79; median POP quantification stage 2, range 2-3). On 3D transintroital ultrasound, there was sufficient echogenicity of the distended vaginal wall to establish boundaries for 3D surface models of the vagina (Figure 2B-E). The median intravaginal volume and pressure at maximal vaginal capacity were 485 mL and 48 cmH2O, respectively. Between Round A and Round B, normalized within-subject SD was 10% for volume, and 22% for pressure; Bland-Altman plots for individual subjects are shown in Figure 3. The normalized within-subject SD values for vaginal measurements were as follows: anterior posterior diameter (13%), lateral diameter (3%), maximum diameter (11%), minimum diameter (9%), and vaginal length (9%).

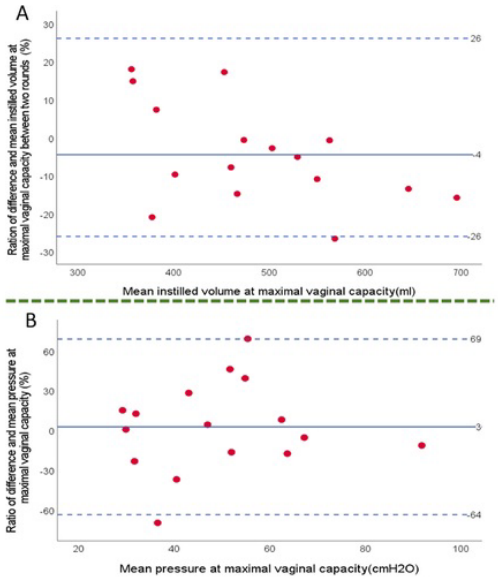


Figure 3. Bland-Altman plots: the ratio of difference and mean (A) instilled volume and (B) pressure at maximal imaging fills for all 16 patients (red dots). Solid line represents mean; upper and lower dashed lines show lower and upper limit of agreement (mean±1.96×SD), respectively.

Conclusions: This novel 3D ultrasound imaging technique provides a feasible and reproducible method for characterizing vaginal capacity and distension. CDI has the potential to provide quantitative data to inform the design of customized, patient-specific pessaries.

Perspectives on interdisciplinary research in the field of women's health research
Luyun Chen

I want to share my unique perspective as a biomedical engineer scientist with interdisciplinary research background in the field of women's health research. Women's health is a multifaceted and dynamic field and Interdisciplinary research is essential for advancing our understanding of complex women's health issues. As a biomedical engineer, I contribute to the field by developing new technologies, devices, collaborating with medical professionals and researchers, analyzing large and complex datasets. By working together, we are making significant progress in understanding the mechanism of pelvic floor disorders and provide patient-specific interventions to improve treatment outcomes. While interdisciplinary research in women's health can be highly rewarding, it also poses several challenges such as spending time to learn the vocabulary and methodology and challenges of other disciplines, identify Interdisciplinary peer-review for funding and publications. With the support of our departments and institutes, effective communication and collaboration, and a willingness to learn and understand each other, we can overcome these challenges and make meaningful progress in improving women's health outcomes.

Patient Recovery and Opioid Use After Hysterectomy

Jennie DeBlanc, Chad Brummett, Vidhya Gunaseelan, Sawsan As-Sanie, Daniel Morgan

Objectives: To analyze how postoperative opioid use and return to activity varies by surgical approach for hysterectomy.

Materials and Methods: Hysterectomies performed for gynecologic indications between January 1, 2018 and October 31, 2019 and abstracted into a statewide collaborative were linked to the State's prescription drug monitoring program. We analyzed two outcomes with respect to surgical approach: postoperative opioid consumption in morphine milligram equivalents (MME) 30 days after hysterectomy, and return to baseline activity assessed with a patient questionnaire. Adjusting for comorbidities, preoperative opioid use, and surgical approach (open, laparoscopic and vaginal hysterectomy), we used a multivariable linear regression model and a multivariable logistic regression model to identify factors associated with postoperative opioid consumption and return to baseline activity >4 weeks after surgery respectively.

Results: 2,359 of 9,140 patients in the registry were linked to the State drug monitoring program and were included in our study. Postoperative opioid consumption in MME (mean, 95% CI) was 54.8 (48.7, 60.8) for open, 39.8 (37.1, 42.5) for laparoscopic, and 33.4 (28.5, 38.3) for vaginal hysterectomy. Lower opioid consumption was associated with those >65 years, those with a history of non-gynecologic cancer, those undergoing hysterectomy for a gynecologic cancer, and those who had surgery in 2019 vs 2018. The probabilities of returning to baseline activities in >4 weeks (95% CI) were 64% (59-68%) for open, 43% (40-45%) for laparoscopic, and 53% (47-58%) for vaginal hysterectomy. Readmission was associated with return to baseline activities >4 weeks after surgery, and history of non-gynecologic cancer with <4 weeks.

Factors Significantly Associated with Opioid Consumption After Hysterectomy

	Coefficient	P Value	95% Confidence Interval	
Open surgical approach (ref group: laparoscopic)	14.98	<0.001	8.24	21.72
Vaginal surgical approach (ref group: laparoscopic)	-6.38	0.024	-11.90	-0.86
Preoperative opioid use	12.76	<0.001	7.52	18.01
Age 18 to 29 (ref group: >=65 years)	42.61	<0.001	25.23	59.99
Age 30 to 39 (ref group: >=65 years)	39.40	<0.001	30.61	48.19
Age 40 to 49 (ref group: >=65 years)	35.68	<0.001	26.96	44.39
Age 50 to 59 (ref group: >=65 years)	20.33	<0.001	12.65	28.01
Age 60 to 64 (ref group: >=65 years)	10.35	0.012	2.26	18.44
Smoking	13.65	0.001	6.61	20.70
History of non gynecologic cancer	-10.72	0.050	-21.42	-0.02
Medicare and/or Medicaid insurance (ref group: private)	8.58	0.007	2.31	14.86
Surgery year 2019 (ref group: 2018)	-9.23	<0.001	-14.11	-4.35

Factors Significantly Associated with Return to Activity After Hysterectomy

	Odds Ratio	P Value	95% Confidence Interval	
Open surgical approach (ref group: laparoscopic)	2.41	<0.001	1.91	3.04
Vaginal surgical approach (ref group: laparoscopic)	1.51	0.002	1.17	1.94
History of non gynecologic cancer	0.60	0.019	0.39	0.92
Hospital readmission	2.34	0.021	1.14	4.81

Conclusion: Laparoscopic and vaginal hysterectomy are associated with lower postoperative opioid consumption and a more rapid return to normal activities. These findings support the importance of considering minimally invasive hysterectomy in efforts to improve patient safety and outcomes.

Structural Failure Sites at Rest in Women with Cystocele: A Mid-sagittal MRI Analysis

Mary E. Duarte Thibault, Payton Schmidt, John O. DeLancey, Luyun Chen

Introduction: Although prolapse is typically analyzed during Valsalva, we recently discovered that resting measures, such as enlarged levator hiatus and a dorsally oriented levator plate shape, are associated with increased risk of prolapse recurrence. Abnormalities at rest may be due to permanent structural changes indicating advance disease.

Objective: To quantify the resting structural failure site frequency and severity in a prospective cohort of women with cystocele compared to normal controls.

Methods: Secondary analysis of pelvic MRIs of women in two groups: 1) anterior predominant prolapse, defined as Ba ≥1 cm below the hymen, and 2) parous controls with normal pelvic support. We analyzed resting structural measurements on mid-sagittal MRIs using ImageJ: apex location, urogenital hiatus (UGH), levator hiatus (LH), levator area (LA), and levator plate (LP) shape as shown in Figure 1. Principal component analysis was used to quantify LP shape variations between groups. Positive principal component (PC) scores indicate a more vertical position of the LP in relation to the body axis which indicates a lower pelvic floor. MR measures and PC scores were compared between groups using independent t-test. "Structural failure site" was defined as MRI measures greater than the 90th percentile of normal controls. The failure frequency was calculated as the proportion of prolapse women with respective structural site failures. The impairment severity z-score was calculated as the structural measurement z-score relative to the normal distribution in control subjects. We also examined the correlation between resting MRI measures and maximum prolapse size on POP-Q.

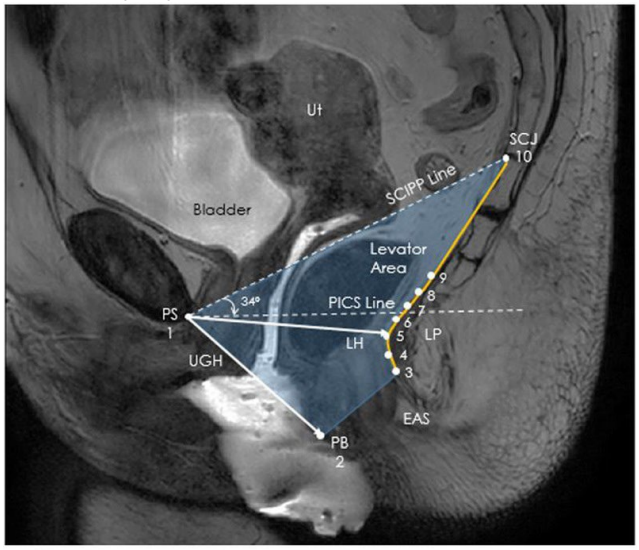


Figure 1. Resting midsagittal MRI-based measurements include pubic symphysis (PS), urogenital hiatus (UGH), genital hiatus (GH), levator hiatus (LH), sacrococcygeal joint (SCJ), levator area (blue shaded area). Levator plate (yellow line) identified based on landmarks noted by white dots. From Schmidt 2021.

Results: Eighty-nine women were included: 59 (66.3%) women with prolapse and 30 (33.7%) controls. Mean age (mean 59.9 ± standard deviation 11.7 years vs 57.7 ± 5.6 years, P = .34), BMI (26.2 ± 4.6 kg/m2 vs 27.7 ± 6.2 kg/m2, P = .26), and parity (mean 3 IQR (2,4) vs 3 (2.75, 5)) did not differ between groups. Maximum prolapse size on POP-Q in cases was 3 (2,4) versus -1.5 (-2.5, -1) in controls (P < .001). Women with cystocele had 31.9% larger LA (P < .001), 35.9% larger UGH (P < .001), 13% larger LH (P < .001), and 2 cm lower apex location (P < .001) on resting MRIs compared to controls (Figure 2). Women with prolapse also had significantly larger PC1 scores, indicating a more dorsally orientated LP than normal controls (4.9 ± 17.5 vs -9.6 ± 16.5, P < .001). Failure frequency was highest at apex location (55.8%), followed by UGH (45.8%), PC1 score (40%), LH (37.3%), and LA (28.8%) (Figure 3). The median number of failure sites was 2 (1,4) in women with prolapse, with an average (SE) impairment score of 1.3 (0.41). (Figure 3). Resting measures have moderate to strong correlations with POP-Q maximum prolapse size (r ranges from .33 to .67, P < .001).

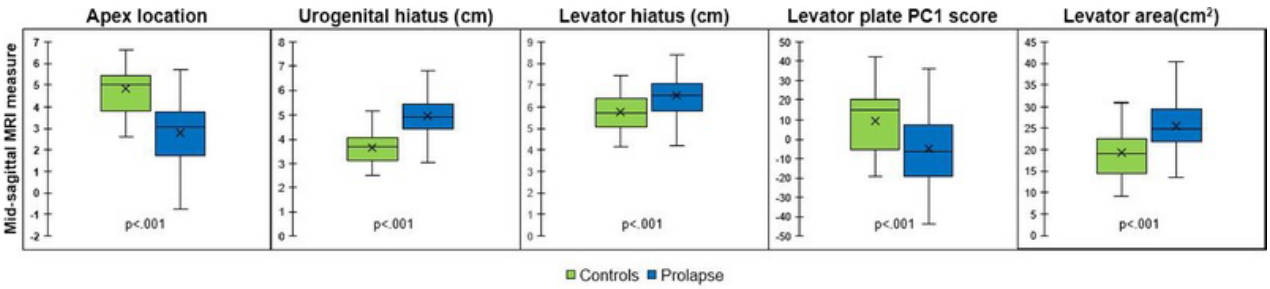


Figure 2. Resting MRI measures in subjects with anterior vaginal prolapse compared with normal controls. The top error bar indicates the 75th percentile to the maximum and the bottom error bar indicates the 25th percentile to the minimum.

Conclusions: At rest, 56% of women with cystocele have an abnormally low apical location, 40-46% have larger than normal UGH and an abnormal dorsally oriented LP shape. The severity of these resting structural failures is significantly associated with increasing maximum prolapse size.

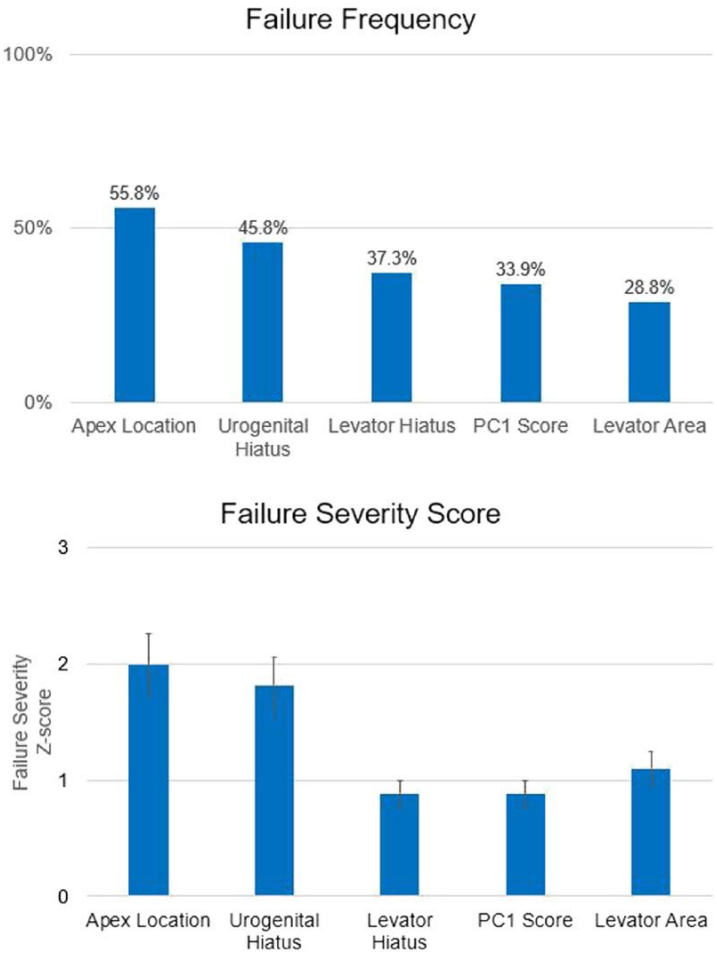


Figure 3. Resting failure site frequency and severity score among women with anterior vaginal wall prolapse. Top: the percentage of subjects with MRI measures outside the 90th percentile for normal controls. *Bottom*: the mean *z*-score among subjects for each MRI measure. Error bars represent the standard error of the mean.

Development and Validation of Machine Learning Algorithms for Predicting Ring Pessary Size in Patients with Pelvic Organ Prolapse

A Eltahawi, Christopher Hong, Javier Pizarro-Berdichevsky, M. Robert, R. Cheung, Golafsoun Ameri, Ali Borazjani

Introduction: Vaginal pessaries are a cost-effective and low-risk treatment option for patients with symptomatic pelvic organ prolapse (POP). There have been prior attempts to predict pessary size and type based on clinical POP quantification (POP-Q) exam measurements using logistic regression, but pessary fitting remains a trial-and-error process. Machine learning (ML) algorithms, a subset of artificial intelligence, have the potential to generate superior prediction models that, when applied to pessary selection, could reduce the number of fitting attempts and time to effective treatment.

Objective: Our primary objective was to predict the size of ring pessaries worn by patients with POP using ML models. Our secondary objective was to compare the accuracy of the ML models to logistic regression models and occurrence-based random selection.

Methods: Predictive models were developed using combined retrospective and prospective datasets of patients with POP that consistently reported ring pessary size and success following fitting at three clinical sites worldwide (Hong Kong, Canada, and Chile). Patients were included in the analysis if they were successfully fitted with a ring pessary and continued pessary use for at least one year. Our primary outcome was the size of the ring pessary used. The ring pessary diameter was used to group pessaries into 10 discrete sizes (e.g., ring size #1-10), the most common size scale in our cohort. POP-Q exam measurements and ratios between measurements (e.g., genital hiatus/total vaginal length) were used as predictor variables. We developed two ML models using random forest (RF) and extreme gradient boosting (XGboost) algorithms and one traditional statistical model using logistic regression. We also developed a model using occurrence-based random selection (i.e., selecting a pessary size solely based on the known distribution of sizes). The data was randomly split into 70% and 30% for training and testing the ML models, respectively. The accuracy of the models was assessed for one prediction and two predictions.

Results: A total of 694 patients using ring pessaries met inclusion criteria for this study. The distribution of fitted pessary sizes is shown in Figure 1. The RF model had the best accuacary for one and two predictions (33% and 48%, respectively) followed by the XGboost model (30% and 47%, respectively) (Table 1). Both ML models had a higher accuracy for one and two

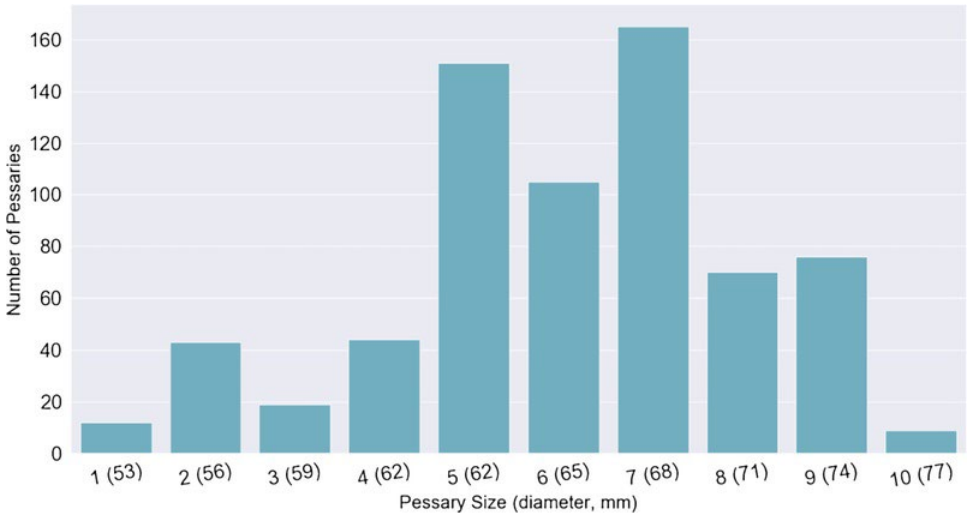


Figure 1: Distribution of ring pessary sizes

predictions compared to logistic regression (20% and 43%, respectively) and occurrence-based random selection (17% and 41%, respectively). In assessing accuracy after one prediction, logistic regression had only 18% improvement over occurrence-based random selection, whereas RF and XGboost models had 94% and 76% improvement, respectively. All models showed an expected improvement in accuracy with two predictions.

Table 1. Accuracy of the prediction models in predicting the ring pessary size

Prediction Model	Model Accuracy, One Prediction	Model Accuracy, Two Predictions
Random Forest	33%	48%
Extreme Gradient Boost	30%	47%
Logistic Regression	20%	43%
Occurrence-based Random Selection	17%	41%

Conclusions: Machine Learning models are more accurate than statistical models and occurrence-based random selection in predicting the size of ring pessaries among pessary users, demonstrating the potential of ML techniques to improve upon empiric pessary selection. Nevertheless, prediction accuracy based solely on POP-Q measurements remains poor. Additional predictors, such as vaginal width or capacity, are likely to improve the predictive ability of ML models.

Pregnancy Outcomes in Patients with Obstructed Hemivagina Ipsilateral Renal Agenesis (OHVIRA)

Elizabeth Erkkinen, Mina Farahzad, Kathleen O'Brien, Monica W. Rosen

Background: Obstructed Hemivagina with Ipsilateral Renal Agenesis (OHVIRA) is a rare congenital Mullerian anomaly. The diagnosis usually presents soon after menarche with pain secondary to hematocolpos from an outflow obstruction of menstrual blood from the hemivagina. Treatment involves vaginal septum resection to relieve the obstruction. Currently, there is a paucity of data on the impact of OHVIRA on pregnancy outcomes.

Methods: To address this knowledge gap, a retrospective chart review was completed. Using ICD codes for OHVIRA and pregnancy, 8 patients were identified with a diagnosis of OHVIRA and at least one documented pregnancy. Data were collected on demographics, age of diagnosis and repair, gynecologic history and pregnancy outcomes. Descriptive analysis was performed.

Results: Twenty-three pregnancies were identified in total among the 8 women, with a range of 1 to 5 pregnancies per patient. Three patients had an infertility diagnosis, and 1 pursued in-vitro fertilization. Of the 23 pregnancies, there were 9 term births, 6 preterm births, and 8 spontaneous abortions in the first trimester. On average, the first pregnancy was 8 (range 2 to 21) years after surgery for OHVIRA and resulted in a live birth in 75% (6/8) women. Of the 15 pregnancies resulting in live birth, 10 were cesarean deliveries, 4 were vaginal deliveries and 1 was a forceps-assisted vaginal delivery. The average gestational age at delivery was 37 weeks and 2 days; however, 60%, or 9/15 live births, were at term. The most common pregnancy complications included fetal growth restriction (2/15) and preeclampsia with severe features (2/15). Three of the patients (3/10, 30%) underwent primary cesarean deliveries due to fetal malpresentation, with one patient first undergoing an unsuccessful external cephalic version. Another 5 live births were via repeat cesarean delivery. There were two unscheduled cesareans, at 34 weeks and 36 weeks due to preeclampsia with severe features. Two patients delivered after going into preterm labor, one of whom also had premature prelabor rupture of membranes. One patient experienced retained placenta following a normal spontaneous vaginal delivery requiring removal under ultrasound guidance.

Conclusion: This study is the first of its kind to look at pregnancy outcomes among patients with OHVIRA. This descriptive data set serves to address a knowledge gap to help clinicians advise patients with OHVIRA about pregnancy outcomes more effectively.

Establishment and characterization of a human Spinal and Bulbar Muscular Atrophy (SBMA) disease specific human embryonic stem cell (hESC) line

Indri Erliandri, Laura Keller, Agamjot Sangotra, Andrew Lieberman, Gary D. Smith

The Spinal and Bulbar Muscular Atrophy (SBMA) syndrome is a X-linked motor neuron disease causing progressive muscle weakness and atrophy. SBMA onset is in adulthood and associated with an Androgen Receptor (AR) gene mutation on the X chromosome at the locus Xq11-Xq12. Expansion of a CAG repeat of the AR is transmitted from parent to offspring. The polyQ encoding CAG repeat in the AR gene of SBMA patients are longer than non-SBMA individual, with the expansion 40-68, compared to 13-32 CAGs, respectively. Transcriptional activity of AR is inversely related to polyglutamine repeat length, where transcription is less active in AR with longer polyglutamine repeats. Here we report derivation and characterization of the first SBMA-specific human embryonic stem cell (hESC), referred to here as SBMA-hESC. The Inner Cell Mass (ICM) of a day-5 SBMA-affected (X,Y) human embryo was biopsied and cultured on HFF feeders in Xeno-Free (XF) media, followed by maintenance and expansion on MG-coated plates. The cytogenetic analysis of G-banded metaphase cells demonstrated a karyotype of 46, XY and the DNA STR profiling confirmed presence of a single cell line and alleles did not match DNA fingerprint patterns of cell lines published in the ATCC, NIH or DSMZ websites. Derived human SBMA-hESC, refer to here as UM197-1, was accepted on the NIH registry of approved hESC lines in 2019 (registration # -0399). The stemness of SBMA-hESC was displayed by the expression of pluripotency markers; Nanog, Oct3/4, Sox2, Tra1-60 and SSEA4. The abilities to differentiate into three germ layers; endoderm, mesoderm and ectoderm were demonstrated in SBMA-hESC generated embryoid bodies (EBs) with the expression of AFP and Gata4, Brachyury and VE-Cadherin, Tuj1 and Krt18, respectively. Sequencing analysis revealed that CAG repeat was expanded in the SBMA-hESCs, and AR expression was 0.5 of that of normal control hESCs. Cellular localization of AR in SBMA-hESCs was accumulated in the perinuclear region, like AR localization in SBMA patients. The newly established SBMA-hESC offers a valuable resource to study SBMA mechanisms of disease onset, disease modelling and progression, and preclinical pharmaceutical treatment assessment and screening.

Experiences of Inappropriate, Disrespectful, or Coercive Health Care: A Study of University Women

Andrea Hess, Charisse Loder, Claire Kalpakjian, Michelle Munro-Kramer

Introduction: A number of prominent cases involving sexual misconduct among university-affiliated physicians reveal the need to assess inappropriate, disrespectful, or coercive (IDC) health care experienced by university students.

Methods: We surveyed students at one public university to gather information about their positive and negative experiences while receiving health care. Survey items included questions about respect for the participant's identity (race, gender, sexual identity) and whether IDC occurred during health care provision. Items queried about experiences with sensitive exams or exams involving the breast, genitals, or rectum.

Results: Survey respondents (n=2495) had a mean age of 23 years, identified as female or trans-male, and had experienced at least five relevant health care interactions (76%). Most respondents reported that their needs were accommodated (99%) and their provider made sure they understood their care (98%). However, respondents felt judged about sexual behavior (52%), experienced sexist comments (42%), reported unwanted attention (29%) or advances (23%), and experienced personal calls (1%) from their provider. During sensitive exams, respondents reported that they waited too long while undressed (26%) and were not provided a gown or drape (5%). Alarmingly, respondents reported that sensitive exams were performed without gloves (2%) and experienced inappropriate touch (1%). Finally, 62% stated that they did not know how to report a concern about a provider.

Conclusion: University students are vulnerable to IDC health care experiences and lack comfort with reporting concerns. These negative experiences reveal the need to improve health professional education, including robust training in cultural safety, professionalism, and trauma-informed care, and to create transparent reporting mechanisms.

Cumulative Effect of Medical and Social Risk Factors on Routine Prenatal Care Screening

Harini Pennathur, Leena Ghrayeb, Dipra Debnath, Stephanie Ganzi, Amy Cohn, Alex F. Peahl

Introduction: Social risk factors affect prenatal care attendance; however, little is known about how cumulative medical and social risk factors influence receipt of prenatal services. We describe the association between medical and social risk factors and the timing of a routine prenatal care screening: gestational diabetes (GDM).

Methods: We identified patients with a GDM diagnosis receiving prenatal care at a single institution from January 1 to December 31, 2018. We divided patients into four groups by medical and social risk factors in the electronic health record: completely low-risk, social risk only, medical risk only, and completely high-risk. We compared the timing of GDM diagnosis and time for all group members to receive the GDM diagnosis. The study was deemed exempt by the institutional review board.

Results: We identified 102 patients with GDM: 11 (10.8%) completely low-risk, 17 (16.7%) social risk only, 11 (10.8%) medical risk only, and 63 (61.8%) completely high-risk. The median gestational age of diagnosis for GDM was 28.6 weeks (IQR, 27.2–30.9) and was similar across groups: completely low-risk 28.8 (IQR, 27.4–30.9) weeks, social risk only 28.2 (IQR, 27.1–29.6) weeks, medical risk only 29.2 (IQR, 27.6–30.1) weeks, and completely high-risk 28.6 (IQR, 26.9–31.4) weeks. The time for all patients to be diagnosed was later for groups with social risk factors, regardless of medical risk factors: completely low-risk 32 weeks, social risk only 35 weeks, medical risk only 30 weeks, and completely high-risk 36 weeks.

Conclusion: Many patients with social risk factors were diagnosed with GDM later in pregnancy. Attention to social risk factors can potentially improve timeliness of diagnosis of pregnancy complications and pregnancy outcomes.

Elective Induction of Trial of Labor after Cesarean at 39 weeks: Is it Risk Reducing?

Lorie M. Harper, George A. Macones, Molly J. Stout

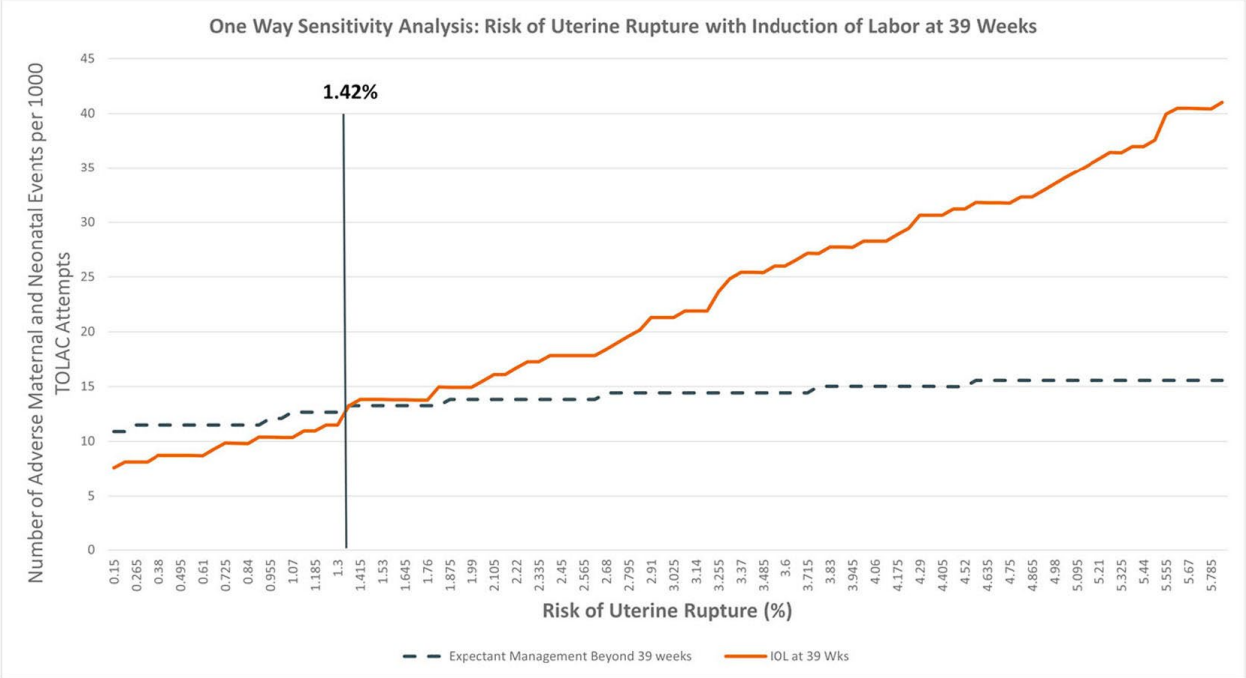
Objective: After the ARRIVE trial, induction of labor (IOL) at 39 weeks became ubiquitous. We aim to determine whether patients with a prior cesarean should undergo risk reducing induction of labor at 39 weeks or be expectantly managed beyond 39 weeks.

Study Design: We created a decision analytic model to compare two management strategies in patients with a prior cesarean: 1) IOL at 39 weeks, 2) expectant management beyond 39 weeks. Patients expectantly managed beyond 39 weeks could: experience stillbirth, undergo indicated induction, or reach 40 weeks. At 40 weeks, patients could be induced or expectantly managed. We assumed all patients would be induced if they reached 41 weeks. We further assumed that all patients would attempt a trial of labor after cesarean (TOLAC) and all patients undergoing TOLAC were at risk for uterine rupture; the risk of uterine rupture was varied by IOL versus spontaneous labor and gestational age. Adverse maternal outcomes considered were maternal death, hysterectomy, operative injury (bowel or bladder injury). Neonatal outcomes considered were stillbirth, neonatal death, and hypoxic ischemic encephalopathy. Baseline risk estimates for uterine rupture, adverse events associated with uterine rupture, failed TOLAC, and successful TOLAC were obtained from the literature. One-way and multi-way sensitivity analyses were performed to address uncertainties in baseline assumptions.

Results: Within baseline assumptions, the model identified that IOL at 39 weeks resulted in fewer adverse maternal or neonatal events compared to expectant management and more vaginal deliveries (Table). The model is sensitive to the risk of uterine rupture associated with IOL at 39 weeks; if the incidence of uterine rupture exceeds 1.42% in those undergoing IOL at 39 weeks, the model favors expectant management. In Monte Carlo simulations, induction of labor was selected in 91.7% of simulations.

Table: Events per 1,000 Trial of Labor after Cesarean Attempts

	IOL at 39 weeks	Expectant Management at 39 Weeks	Incremental Difference
Any Adverse Maternal or Neonatal Event	9.43	12.1	2.67
Any Adverse Maternal Event	6.34	8.53	2.19
Any Adverse Neonatal Event	3.09	3.57	0.48
Vaginal Delivery	620.20	448.71	-171.49
Adverse Maternal Event: Maternal Death, Hysterectomy, other operative injury (eg bowel or bladder injury) Adverse Neonatal Event: Neonatal death, stillbirth, hypoxic ischemic encephalopathy Key Baseline Assumptions: Risk of uterine rupture with IOL at 39 weeks, 40, 41 weeks: 0.63%, 0.62%, 0.71% Risk of uterine rupture after spontaneous labor at 39, 40 weeks: 0.37%, 0.5%			



Conclusion: Risk-reducing IOL at 39 weeks should not be withheld from women undergoing TOLAC and, depending on the risk of uterine rupture, may be associated with more favorable outcomes than expectant management.

Doctors' Voices Can Increase Public Support for Abortion Care
Lisa Harris

Objectives: Doctors' public voices correct negative stereotypes of abortion patients and caregivers. We tested how these corrections impact support for legal abortion and abortion restrictions.

Methods: We conducted a national online survey (n=1,508), oversampling Black, Latinx, Asian and Pacific Islander respondents. Respondents viewed messaging videos featuring a gender, age, and racially diverse cohort of abortion-providing physicians who used specific evidence-based communication strategies. Respondents completed pre-post surveys assessing attitudes about doctors, abortion access, and abortion law/policy. We performed descriptive statistical analysis, t-tests, and regression modeling (Stata SE/14.0).

Results: Endorsement of positive descriptors of abortion-providing physicians increased post-messaging: trustworthy (+11 percentage points), motivated by conscience (+10), compassionate (+9), non-judgmental (+8), ($p<0.001$; $t=-3.27$). Post-messaging, support for legal abortion increased from 43% to 50% ($p<0.001$; $t=-7.03$), and the percentage of respondents who would be *less likely* to support abortion restrictions increased from 30% to 44% ($p<0.001$; $t=-7.99$). Greater post-messaging agreement with positive physician descriptors was independently associated with less likelihood of supporting abortion restrictions (AOR=1.69; $p<0.01$). Notably, favorable shifts away from negative descriptors of physicians (less agreement that doctors are motivated by money, unqualified, harmful) were *not* associated with shifts in abortion law or policy attitudes, suggesting that *replacing* negative stereotypes with positive ones is essential.

Discussion: Voices of doctors who provide abortion care are critical for correcting negative stereotypes and misinformation, which reduces support for abortion restrictions and increases support for legal abortion. It is vital to replace negative images with positive ones by showing doctors' compassion, skill and caring; simply refuting negative stereotypes is not enough.

Labor Induction Outcomes Among Patients with Cardiovascular Disease

Ashley Hesson, Ajleeta Sangtani, Elizabeth Langen

Objective: To characterize induction of labor (IOL) outcomes in women with cardiovascular disease compared across low and high-risk lesions.

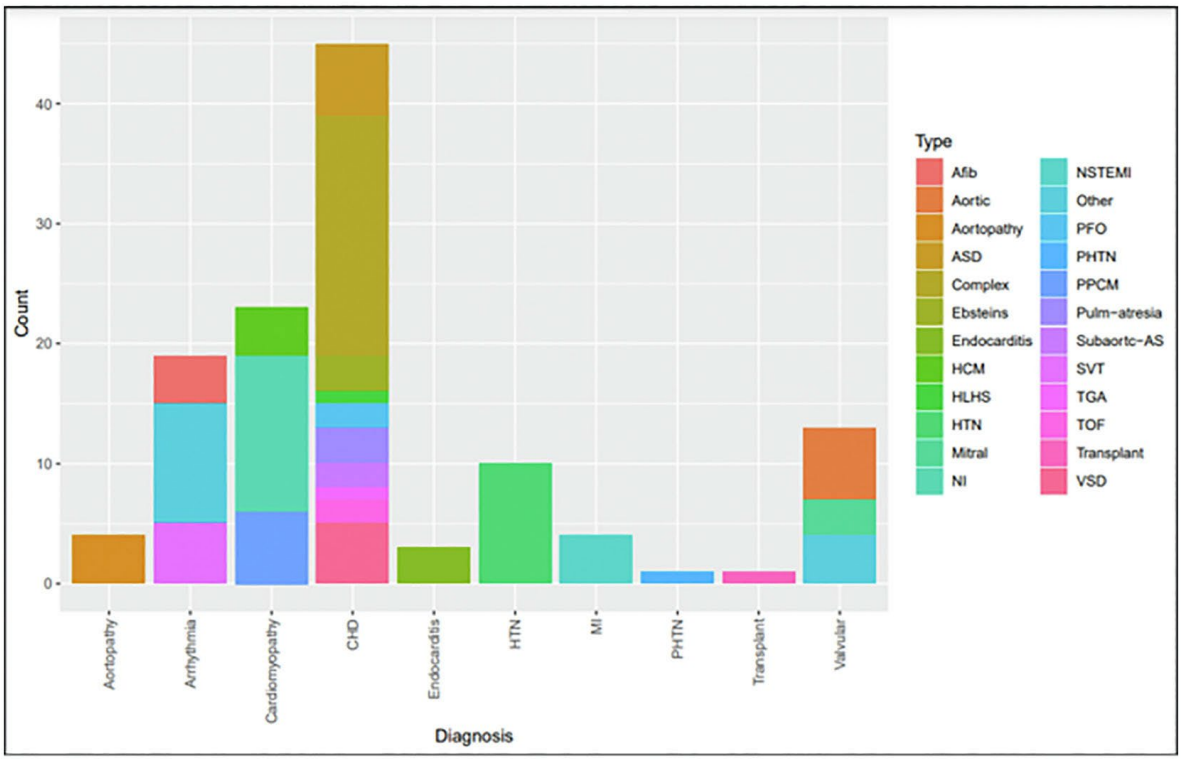
Study Design: A single institution, retrospective cohort study included patients followed in the Cardio-Obstetrics program from 2017-2021 and underwent an IOL. Medical records were reviewed for demographic data including cardiac risk score, reason for presentation to labor and delivery, and mode of delivery. High risk was defined as a CARPREG 2 or greater, indicating a risk of morbidity or mortality of ≥ 10%.

Results: 255 medical charts were reviewed. 76 (29%) patients underwent a planned cesarean delivery (CD) and 56 (21%) presented in spontaneous labor, leaving 123 patients for analysis. Of included patients, 62 (50.4%) were high risk. Figure 1 shows the distribution of cardiac lesions. There were no differences in baseline demographics between groups (Table 1). CD was significantly more common in the low risk group, compared to the high risk group (20% v 11%, P=0.02). Only one patient underwent a CD for cardiac indications after an induction of labor in the high risk group. The most common indication for cesarean in the low risk group was non-reassuring fetal status (71%). In patients that underwent a second stage of labor, the length of the second stage of labor was not significantly different between groups (45min v 48min, P=0.77). The total time to delivery (22hr v 25hr, P=0.1663), time to amniotomy (17hr v 25hr, P=0.27) prevalence of epidural usage (91% v 85%, P=0.3767), and mean quantitative blood loss (567cc v 608cc, P=0.63) were not significantly different between groups. Serious maternal cardiac complications (15% v 11%, P=0.82) did not differ, nor did 5-min Apgar score < 7 (5% v 5%, P=1) or NICU admission (15%v 16%, P=0.97).

Table 1 Baseline Demographics

Characteristic	High-risk (N=62)	Low-risk (N=61)	P-value
Age [Mean(SD)]	29 (6)	29 (6)	0.36
Body mass index [Mean(SD)]	29 (9)	29 (9)	0.77
Race [N(%)] *White* *Other*	 55 (88) 7 (12)	 48 (79) 13 (21)	0.21
Nulliparous [N(%)]	20 (32)	18 (30)	0.89
Dilation (cm) [Mean(SD)]	1.5 (1.0)	1.6 (1.3)	0.53
Hypertensive disorder of pregnancy [N(%)]	10 (16)	6 (10)	0.44
Fetal growth restriction [N(%)]	6 (9)	8 (13)	0.63

Figure 1: Cardiac diagnoses by type



Afib: atrial fibrillation; ASD: atrial septal defect; HCM: hypertrophic cardiomyopathy; HLHS: hypoplastic left heart syndrome; HTN: hypertension; NI: non-ischemic cardiomyopathy; NSTEMI: non-ST elevation myocardial infarction; PFO: patent foramen ovale; pHTN: pulmonary hypertension; PPCM: peripartum cardiomyopathy; AS: aortic stenosis; SVT: supraventricular tachycardia; TGA: transposition of the great arteries; TOF: tetralogy of Fallot; VSD: ventricular septal defect

Conclusion: Women with cardiac disease who are deemed candidates for vaginal delivery had equivalent obstetrical outcomes regardless of CARPREG risk category. Vaginal delivery can be supported for most women with cardiac disease. The higher rate of cesarean birth for women with lower cardiac risk scores should be evaluated in other cohorts.

Prediction Models for Same-Day Discharge Following Benign Minimally Invasive Hysterectomy

Christopher Hong, Neil Kamdar, Daniel M. Morgan

Objectives: To develop prediction models for same-day discharge (SDD) following minimally invasive hysterectomy (MIH) using both clinical and nonclinical attributes and to compare model concordance of individual attribute groups.

Materials and Methods: We performed a retrospective study of patients who underwent elective MIH for benign gynecologic indications at 69 hospitals in a statewide quality improvement collaborative between 2012 and 2019. Potential predictors of SDD were determined a priori and placed into attribute groups (Figure 1). To account for clustering of SDD practices among surgeons and within hospitals, hierarchical multivariable logistic regression models were fitted using predictors from each attribute group individually and all attribute groups in a composite model. Receiver operating characteristic (ROC) curves were generated for each model. To compare the concordance of each attribute group within the composite model, the area under the ROC curve (AUC) of the composite model was compared to that of a model from which a single attribute group was removed. The Hanley-McNeil test was used for comparisons, 95% confidence intervals (CI) for the AUCs were calculated, and a p-value of <0.05 was considered significant.

A. Intraoperative attributes
- Hysterectomy route
- Conversion to laparotomy
- Length of surgery
- Estimated blood loss

B. Surgeon attributes
- Annual hysterectomy volume

C. Hospital attributes
- Annual hysterectomy volume
- Metropolitan status
- Teaching hospital status

D. Patient clinical attributes
- Age
- Body mass index
- American Society of Anesthesiologists class
- Diabetes
- Chronic obstructive pulmonary disease
- Tobacco use
- Hypertension
- Personal history of DVT/PE
- Bleeding disorder

E. Surgical timing attributes
- Surgery start time
- Surgery day of week

F. Patient socioeconomic attributes
- Race
- Insurance type

G. Patient geographic attributes
- Distance from patient home to hospital

Figure 1. Attribute groups for potential predictors of same-day discharge.

Results: Of the 25,770 patients in our study, 5,411 (21.0%) underwent same-day discharge. ROC curves are presented in Figure 2. The composite model had an AUC of 0.777 (95% CI 0.770-0.784). Among models using factors from individual attribute groups, the model using intraoperative attributes had the highest concordance for SDD (AUC 0.715, 95% CI 0.707-0.722). Removal of intraoperative attributes from the composite model was associated with the largest decrease in the composite model AUC (Table 1). Models using surgeon and hospital

Attribute group	AUC, attribute group (95% CI)	AUC, composite model with attribute group removed (95% CI)	*p*-value, AUC of composite model vs. AUC of composite model with attribute group removed
Intraoperative attributes	0.715 (0.707-0.722)	0.719 (0.771-0.726)	<0.001
Surgeon attributes	0.678 (0.670-0.685)	0.771 (0.765-0.778)	<0.001
Hospital attributes	0.659 (0.650-0.667)	0.771 (0.765-0.778)	<0.001
Patient clinical attributes	0.581 (0.575-0.591)	0.771 (0.764-0.778)	<0.001
Surgical timing attributes	0.563 (0.555-0.571)	0.769 (0.762-0.776)	<0.001
Patient socioeconomic attributes	0.551 (0.543-0.558)	0.775 (0.769-0.781)	0.002
Patient geographic attributes	0.535 (0.526-0.544)	0.777 (0.770-0.784)	0.671

attributes were second and third most concordant, respectively (AUC 0.678, 95% CI 0.670-0.685; AUC 0.659, 95% CI 0.650-0.667). Models using surgical timing and patient clinical, socioeconomic, and geographic attributes groups were poor (all AUCs <0.6). Even so, factors from each attribute group contributed incrementally to the concordance of the composite model, with the exception of patient geographic attributes.

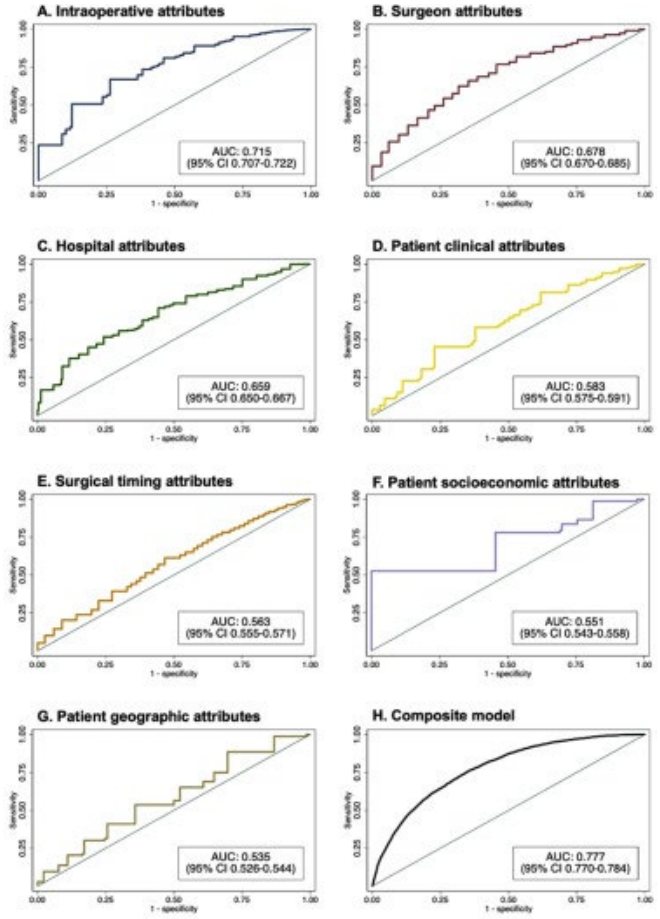


Figure 2. Receiver operating characteristic (ROC) curves for individual attribute groups (A-G) and a composite model (H). AUC: area under the ROC curve.

Conclusion: Clinical and nonclinical attributes contributed to a composite prediction model with good discrimination in predicting SDD following MIH. Factors related to intraoperative, hospital, and surgeon attributes produced models with the strongest concordance. Attention to these attributes may aid efforts to improve utilization of SDD following MIH.

Structural Failure Sites in Anterior Wall Prolapse: Validation of Correlated Apical, Paravaginal, and Hiatal Impairments in a Prospective Cohort

Christopher Hong, Lahari Nandikanti, Beth Schrosbree, John O. DeLancey, Luyun Chen

Introduction: Historically, study of prolapse has focused on what fell (e.g., anterior wall), but now it is possible to identify specific failure sites responsible for the fallen structure in individual women. Cystocele, or anterior vaginal wall prolapse, has been shown to be associated with several failures: apical and paravaginal location, vaginal length and width, and urogenital hiatus size in patterns unique to each woman. A prior pilot study (see ref.) comparing women with cystocele and normal controls using three-dimensional magnetic resonance imaging (MRI), showed that apical location, paravaginal location, and urogenital hiatus size were the predominant failure sites and correlated with one another. Vaginal width did not differ between patients with and without prolapse. However, due to technical challenges at the protocol development phase, many subjects had to be excluded from the pilot study resulting in a small sample size (n = 30) and possible selection bias.

Objective: To identify structural site failure in a larger, prospective cohort of women with cystocele undergoing high- resolution stress 3D MRI.

Methods: A prospective cohort of fifty-three women with anterior vaginal wall-predominant prolapse who had undergone stress 3D MRI at maximal Valsalva were compared to thirty women without prolapse (controls) from prior studies with similar protocols. The anterior vaginal wall length and width (at four equally spaced along vaginal axis), apex and paravaginal locations relative to the Pelvic Inclination Coordinate System (PICS), and urogenital hiatus diameter were measured (Figure 1). Clinical characteristics were compared using the Wilcoxon rank-sum test. Spearman correlation coefficients were calculated to assess bivariate relationships. A p-value <0.05 was considered statistically significant.

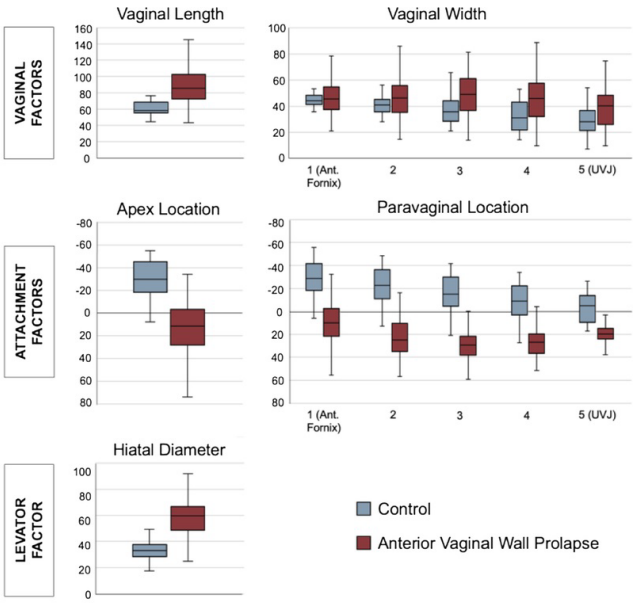


Figure 1. Comparison of vaginal factors (top row), attachment factors (middle row), and levator factors (bottom row) by control and anterior vaginal wall prolapse groups. All *y*-axis measurements are in millimeters. Apex and paravaginal locations are in reference to the inferior pubic point, with more positive values indicating further pelvic descent. All measurements were statistically significant between groups (p< .01 for all).

Results: Subject clinical characteristics are shown in Table 1. Measurement comparisons between groups are shown in Figure 1. Vaginal length was 57% longer in women with prolapse compared to controls (P < 0.01). Similarly, vaginal width was 15-58% greater in women with prolapse compared to controls, with larger differences observed among

Table 1. Clinical characteristics between control and prolapse groups.

Demographics	**Control** (n=30)	**Anterior Wall Prolapse** (n=53)	***p*-value**
Age (y)	57.2 (54.6-62.1)	63.2 (59.8-69.4)	<0.01
BMI (kg/m^2)	26.9 (24.4-30.5)	24.8 (23.1-28.7)	0.19
Parity	3.0 (2.0-4.0)	3.0 (2.0-4.0)	0.50
POP-Q			
Aa (cm)	-2.0 (-3.0 to -1.0)	1.0 (0.0 to 2.5)	<0.01
Ba (cm)	-2.0 (-3.0 to -1.0)	3.0 (2.5 to 4.0)	<0.01
C (cm)	-7.0 (-8.0 to -6.0)	-2.0 (-3.5 to 3.0)	<0.01
D (cm)	-9.0 (-10.0 to -8.0)	-6.0 (-7.2 to -5.0)	<0.01
Ap (cm)	-2.0 (-3.0 to -2.0)	-2.0 (-2.0 to -1.0)	<0.01
Bp (cm)	-2.0 (-3.0 to -2.0)	-2.0 (-2.0 to -1.0)	<0.01

BMI = body mass index; POP-Q = pelvic organ prolapse quantification. Data are presented as median (IQR).

vaginal segments closer to the urethrovesical junction. On average, patients with prolapse had a 33.5 cm lower vaginal apex and 21.5 cm lower paravaginal locations (P < 0.01 for all) compared to controls. Hiatal diameter was 88% greater in women with prolapse compared to controls (P < 0.01). Bivariate correlations between structural failure sites are shown in Figure 2. Paravaginal location, apex location, and hiatus size (the collinear triad) were highly correlated to each other with the correlation coefficient ranging from 0.81 to 0.84 (P < 0.01 for all). Moderate correlations were observed between vaginal length and hiatal diameter (R = 0.63, P < 0.01), and prolapse size (R = 0.61, P < 0.01). Vaginal width was weakly correlated with other structural supports (R < 0.6, P < 0.01 for all).

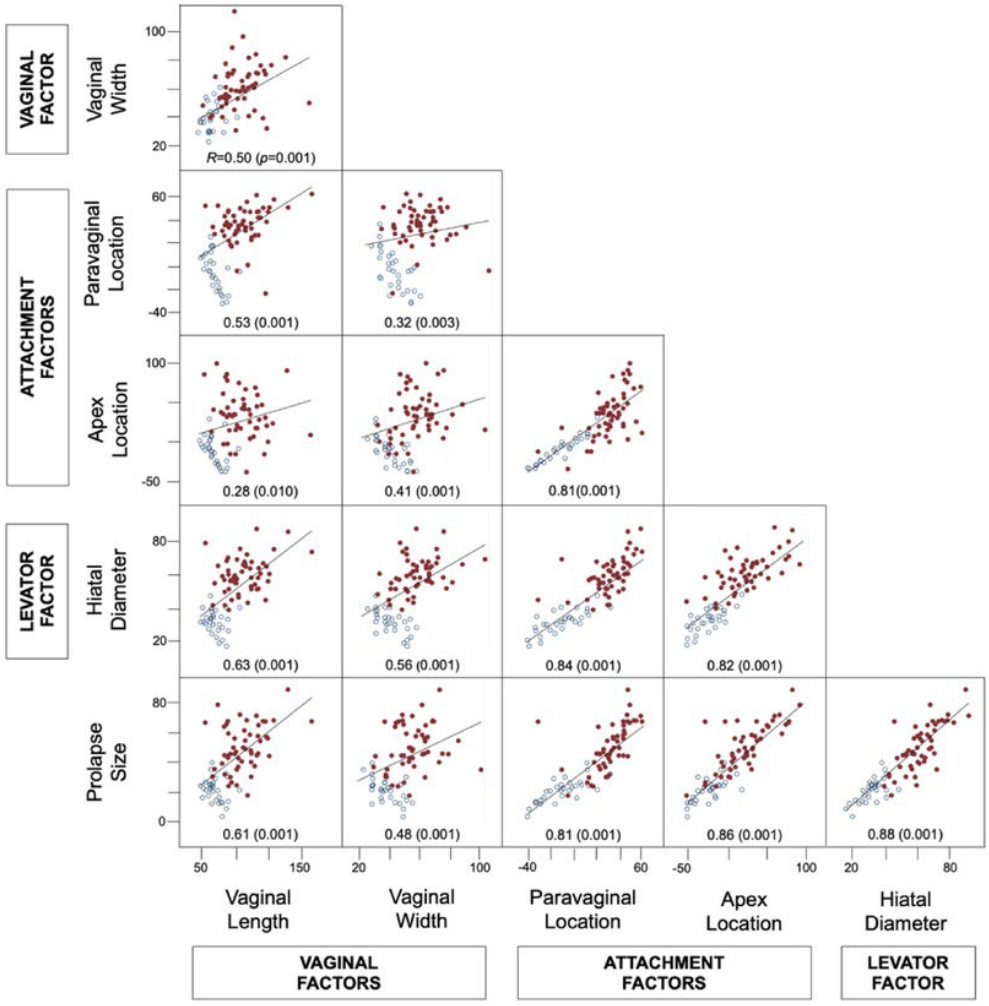


Figure 2. Bivariate scatterplots for each support factor among subjects with prolapse (filled red dots) and controls (open blue dots). Note that paravaginal location, apex location, and hiatal diameter (the "collinear triad") are all highly correlated. The collinear triad is also highly correlated with prolapse size.

Conclusions: We have confirmed the primary causes of cystocele (apical and paravaginal descent and enlarged hiatus size) and their collinearity in an independent prospective and larger cohort of women. These causes are strongly predictive of prolapse presence and size among subjects with cystocele. Contrary to prior findings in less severe prolapse, we found a difference in vaginal width between patients with and without prolapse and a positive correlation between vaginal width and other factors, although this correlation was weak.

Variations in structural support site failure patterns by prolapse size on stress 3D MRI
Christopher X. Hong, Lahari Nandikanti, John O.L DeLancey, Luyun Chen

Background: The pathophysiology of anterior vaginal wall prolapse, or cystocele, involves failure at several fascial and muscular sites. These support sites can be organized into five support structural features grouped into three main domains: 1) fibromuscular wall of the vagina, characterized by length and width; 2) fascial attachments of the uterus and vaginal wall to surrounding structures, including paravaginal and apical attachments; 3) levator ani muscle injury, which results in abnormal hiatal closure. Understanding patterns in frequency and severity of failure at specific structural support sites could aid in future efforts to determine and validate objective cutoff values for patient-specific operative planning.

Objective: To develop and use a standardized measurement system to evaluate structural support sites among women with anterior vaginal wall-predominant prolapse according to increasing prolapse size using stress 3D MRI.

Study Design: Ninety-one women with anterior vaginal wall-predominant prolapse and uterus in situ who had undergone research stress 3D MRI were selected for this analysis. All participants had symptomatic prolapse with pelvic organ prolapse quantification location Ba > 1 and Ba > C, D, and Bp. The vaginal wall length and width, apex and paravaginal locations, and urogenital hiatus diameter were measured at maximal Valsalva. Prolapse size on MRI was measured as the lowest point of anterior wall descent relative to the modified Pelvic Inclination Coordinate System. Subject measurements were compared to established measurements in 30 normal controls without prolapse using a standardized z-score measurement system in controls without prolapse. A z-score greater than 1.28, or the 90th percentile in controls, was considered abnormal. The frequency and severity of structural support site failure was analyzed based on tertiles of prolapse size (small, medium, and large) on MRI.

Results: Substantial variability in support site failure pattern and severity was identified, even between women with the same stage and similar size prolapse. Overall, the most common failed support sites were straining hiatal diameter (91%) and paravaginal location (92%), followed by apical location (82%). An increase in failure frequency was observed in all sites between small and medium/large prolapse size ($p<0.01$ for all), but not between medium and large prolapse size ($p>0.05$ for all). Impairment severity z-score was highest for hiatal diameter (3.56) and lowest for vaginal width (1.40). An increase in impairment severity z-score was observed with increasing prolapse size among all support sites across all three prolapse size tertiles ($p<0.01$ for all). Progression from small, medium, and large prolapse size tertiles was associated with an increase in the total impairment severity z-score (small: 1.47; medium: 2.60; large: 3.60).

Conclusions: This study establishes a novel framework that quantifies the number, severity, and location of structural support site failures in women with different degrees of anterior vaginal wall prolapse. Increasing anterior vaginal wall prolapse size is associated with an increase in the number of structural support site failures from small to medium and an increase in failure severity between all sizes, although significant variation exists between women with similar prolapse sizes.

The Heaney Transfixion Stitch: A Cognitive Task-Analysis Based Educational Video
Whitney Horner, John O. DeLancey, Deborah M. Rooney D, Payton Schmidt

Objective: To teach the critical actions used to perform a Heaney transfixion pedicle ligation ("Heaney stitch").

Description: Mapping the decisions made by experts while performing surgical skills can reveal cognitive mental representations utilized to achieve mastery performance. Cognitive task analysis (CTA) is a method used to deconstruct tasks to identify critical knowledge, action steps, and decision points that may be unintentionally automated by experts. CTA increases the accuracy and completeness of surgeons' instructions on how to complete tasks and has been utilized for making educational interventions in general surgery, plastic surgery, and orthopedics. Three experts and three novices were interviewed on how to perform a Heaney stitch. Eighteen common critical action points were identified and used to generate an educational video.

Conclusion: Using the Fundamentals of Vaginal Surgery (FVS) task trainer, this CTA-based educational video will instruct learners on proper needle loading; suture management; needle placement; how to optimize visualization; and efficiency of motion. This is the first of a planned series of educational videos for the Fundamentals of Vaginal Surgery (FVS) Simulation System.

https://sgs.eng.us/watch.php?vid=c5eaaea0e (SGS login required)

From OASIS to the OR: Timing of Presentation to a Postpartum Pelvic Floor Specialty Clinic in Women Undergoing Secondary Sphincteroplasty

Whitney Horner, Colin Russell, Pamela S. Fairchild, Carolyn W. Swenson, Payton Schmidt

Introduction: Recognition of pelvic floor dysfunction within the first month postpartum can facilitate early intervention, such as surgical treatment or pelvic floor physical therapy, which can help reduce long-term sequalae of traumatic birth. Early secondary sphincteroplasty after obstetric anal sphincter injuries (OASIS) within 21 days of delivery has been associated with outcomes comparable to those following a delayed sphincter repair and likely reduce morbidity and psychologic distress in new mothers [1].

Objective: To determine the average time to presentation to our peripartum pelvic floor disorders clinic in women who undergo secondary sphincteroplasty. Secondarily, to characterize the indications for and determine perioperative outcomes of secondary sphincteroplasty. Lastly, to compare outcomes between woman who underwent sphincteroplasty ≤12 weeks versus >12 weeks from OASIS.

Methods: We conducted a case series of women seen in a peripartum pelvic floor disorders clinic for complications of OASIS who ultimately underwent secondary sphincteroplasty between March 2012 and May 2020. Cases were identified using the CPT code 46750 (repair of anal sphincter). Six board-certified urogynecologists performed all procedures using a similar technique. Demographics, clinical and surgical data were abstracted via chart review. Descriptive analyses were used to describe the cohort. Bivariate analyses were used to compare demographics, delivery characteristics and postoperative complications in women who underwent sphincteroplasty ≤12 weeks versus >12 weeks following OASIS.

Results: Forty women were identified with an average age of 29.2 ± 5.3 years and BMI of 25.6 ± 6.2 kg/m2. Most women were primiparous (n = 30, 75%). All women delivered vaginally with their most recent delivery: 65% had a spontaneous vaginal delivery (n = 26), 20% were vacuum-assisted (n = 8), and 15% were forceps-assisted (n = 6). Fifty-two percent of women had fourth degree lacerations (n = 21). Thirteen percent (n = 5) presented with infected repairs while 33% (n = 13) had wound breakdown. The average time from OASIS to clinic presentation was 59.3 ± 288.3 days, from presentation to surgery was 31.0 days ±115.5 days, and from OASIS to surgery was 70.3 ± 297.8 days. The most common indication for secondary sphincteroplasty was chronic sphincter defect with anal incontinence (n = 19, 47.5%), followed by wound breakdown with anal incontinence (n = 8, 20%). Fifteen percent of women had a 30-day postoperative complication (n = 6). When comparing women who underwent secondary sphincteroplasty ≤12 weeks versus >12 weeks from OASIS, there were no differences in demographic or obstetrical data or 30-day postoperative complications (Table 1), consistent with prior studies. However, indications were significantly different – compared to sphincteroplasties done >12 weeks after OASIS, those done ≤12 weeks were more commonly performed for wound breakdown with/without anal incontinence (68.8% vs 4.2%) and less commonly performed for chronic sphincter defect with anal incontinence (18.8 vs 66.7%).

Conclusions: Average time from OASIS to secondary sphincteroplasty was 10 weeks. Wound breakdown was the indication for surgery in nearly 70% of patients with secondary sphincteroplasty within 12 weeks of OASIS. In our cohort, early secondary sphincteroplasty was not associated with an increased postoperative complication rate. Future studies are needed to compare improvement in

bowel symptoms and anal incontinence between women with early and delayed secondary sphincteroplasty.

Table 1: Demographic, peripartum, and perioperative variables compared between early sphincteroplasty performed ≤12 weeks from incident injury versus >12 weeks.

	≤12 weeks	>12 weeks	p-value
Patient variables	n=16 (40)	n=24 (60)	
Age at delivery (years)	30 (4.9)	29 (5.6)	0.459
Body mass index (kg/m^2)	25.4 (4.0)	25.8 (7.4)	0.861
Primiparous	11 (69)	19 (79)	0.425
Birthweight (g)	3645 (531.0)	3815 (468.4)	0.298
Mode of Delivery			0.589
Spontaneous vaginal delivery	11 (68.8)	15 (62.5)	
Vacuum-assisted vaginal delivery	2 (12.5)	6 (25.0)	
Forceps-assisted vaginal delivery	3 (18.8)	3 (12.5)	
Degree of laceration			0.228
3rd	8 (50.0)	1145.8)	
4th	8 (50.0)	13 (54.2)	
Indication for Secondary Sphincteroplasty			<0.001
Wound breakdown, no AI	4 (25.0)	0 (0.0)	
Wound breakdown w/ AI	7 (43.8)	1 (4.2)	
Chronic sphincter defect w/ AI	3 (18.8)	16 (66.7)	
Fistula w/ chronic sphincter defect	2 (12.5)	5 (20.8)	
Perineal pain, chronic sphincter defect, no AI	0 (0.0)	2 (8.3)	
Postoperative Complications			0.627
No complication	13 (81.3)	21 (87.5)	
Any complication	3 (18.8)	3 (13.0)	
Wound breakdown w/o infection	1 (6.2)	0	
Surgical site infection	1 (6.2)	1 (4.2)	
Fistula	1 (6.2)	0	
Fistula + surgical site infection	0	1 (4.2)	
Severe suture reaction	0	1 (4.2)	

Time from OASIS to presentation	30.2 (18.4)	310.4 (317.5)	<0.001
Time from presentation to OR	13.5 (18.8)	120.3 (216.2)	0.057
Time from OASIS to OR	43.75 (24.5)	430 (401.0)	<0.001
Data are mean (SD) or n (%)			

[1] Lewicky-Gaupp C, et al. Early Secondary Repair of Obstetric Anal Sphincter Injury Breakdown: Contemporary Surgical Techniques and Experiences from a Peripartum Subspecialty Clinic. Female Pelvic Med Reconstr Surg. 2021 Feb 1;27(2):e333-e335.

Levator Plate and Iliococcygeal Muscle Shape Changes Contribute to the Increasing Levator Bowl Volume with Aging

Whitney Horner, Carolyn W. Swenson, John O. DeLancey, Luyun Chen

Introduction: Pelvic floor failure is a critical causal factor in prolapse. A full understanding of its structural alterations is incomplete, and the separate contribution from childbirth and age is unclear. Levator bowl volume (LBV), of which the levator plate (LP) and iliococcygeus muscle (ICM) shapes are key structural features, increases with age in women with, and without, prolapse (Figure 1A). The contributions of LP and ICM shape changes alone or in combination to increased LBV with aging is unclear.

Objective: To quantify age-related changes independent from childbirth changes in the LP and ICM across three different nulliparous age groups. Additionally, we sought to quantify the contribution of these shape changes to LBV.

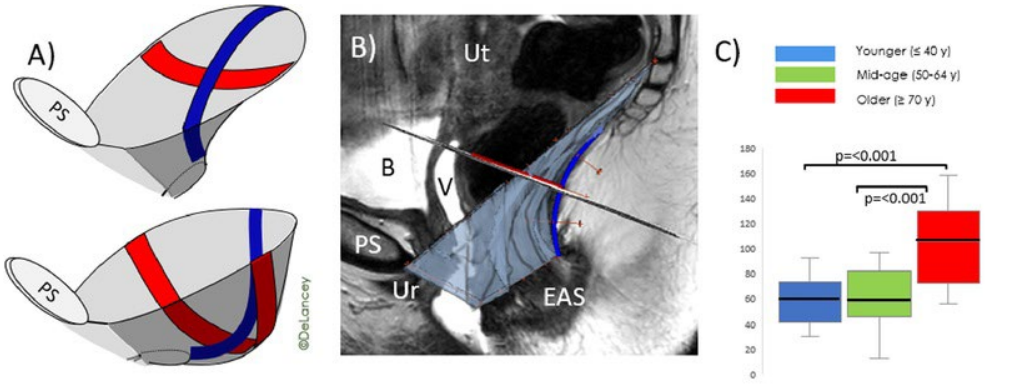


Figure 1. A) Conceptual model for age-related pelvic floor changes, representing the levator plate (blue band) and ICM (red band). B) Mid-sagittal MRI with blue line showing the levator plate. Axial plane tipped to measure in plan of ICM. Levator bowl volume is demonstrated. Pubic symphysis (PS), bladder (B), urethra (Ur), vagina (V), uterus (Ut), external anal sphincter (EAS). C) Average levator bowl volumes for young, middle-aged, and older nulliparous women.

Methods: 3D Slicer™ was used to model the LP, ICM, and LBV using high resolution 2 mm resting sagittal, axial, and coronal MR images from young, middle-aged, and older nulliparous women (Figure 1B). First, the LP was identified on mid-sagittal image and the ICM was then sampled in the middle of the LP. On rotated axial and coronal MRI, B-spline curves were identified representing ICM muscle shape (Figure 1B). LP and ICM shape evaluation was performed with principal component analysis (PCA). For each analysis, two independent shape variations (PC1, PC2) were identified, and PC scores were compared using one-way analysis of variance. A bivariate correlation was explored to identify the shape variations significantly associated with LBV. Linear regression model estimated significant shape variation's relative contribution to LBV.

Results: Ten young (24 ± 3.5 years old), 10 middle-aged (58 ± 4.7 years old), and 10 older (74 ± 4.7 years old) nulliparous women were included. LBV from young to middle-aged women were similar (59 ± 19.3 cm3 versus 63 ± 10.2 cm3, P= > 0.99). LBV in the older group was larger than both younger groups (older 108 ± 34.5 cm3 vs middle 63 ± 10.2 cm3 vs younger 59 ± 19.3 cm3, P = <0.001) (Figure 1C). Age-related LP shape change was seen in PC1 (Figure 2). Younger women had a more horizontal LP shape while the middle-aged and older women had a more vertical LP shape. For the ICM shape analysis, an age-related shape change was seen in PC2 (Figure 3). Older women had a more concave upward ICM than young and middle-aged women who had a more convex ICM. LP PC1 and ICM PC2 were significantly correlated with LBV (r = .67, r = .64

respectively). LP PC1 can explain 40% of the variation of LBV. ICM PC2 can explain an additional 26% of LBV variation. Together, ICM and LP can explain 66% of the variation in LBV.

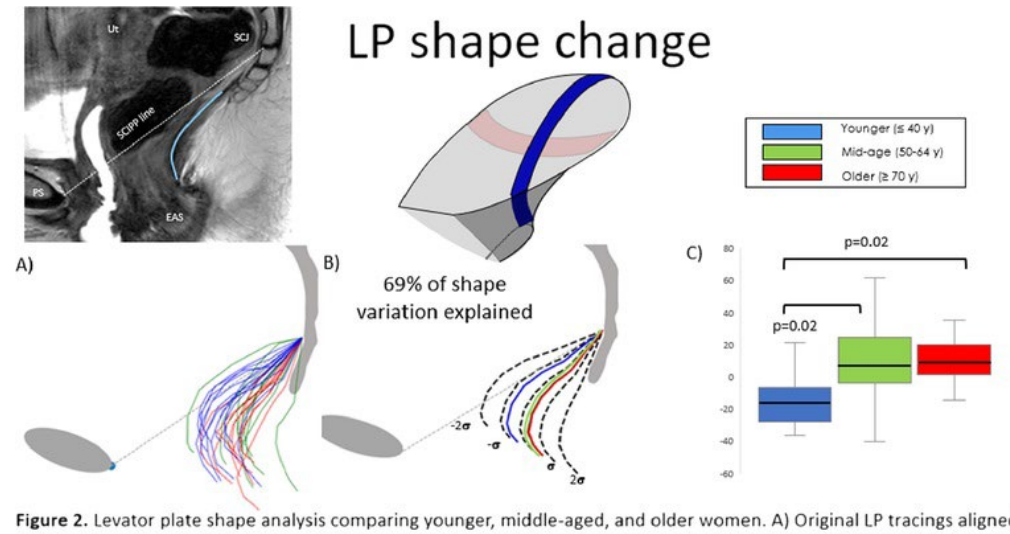


Figure 2. Levator plate shape analysis comparing younger, middle-aged, and older women. A) Original LP tracings aligned at the sacrococcygeal joint. B) Predominant LP shape variations for each groups. C) PC scores compared among groups. PC = principal component

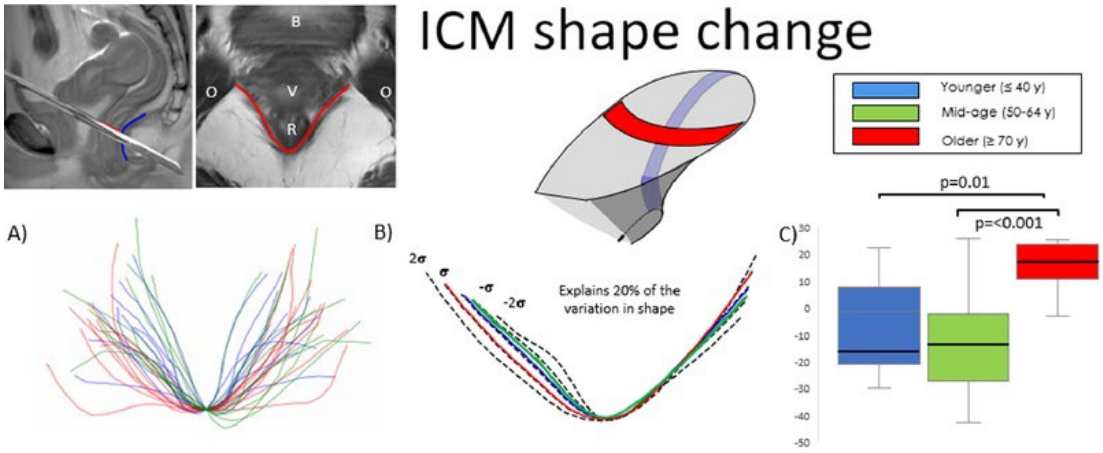


Figure 3. Iliococcygeus shape analysis comparing younger, middle-aged, and older women. A) Original ICM tracings aligned at the levator plate. B) Predominant ICM shape variations for each group. C) PC scores compared among the three groups. PC = principal component

Conclusions: Older nulliparous women have a more vertical LP and concave ICM which contribute to an enlarged levator bowel volume. Comment: Age and vaginal birth are two primary factors in prolapse. This project deepens our understanding of age specific pelvic floor change to complement birth-related changes.

Hysteroscopic Myomectomy is not Associated with Intraperitoneal Dissemination of Myometrial Cells

Christine E. Hur, Jennifer Brainard, Chelsea N. Fortin, Cara R. King, Jeffrey M. Goldberg

Objective: Hysteroscopic myomectomy is the surgical treatment of choice for women with submucosal fibroids. Although many studies have looked at the risk of intraperitoneal dissemination of myoma cells following laparoscopic myomectomy, only a few isolated case reports have shown the possible spread of leiomyosarcoma cells intraperitoneally following hysteroscopic myomectomy. The objective of this study is to determine whether myometrial cells can be detected intraperitoneally following hysteroscopic myomectomy.

Materials and Methods: This is a pilot prospective cohort study which included premenopausal women over the age of 18 undergoing hysteroscopic myomectomy for uterine fibroids. Only women with fibroids >2 cm were included as determined by preoperative ultrasonography. Included patients had no prior tubal surgery or risk factors for tubal disease. Hysteroscopic myomectomy was performed with a bipolar resectoscope using saline for uterine distention. Washings of the peritoneal cavity were obtained via culdocentesis, collected at two times during surgery: (1) after performing diagnostic hysteroscopy but before hysteroscopic morcellation, and (2) after hysteroscopic resection of the fibroids was completed. The study pathologist was blinded to whether the samples were obtained pre- or post-myomectomy. One Papanicolaou stained ThinPrep slide (Hologic; Marlborough MA) and one hematoxylin and eosin stained cell block slide was reviewed for each washing. An immunohistochemical stain for desmin (Dako; Carpenteria, CA) was performed on each sample to assist with the identification of smooth muscle cells.

Results: Five women undergoing hysteroscopic myomectomy were included for analysis. Four of the five women presented primarily for management of abnormal uterine bleeding. One woman presented for uterine cavity evaluation prior to a frozen embryo transfer. The mean patient age was 41 years [range: 31-48 years]. The mean diameter of the largest intracavitary submucosal fibroid was 33mm [range: 28-45mm]. Across all participants, no muscle cells were identified in either the pre- or post-myomectomy cytology samples using routine and desmin immunohistochemical staining.

Conclusions: Hysteroscopic myomectomy utilizing a bipolar resectoscope was found to not be associated with the intraperitoneal dissemination of myometrial cells. This study provides reassuring data for both surgeons and patients undergoing hysteroscopic morcellation of submucosal fibroids although further study with a larger cohort must be performed.

Impact Statement: This is the first prospective study evaluating the presence of intraperitoneal myometrial cells following hysteroscopic myomectomy. These data suggest hysteroscopic myomectomy is a safe option for women with submucosal leiomyomas and confers low risk for the dissemination of leiomyosarcoma.

Telemedicine patient satisfaction metrics and methods of recurrence detection for gynecologic cancer patients throughout the initial year of the COVID-19 pandemic

Arielle Mora Hurtado, Rachel Mojdehbakhsh, Shitanshu Uppal, Ryan Spencer

Objectives: To determine the patient satisfaction with telemedicine services throughout the initial year of the COVID-19 pandemic and evaluate detection of recurrence in those patients at a single, academic, tertiary-care medical center.

Methods: Our Gynecologic Oncology clinic schedule was queried for all telemedicine encounters during the period of April 27, 2020- March 30, 2021. To assess patient satisfaction with telemedicine encounters, a modified 12-item Telemedicine Satisfaction Survey (TeSS) was administered to patients. Up to three contact attempts by phone were made for each patient. The exclusion criteria included patients requiring interpreter services. To analyze the initial method of diagnosis of recurrent gynecologic cancer during the COVID-19 pandemic, a retrospective chart review was completed on patients reached for survey completion.

Results: Three hundred ninety-four patients were contacted. Three hundred sixteen completed the survey, and 78 declined, with a survey response rate of 80.2% (316/394). The mean age at cancer diagnosis was 60.1 years. The mean distance traveled from a patient's home to the Gynecologic Oncology clinic was 50.4 miles. As detailed in Figure 1, personal comfort using telemedicine was rated as good or excellent by 90.8% of patients (n = 287). Almost 93.7% of patients felt that the explanation of treatment by the telemedicine staff was good or excellent (n=296). The courtesy, respect, sensitivity, and friendliness of staff during the telemedicine encounter was rated as excellent by 80.7% of patients (n=255). Of the 394 patients, 312 had pathologically-proven gynecologic malignancies. Of these patients, 9.3% (29/312) had recurrent gynecologic cancer during the study period. The initial method of recurrence detection included patient-reported symptoms (62.1%, n=18), routine biomarker (24.1%, n=7), and routine imaging (13.8%, n=4). Of the 364 patients, 72.6% used telemedicine for surveillance, 26.1% for postoperative visits, 11.7% for chemotherapy, 3.6% for problem visits, 1.3% for preoperative visits, and 0.5% for initial visits. Ultimately, 92.7% of patients rated their "overall treatment experience at using telehealth" as good or excellent (n=293). Telemedicine was well-received, with 87.0% of patients (n=275) indicating they would use telehealth again and 82.0% of patients (n=259) stating they would recommend telehealth to another gynecology oncology patient.

Conclusions: With high patient acceptability, this study provides evidence to support the use of telemedicine as an option for gynecologic cancer surveillance in the post-pandemic period. Guided by patient health factors and preferences, telemedicine may be leveraged to reduce barriers to gynecologic specialty care such as distance traveled to the clinic while at the same time maximizing clinic capacity for patients necessitating in-person examination.

Differences in Postpartum Care Content at the Intersection of Race/Ethnicity, Income, and Geography

Julia Interrante, Katy Kozhimannil, Caitlin Carroll, Phoebe Chastain, Carrie Henning-Smith, Lindsay Admon

Research Objective: Postpartum care is inadequate in the U.S. and varies by race/ethnicity, income, and geography, but little is known about variation in care across sub-groups. This analysis describes differences in receipt of recommended postpartum care components for intersectional identities of race/ethnicity, income, and geography.

Study Design: Using national survey data from postpartum patients, we calculated weighted percent [95% confidence intervals (CI)] for receipt of postpartum care. We grouped care by components with existing national quality standards (depression screen, contraceptive counseling) and other recommended components (smoking, abuse, birth spacing, eating/exercise, diabetes screening). Intersectional differences were examined across eight dimensions: non-Hispanic white, BIPOC (non-Hispanic Black, Spanish-speaking Hispanic, Indigenous, Asian), privately-insured, Medicaid-insured, and rural or urban residence.

Population Studied: Analyses included 118,577 patients at 44 sites in the Pregnancy Risk Assessment Monitoring System with childbirths during 2016–2019.

Principal Findings: Rates of depression screening and contraceptive counseling were 6.0-percentage points higher for white (vs. BIPOC) and 6.3-percentage points higher for privately-insured (vs. Medicaid) patients. However differences were greater across intersectional dimensions; highest among white, privately-insured urban residents (76.1% [95% CI: 75.5-76.7]), lowest among BIPOC, Medicaid-insured rural residents (62.8% [60.2-65.5]). The white/BIPOC disparity was driven by privately-insured rural residents (9.2-percentage points), with minimal difference among Medicaid-insured urban residents (0.7-percentage points), while the private/Medicaid disparity persisted largely among white patients (urban: 8.4-percentage points; rural: 5.2-percentage points).

In contrast, receipt of all other components was highest among BIPOC, Medicaid-insured rural residents (31.5% [28.9-34.1]) and lowest among white, privately-insured urban residents (14.6% [14.1-15.1]). This pattern was maintained within and across categories for these other recommended care components.

Further stratification shows a more complete story of where care disparities exist. For example, there was an 18.2-percentage point difference in smoking screening across racial/ethnic groups (white: 50.3% [49.8-50.8]; Spanish-speaking Hispanic: 68.5% [66.9-70.2]). Yet among Medicaid-insured rural residents, the racial/ethnic difference was 7.5-percentage points, compared to 20.8-percentage points among privately-insured rural residents (Black: 50.4% [40.2-60.6]; Indigenous 71.2% [65.1-77.3]). While overall 50.3% [49.8-50.8] of white patients received smoking screening, rates varied by 17.1-percentage points across intersectional dimensions (private-urban: 44.6% [43.9-45.3]; private-rural: 52.7% [51.1-54.3]; Medicaid-urban: 57.8% [56.7-58.9]; Medicaid-rural: 61.7% [60.1-63.3]).

Conclusions: Large differences (over 20-percentage points) in receipt of recommended postpartum care exist at the intersection of race/ethnicity, income, and geography. Postpartum patients with the most advantaged identities (white, privately-insured, urban) experienced the highest rates of depression screenings and contraceptive counseling, components that are

linked to quality metrics and, in some cases, tied to financial incentives for health care providers. Conversely, while generally low for all groups, patients with the least advantaged identities (BIPOC, Medicaid-insured, rural) experienced higher rates of screenings for topics like smoking and abuse, while white patients experienced the lowest.

Implications for Policy or Practice: Examining only one dimension of identity can mask the range and nature of disparities in postpartum care. Findings suggest that clinical and financial policies should ensure receipt of postpartum care be standardized across race, payer, and geography, and be comprehensive, including all recommended care components, for all patients.

Severe Maternal Morbidity and Mortality Risk at the Intersection of Rurality, Race, and Medicaid

Julia Interrante, Mariana Tuttle, Lindsay Admon, Katy Kozhimannil

Research Objective: In the U.S. maternal health is marked by longstanding inequities based on income, geography, and race/ethnicity. This analysis examined differences in risk of severe maternal morbidity and mortality for Medicaid-funded compared to privately-insured hospital births through specific intersectional and additive risk by rural/urban geography, race/ethnicity, and clinical factors.

Study Design: Using a multiyear, cross-sectional study of hospital births, we calculated predicted probabilities using weighted multivariable logistic regressions to estimate adjusted rates of severe maternal morbidity and mortality, examining differences in rates at the intersection of payer, rurality, and race/ethnicity. In order to assess the presence and extent of additive risk by payer with other sociodemographic and clinical factors, we estimated the proportion of the combined effect that was due to the interaction. Maternal residence was defined as metropolitan (urban) or either micropolitan or non-core (rural), based on county.

Population Studied: The analysis included maternal discharge records from childbirth hospitalizations between 2007 through 2015 from the National Inpatient Sample, collected by the Healthcare Cost and Utilization Project. The analytic sample included 2,932,234 Medicaid-funded and 3,425,562 privately-insured hospital births.

Principal Findings: Controlling for sociodemographic and clinical factors, rural Indigenous Medicaid beneficiaries had the highest rate of severe maternal morbidity and mortality (224.9 per 10,000 births), with the lowest among urban white privately insured patients (96.5 per 10,000 births). Black Medicaid beneficiaries, both rural and urban residents (207.9 and 210.9 per 10,000 births, respectively), and urban Hispanic Medicaid beneficiaries (164.9 per 10,000 births), also experienced elevated rates and significant additive interaction with payer ($p<0.05$). Thirty-two percent of cases among patients with chronic heart disease were due to payer interaction, while 19% among those with cesarean delivery were due to the interaction.

Conclusions: While overall people with Medicaid at the time of childbirth have moderately increased rates of severe maternal morbidity and mortality compared to those with private insurance, there are important differences at the intersection of payer, rural residency, and race/ethnicity. These results indicate that known racial and geographic disparities are not lessened when accounting for Medicaid coverage; moreover, there is substantive interaction between these factors and Medicaid coverage.

Implications for Policy or Practice: The findings on the intersectionality of severe maternal morbidity and mortality risk imply that Medicaid policy change to improve maternal health must account for the particular challenges posed by rural locations and by racism. The findings on additive risk suggest that policies that lower risk among Medicaid patients could have additional additive benefits in reducing racial/ethnic and rural/urban disparities. As the primary payer for nearly half of all births in the U.S., state Medicaid programs have an opportunity to contribute to efforts to improve maternal health and reduce severe maternal morbidity and mortality through reimbursement and coverage policies as well as clinical care bundles that address the disproportionate risk among Medicaid beneficiaries as a whole, as well as among particular groups of beneficiaries that experience heightened risks based on geography, race, or clinical conditions.

Likes, Follows, and Shares, Oh My!: Lessons Learned in Promoting New MedEd Podcast
Sanaya Irani, Jourdan Clements, Regina Onishenko, Anna Eisenberg, Sarena Gill, Theresa Rager, Maya Hammoud

Introduction: ObGyn Delivered is a student-led, social media-based MedEd platform. With over 2,500 Instagram® followers, ObGyn Delivered engages medical learners with exam-style questions. In 2022, ObGyn Delivered expanded to produce the podcast “UltraSounds” and has published 17 episodes. Episodes are released biweekly and advertised on Instagram®. This study seeks to evaluate learner interaction with new MedEd podcast posts compared to established question posts through Instagram® engagement.

Methods: Instagram® posts from April-October 2022 were retrospectively analyzed. Question and podcast posts were compared across six engagement criteria (accounts reached, impressions, actions taken, follows, shares, likes). Analysis was performed using Student's t-tests to compare means across engagement criteria.

Results: Question posts reached significantly more accounts ($p=0.002$), generated significantly more interactions ($p<0.001$), and garnered significantly more likes ($p=0.0184$). There was no significant difference in actions taken, follows, or shares between question and podcast posts. Amongst podcast posts, the OBGYN Match post reached the greatest audience (nAR=1337, nIMP=1453), resulted in the greatest actions taken (nActions=56) and received the most likes (nlikes=40). This post resulted in the greatest actions taken (nAT=56) and shares (nshares=15) amongst all 28 analyzed posts.

Conclusions/Implications: Exam-style posts generated more learner engagement, possibly as our audience turns to ObGyn Delivered for test preparation resources. Although medical learners stand to benefit from “UltraSounds” episodes for test preparation, traditional Instagram® advertisements may be ineffective in conveying the utility of this new MedEd resource. Podcast advertisement may be improved with preview questions prior to episode release.

Listening to Learn: Evaluation of an ObGyn MedEd Podcast

Sanaya Irani, Jourdan Clements, Brittany Gates, Rachel Clark, Sarena Gill, Theresa Rager, Maya Hammoud

Introduction: MedEd podcasts improve knowledge acquisition for busy medical learners. “UltraSounds” is a student-produced MedEd podcast covering clinical vignette reviews, current event discussions, and interviews with ObGyn’s and reproductive health professionals. This study seeks to evaluate UltraSounds as a learning tool in order to improve podcast content.

Methods: UltraSounds is produced by ObGyn Delivered bi-weekly with 17 episodes published. A 15-item questionnaire containing dichotomous and five-point Likert-scale questions collected participant demographics and perceptions of podcast information, entertainment, and helpfulness as a learning tool. The questionnaire was disseminated through written and recorded podcast descriptions, clerkship resources at multiple institutions, and social media. Listenership demographics were collected through Anchor® and compared to questionnaire participant demographics. Data was analyzed using Chi-square.

Results: UltraSounds has 2,394 listens and 89 questionnaire responses to date. There was no significant difference in listener and participant age or sex ($p=0.968$) with most listeners and participants being female ages 23-27. Seventy-three participants are medical students and 16 are employed in medicine. On average, participants perceived UltraSounds as “very informative” (avg=4), “very helpful” (avg=3.6), and “very entertaining” (avg=3.6). Medical students (avg=4.06) gave a higher overall rating than medical professionals (avg=3.89) with both correlating to “very good”. There was no significant difference in overall rating ($p=0.844$).

Conclusions/Implications: Preliminary data shows that both medical students and professionals perceived UltraSounds as helpful, informative, and entertaining demonstrating that UltraSounds is a valuable learning tool for a larger audience than anticipated. Participant and listener demographics correlate suggesting that questionnaire data is representative of podcast listenership.

The utility of physical examination in ovarian cancer recurrence detection: a retrospective analysis informing virtual surveillance care

Monica Janke, Sarah Santiago, Alli Straubhar, Shitanshu Uppal

Objectives: To investigate the utility of symptom review, serum CA125, and physical exam in the detection of ovarian cancer recurrence to determine the role of virtual surveillance care in the post-COVID-19 era.

Methods: Patients diagnosed with ovarian cancer between 2013 and 2020 were identified and included if they completed standard of care treatment with surgical resection and platinum doublet chemotherapy, had no evidence of disease after completion of treatment, and had recurrence of disease detected by symptoms, CA125, physical exam, or imaging. Patients were excluded if they did not have pretreatment elevated serum CA125 (>35 U/ml) or a complete medical record. All recurrences were confirmed with imaging or biopsy. Modalities of recurrence detection were defined as the following: symptoms, physical exam, elevated CA125, or other. “Other” was denoted if imaging studies were obtained for reasons other than suspected recurrence and recurrence was incidentally identified. Descriptive statistics were used to summarize the cohort. Kaplan Meier analyses were used to estimate overall survival.

Results: 109 patients met criteria at our institution. At initial diagnosis, the median age was 61 years (range 33-84) and most patients had advanced-stage disease, with 73 (67%) patients with Stage III disease and 26 (23.9%) with Stage IV disease. The median time to recurrence was 12 months (range 3-65) and median overall survival was 56 months (95% CI 46-79). In 46 (42.2%) patients, recurrence was suspected based on multiple modalities. At time of recurrence, elevated CA125 was present in 97 (89. 0%) patients, symptoms in 41 (37.6%) patients, and abnormal physical exam findings in 27 (24.8%) patients. Of patients with abnormal physical exam, 26 (96. 3%) also had elevated CA125 or symptoms present. Recurrence was suspected based on abnormal physical exam findings alone in 1 (0. 9%) patient. Detection modalities other than abnormal physical exam (e.g., CA125, symptoms) were present in 102 (93.6%) patients. Recurrence was incidentally found with imaging obtained for reasons other than suspicion of recurrence in 6 (5.5%) patients.

Table 1. Distribution of recurrence detection modalities (N=109)

Recurrence detection modality	n (%)
CA125 alone	52 (47.7)
Symptoms alone	4 (3.7)
Physical exam alone	1 (0.9)
Other	6 (5.5)
CA125 + symptoms	20 (18.3)
CA125 + physical exam	9 (8.3)
Symptoms + physical exam	1 (0.9)
CA125 + symptoms + physical exam	16 (14.7)

Conclusions: Most ovarian cancer recurrences can be detected by rising CA125 or symptoms. Physical exam may have limited value in the detection of recurrence. Review of CA125 and symptoms can be conducted virtually. The inclusion of virtual visits for ovarian cancer surveillance should be considered for patients with pretreatment elevated CA125

Ten-year conditional probability of survival for patients with ovarian cancer: A new metric for the new millennium

Ryan Kahn, Olga Filippova, Alli Straubhar, Anjile An, Oliver Zivanovic, Ginger Gardner, Roisin O'Cearbhaill, William Tew, Yukio Sonoda, Kara Long Roche, Dennis Chi

Objectives: To demonstrate the utility of conditional probability of survival (CPS) as a metric in analyzing survival outcomes for women with ovarian cancer.

Methods: We analyzed the records of all patients (pts) with newly diagnosed high-grade epithelial ovarian cancer who underwent treatment at our institution from January 2001 to December 2009. Pts lost to follow-up were excluded if they had less than three years of follow-up. CPS was defined as the probability of surviving additional years (y) based on the condition that a patient had already survived at a given time (x): $S(x + y)/S(x)$. Confidence intervals (CIs) were estimated using a variation of Greenwood's formula.

Results: A total of 916 pts met the inclusion criteria. The median age at diagnosis was 60 years (range: 25-95) with 37% (337/916) <65 years old (yo). FIGO stage was as follows: stage I 14% (132/916), stage II 6% (59/916), stage III 57% (519/916), and stage IV 23% (206/916). Histology was high-grade serous in 83% pts (759/916). Among the 907 pts who underwent surgical management, 64% (584/907) had a primary debulking surgery, 16% (143/907) had an interval debulking after neoadjuvant chemotherapy and 20% (180/907) underwent staging. A total of 84% (757/907) had an optimal cytoreduction (<1 cm of residual disease), whereas 49% (440/907) had a complete gross resection. The Median follow-up time for the entire cohort was 55 months, and the median overall survival (OS) was 57 months. Twenty percent (183/916) had an OS >10-years. Ten-year OS for pts aged <65 yo with early-stage I/II, stage III, and stage IV ovarian cancer was 48%, 24%, and 11%, respectively. For patients >65 yo, 10-year OS was 22%, 11%, and 4%, respectively. For patients <65 yo, the 10-year CPS for 5-year survivors was: early-stage I/II, 90.0 % (95% CI: 85.4%-94.6%); stage III, 56.8% (95%CI 51.0%-62.7%); stage IV, 38.8% (95% CI: 24.3%- 53.4%). For patients >65y, the 10-year CPS for 5-year survivors was: early-stage I/II, 63.1% (95% CI: 52.6%-73.5%); stage III, 43.8% (95% CI: 31.7%-55.9%); stage IV, 22.5% (95% CI: 6.6%-38.3%).

Conclusions: For long-term 5-year survivors with advanced OC, CPS can provide a more representative estimate of future survival than conventional OS ratesl OS.

MStem Cell Laboratory: Production, Characterization, Distribution, and Facilitation of Monogenic Disease-In-A-Dish Research

Laura Keller, Indri Erliandri , Gary D. Smith

In November, 2008, Michigan voters approved amending the state constitution allowing production of human embryonic stem cells (hESC) in Michigan. With this approval, the University of Michigan established the state's first hESC derivation facility. Embryo donation is performed under an approved IRB protocol with informed consent. Any couple participating in IVF and embryo production within the United States can voluntarily donate embryos for hESC derivation. These embryos fall into two categories; either i) cryopreserved embryos no longer needed for reproductive purposes, or ii) embryos tested with Preimplantation Genetic Testing (PGT) and affected with monogenic diseases or aneuploidies (not suitable for implantation). To date most embryo donations have been from PGT-tested and –affected cycles, where the donated embryos would otherwise be discarded. Production of hESCs has opened the door for stem cell research yielding results that are increasing knowledge of a wide range of diseases. MStem Cell Lab is the leading U.S. academic institution in the production of monogenic, disease-specific hESC lines placed on the National Institutes of Health (NIH) hESC registry.

MStem Cell Lab derivation research cannot be federally funded; however, hESC lines can be studied using federal funds once accepted on the NIH registry and are utilized as research models by investigators across the U.S. MStem Cell Lab can provide unique single gene disorder human cell systems to the research community to gain a greater understanding of monogenic disorders and to the ensuing development of therapies and cures for these diseases of significant healthcare burden. MStem Cell Lab has derived 53 monogenic disease-specific and aneuploidy hESC lines and 22 normal control hESC lines. These hESC lines are also being used to understand fundamental genetic stability, chromatin segregation in human preimplantation embryos, and causes of miscarriages.

Patient and Provider Variation in Urinary Incontinence Diagnosis in Women

Edward Kim, Christopher Hong, Jaclyn Munoz, Heidi Harvie

Introduction: There is paucity of data on the specialty and type of healthcare providers who diagnose urinary incontinence (UI) in women and demographics of women diagnosed with UI. Understanding these patterns may help identify a need for provider education or community outreach.

Objective: Our objective was to use electronic medical records to determine the rate of UI diagnosis in women and identify variation in the demographics of UI patients and diagnosing providers.

Methods: This was a retrospective study using the electronic medical records of a multicenter academic health system from January 1, 2010 to January 1, 2019. Female patients 18 years and older who sought ambulatory care for annual, routine health maintenance, problem-based new or problem-based return visits were identified. New encounter or billing diagnoses of stress urinary incontinence (SUI), urgency urinary incontinence (UUI), mixed urinary incontinence (MUI) or unspecified urinary incontinence (UI NOS) were identified using International Classification of Disease (ICD) 9 and ICD 10 codes [UUI (788.31, N39.41), SUI (625.6, N39.3), MUI (788.33, N39.46) and UI NOS (788.30, R32]. The following data were extracted: provider specialty and type, patient age, race, estimated household income and type of health insurance coverage. Household income was stratified into: below the federal poverty level (FPL) ($25,750 for a 4-person household in 2019), between FPL and median household income (MHI) ($63,463 for the region), and above the MHI. The income groups were further stratified by race. Data were compared using descriptive statistics.

Table 1: Demographic composition of patients with new urinary incontinence diagnosis and variation in the rates of urinary incontinence diagnosis

Demographic composition of patients with UI diagnosis (n=27,872)		Rate of UI diagnosis (Number of patients with UI in the subgroup/Total number of patients the in subgroup)
Patient age		Patient age
<40 years-old	1,424 (5% = 1424/27872 x 100)	218,755 (0.7% = 1424/218755 x 100)
40-65 years-old	10,985 (40%)	318,809 (3.4%)
>65 years-old	15,463 (55%)	273,579 (5.6%)
Patient race		Patient race
White	14,271 (51%)	512,610 (2.8%)
Black	6,000 (22%)	164,944 (3.6%)
Hispanic	524 (1.9%)	20,906 (2.5%)
Asian	521 (1.8%)	29,937 (1.7%)
Unspecified or unknown	6,556 (23%)	N/A
Estimated household income; Additionally stratified by race		Estimated household income; Additionally stratified by race
Below the Federal Poverty Line (FPL) for a four-person household in 2019	6,159 (22%)	212,563 (2.9%)
White	1,588 (25%)	65,845 (2.4%)
Black	3,926 (64%)	111,406 (3.5%)
Hispanic	203 (3.3%)	9,022 (2.3%)
Asian	137 (2.2%)	7,750 (1.8%)
Unspecified or unknown	206	N/A
Between FPL and Median Household Income for the region	11,932 (43%)	511,251 (2.3%)
White	9,319 (78%)	381,446 (2.4%)
Black	1,450 (16%)	51,119 (2.8%)
Hispanic	230 (1.9%)	11,185 (2%)
Asian	276 (2.3%)	17,065 (1.6%)
Unspecified or unknown	657 (5.5%)	N/A
Above the Median Household Income for the region	2,311 (8.3%)	74,983 (3.1%)
White	2,001 (87%)	58,730 (3.4%)
Black	90 (3.9%)	2,384 (3.7%)
Hispanic	21 (0.9%)	1,064 (1.9%)
Asian	84 (3.6%)	4,911 (1.7%)
Unspecified or unknown	115 (5%)	N/A
Estimated household income unspecified or unknown	7,470 (26%)	N/A
Reported health insurance coverage		Reported health insurance coverage
Commercial insurance	9,120 (33%)	486,451 (1.9%)
Medicare	9,050 (32%)	191,486 (4.7%)
Self-pay	5,830 (21%)	159,564 (3.7%)
Medicaid	2,053 (7%)	70,520 (2.9%)
State medical assistance program	654 (2%)	12,869 (5%)
Military	154 (0.5%)	7,002 (2.2%)
Unspecified or unknown	1,011 (3.5%)	N/A

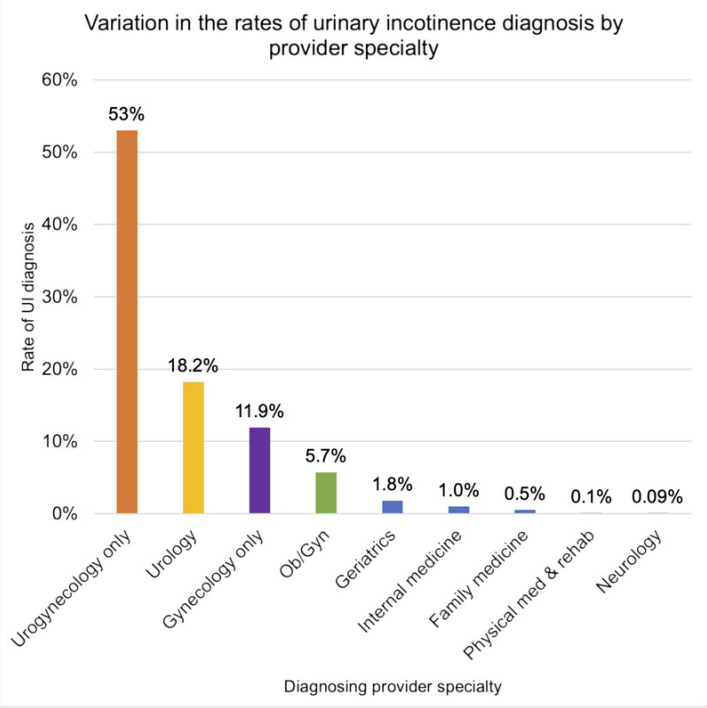
Results: There were 811,143 patients captured during the study period. The overall proportion of patients with new UI diagnosis was 3.4% (27,872). Among patients with UI, 34% (9,496) had SUI, 35% (9,838) UUI, 23% (6,471) MUI and 7% (2,067) UI NOS. Table 1 summarizes the demographics of patients diagnosed with UI. Most patients with UI were older than 65, White, had income between the FPL and MHI, and had commercial insurance or Medicare. The rate of UI diagnosis was higher for patients who were Black, older than 65, and on state medical assistance or Medicare. While the income group above the MHI had a higher rate of diagnosis than the other two income groups, the degree of differences was small. When income groups were stratified by race, Black patients had the highest rate of diagnosis in all categories. Table 2 summarizes the demographics of diagnosing providers. Most of the diagnoses were made by providers in obstetrics and gynecology (47%) followed by urology (16%). The rate of diagnosis was highest in urogynecology (53%) followed by urology (18.2%) (Figure 1). The rate of diagnosis was lower than 2% in geriatrics, family medicine and internal medicine.

Table 2: Demographic composition of diagnosing providers and variation in the rates of urinary incontinence diagnosis

Demographic composition of providers who diagnosed patients (n=27,872) with UI		Rate of UI diagnosis (Number of patients with UI in the subgroup/Total number of patients the in subgroup)
Provider specialty		Provider specialty
Urology	4,544 (16% = 4544/27872 x 100)	25,003 (18.2% = 4544/25003 x 100)
Obstetrics and gynecology	13,676 (49%)	237,908 (5.7%)
Gynecology only	12,971 (47%)	114,964 (11.9%)
Urogynecology only	8,141 (29%)	15,352 (53%)
Geriatrics	447 (1.6%)	25,406 (1.8%)
Internal medicine	3,536 (13%)	335,532 (1%)
Family medicine	1,752 (6%)	331,381 (0.5%)
Physical medicine and rehabilitation	44 (0.1%)	31,582 (0.1%)
Neurology	63 (0.2%)	72,822 (0.09%)
Other	3,810 (14%)	N/A
Provider type		Provider type
Physicians	18,150 (65%)	634,397 (2.9%)
Nurse practitioners	1,185 (4%)	42,986 (2.8%)
Physician assistants	236 (0.8%)	12,157 (1.9%)
Unspecified or unknown	8,301 (30%)	N/A

Conclusions: While our study has limitations inherent to retrospective database studies, it highlights the need for strengthening the partnership between primary care providers and specialty providers to help diagnose women with UI. While the high rate of diagnosis for patients who are Black, older than 65, or have state medical assistance potentially supports equity in the diagnosis of UI, future work should focus on variation in access to care and treatments offered.

Figure 1: Graphical representation of the variation in the rates of urinary incontinence diagnosis by diagnosing provider specialty



Statewide geographic variation in hysterectomy approach for pelvic organ prolapse: A county-level analysis

Kyle R. Latack, Michelle Moniz, Christopher X. Hong, Payton Schmidt, Anita Malone, Neil Kamdar, Brian Madden, Daniel M. Morgan

Objective: To examine statewide geographic variation in surgical approach of hysterectomy for prolapse repair and concurrent use of colporrhaphy and colpopexy.

Methods: We conducted a retrospective analysis of Blue Cross Blue Shield, Medicare, and Medicaid insurance claims for hysterectomies performed for prolapse within a single state between October 2015 and December 2021. Prolapse was identified with ICD-10 codes. The primary outcome was variation in surgical approach for hysterectomy as determined by CPT code (vaginal [VH], laparoscopic [LSH], laparoscopic assisted vaginal [LAVH], or abdominal) on a county level. Patient home address zip codes were used to determine county of residence (n=81). Vaginal approach was the dependent variable in a hierarchical multivariable logistic regression with random effects for between-county variation and with fixed effects for patient attributes including age, comorbidities (diabetes, COPD, CHF, morbid obesity), concurrent gynecologic diagnoses, health insurance, and social vulnerability index. To quantify variation between counties, the median odds ratio was calculated from covariance parameter estimates. To perform this calculation, it was necessary to exclude counties in which no VH was performed. County-level variation is displayed using a funnel plot.

Results: After exclusion of data from three counties due to no VH (n=10 cases) and of abdominal hysterectomies due to low prevalence (n=42), there were 6,974 hysterectomies performed for prolapse. Of these, 2,866 (41.1%) underwent VH, 1,145 (16.4%) underwent LAVH, and 2,963 (42.5%) underwent LSH. The proportion of VH across 78 counties ranged from 5.8% to 86.8%. The median odds ratio was 1.86, consistent with a high level of variation (Figure 1). Thirty seven counties were considered statistical outliers because the observed proportion of VH was outside the predicted range (as defined by confidence intervals of the funnel plot). VH was associated with higher rates of concurrent colporrhaphy than LAVH or LSH (88.5% vs. 65.6% vs. 41.1%, respectively; p<.001) and lower rates of concurrent colpopexy (45.7% vs. 51.7% vs. 80.1%, respectively; p<.001).

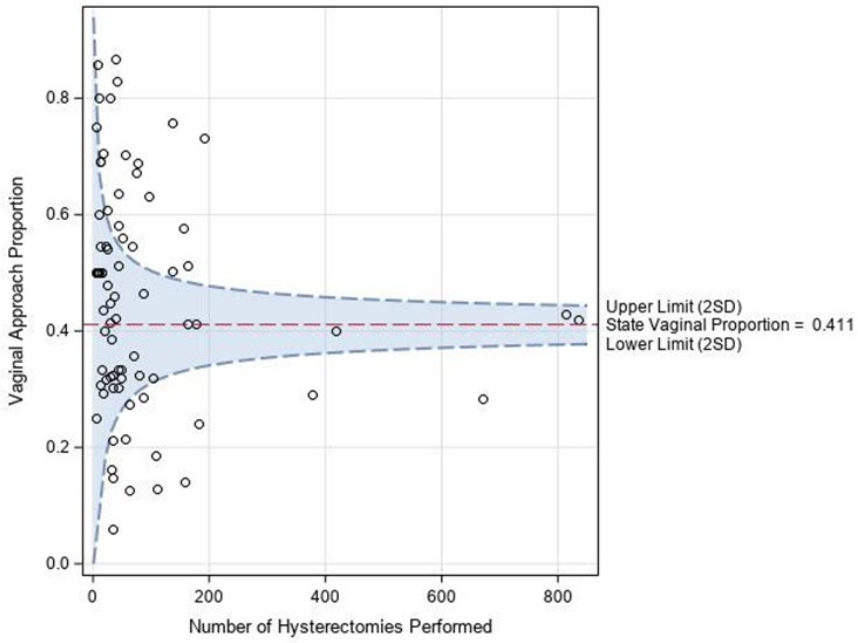


Figure 1: Funnel plot representing patient counties (n=78) in single state and their respective proportion of vaginal hysterectomies. Red line indicates proportion of vaginal hysterectomies in the state. Dots represent individual counties. Upper and lower boundaries set at two standard deviations (SD) of the mean and are adjusted for case volume.

Conclusion: This statewide analysis reveals a remarkably high level of variation in choice of surgical approach for hysterectomy undertaken for prolapse. The association of surgical approach for hysterectomy may help account for high rates of variation in concurrent procedures, especially apical suspension procedures. These data reflect how geography determines what surgical procedures a patient undergoes for uterine prolapse.

Trends in copper versus hormonal intrauterine device breakage reporting within the United States' Food and Drug Administration Adverse Event Reporting System

Kyle R. Latack, Brian T. Nguyen

Objective: To examine trends in national reporting of broken intrauterine devices (IUDs).

Methods: We examined the Food and Drug Administration Adverse Event Reporting System (FAERS)'s reports for IUDs, with interest in "breakage." We explored associations of breakage with IUD type (copper versus hormonal), year reported, reporter (consumer versus clinician), and patient characteristics (age and weight).

Results: We identified 170,360 adverse events within the database for all IUDs (43,230 copper; 127,130 hormonal). Breakages comprised 9.6% (n=4,147) of adverse events for the copper IUD; breakages comprised 1.7% (n=2,147) of adverse events for hormonal IUDs. A disproportionality analysis comparing breakage reports for copper versus hormonal IUDs noted reports for copper IUDs being 6.18 (95%CI: 5.86-6.52) times more likely to be a breakage as compared to reports for hormonal IUDs. Breaks were also associated with older and heavier weight individuals. Trends in breakage reports are seen in Figure 1

Conclusion: National pharmacovigilance data show disproportionate breakage in copper versus hormonal IUDs.

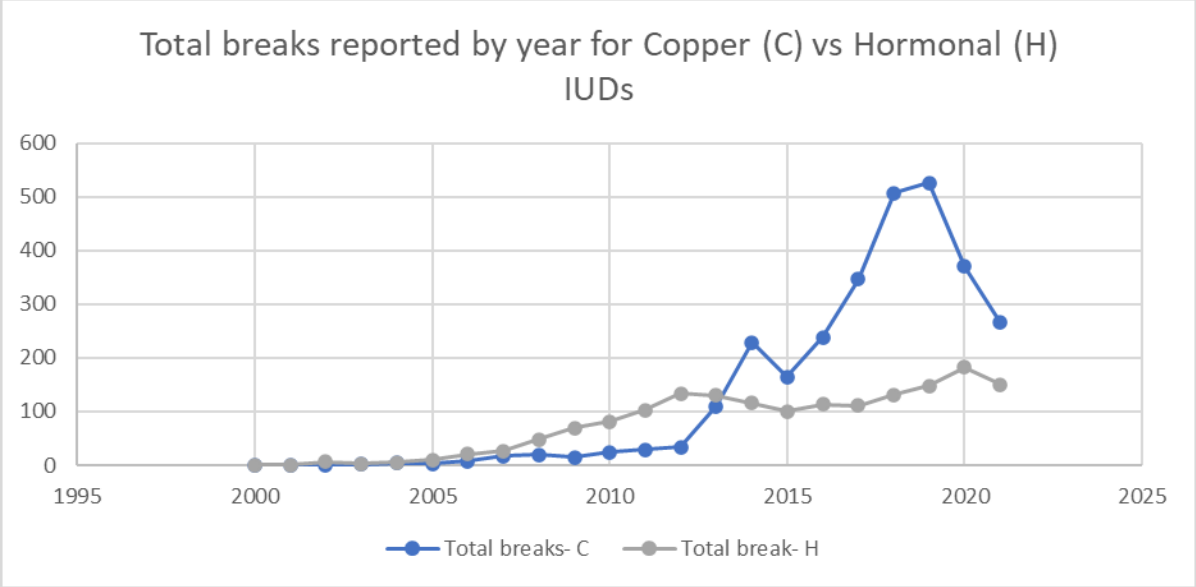


Figure 1: Total number of breakage reports since 2000 for copper versus hormonal IUDs. Due to date of data extraction, reports from 2021 may be limited and still continued to be reported during 2022

Neonatal Outcomes Among Patients Taking Medication for Opioid Use Disorder

Emma Keer, Sanaya Irani, Jordyn Boggan, Courtney Townsel

Introduction: Our multidisciplinary “Partnering for the Future” (PFF) clinic cares for birthing people with a mood or substance use disorder, including patients receiving medications for opioid use disorder (MOUD). The purpose of this study was to summarize the neonatal outcomes among infants born to patients receiving MOUD.

Methods: We conducted a retrospective analysis of all patients receiving care in our PFF clinic from January 2019 to August 2021. We excluded patients who were not maintained on MOUD and those only seen for consultation. Neonatal characteristics were abstracted from the medical record. Descriptive statistics were computed in SPSS v27. This study was deemed exempt by the institutional review board

Results: A total of 92 maternal-infant pairs were identified, of whom 49 patients were taking MOUD, resulting in 51 (54.3%) opioid-exposed infants (two twin pregnancies). Methadone exposure occurred in 21 (43%) pregnancies and buprenorphine exposure in 28 (57%). Neonatal intensive care unit (NICU) admission occurred in 45% (23/51) of infants. Neonatal opioid withdrawal syndrome (NOWS) was diagnosed in 26 (51.0%) infants, with 69% (18/26) infants developing severe NOWS meeting criteria for treatment. Severe NOWS occurred in 57% (12/21) of methadone-exposed pregnancies and 21% (6/28) of buprenorphine-exposed pregnancies. Among the 18 neonates diagnosed with severe NOWS, the average time to initial NOWS diagnosis was 22.35 (±0.86) hours compared to 40.4 (±0.70) hours for neonates diagnosed with non-severe NOWS.

Conclusion: Severe NOWS was more prevalent among infants exposed to methadone and diagnosed sooner than non-severe NOWS cases. Strategies are needed to reduce NICU admissions and identify infants at highest risk for severe NOWS.

A Systematic Review of Patient-Reported Outcomes to Inform Women's Health Quality Improvement

Vivian Ling, Minji Kang, Buu-Hac Nguyen, Makazhia McGowan, Alex F. Peahl, Michelle Moniz

Introduction: Patient-reported outcomes (PROs) are defined as data reported from patients without interpretation or alteration from others. Use of PROs in health care can identify opportunities for quality improvement (QI) that may be overlooked by clinician-based metrics. This rapid review evaluated best practices for selecting, implementing, and utilizing PROs to inform QI initiatives.

Methods: We performed a systematic review of studies addressing PROs in PubMed and Google Scholar. Inclusion criteria specified use of PROs in a health care setting for QI. We excluded articles where PROs were utilized only as an outcome. Further evaluation was based on the PICOS (Population, Intervention, Comparator, Outcomes, Setting) framework. Two members of the study team independently reviewed articles for inclusion and data abstraction.

Results: A total of 156 articles were independently reviewed: 111 were removed following title and abstract screening, and 21 after full-text assessment, resulting in 24 articles for qualitative synthesis. The most common populations were clinical trial participants (46%), patients with cancer (16.7%), and postpartum patients (8.3%). Articles revealed key considerations for integrating PROs in QI work, including: 1) selection (e.g., use of specific criteria, expert or literature review), 2) implementation (e.g., data management, survey use), and 3) utilization (e.g., for decision-making, future PRO selection).

Conclusion: This review highlights several important steps in effective integration of PROs in QI initiatives, including selection, implementation, and application. Future work is needed to define best practices for incorporating these principles in quality initiatives to improve patient-centeredness and equity among diverse populations.

The experience of shared decision making during and the context of hospital care for families having their first births in a state wide maternity quality collaborative

Lisa Kane Low, Althea Bordeau, Xilin Chen, Elizabeth Langen

The context of maternity care in the United States is under increased scrutiny given our deplorable maternal health outcomes, including higher cesarean rates in low-risk populations. The context of care includes communication and respectful care with use of shared decision-making strategies. A state-wide quality collaborative of 75 hospitals focused on reducing primary low-risk cesarean births engaged in education and training to improve the use of shared decision-making for birthing families in the state having a first birth. Shared decision making is a process of communication in which the birthing person is centered and engages with health care providers to confirm their plan of care.

Methods: Using a standard quality improvement approach, hospitals were provided with a series of educational webinars, workgroups and then specific resources and training to support adoption of shared decision making. Over two years, the use of shared decision making was monitored using chart abstraction of provider documented episodes of shared decision. The relationship between experiencing shared decision making and cesarean births were assessed using chi square and generalized linear mixed model analytics.

Results: Of the 67,915 birthing people included in our analysis, 17,588 (25.9%) had an unplanned Cesarean and 47,696 (70.2%) experienced some form of shared decision making.

Experiencing any SDM varied significantly by race-ethnicity, with providers least likely to engage in SDM with Black birthing people (59.9% SDM vs. 73.7% SDM among White birthing people). SDM also varied by insurance status, with providers least likely to engage in SDM with birthing people paying only with Medicaid (66.6% vs. 72.0% among birthing people paying with private insurance). Additionally, patients having an elective induction of labor were the least likely to experience SDM (68.3% vs. 70.5% among spontaneous labors).

Having any SDM overall or any aggregated provider-led SDM was not associated with having an unplanned Cesarean birth in adjusted models. Having a document scanned alone was associated with an increased risk of unplanned Cesarean delivery (aOR 1.07, 95% CI 1.01 - 1.14), while having a provider chart statement (aOR 0.92, 5% CI 0.87 - 0.97) or a provider labor progress note statement (aOR 0.67, 5% CI 0.58 - 0.76) was associated with a decreased risk of unplanned Cesarean delivery. Having a nurse documentation of preferences was not associated with having an unplanned Cesarean delivery.

Conclusion: In this collaborative the type of shared decision making used mattered in the context of maternity care. Understanding who engages in shared decision making and how may offer opportunities to improve patient and provider engagement to address cesarean birth rates and outcomes of care. A next step requires an assessment of the birthing persons' experience of SDM.

Secret Shopper Study Evaluating Long Acting Reversible Contraception Access Barriers in Rural Michigan

Ann Lozier, Vivian Ling, Emma Keer, Vanessa Dalton, Lauren Owens, Michelle Moniz

Introduction: Rural communities are disproportionately affected by unintended pregnancy and access barriers to long-acting reversible contraception (LARC). It is unknown whether differences in patient payer type affect LARC access in rural communities. We evaluated rural access to LARC and same-day insertion, using the Upper Peninsula of Michigan (UP) as a case study for rural access.

Methods: Using a secret shopper study design, we administered a screening telephone survey to UP women's health clinics, excluding those not accepting new patients or not offering LARC. Between September 15 and October 29, 2021, we re-contacted eligible clinics using a telephone script simulating an adult patient with either commercial or Medicaid insurance seeking LARC insertion. Key outcomes were differences in access to LARC and same-day insertion by payer type and LARC access by county, ascertained by merging LARC access findings with 2010 census data.

Results: Of 19 eligible clinics, 16 (84.2%) offered LARC to simulated patients, with all 16 offering LARC to both commercial insurance and Medicaid enrollees. Same-day LARC insertion was available at 7 of 19 clinics (36.8%) for commercially insured enrollees and 4 of 19 clinics (21.1%) for Medicaid enrollees. Of 15 counties in the UP, five have zero clinics that currently offer LARC insertion to new patients, representing 12,677 women of childbearing age (24.9% of this population in the UP).

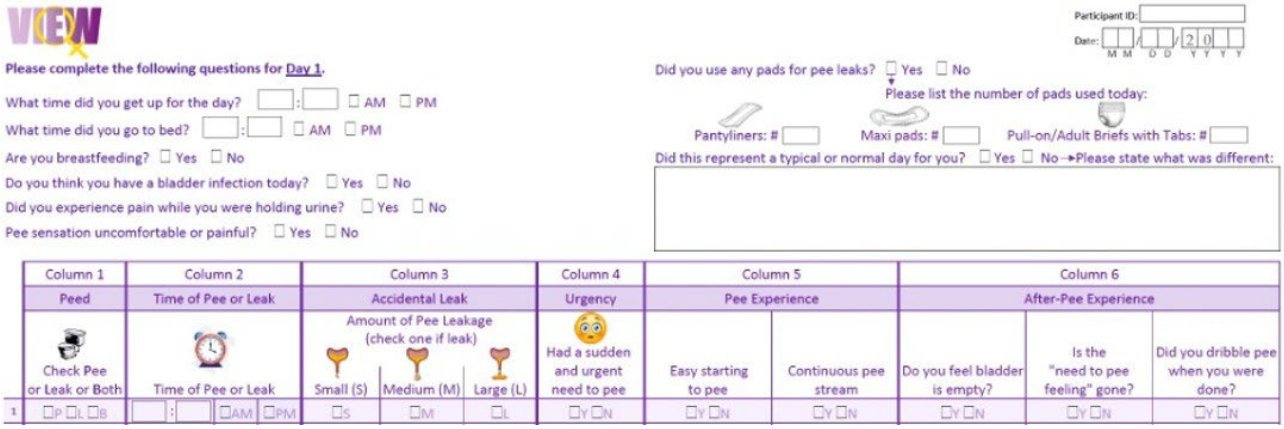
Conclusion: LARC access is limited in Michigan's UP and may be particularly challenging for Medicaid patients given less opportunity for same-day LARC placement.

Healthy Bladder Storage and Emptying Functions in Community-Dwelling Women Using a Novel 2-Day Bladder Health Diary

Emily Lukacz, Chloe Falke, Lisa Kane Low, Jean Wyman, Julia Geynisman-Tan, Elizabeth Mueller, Alayne Markland, *et al.*

Hypothesis/Aims of Study: To describe the distribution of and factors associated with healthy bladder storage and emptying functions in community-dwelling women using a novel 2-day bladder health diary.

Study Design, Materials and Methods: We conducted a secondary analysis of participants enrolled in a U.S. cross-sectional study designed to validate a novel bladder health instrument (BHI).(1) Women aged 18+ years were recruited between September 2019 and August 2020 using a delivery sequence file address-based probability sampling frame. Those who completed the primary surveys, which included demographic and medical history, were invited to complete a 2-day bladder health diary. The diary captured bladder storage symptoms (frequency, continence, sensation of urgency and pain), emptying symptoms (initiation, flow, efficacy, relief of urge sensation and pain), and were used to define each individual storage and emptying function (e.g. post void dribbling PVD was captured in column 6, Figure 1.) "Overall healthy bladder function" was defined as



up to a mean of 8 voids during waking hours, 0 voids during sleeping hours, and the absence (on both days) of urinary leakage, urinary urgency, or voiding difficulties (including post void dribbling; [PVD]). (2) "Overall healthy voiding experience" was defined as yes responses to "easy starting to pee, continuous stream, feeling the bladder empty and the need to pee feeling is gone;" plus a no response to the item "did you dribble pee when you were done?" Descriptive statistics were used to report overall prevalence of healthy bladder functions. Prevalence of healthy function for each storage and emptying function was assessed. Descriptive statistics were also used to report urinary frequency (waking and sleeping) as well as to describe the prevalence of unhealthy functions including presence and amount of urinary incontinence, frequency of urgency episodes and negative voiding experiences with each void. Presence of pain with storage or emptying and pad usage on either day was also assessed. Means, standard deviations (SD), medians, interquartile ranges (IQR) were used to describe the distribution of voiding frequencies. Stepwise logistic regression models included characteristics associated with healthy function at a $p<0.2$ on univariate analysis to identify factors associated with healthy bladder function and reported in Odds Ratios (OR) with 95% Confidence Intervals (95%CI). Missing values were handled by single imputation using fully conditional specification methods.

Results: Of 605 respondents in the primary study, 248 returned the 2-day bladder health diary. The mean age was 56.2±15.4 years with 36% being normal weight, 2% underweight and 52% overweight/obese; 53% denied comorbid conditions; 4% were Asian, 6% Black, 88% were non-Hispanic white. Only 12% of women (30/244, 4 missing) had overall healthy bladder function based on our strict definition. Healthy storage function, with voiding frequency during waking hours of 8 or fewer times per day, occurred in 74% (183/248), and 51% (127/248) reported 0 episodes of nocturia. Nocturia occurred once in 30% (74/248), twice in 13% (31/248) and 3 or more times in 6% (16/248). Frequency of urination was 7.6±2.3 (median=7, IQR=3) per 24 hours (7.2±2.2; median=7, IQR=3 during waking hours and 0.8±1.2; median 0, IQR=1 during sleeping hours). A total of 63% (157/248) denied any urine leakage on their 2-day diary; however, those with leakage reported 1.9±1.8 (median=1, IQR=2) leaks per 24 hour period with the majority of leaks being of small volume (68%), and the rest medium (20%) or large (12%) volume. Only 29% (72/248) denied any urgency episodes over 2-days. In those with urgency, the mean daily number of urgency episodes was 3.3±2.5 (median=2.5, IQR=4) and within those women who reported any urgency 39% (IQR=45) of their daily voids were associated with urgency. Overall healthy voiding experience was noted in 47% (91/248) of women. Of those with unhealthy voiding experiences the most common was PVD at 84% (132/157) followed by non-continuous stream (50%, n=80/157), feeling of incomplete emptying (32%, 51/157) and persistent “need to pee” (26%, 40/157). Of those reporting one or more unhealthy voiding experiences on either day of the diary, the median percentage of voids described as unhealthy was 39% (IQR=49). The majority (92%, 225/244, 4 missing) of women denied pain during storage or voiding and of those with pain, 58% (11/19) reported pain with holding, 47% (9/19) pain with peeing and 5% (1/19) pain with both. Stepwise logistic regression models (Figure 2) identified higher income (OR:95%CI=26.3: 2.8-249.5 for >$150,000 vs. <%50,000), and never previously seeking treatment for bladder problems (OR:95%CI=0.1; 0 -0.9) as associated with overall healthy bladder function. Those with healthy voiding frequency, absence of leakage or PVD were less likely to have sought treatment for bladder problems (OR:95%CI = 0.3: 0.2-0.7; 0.3: 0.1-0.5; 0.2: 0.1-0.5

	Overall Healthy Bladder	<=8 voids waking	No Nocturia	No Leakage	No Urgency	No Dribble	No Dysfunction
Age							
18-24 vs 35-64	-	-	-	-	-	-	-
25-34 vs 35-64	-	-	-	-	-	-	-
65+ vs 35-64	-	-	-	-	-	-	-
Bladder Problems							
Sought treatment for bladder vs No	**0.1 (0, 0.9)**	**0.3 (0.2, 0.7)**	-	**0.3 (0.1, 0.5)**	-	**0.2 (0.1, 0.5)**	**0.4 (0.2, 0.8)**
BMI							
Underweight vs Normal	-	-	-	-	-	-	-
Overweight vs Normal	-	-	-	-	-	-	-
Obese vs Normal	-	-	-	-	-	-	-
Comorbidities							
Comorbidity Count	-	-	0.8 (0.5, 1)	**0.7 (0.5, 0.9)**	**0.6 (0.4, 0.8)**	**0.6 (0.5, 0.9)**	0.8 (0.5, 1)
Education							
Less than highschool vs BA/BS	-	0.4 (0.1, 2.3)	-	2.5 (0.3, 24.9)	-	-	-
Highschool or GED vs BA/BS	-	1.1 (0.3, 3.3)	-	**0.3 (0.1, 0.7)**	-	-	-
Some college or AA vs BA/BS	-	0.8 (0.3, 1.8)	-	0.5 (0.2, 1.1)	-	-	-
Graduate Degree vs BA/BS	-	2.4 (1, 5.7)	-	0.8 (0.3, 1.8)	-	-	-
End of Month							
Some left over vs Not enough	-	1.7 (0.4, 7)	-	-	0.9 (0.2, 3.1)	1.6 (0.4, 5.9)	2 (0.5, 8.3)
Just enough vs Not enoughr	-	2.1 (0.5, 7.8)	-	-	0.4 (0.1, 1.6)	0.7 (0.2, 2.7)	0.7 (0.1, 2.8)
More than enough vs Not enough	-	0.8 (0.2, 3.2)	-	-	1.1 (0.3, 4)	1.9 (0.5, 7.3)	2.1 (0.5, 8.7)
Hispanic							
Hispanic vs No	-	0.3 (0.1, 1.4)	-	-	-	-	-
Income							
24,999orless vs $25k-$49,999	3.4 (0.3, 41.5)	-	0.4 (0.1, 1.2)	-	-	-	-
$50k-$74,999 vs $25k-$49,999	2.6 (0.2, 30.8)	-	0.5 (0.2, 1.6)	-	-	-	-
$75k-$99,999 vs $25k-$49,999	**20.9 (2.2, 196.9)**	-	0.9 (0.3, 3)	-	-	-	-
$100k-$149,999 vs $25k-$49,999	**16.1 (1.7, 150.3)**	-	0.5 (0.2, 1.7)	-	-	-	-
$150kormore vs $25k-$49,999	**26.3 (2.8, 249.5)**	-	3.3 (0.6, 16.7)	-	-	-	-
Insurance							
No insurance vs Have insurance	-	-	-	-	-	-	3.8 (0.9, 15.5)
Job (Note: seperate dichotomous variables)							
Homemaker vs Not homemaker	-	2.1 (1, 4.3)	-	-	-	-	-
Student vs Not student	5.3 (1, 27.2)	5.8 (0.7, 48.4)	-	-	-	-	-
Unable to work vs Not unable to work	-	0.4 (0.1, 1.5)	-	-	-	-	-
Working vs Not working	-	0.5 (0.3, 1)	2.8 (1.3, 5.8)	-	-	-	-

respectively). Those without leakage, urgency and PVD had fewer comorbidities (OR:95%CI= 0.7: 0.5-0.9; 0.6: 0.4-0.8; and 0.2: 0.1-0.5 respectively. Those working, compared to not working, were more likely to not wake up from sleep to urinate (OR:95%CI: 2.8; 1.3-5.8). There were too few women with pain to evaluate associations between pain free bladder experiences and baseline characteristics.

Interpretation of Results: The prevalence of overall healthy bladder function for all storage and emptying components, as measured using a 2-day bladder health diary, was very low. Although three in four women void fewer than 8 times during waking and 0 to 1 times during sleeping hours, most community-dwelling women report voiding irregularities and urinary urgency occurring approximately 3 times per day. Two thirds of women deny leakage; however, in those who do report leakage, most have small amounts approximately 2 times a day. Factors associated with healthy bladder functioning include fewer comorbidities, financial security and being a student or working at a job. As expected, having not sought care for bladder problems was associated with healthy storage and emptying functions.

Concluding Message: A strict definition of overall bladder health based on bladder diaries alone may not represent “normal.” The presence of a sudden and urgent need to pee may not be unhealthy, rather a natural response when storage capacity is stressed. Voiding difficulties including PVD and non-continuous stream also occur commonly. Further investigation into whether these clinically defined perturbations in bladder storage and emptying functions are also perceived as unhealthy by women is critical to developing a more informed definition of bladder health and shared treatment goals.

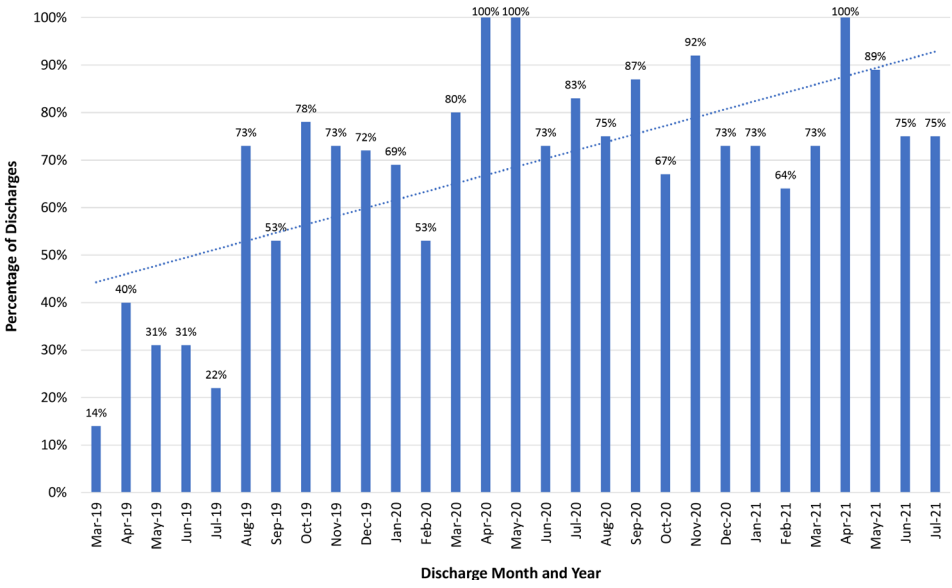
Avoidable admissions in gynecology oncology patients undergoing minimally invasive hysterectomy

Amanda Manorot, Shitanshu Uppal, Olivia de Bear, Cynthia Stroup, Liam Dalton, Aimee Rolston, Kevin McCool, Karen McLean, Jean Siedel, Alli Straubhar, R Kevin Reynolds

Objectives: To determine the rate and identify factors associated with potentially avoidable admissions following a minimally invasive hysterectomy.

Methods: Patients who underwent a minimally invasive hysterectomy for a suspected or known gynecologic malignancy between January 2019 to July 2021 were identified in our institution's prospectively curated quality improvement surgical database. Preoperatively, patients were assessed for planned same-day discharge versus a planned admission. Reasons for those who were admitted despite a planned same-day discharge were characterized as the following: anesthesia-related, comorbid conditions, intraoperative factors, social factors, system issues, and uncontrolled pain. For planned admissions, reasons for admission were categorized as necessary and potentially unavoidable. Descriptive statistics were used to summarize the cohort.

Results: A total of 380 patients were identified, of which 267 (70%) patients had a planned same-day discharge, and 113 (30%) had an anticipated admission. Same-day surgery discharge rates increased over time (Figure 1). Two hundred and thirty-five patients (88%) were successfully discharged the same day. Of these patients, 17 (7%) presented to the emergency department (ED) within 30 days, and the re-admission rate in this group was 12% (n=2). Thirty-two patients did not successfully discharge on the same day, and five patients (15%) presented to the ED for evaluation within 30 days. Most unplanned admissions were anesthesia-related (n=15, 47%), followed by system issues (n=7, 22%), such as failure to recognize comorbid conditions in the preoperative period, intraoperative factors (n=5, 16%), postoperative pain (n=3, 9%), and social factors (n=2, 6%). Among the 113 anticipated admissions, 78 (69%) patients were deemed necessary due to multi-factorial comorbid conditions or surgical complexity. However, 35 (31%) patients could have been optimized for same-day discharge; reasons for which included patients with comorbid conditions that could have been optimized preopera- tively, such as poorly controlled diabetes (n=13, 12%), system issues, (n= 8, 7%), social factors (n= 7, 6%), anesthesia-related (n= 4, 4%), and surgical complexity (n=3, 3%).



Conclusions: Most patients were successfully discharged the same day, and of those who were deemed unsuitable for same-day discharge, nearly half could have been optimized for same-day discharge. Unplanned admissions in the anticipated same-day discharge cohort were primarily due to anesthesia-related concerns in the immediate postoperative period and where patient comorbid conditions could have been better optimized in the preoperative period. Recognizing potential areas for improvement and further optimizing same-day discharge will allow hospital systems to continue providing care for gynecologic oncology patients during COVID-19 surges.

Incidence of Mood Disorders in Women Treated With Linzagolix: 52-week Results From Two Phase 3 Trials

Erica E. Marsh, William Catherino, Ayman Al-Hendy, Jacques Donnez, Elke Bestel, Elizabeth Garner

Introduction: Safety data from two Phase 3 trials of linzagolix, a GnRH receptor antagonist, for the treatment of women with uterine fibroids (UFs) for 52 weeks were reviewed for treatment emergent adverse events (TEAEs) of depression and other mood disorders. We note that the incidence of TEAEs of depression and other mood disorders, previously reported up to 24 weeks, was low and revealed no consistent drug-related pattern.

Methods: PRIMROSE 1 and 2 are randomized, double-blind, placebo-controlled Phase 3 trials investigating the efficacy and safety of linzagolix 100 mg and 200 mg once daily, with and without hormonal add-back therapy (ABT) in women with UFs. After 24 weeks, the placebo group in PRIMROSE2 was switched to 200 mg+ABT. The incidence of depression and other mood disorder TEAEs from week 24 to week 52 was assessed using the Standardized MedDRA Query for Depression and suicide/self-injury and adding TEAEs of anxiety.

Results: Safety data from 336 and 421 patients, in PRIMROSE1 and PRIMROSE2, respectively, were collected from week 24 to week 52. Mood swings were reported for one (1.1%) subject in PRIMROSE2, and anxiety was reported in one (1.1%) subject in PRIMROSE1, both in the placebo/200 mg+ABT group. Depression was reported in one (1.1%) subject in PRIMROSE2 in the 200 mg/200 mg+ABT group. There were no reports of suicidal ideation, affect lability, or altered mood.

Conclusion: The low incidence of depression and other mood disorder TEAEs was maintained up to 52 weeks of treatment with linzagolix. Linzagolix appears to be well tolerated in women with symptomatic UFs.

Use of a novel device to quantify inter-individual differences in lower birth canal resistance to dilation during the late 1st stage of labor

Mariana Masteling, Molly J. Stout, John O. DeLancey, James A. Ashton-Miller

Objective: Use a novel device to quantify inter-individual differences in birth canal resistance to dilation during the late 1st stage of labor.

Study Design: The PREP device, a pelvic floor dilator, was introduced into the first 4 cm of the vaginal canal in nulliparous women during the first stage of labor (at approx. 6cm) during the EASE trial (NCT 03973281). A semi-automatic, dilation controlled actuation system mechanically expanded the device to ~8 cm in a step-wise manner over ~60 minutes. Information regarding the force with which the lower birth canal resists dilation and diameter was recorded continuously. The intrinsic mechanical properties of the birth canal during labor were obtained from force and dilation recordings. The viscoelastic behavior of the birth canal from the PREP device data were compared between individuals.

Results: Force and dilation measurements were available from 20 nullipara (mean age: 30.8 ± 4.2 years) in the late 1st stage of labor with adequate regional anesthesia (Fig. 1, two examples). The initial force with which the birth canal resisted initial dilation from 4 to 5.5 cm varied between 3 and 15 N (0.7 - 3.4 lbf), a ~4-fold variation. During the 4-min hold at 5.5 cm that force decreased exponentially to between 3 and 8 N, a ~3-fold variation reflecting differences in the stress-relaxation characteristics of the birth canal. During the entire 60-minute dilation to 8 cm, the maximum dilation force ranged from 10 to 28 N, a ~3-fold variation. These differences are summarized graphically in Fig. 2 (top), along with the time points when they occurred Fig. 2 (bottom).

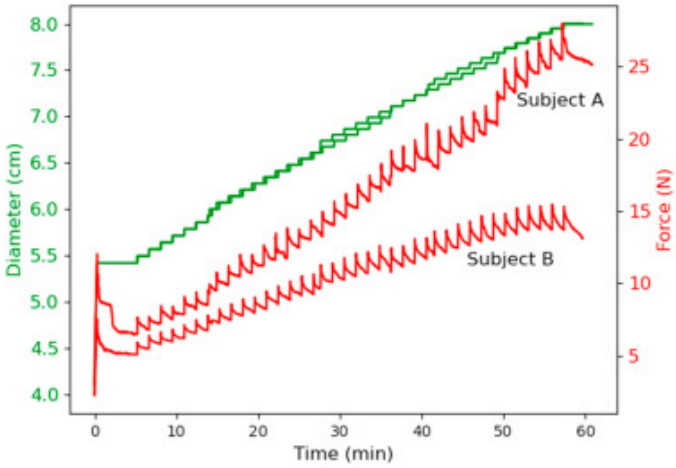


Fig. 1

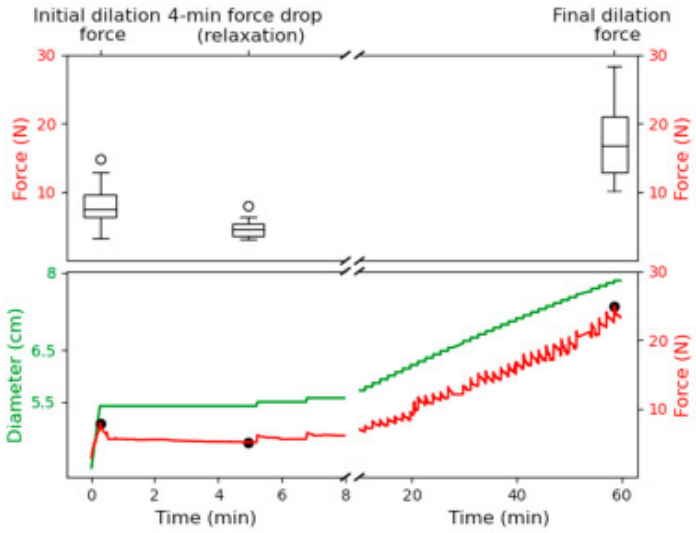


Fig. 2

Conclusion: These first-in-human measurements of lower birth canal resistance to dilation show large inter-individual differences in viscoelastic behavior. Future follow up studies are needed to evaluate the possible association between greater resistance to dilation and risk for levator ani injury.

Venous Thromboembolism Prophylaxis during Neoadjuvant Chemotherapy for Patients with Ovarian Cancer

Hannah D McLaughlin, Alli M Straubhar, Aimee Rolston, Kevin McCool, Melissa Brackmann, Jean H Siedel, Karen McLean, R. Kevin Reynolds, Shitanshu Uppal

Background: The primary objective was to assess the rate of venous thromboembolism (VTE) in patients with ovarian cancer who received neoadjuvant chemotherapy (NACT) following a quality improvement (QI) intervention of routine pharmacologic VTE prophylaxis compared to patients that did not receive prophylaxis.

Methods: This is a retrospective cohort study of patients with pathologically confirmed ovarian cancer that received NACT between January 2009 to December 2021 from a single institution. Patients were excluded if VTE was diagnosed prior to initiating NACT. Routine pharmacologic VTE prophylaxis during NACT started in January 2017 following a QI initiative. VTE events were diagnosed by doppler scan of extremities or computed tomography of the chest ordered for symptomatic patients or diagnosed incidentally on routine treatment imaging. Patient factors and perioperative variates of interest were investigated for their association with VTE events through univariate and multivariate models.

Results: A total of 290 patients with ovarian cancer received NACT and were included, with 106 of 290 patients (36.5%) receiving pharmacologic prophylaxis during NACT. Rate of VTE prophylaxis prior to the QI intervention was 3.68% (n=5) compared to 65.58% (n=101) after. The rate of VTE during NACT was 11.41% (n=21) without prophylaxis and 2.83% (n=3) with prophylaxis (p=0.013) (Table 1). The rate of any VTE event from the start of NACT through adjuvant chemotherapy was 20.11% (n=37) without prophylaxis and 4.72% (n=5) with prophylaxis (p<0.01). There was no difference in adverse bleeding events in those that received prophylaxis to those that did not (0% vs 1.32%, p=0.239). On univariate analysis, VTE prophylaxis was associated with a decreased risk of VTE during NACT (OR 0.23; 95% CI: 0.06-0.78) and any VTE during primary treatment (OR 0.19; 95% CI 0.07-0.52). On multivariate analysis, VTE prophylaxis remained significantly associated with reduced VTE rates during NACT and during primary treatment (p=0.02 and p=0.001, respectively).

Table 1. VTE events with and without VTE prophylaxis during NACT

Characteristics	No VTE Prophylaxis N=184 (63.4%)	VTE Prophylaxis N=106 (36.5%)	p-value
Total VTE Events	37 (20.11%)	5 (4.72%)	**<0.01**
NACT VTE	21 (11.41%)	3 (2.83%)	**0.013**
VTE within 30 days of surgery	7 (3.80%)	1 (0.94%)	0.265
Adjuvant Chemotherapy VTE	11 (5.98%)	1 (0.94%)	0.062

NACT: neoadjuvant chemotherapy; VTE: venous thromboembolism

Conclusion: Routine administration of pharmacologic VTE prophylaxis during NACT for patients with ovarian cancer is associated with reduced risk of VTE during NACT and throughout primary treatment and is not associated with adverse bleeding events.

What's the current value of a pelvic exam? Methods of recurrence detection for endometrial cancer in the era of telemedicine

Hailey Milakovich, Shitanshu Uppal, Ryan Spencer

Objectives: To determine the detection method for initial endometrial cancer recurrences at a tertiary-care, academic, referral center in the era of telemedicine.

Methods: The institutional enterprise data warehouse (EDW) was queried for all endometrial cancer patients seen between January 1, 2010, and December 31, 2019. The electronic health record for each patient was reviewed to identify the number of patients who experienced an initial recurrence within the period, the method of recurrence detection, patient demographics, and cancer characteristics.

Results: Over the 10-year period, 234 initial recurrences were identified. The mean age was 68.5 years. Among the cases, 95.3% were White and lived an average of 50.2 miles from our institution. Endometrioid histology was most common at 64.5% (n=151), followed by serous at 22.2% (n=52), carcinosarcoma at 9.0% (n=21) and clear cell at 4.3% (n=10). The stage breakdown was 55.5% stage I (n=130), 3.8% stage II (n=9), 23.9% stage III (n=56), and 16.7% stage IV (n=39). Of the endometrioid cancer recurrences identified, 50.3% were grade 1 (n=76), 34.4% grade 2 (n=52), and 15.2% grade 3 (n=23). Of the 234 initial recurrences detected, 8.5% (n=20) were diagnosed by asymptomatic pelvic exam during a surveillance visit. The most common factor leading to recurrence detection was patient-reported symptoms in 67.9% (n=159) of patients, followed by surveillance imaging in 11.1% (n=26), surveillance biomarker elevation in 9.0% (n=21), and incidental finding on imaging for other indications in 3.4% (n=8). For the low-risk subset of patients with stage I/II, grade1/2 endometrioid histology (n=99), factors leading to recurrence detection were 78.8% patient-reported symptoms (n=78), 2.0% surveillance imaging (n=2), 2.0% surveillance biomarkers (n=2), 14.1% asymptomatic pelvic exam (n=14), and 3.0% incidental (n=3). For the high-risk subset (stage III/ IV or any stage G3EC, UPSC, CS, CCC; n=135), the factors leading to recurrence detection were 60.0% patient-reported symptoms (n=81), 17.8% surveillance imaging (n=24), 14.1% surveillance biomarkers (n=19), 4.4% asymptomatic exam (n=6), and 3.7% incidental (n=5). The low-risk subset was more likely to have recurrence detected by patient-reported symptoms (78.8% vs 60.0%) and asymptomatic exams (14.1% vs 4.4%) than the high-risk subset. The high-risk subset was more likely to have recurrence detected by surveillance imaging (17.8% vs 2.0%) and biomarkers (14.1% vs 2.0%) than the low-risk subset (Chi-square = 31.3, $p<0.001$).

Conclusions: Current guidelines for endometrial cancer surveillance include evaluation of symptoms and examinations at regular intervals. These 10-year data from a high-volume referral center demonstrate a lower rate of recurrence detection by asymptomatic pelvic exams (8.5%), especially in a high-risk subgroup (4.4%), than previously reported. These data can be used for patient counseling regarding the low risk of missing an endometrial cancer recurrence in an era of telemedicine.

Bringing Implementation Science methods to maternity care quality improvement: A statewide multiple case study

Michelle H. Moniz

Implementation Science methods are underutilized in maternity care quality improvement efforts but hold promise to help drive more effective, efficient improvements in care delivery, health outcomes, and outcomes inequities. The Obstetrics Initiative is a statewide collaborative quality initiative funded by Blue Cross Blue Shield of Michigan with the goal of maternity care Value by advancing Effectiveness, Equity, and Patient Experiences (V=E3). From its inception in 2019, through 2022, OBI's quality improvement agenda focused on safely lowering the Nulliparous Term Singleton Vertex (NTSV) cesarean rate. However, from 2020 to 2022, the statewide average CS rate did not decrease. We are using key Implementation Science methods to drive quality improvement, including a) robust quantitative analytics to identify gaps between clinical practice and recommended, evidence-based behaviors; b) site visits with in-depth interviews to compare high performers, low performers, and improvers; and c) more intensive QI support for sites with more significant barriers to change. We will share methodologic lessons learned, how our findings will shape ongoing QI efforts, and applications to other clinical contexts.

Hospital-Level Variation in Postpartum Contraceptive Utilization in Michigan
Michelle Moniz, Dawn Zinsser, Giselle Kolenic, Molly Stout, Alex Peahl, Anita Malone, Vanessa Dalton, Daniel Morgan

Research Objective: Postpartum contraceptive utilization is a nationally-recognized indicator of the quality of maternity care in the United States. Nonetheless, many individuals face barriers to initiating their preferred contraceptive method after childbirth, especially long-acting reversible contraception (LARC; i.e., intrauterine devices and the contraceptive implant) and sterilization. We aimed to a) measure utilization of postpartum contraception across diverse practice settings in Michigan, b) describe interhospital variation in utilization, and c) identify hospital determinants of utilization to guide future quality improvement interventions.

Study Design: We conducted a retrospective cohort analysis. Key outcomes included LARC utilization and sterilization utilization at 0-3 days and 0-60 days postpartum, as defined by the Office of Population Affairs. Multilevel multivariable logistic regressions with hospital random intercepts evaluated LARC and sterilization utilization by 60 days postpartum by hospital characteristics (i.e., teaching status, for-profit status, rurality, Catholic church-operated, and size [total beds], as reported on the AHA 2019 survey), adjusting for patient characteristics (i.e., age, chronic conditions, birth year, region, and zipcode-based social vulnerability index). Adjusted hospital-specific outcome variation was assessed graphically with caterpillar plots.
Population Studied: We identified childbirth episodes among Blue Cross Blue Shield of Michigan PPO and HMO enrollees and Medicaid enrollees delivering at 77 hospitals in the Michigan Value Collaborative between January 2016 and December 2019.

Principal Findings: The study cohort included 138,044 delivery episodes, among 128,015 women (mean [SD] age, 28.8 [5.4] years). Unadjusted hospital-specific rates of LARC utilization and sterilization utilization varied widely (0-3 days postpartum: LARC, 0.0% to 6.2%, sterilization, 0.0% to 16.6%; 0-60 days postpartum, LARC 0.6% to 21.7%; sterilization, 0.0% to 18.3%). Variation persisted in adjusted models predicting postpartum contraceptive utilization by 60 days (LARC, 2.0% to 18.0%; sterilization, 0.6% to 18.0%). After adjusting for patient characteristics, LARC initiation by 60 days postpartum was significantly less likely among those delivering at for-profit (vs. non-profit) hospitals (aOR 0.52, p=0.011) and Catholic-owned (vs. not Catholic-owned) hospitals (aOR 0.72, p=0.048). Sterilization by 60 days postpartum was also far less likely at Catholic-owned hospitals (aOR 0.22, p<0.001). Hospital teaching status, rurality, and size were not associated with postpartum LARC or sterilization utilization.

Conclusions: Wide observed variation in interhospital provision of postpartum contraception is unlikely to reflect only patient preferences. Rather, our findings suggest provider-driven barriers to postpartum contraceptive access in Michigan and need for quality improvement.

Implications for Policy or Practice: Initiatives to improve postpartum contraceptive access for birthing individuals in Michigan should investigate barriers and facilitators to postpartum contraceptive provision at for-profit and Catholic-owned hospitals. Efforts to monitor and report patient reported outcomes, including whether one’s preferred method was initiated, may help motivate quality improvement activities and ensure that efforts to enhance contraceptive access concomitantly center individual patients’ preferences in contraceptive decision-making.

Patterns and Predictors of Medical Debt Among Commercially-Insured Postpartum Women
Michelle Moniz, Nora Becker, Giselle Kolenic, Erin Carlton, John Scott, Morgen Miller, Daniel Morgan, Molly Stout

Research Objective: Birthing populations demonstrate high rates of self-reported financial stress. One driver of financial strain may be high out-of-pocket spending for healthcare among commercially-insured individuals. We therefore aimed to evaluate prevalence and predictors of medical debt among postpartum women.
Study Design: Individuals enrolled in the Michigan Value Collaborative commercial insurance claims dataset were linked to their January 2021 Experian credit report data. Our primary outcome was probability of having medical debt in collections. Generalized linear models evaluated the relationship between medical debt and patient characteristics, including age, type of chronic condition, type of pregnancy complication, and patient ZIP code-based social vulnerability index (SVI) for socioeconomic status, household composition, minority/language status, and housing type/transportation (highest quintile [i.e., most vulnerable] SVI, by theme, yes/no).

Population Studied: Blue Cross Blue Shield of Michigan preferred provider organization (PPO) plan adult enrollees (age 21 to 49) undergoing childbirth between January and June 2020, continuously enrolled for 3 months prior to childbirth, with linked commercial credit score data in January 2021 (6-12 months after birth episode) (n=12,157).

Principal Findings: Overall, 18.3% of postpartum individuals had medical debt in collections. Among those with non-zero medical debt, the average amount was $1452.71 ($10-$104,234). The predicted probability of medical debt was significantly higher among younger individuals (age 21-24 (35.1%; 95% CI, 31.8%-38.6%) vs. age 25-34) and those with highest socioeconomic vulnerability (33.3%; 95% CI, 27.3%–39.9%), highest minority status/language vulnerability (28.8%; 95% CI, 21.5%-37.2%), and highest household composition vulnerability (24.4%; 95% CI, 19.0%-30.7%). All chronic conditions significantly increased predicted probability of medical debt (hypertension [25.5%; 95% CI, 21.5%-30.1%], respiratory disease [22.6%; 95% CI, 18.7%-27.0%], diabetes [27.2%; 95% CI, 21.3%-33.9%], substance abuse [44.0%; 95% CI, 34.1%-54.3%], anxiety/depression [21.8%; 95% CI, 18.2%-25.8%]). Some obstetric complications, including cervical insufficiency (33.3%; 95% CI, 21.8%-47.2%), preterm labor (27.1%; 95% CI, 21.8%-33.1%), history of poor obstetric outcomes (25.3%; 95% CI, 20.1%-31.2%), and Cesarean delivery (20.7%; 95% CI, 17.5%-24.3%) also significantly increased predicted probability of medical debt among postpartum individuals.

Conclusions: Medical debt affects nearly one in five postpartum individuals, with younger age, neighborhood vulnerability, common chronic conditions, and some obstetric complications significantly increasing odds of medical debt.

Implications for Policy or Practice: The high costs of healthcare for commercially-insured populations saddle many birthing individuals with medical debt. Given the known association between financial hardship and adverse health effects, including delayed/deferred healthcare, mood disorders, and mortality, policymakers should seek to mitigate medical debt for peripartum populations. Limiting peripartum healthcare spending for commercially-insured individuals is one such strategy. Policies that limit the adverse effects of medical debt on individuals' credit scores may also help buffer families who are navigating financial strain due to healthcare utilization.

The Association of Childbirth with Economic Hardship

Michelle Moniz, Molly Stout, Giselle Kolenic, Erin Carlton, John Scott, Morgen Miller, Daniel Morgan, Nora Becker

Research Objective: Childbirth may precipitate economic hardship, given healthcare costs, caregiving expenses, and potential changes in earnings. Individuals with the least socioeconomic security may be at greatest risk, given that any additional expenses account for a greater proportion of household income. We evaluated the association between childbirth and objective financial hardship and potential differences by socioeconomic status.

Study Design: Individuals in Michigan Value Collaborative's commercial claims dataset were linked to their January 2021 Experian credit report data. We defined a "pregnant cohort" (childbirth episodes February-July, 2021; credit data 1-6 months before childbirth) and a "postpartum cohort" (childbirth episodes January-June, 2020; credit data data 6-12 months after childbirth). We examined the association between childbirth and financial hardship and whether this association differed by socioeconomic status. Primary outcomes included the probability of having medical or non-medical debt in collections. Generalized linear models compared financial hardship outcomes in the pregnant versus postpartum cohorts, adjusting for age category, number of chronic conditions, and patient ZIPcode-based average per capita income (lowest quintile in cohort, yes/no, in month of childbirth), with an interaction term between cohort and income.

Population Studied: Blue Cross Blue Shield of Michigan preferred provider organization plan adult enrollees undergoing childbirth between January 2020 and June 2021, continuously enrolled for 3 months prior to childbirth, with linked commercial credit score data in January 2021 (n=26,717 childbirth episodes: 14,560 (54.5%) pregnant cohort, 12,157 (45.5%) postpartum cohort).

Principal Findings: Economic hardship was common among both cohorts (medical debt: pregnant, 15.1%, postpartum 18.3%; non-medical debt: pregnant, 12.8%, postpartum 13.0%). In both cohorts, individuals living in the lowest income neighborhoods (average per capita income ≤$25,417.60), compared to all others, demonstrated higher prevalence of medical debt (pregnant, 24.8% vs. 12.1%; postpartum: 30.7% vs. 15.1%) and non-medical debt (pregnant, 24.0% vs. 10%; postpartum, 24.8% vs. 10%). The association between cohort and medical debt was significantly moderated by income: the postpartum cohort had higher predicted probabilities of medical debt than the pregnant cohort for both income groups, but this difference between cohorts was significantly larger for the lowest income group (lowest income: pregnant, 21.7% [95% CI 19.6%-24.1%], postpartum, 29.2% [95% CI 26.5%-32.1%]; non-lowest income: pregnant, 11.9% [95% CI 10.4%-13.6%], postpartum, 15.1% [95% CI 13.1%-17.3%]). Conversely, the odds of non-medical debt were increased in the postpartum cohort (aOR 1.08, p=0.03) and the lowest income group (aOR 2.66, p<0.001,) but there was no significant interaction between cohort and income.

Conclusions: Objective financial hardship is significantly more common among postpartum compared to pregnant individuals. Postpartum individuals living in the most economically vulnerable neighborhoods are at highest risk of having medical debt.

Implications for Policy or Practice: Future research should evaluate longitudinal financial outcomes and their effects on growing families. Policymakers should consider reducing or eliminating maternal and infant healthcare spending for commercially-insured individuals, particularly those in socioeconomically vulnerable communities.

Social Vulnerability and Postoperative Complications after Hysterectomy for Benign and Malignant Conditions

Daniel Morgan, Anita Malone, Morgen Miller, Brian Madden, Giselle Kolenic, Michelle Moniz

Research Objective: The Center for Medicare and Medicaid Services compares and publicly reports hospital rates of postoperative complications, which may affect hospital payments under Pay for Performance programs. We sought to analyze how social vulnerability is associated with postoperative complications after hysterectomy for benign and malignant conditions.

Study Design: Retrospective cohort analysis of insurance claims for hysterectomy episodes of care in the Michigan Value Collaborative (MVC) Registry which contains professional and facility claims for Blue Cross Blue Shield of Michigan and Michigan Medicaid and Medicare enrollees. We analyzed the association of post operative complications with the Social Vulnerability Index (SVI) which utilizes census tract data to quantify relative vulnerability of communities using 15 factors such as poverty, transportation, and household composition. Patients are assigned an SVI score corresponding to the patient's zip code on their insurance claim and grouped into quintiles for analysis (where 1st quintile low scores suggests lowest vulnerability and 5th quintile high scores suggests highest vulnerability). Complications after hysterectomy were identified with ICD-10 billing codes and included intraoperative injuries, surgical complications (e.g. visceral, vascular injury, hemorrhage, surgical site infections) and medical complications (e.g. venous thromboembolism, kidney failure, cardiac events, cerebral vascular accident, respiratory failure). A multivariable logistic regression model to identify independent associations between postoperative complications and SVI quintiles with adjustment for age (in deciles), benign vs malignant gynecologic disease, and use of abdominal hysterectomy vs non-abdominal hysterectomy (laparoscopic or vaginal) was developed.

Population Studied: Patients who underwent hysterectomy for benign and malignant gynecologic conditions between October 2015 and July 2021.

Principal Findings: Among 32,409 hysterectomies in the MVC Registry, postoperative complications were identified in 22.1% (n=7155). Gynecologic cancer was the indication in 10.8% (n=3517), and abdominal hysterectomy was undertaken in 1.73% (n=561). The odds of postoperative complications were higher among patients in the 4th (OR 1.17, 95% CI 1.02-1.33, p=0.017) and 5th quintiles (OR 1.41, 95% CI 1.17-1.7, p<.001) of the SVI compared to those in the 1st quintile. A higher odds of postoperative complications were also identified among those with gynecologic cancer vs benign gynecologic conditions (OR 1.55, 95% CI 1.36-1.91, p<.001), those who had abdominal hysterectomy vs non-abdominal hysterectomy (OR 1.29, 95% CI 1.08-1.54, p=.005), and those aged >70 years vs those <40 years (OR 1.41, 95% CI 1.28-1.55, p<.001).

Conclusions: This statewide analysis of commercially and publicly insured patients in Michigan, adjusted for the most common confounders, reveals that those living in the most socially vulnerable areas are more likely to experience postoperative complications within 30 days of hysterectomy.

Implications for Policy or Practice: Future research should continue to investigate how social determinants of health are associated with clinical outcomes. If social determinants are not explicitly considered, Pay for Performance programs may unintentionally disadvantage safety net institutions and disincentive healthcare provision to the most marginalized patients. Policymakers should consider advancing payment policies that recognize the difficult and critical work of addressing social needs and reward those health systems that do this well.

The Potential for Increased Gender Equity with Employer-Covered Oocyte Cryopreservation in Medical Training

Hana Murphy, Kiernan Bloye, Sarah Compton, Molly Moravek, Monica Rosen

Objective: This study was conducted to better characterize medical students' attitudes towards planned oocyte cryopreservation (POC) and how employer coverage might impact medical career decision-making.

Methods: This cross-sectional, multi-institutional study was conducted using a digital survey software and distributed to all medical students at two large academic institutions from December 2022-January 2023. Survey questions spanned demographics, family planning goals, attitudes towards childbearing, attitudes towards POC, effect of employer coverage of POC on medical career decisions, and fertility knowledge.

Results: 630 total responses were collected, 71.8% women (n=452) and 28.1% men (n=177). Total response rate was 32.6%. 33.2% of women currently have delayed childbearing due to medical training and 89.2% of women felt pressure to delay it when compared to men (P<0.001). Women more than men were concerned about the anticipated physical demand of residency (76.5%), stigma in residency hiring practices (41.2%), and parental leave interfering with team dynamics (49.6%) when it came to childbearing (P<0.001). Respondents were more likely to pursue POC for themselves or their family if it were covered by residency employer health insurance (60% vs 11.6%; P < 0.00001). Women were more likely than men to think that their residency ranking and length, decision to pursue additional degrees, and pursuit of fellowship training would be influenced by employer-covered POC (P < 0.02). Additionally, 25.4% of women and 19.8% of men felt their choice in medical specialty would be impacted by employer-sponsored POC.

Conclusion: Medical students feel pressure to delay childbearing due to their medical training and therefore are concerned about their future fertility. Both male and female medical students were interested in employer-sponsored POC resources and would be more likely to pursue cryopreservation with financial coverage. Further research is needed on a national scale to determine the full impact of employer-sponsored POC on medical career decision-making.

The Relationship Between Estrogen and Subsequent Growth Restriction Among Adolescents with Heavy Menstrual Bleeding at Menarche

Jessie M. Nelson, Sarah D. Compton, Mina M. Farahzad, Olivia K. Winfrey, Monica W. Rosen

Background: We sought to evaluate the impact of estrogen-containing treatment for heavy menstrual bleeding (HMB) on subsequent height compared to progesterone-only or non-hormonal treatment when initiated at menarche.

Methods: We performed a retrospective chart review of adolescent females aged 10-15 years who presented to an institution-affiliated outpatient, inpatient, or emergency setting for management of HMB within three months of menarche. Growth records over a 2-year period starting at menarche were recorded, and comparisons made among patients treated with 1) estrogen, 2) progesterone, and 3) non-hormonal methods (controls). Groups were compared using bivariate analysis with Chi-square or Fisher's exact test and linear regression.

Results: In an analysis of 80 patients at 24 months, the mean increase in height from menarche was 6.4 cm among controls (n=54), 7.2 cm among the progesterone-only group (n=10), and 3.8 cm among the estrogen group (n=16). The estrogen group's increase in height was significantly lower than the control group's, by a mean of 1.8 cm ($p=0.04$). Change in height did not differ significantly between the progesterone and control groups ($p=0.87$). Additionally, for every year younger at menarche, there was 1 fewer cm of growth (change in height) at 24 months after menarche ($p<0.002$).

Conclusions: Estrogen-containing treatment for HMB initiated within three months of menarche was associated with reduced growth at 24 months compared to progesterone-only or non-hormonal methods. The clinical applicability of the estrogen group's 1.8 cm absolute reduction in height may have considerable significance for those who are shorter at baseline.

Oophorectomy at the time of gender affirming hysterectomy in young adults

Kathleen E. O'Brien, Elisabeth H. Quint, Mina M. Farahzad, Rebecca M. Warwick, Monica W. Rosen, Yolanda R. Smith, Melina L. Dendrinos

Background: Many transgender and gender diverse (TGD) individuals who are assigned female at birth eventually decide to undergo gender affirming surgery (GAS), including hysterectomy with or without oophorectomy. The World Professional Association of Transgender Health Standards of Care for the Health of Transgender and Gender Diverse People, Version 8 does not recommend for or against bilateral oophorectomy but, rather, defers to shared decision-making and patient preference. Limited data exist regarding oophorectomy rates. The aim of this study is to identify factors associated with ovarian retention or removal at the time of gender affirming hysterectomy.

Methods: A retrospective chart review was performed at a single academic referral center for gender affirming care. IRB exemption was obtained. Patients aged 18 to 30 who identified as TGD and underwent a hysterectomy between January 2017 and October 2022 were identified using hysterectomy CPT codes and ICD-10 codes for gender identity disorder. Data were collected on demographics, medical history, completion of fertility preservation, parity, preoperative testosterone use, completed procedures, intraoperative findings, and surgical complications. Data were analyzed using paired t-tests and chi-square tests.

Results: Among the 115 individuals who met the inclusion criteria, 37 retained one or both ovaries, and 78 underwent a bilateral oophorectomy (68%). 3 patients had carried term pregnancies, and 1 patient underwent fertility preservation prior to surgery. Affirmed male patients were more likely to undergo bilateral oophorectomy than nonbinary or genderqueer patients ($p<0.0001$). All patients who underwent bilateral oophorectomy were on testosterone at the time of surgery, compared with 76% of individuals with ovarian retention ($p<0.0001$). The length of time on testosterone was not significant ($p=0.44$). Individuals who underwent vaginectomy at the time of hysterectomy were more likely to have both ovaries removed ($p<0.0001$). BMI, age, and insurance type were not significantly different between the two groups. Of the 4 highest volume surgeons, there was some variation in rates of oophorectomy.

Table 1

	One or both ovaries retained N = 37	Both ovaries removed N = 78	*p*-value
Gender: Affirmed Male Gender: Nonbinary/Genderqueer	N = 23 N = 14	N = 75 N = 3	<0.0001
Age (y)	23.32	24.51	0.07
Preoperative testosterone use (%)	76	100	<0.0001
Length of testosterone use (y)	3.43	3.78	0.46
BMI (kg/m^2)	27.69	28.21	0.51
Rate of public insurance (%)	35	29	0.54
Concurrent vaginectomy (%)	11	44	<0.0001
History of ovarian pathology (%)	3	8	0.30
Intraoperative ovarian pathology (%)	5	8	0.68
Family history of ovarian cancer (%)	3	4	0.76
Rate of surgical complication (%)	8	9	0.88
Mental health diagnosis (%)	78	72	0.45
PCOS diagnosis (%)	3	4	0.76

Conclusions: In this study, 68% of TGD individuals aged 18 to 30 chose to have a bilateral oophorectomy at the time of gender affirming hysterectomy. Stated male gender identity, testosterone use, and concurrent vaginectomy were associated with a statistically higher rate of this surgery. While the reasons for this high rate and these differences cannot be ascertained directly from this study, future research should explore patient preferences and the role of preoperative counseling regarding ovarian retention or removal.

Risk Factors for Obstetrical Hemorrhage Among Nulliparous, Term, Singleton, Vertex Pregnancies

AnneMarie E. Opipari, Emily K. Kobernik, Molly J. Stout, Elizabeth S. Langen, Angela Liang, Natalie Saunders, Daniel M. Morgan

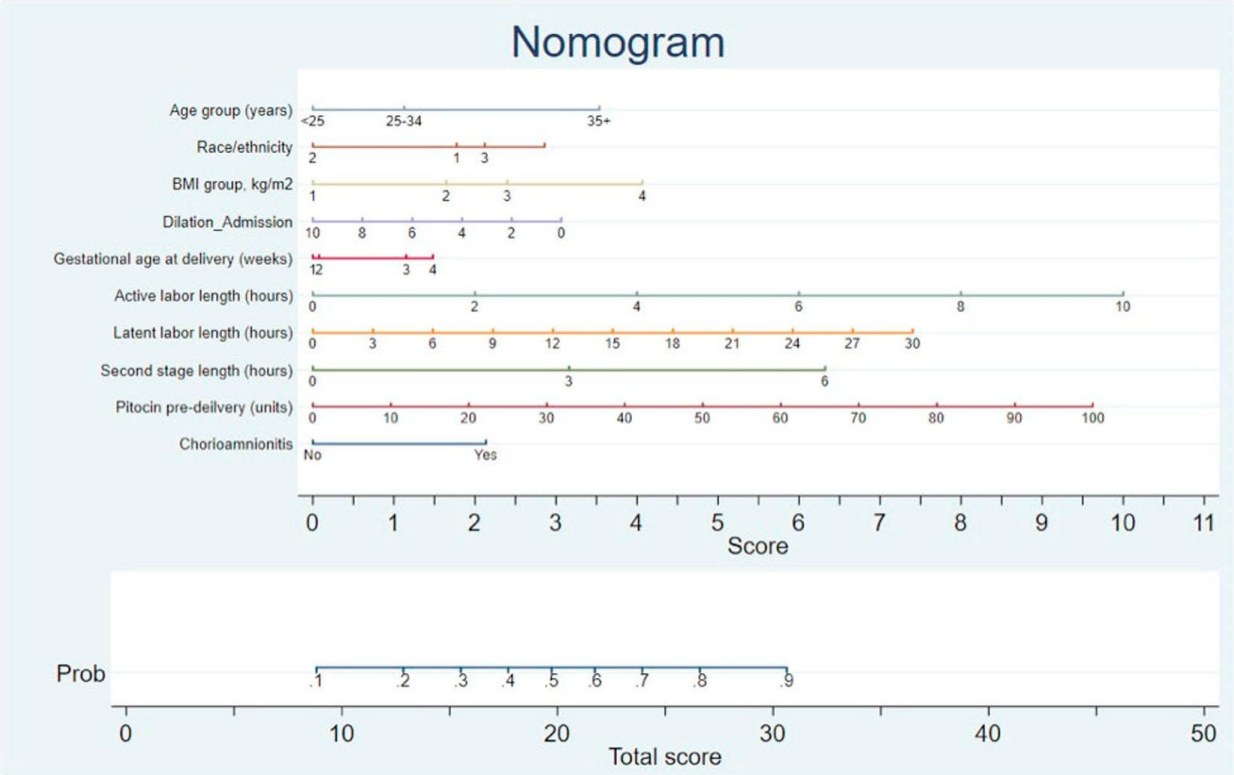
Objective: Postpartum hemorrhage (PPH) is an important cause of severe maternal morbidity. Current prediction models do not identify risk factors for PPH among low-risk pregnant patients. Our objective was to evaluate the labor course and identify factors associated with PPH among nulliparous, term, singleton, vertex patients (NTSV) to develop a nomogram to assess risk.

Study Design: Retrospective cohort study of patients admitted for labor management January 2015-October 2020 at a single tertiary center. Inclusion criteria: nulliparous, term(gestational age ≥ 37/0), singleton, vertex pregnancies admitted for spontaneous labor or induction of labor. Exclusion criteria: scheduled cesarean delivery and patients who delivered precipitously upon presentation. The primary outcome was PPH defined as ≥1000mL. Bivariate analyses and multivariable logistic regression model were used to develop a nomogram for prediction of PPH.

Results: Of 7,805 NTSV patients, there were 1,395 (17.8%) with PPH. Patients who experienced PPH were on average older, more likely to be non-Hispanic White, have a higher BMI, and a more advanced gestational age at delivery. With adjustment for these demographics, the following factors were independently associated with increased odds of PPH: cervical dilation at admission ≤2, longer length of latent and active labor, shorter length of the second stage, pre-delivery pitocin and chorioamnionitis. PPH was associated with labor courses that required pitocin pre-delivery. Those who presented in spontaneous labor and did not receive pitocin had the lowest rate of PPH (23%), followed by those who had spontaneous labor and received pitocin (31.1%) and by those who had induction of labor (37.8%) P< .001. In our nomogram a score of 20 was associated with ~50% risk of PPH.

Table 1. Independent factors associated with hemorrhage (>1000ml) prior to delivery, among patients with NTSV deliveries

Factor	Unadjusted Odds Ratio	Adjusted Odds Ratio	95% Confidence Interval	*P*
Age category				
<25 years	REF	REF	REF	REF
25-34 years	1.39	1.26	1.05, 1.50	0.01
≥35 years	2.50	2.04	1.63, 2.55	<.001
Race/ethnicity				
Non-Hispanic White	REF	REF	REF	REF
Non-Hispanic Black	0.68	0.70	0.55, 0.89	0.004
Hispanic	1.05	1.07	0.79, 1.46	0.66
Other non-Hispanic	1.01	1.25	1.03, 1.50	0.02
Pregnancy BMI				
<24.9 kg/m^2	0.50	0.62	0.48, 0.80	<.001
25.0-29.9 kg/m^2	0.76	0.86	0.73, 1.01	0.07
30.0-34.9 kg/m^2	REF	REF	REF	REF
≥35 kg/m^2	1.53	1.40	1.18, 1.66	<.001
Gestational age at delivery				
<39/0 weeks	1.14	0.99	0.82, 1.19	0.87
39/0 - 39/6 weeks	REF	REF	REF	REF
40/0 - 40/6 weeks	1.21	1.24	1.05, 1.47	0.01
41/0 weeks+	1.59	1.33	1.10, 1.60	0.003
Dilation at admission, per 1 cm	0.82	0.94	0.90, 0.98	0.004
Latent labor length, per 4 hours	1.13	1.05	1.03, 1.08	<.001
Active labor length per 6 hours	1.43	1.22	1.12, 1.34	<.001
Second stage length, per 3 hours*	1.27	1.24	1.12, 1.36	<.001
Pitocin given pre-delivery, per 10 units	1.04	1.02	1.01, 1.03	<.001
Chorioamnionitis	2.23	1.54	1.23, 1.92	<.001



Conclusion: In this analysis, we identified labor findings and events that increase the likelihood of PPH among NTSV deliveries. Avoiding prolonged labor could be a strategy to reduce PPH. Use of this risk assessment nomogram could help to anticipate and clinically prepare for PPH an important strategy to reduce severe maternal morbidity.

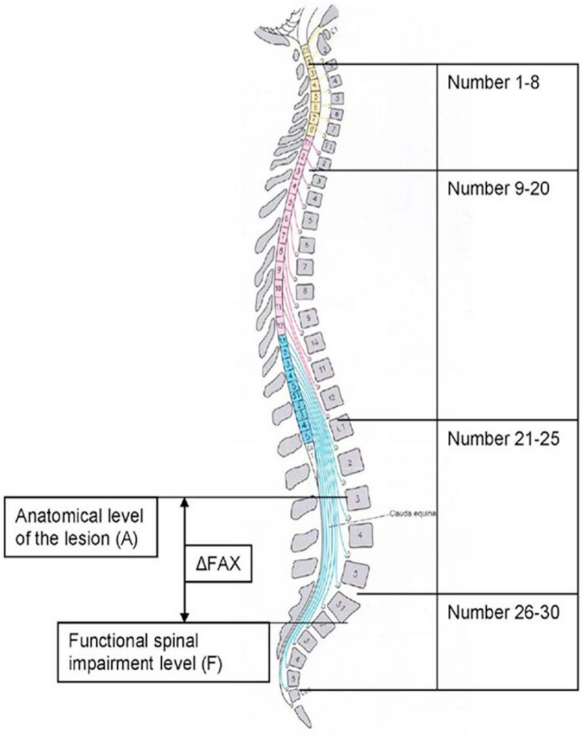
Mode of Delivery and Motor Function in Infants with Myelomeningocele without In-Utero Repair

Anna Palatnik, Amy Pan, Stephen P. Emery, Stephanie Greene, Nallammai Muthiah, Deborah R. Berman, Terry Buchmiller, Juliana S. Grebb, *et al.*

Objective: To assess the impact of mode of delivery on two-year motor function in infants with prenatal diagnosis of myelomeningocele (MMC) who did not undergo in-utero repair.

Study Design: A multisite retrospective cohort study of 14 North American Fetal Therapy Network (NAFTNet) centers. De-identified data of all 2007-2020 MMC births were collected. Inclusion criteria were live singleton gestation with MMC at ≥24 weeks at birth and follow-up neurologic assessment available at two years of age (2y). Exclusion criteria were in-utero MMC repair, postnatal MMC diagnosis, abnormal karyotype, and obstetric contraindications to labor. The primary outcome was the difference between the anatomic level of the spinal lesion and functional motor level in the child at 2y (Figure), with a lower functional than anatomic level indicating improved motor function. Secondary outcomes were ambulation (independent, with assistance, or none), shunt-related outcomes (placement/infection/revision), seizures, and neurogenic bladder. A general linear model was used to determine the effect of mode of delivery on the primary outcome. Presence of labor, gestational age at birth, lesion width, length, and origin level, and presence of hydrocephalus were included as potential confounders for the multivariable analyses.

Figure: Difference between functional and anatomic levels of neurological damage expressed in a numeric index as described by Luthy *et al.*, NEJM, 1991. *Part of the figure was borrowed from I. Cuppen et al. / European Journal of Obstetrics & Gynecology and Reproductive Biology 156 (2011) 18–22*



C1	2
C2	3
C3	4
C4	5
C5	6
C6	7
C7	8
T1	9
T2	10
T3	11
T4	12
T5	13
T6	14
T7	15
T8	16
T9	17
T10	18
T11	19
T12	20
L1	21
L2	22
L3	23
L4	24
L5	25
S1	26
S2	27
S3	28
S4	29
S5	30

Results: Of 566 infants with MMC during the study period, 305 met inclusion criteria, with 216 (70.8%) delivering by cesarean and 89 (29.2%) vaginally. Infants delivered by cesarean had a mean (±standard error) level of motor function 0.07 ± 0.21 segments below the anatomic level at 2y, compared to 0.57 ± 0.32 for infants delivered vaginally (p=0.19). After controlling for potential confounders, both groups improved in motor function by 2y compared to anatomic level (p=0.01); however, the difference in motor improvement (0.37 segments) between two modes of delivery was not significant (p=0.62). Secondary outcomes did not differ by mode of delivery (Table).

Table. Primary and secondary outcomes of infants with prenatally diagnosed myelomeningoceles at 2 years of age stratified by mode of delivery

	Cesarean N=216	Vaginal N=89	P value	Adjusted parameter estimate (SE)*	P Value for adjusted analysis
Difference between functional and anatomic level	0.07 (0.21)	0.57 (0.32)	0.19	-0.37 (0.75)	0.62
Anatomic level (at delivery)	23.74 (0.14)	24.15 (0.21)	0.093	-	-
Functional level (at 2 years of age)	23.87 (0.19)	24.82 (0.31)	**0.010**	-	-
				Adjusted relative risk (95% CI) *	
Ambulation at 2 years of age **No ambulation** **Assisted ambulation** **Independent ambulation**	 70 (32.4%) 106 (49.1%) 40 (18.5%)	 21 (23.6%) 44 (49.4%) 24 (27.0%)	0.151	0.80 (0.40-1.60)	
Shunt placement	151 (69.9%)	65 (73.9%)	0.490	0.85 (0.66-1.09)	
Shunt infection	11 (7.4%)	13 (20.6%)	**0.006**	0.30 (0.04-2.24)	
Shunt revision	79 (52.7%)	36 (55.4%)	0.714	0.82 (0.46-1.47)	
Seizures	28 (13.0%)	15 (17.4%)	0.322	0.19 (0.02-1.48)	
Neurogenic bladder	194 (90.7%)	83 (95.4%)	0.168	0.95 (0.84-1.07)	

Data were reported as n (%) or mean (standard error)
*Adjusted for presence of labor, gestational age at birth, lesion width, length, level where lesion started, and presence of hydrocephalus

Conclusion: In this multisite NAFTNet cohort, mode of delivery was not associated with motor outcomes at 2y in infants with MMC.

A Short-Form Screening Tool for Detecting Social Needs Efficiently in Pregnancy

Alex Peahl, Lily Rubin-Miller, Victoria Paterson, Avery Plough, Hannah R. Jahnke, Natalie Henrich Christa Moss, Neel Shah

Objective: Social Determinants of Health (SDoH) affect patients' baseline health needs and their ability to access and engage in healthcare. Though maternity care organizations recommend assessing and addressing SDoH in pregnancy, how to do so is not clear. Current screeners are burdensome (>20 questions) or incompletely evaluate material (tangible) and social support (relationship-based) needs. We assessed the sensitivity and specificity of a 3-question, comprehensive digital SDoH screener relative to a validated screener.

Study Design: We developed a 3-question, short-form SDoH screener using domains from existing validated screeners. We cognitively tested and refined the screener with 5 pregnant/postpartum people. We tested the short-form screener as part of a nationally representative, cross-sectional online survey of pregnant/postpartum people using Centiment, an online survey panel. By design, our cohort included equal numbers of participants with public and private insurance, given differences in SDoH and access to resources in these groups. Participants completed the short-form and a validated screener (PRAPARE). We calculated descriptive statistics, the sensitivity and specificity of the short-form screener compared to PRAPARE for overall, material and social support needs.

Results: Of the 215 participants, mean age was 30.6 (+/-5.7), 77% (167/215) were White, 86.0% (185/215) were non-Hispanic. Using PRAPARE, 88.8%, 67.9%, and 81.4% had ≥1 overall, material or social need, respectively. The sensitivity and specificity of the short form screener were overall: 81.2%, 50.0%; material: 84.2%, 75.4%; social support: 63.4%, 67.5% (Table 1).

Table 1: Sensitivity and specificity of short vs. long-form screening tool

	Sensitivity	**Specificity**
Any need: short form vs. PRAPARE (including "risk-factors*" for social needs)	79.3%	71.4%
Material needs: short form vs. PRAPARE (material domains only)	84.2%	75.4%
Social support needs: short form vs. PRAPARE (social support domains only)	63.4%	67.5%
Any need: short form vs. PRAPARE (excluding "risk-factors*" for social needs)	81.2%	50.0%
***risk-factors for social needs included: public insurance, income, veteran status, language, stress, education, and migrant farm work.**		

Conclusion: A 3-question screener performed well for detecting any social need when compared to a validated screener, though detection for social support needs was lower. Lower specificity in our screener may be due to biases inherent in existing tools, which assume characteristics such as payer are equivalent to social needs. The use of short-form screeners should be considered as a strategy to improve uptake of screening and management of SDoH in routine care.

Provider and Hospital-Level Predictors of Variation in Postpartum Opioid Prescribing: A Statewide Analysis

Alex Peahl, Courtney Townsel, Lisa Kane Low, Elizabeth S. Langen, Michelle Moniz, Hsou Mei Hu, Jennifer Waljee

Objective: To describe variation in opioid prescribing following childbirth across a statewide quality collaborative and assess the proportion of variation due to provider and hospital characteristics.

Study Design: We assessed postpartum prescribing data from nulliparous, term, singleton, vertex births, collected through chart abstraction from a statewide quality collaborative of 68 maternity hospitals from January 2020 to June 2021. Data were summarized using descriptive statistics. Mixed-effects logistic regression models adjusted for patient characteristics and assessed the provider and hospital level predictors of receiving a postpartum opioid prescription. The relative contribution of provider (e.g., sex, profession) and hospital (e.g., annual delivery volume, culture of safety measured by a Labor Culture Survey theme) characteristics was assessed using the intraclass correlation coefficient.

Results: Of the 40,589 patients included in the analysis, 3.0% (872/29.412) received an opioid after vaginal birth, and 87.8% (9812/11,177) received an opioid after cesarean birth. Variation in rates of postpartum opioid prescribing was high across hospitals (Figure 1). In adjusted models, the strongest predictors of receiving a postpartum opioid were receiving care at a mid-volume hospital with 2401-3600 annual births (aOR 5.88, 95% CI 1.75-19.80) and for-profit hospitals (aOR 5.45, 95% CI 1.44-20.63). Lower rates of prescribing were seen for patients cared for by Family Medicine physicians (aOR 0.62, 95% CI 0.41-0.95), Advanced Practice Providers (aOR 0.63, 95% CI 0.48-0.83), seen at hospitals with a NICU (aOR 0.34, 95% CI 0.21-0.91), and positive culture of safety (aOR 0.37, 95% CI 0.15-0.88) (Table 1). The percentage of variation in postpartum prescribing attributable to providers and hospitals was 6% and 44% respectively.

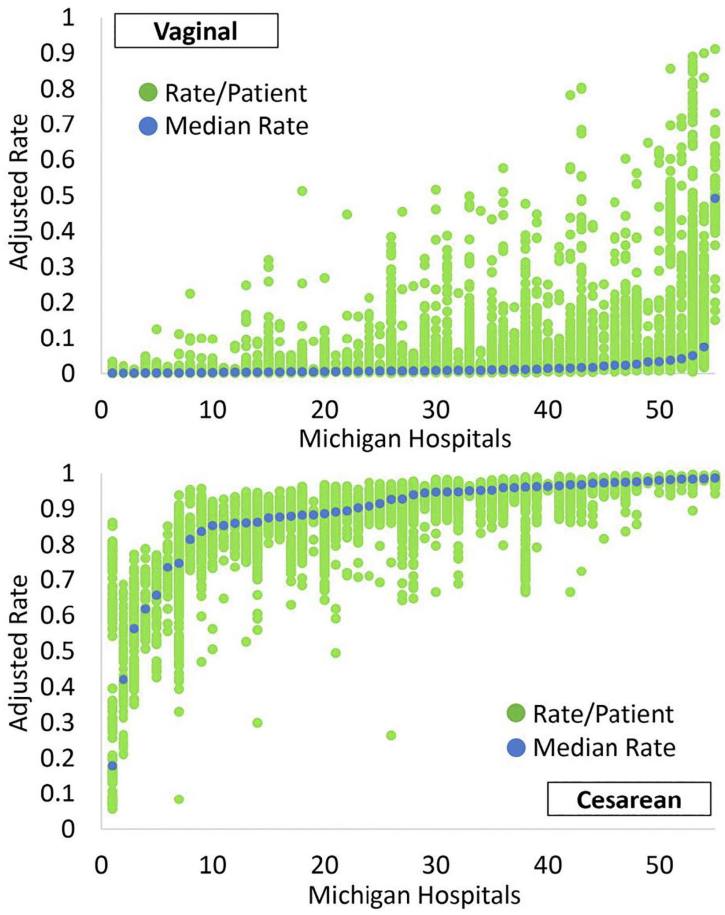


Table 1: Provider and hospital level predictors of receiving a postpartum opioid prescription, adjusted for patient characteristics*

	Total n=32,496			
	Adjusted OR	95% CI		p-value
Provider Characteristics				
Provider Sex (ref: Female)				
Male	1.05	0.88	1.27	0.576
Specialty (ref: OB/GYN MD)				
Surgeon	0.87	0.11	6.74	0.851
Family Medicine MD	**0.62**	**0.41**	**0.95**	**0.029**
Advanced practice providers (APPS)†	**0.63**	**0.48**	**0.83**	**0.001**
Specialist, unspecified	1.25	0.69	2.28	0.460
Unknown	1.10	0.73	1.67	0.650
Hospital Characteristics				
Hospital Annual Delivery Volume (ref: <1200)				
1201 - 2400	1.67	0.82	3.40	0.158
2401 - 3600	**5.88**	**1.75**	**19.80**	**0.004**
>3600	2.10	0.65	6.72	0.214
OB Level of Care (Ref: Level 1)				
Level 2	0.76	0.40	1.45	0.407
Level 3	1.30	0.56	3.06	0.541
Unknown	0.70	0.25	1.97	0.499
Teaching Hospital (Ref: non-teaching hospital)	1.34	0.64	2.81	0.438
NICU Available (Ref: Not available)	**0.34**	**0.12**	**0.91**	**0.032**
Policy Authority (ref: Non-for-profit)				
For-profit	**5.45**	**1.44**	**20.63**	**0.013**
Public/Governmental owned	0.33	0.09	1.19	0.090
Hospital Location (Ref: Urban)				
Suburban	0.49	0.23	1.05	0.067
Rural	1.18	0.26	5.36	0.831
Labor Cultural survey‡	**0.37**	**0.15**	**0.88**	**0.025**

*All models adjusted for patient-level characteristics, including mode of delivery (vaginal, cesarean); demographic characteristics (age, race, insurance type, social deprivation index); pregnancy characteristics (comorbidities, pregnancy conditions); birth characteristics (complications, morbidity procedures, length of stay).
†Includes Midwives/Nurse Practitioners/Physician Assistants
‡An optional survey administered to quality collaborative sites (N=51 sites) that includes questions on the unit's culture including a domain focused on an institution's safety culture readiness

Conclusion: Variation in postpartum opioid prescribing after birth is high and driven largely by hospital level factors. Opioid stewardship efforts targeted at the hospital level may be effective for reducing harms of opioid prescribing.

Digital Support Service Utilization Among Pregnant Patients

Alex Peahl, Alison Pickover, Christa Moss, Hannah Jahnke, Neel Shah

Research Objective: For almost four million people who give birth each year, the current medical model of prenatal care may provide insufficient education and psychosocial support. Prior work has demonstrated that access to this support is associated with reduced cesarean birth rates, improved patient satisfaction, and lower costs; however, patients' access to these high-value services may be limited by transportation barriers, costs, and availability of providers (e.g., doulas, lactation consultants). Digital solutions can make these services more accessible for patients, but patterns of utilization have not been well characterized. Our objective was to describe utilization patterns for users of Maven Clinic, a digital first clinic that offers users unlimited and on-demand access to support service.

Study Design: We conducted a cross sectional cohort study. Users self-reported their age, parity, comorbid conditions, and areas of desired assistance. We used basic descriptive analyses to explore the most commonly used services for all users and by medical risk groups. Users were classified into three levels of medical risk based on self reported factors: low-risk (no chronic conditions or pregnancy complications); intermediate risk (conditions with minimal effect on expected prenatal care delivery and outcomes; e.g., overweight or history of fertility treatment); and high-risk (chronic conditions or pregnancy complications with an expected effect on prenatal care delivery and outcomes; e.g., chronic or gestational hypertension).

Population Studied: A subset of pregnant Maven users who completed program onboarding from January 1, 2021 to December 31, 2021.

Principal Findings: In total, 6844 users were included in the analysis. Median age was 33 (IQR 31-36) and 69.5% were nulliparous. At enrollment, many users reported unmet support needs in pregnancy, including a desire for education on postpartum recovery (77.3%), breastfeeding (71.2%), infant care (69.2%), and emotional health (65.3%). Of included users, 1752/6835 (25.6%), 1412/6835 (20.7%), and 2327/6835 (34.0%) were considered low, intermediate, and high-risk, respectively. The top 5 most commonly accessed services were similar across all risk groups. The majority of users completed an appointment with care advocates (low: 63.2%; intermediate: 60.3%; high: 59.3%), followed by counseling appointments with an Obstetrician Gynecologist (low: 16.6%; intermediate: 14.6%; high: 13.6%), Doula/Childbirth

Table 1: Antepartum support services, as measured through telehealth appointments, utilized by Maven users, reported by pregnancy risk category

All	All (n=6835)	Low (n=1752)	Intermediate (n=1412)	High (n=2327)
Provider visit (any provider)	55.5%	63.2%	60.3%	59.3%
Care advocate	47.2%	57.1%	55.0%	54.4%
OBGYN	14.5%	16.6%	14.6%	13.6%
Doula/childbirth educator	11.3%	13.5%	14.0%	10.9%
Physical therapist	9.0%	11.9%	10.0%	7.6%
Nutritionist	8.9%	9.0%	10.0%	8.6%
Pediatrician	5.6%	6.7%	5.9%	5.9%
Mental health provider	7.6%	3.2%	5.4%	7.4%

Educator (low: 13.5%; intermediate: 14.0%; high: 10.9%), Physical Therapist (low: 11.9%; intermediate: 10.0%; high: 7.6%), and Nutritionist (low: 9.0%; intermediate: 10.0%; high: 8.6%).

Conclusions: Patients with unlimited access to a digital pregnancy platform most commonly utilize routine pregnancy support services, including preparation for childbirth and breastfeeding, regardless of medical risk.

Implications for Policy or Practice: Digital-first services can improve access to patient-centered anticipatory guidance and psychosocial support. Future work is needed to define the best methods of identifying and addressing patients' support needs to improve pregnancy outcomes and experience.

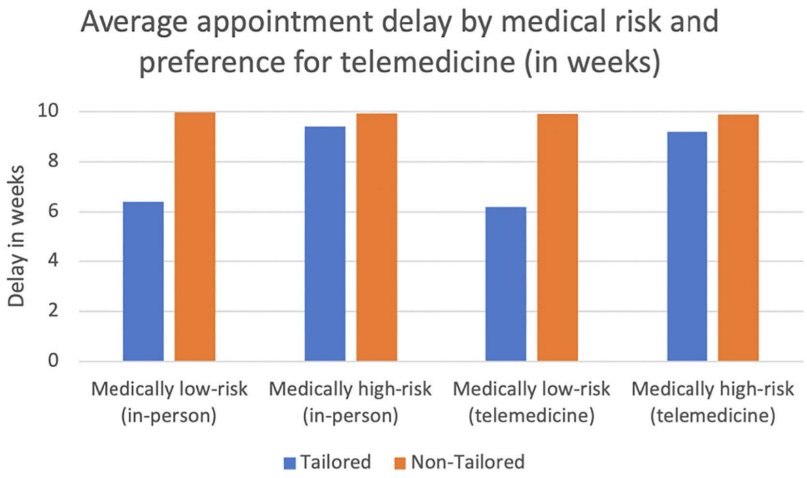
The Effect of Tailored Prenatal Care Policies with Telemedicine on Outpatient Clinic Operations

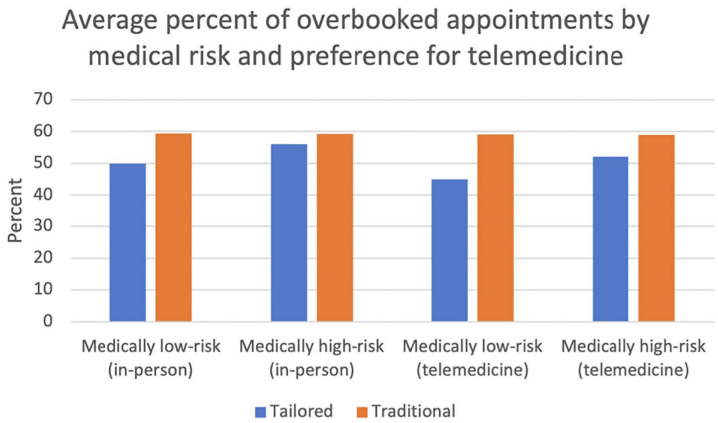
Alex Peahl, Cole Kingston, Leena Ghrayeb, T.J. Bryan, Yuanbo Zhang, Amy Cohn

Objective: To describe changes in clinical operations and efficiency following implementation of a tailored prenatal care delivery policy including telemedicine visits.

Study Design: We conducted a simulation study of a new tailored prenatal care policy with varying visit schedules (9 visits for low-risk patients, 14 visits for high-risk patients) and modality (in-person or hybrid with telemedicine visits) compared to traditional care delivery (14 in-person visits for all patients). We used data from a single academic health system to establish key assumptions about patient characteristics and clinic capacity. We assumed 25% of outpatient clinical volume was available for telemedicine. The dataset included 4968 patients.. We performed a discrete event simulation in C++ evaluating the differential effects of tailored vs traditional prenatal care policies. Simulation parameters included dynamic patient arrival times, patient preference for hybrid prenatal care, and patient risk level. The simulation was run over a 10-year time horizon over 1000 replications. We reported critical operational metrics, including patient delays, the percentage of overbooked appointments, and the overall proportion of unused clinic capacity, for low and high-risk patients based on their preference for in-person or hybrid visits.

Results: Implementation of the tailored prenatal care policy resulted in shorter care delays in weeks for all patients (low-risk in-person: 3.5; high-risk in-person: 0.5; low-risk hybrid 3.7; high-risk hybrid 0.6) [Figure 1]. Tailored policies also resulted in decreased percentages of overbooked appointments (percent difference for low-risk in-person: 9.5%; high-risk in-person: 3.2%; low-risk hybrid 14.1%; high-risk hybrid 6.8%) [Figure 2]. Unused clinic capacity was 3% lower with tailored prenatal care policies across all clinics.





Conclusion: Tailored prenatal care delivery policies with visit schedules based on medical risk and telemedicine improve clinical operations, including patient delays, overbooked appointments, and overall utilization of clinic capacity.

Tailored Prenatal Care Delivery Improves Care Access When Compared to Traditional Prenatal Care

Alex Peahl, Nicholas Zacharek, Samuel Hocher, Meghana Kandiraju, Dipra Debnath, Leena Ghrayeb, Amy Cohn

Research Objective: One-quarter of pregnant patients do not receive timely prenatal care, defined by the American College of Obstetricians and Gynecologists as completing the first prenatal visit before the end of the first trimester. One driver of late presentation to care is access to a maternity care provider, particularly for Black and low-income patients who are more likely to face adverse maternity care outcomes and barriers to care. One promising method for improving access to care is implementing tailored prenatal care guidelines. Tailoring care could improve access through reducing care overutilization by low-risk patients and creating more capacity for high-risk patients. Yet, new care models could create unforeseen bottlenecks in care, potentially reducing access for those who could benefit most from prenatal care services. Simulation is a useful approach for understanding potential implications of policy changes. Our objective was to use simulation to explore how tailored prenatal care recommendations affect care access.

Study Design: To evaluate the operational effects of tailored recommendations compared to usual care, a discrete event simulation was developed in C++. This model simulates dynamic patient arrivals, heterogeneous patient classifications, tailored pathways, and patient flow through the system until the end of each patient's care pathway (e.g., delivery). Patients were assigned to medically low-risk (9 visit) and high-risk (12 visit) groups based on the presence or absence of any medical conditions. Metrics captured included patient delays (defined as total delay in weeks over the entire pregnancy), percentage of overbooked appointments, and total clinic capacity utilization (i.e., the number of appointment slots at the clinic that could be filled). Simulation parameters were derived from a year-long parent data set from a single institution. The model was run for a 12 year horizon for 1000 replications to allow the model to come to steady state. This study of de-identified data was deemed exempt by the IRB.

Population Studied: The parent dataset consisted of all patients who were hospitalized for childbirth at a single, urban academic institution, who also received prenatal care within the health system. The systems operational data was used to determine number of available providers and weekly appointments for capacity metrics.

Principal Findings: The majority of patients in the parent dataset were medically high-risk (3527/4681, 75.3%), age 18 to 34 (3697/4681, 79.0%), and white (3326/4681, 71.1%). Transitioning to the tailored prenatal care delivery model reduced the average delay to appointment over the pregnancy by 1.1 week (traditional: 9.5 weeks; tailored: 8.4 weeks). In the tailored model, a smaller percentage of appointments required overbooking (traditional: 51.%; tailored: 44.8%), and percent of total clinic capacity utilization was similar (traditional: 97.8%; tailored: 97.2%).

Conclusions: In our simulation of two prenatal care delivery policies, tailoring prenatal care to medical risk-factors modestly improved access parameters, even in a predominantly medically high-risk population.

Implications for Policy or Practice: Tailoring prenatal care is operationally feasible and may drive more equitable distribution of pregnancy services.

Appearance of the Normal and Abnormal Perineal Membrane on MRI

Fernanda Pipitone, Luyun Chen, Carolyn W. Swenson, Jorge Milhem Haddad, John O. DeLancey

Introduction: Few critical pelvic floor structures are so seldom studied as the perineal membrane (PM). In recent research, women with prolapse have been shown to have 1) increased separation at the perineal body, 2) longer length of medial and lateral attachments, and 3) larger PM surface area compared to controls [1]. In the process of developing and publishing a technique to measure PM features on MRI [2], we have identified anatomy that contradicts what is shown in many medical illustrations and have found significant changes in PM morphology in the presence of levator injury. The appearance of PM structural changes in women with impaired pelvic support have not yet been described and could aid in advancing our knowledge of the prolapse mechanism.

Objective: To show the appearance of common variations and structural changes of the PM and describe detailed anatomy as seen on MRI in living women.

Methods: Secondary analysis of a convenience sample of MR scans from three prior studies. A total of 53 MRIs were included comprising 10 young nulliparous women, 26 primiparous women with normal support, and 17 young women (<40yo) with prolapse. The PM was identified on 2 mm coronal scans and anatomical boundaries confirmed on axial and sagittal planes. Accurate identification of PM was based on consistent anatomical relationship to surrounding structures as established by previous research [3].

Results: The overall appearance of the PM on MRI differed between nullipara, primiparous women with normal support, and young women with prolapse. The most variability was seen in the dorsal aspect (adjacent to the vagina and perineal body), whereas the anatomy was similar among different groups ventrally (near the urethra). In nullipara, the PM appeared as a mottled layer of tissue intimately connected to surrounding structures – e.g., levator ani and erectile tissue – and penetrated by dorsal clitoral branches of pudendal vessels. However, in parous women, particularly when levator defects were present, PM showed anatomical distortion with dorsal and caudal displacement of medial attachments, acquiring a more vertical orientation, and spreading of the fibers (Fig. 1). In prolapse, the greatest distortion was seen in the dorsal aspect. In addition to changes observed in parous women with normal support, a midline separation could be seen so that

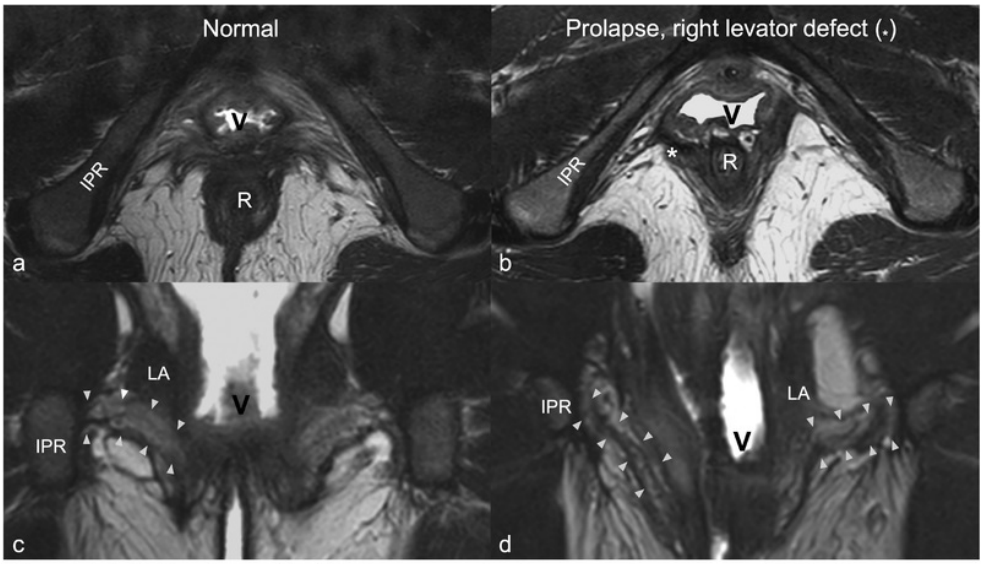


Figure 1. Axial (a,b) and coronal (c,d) MRI scan comparison between nulliparous woman (a,c) and young woman with prolapse with right levator avulsion (b,d). Note the marked asymmetry left/right in the prolapse woman caused by architectural distortion associated with levator defect (*), and caudal angulation of PM (between white arrowheads). Abbrev.: V, vagina; R, rectum; IPR, ischiopubic ramus; LA, levator ani muscle.

the two ends of the PM were not connected at the perineal body, with clear loss of spatial relationship between pelvic structures (Fig. 2). MR images showed that PM is only attached to the ischiopubic ramus 2/3rds of the way from the symphysis to the tuberosity, in contrast to common depictions that have it extend to the tuberosity (Fig.3).

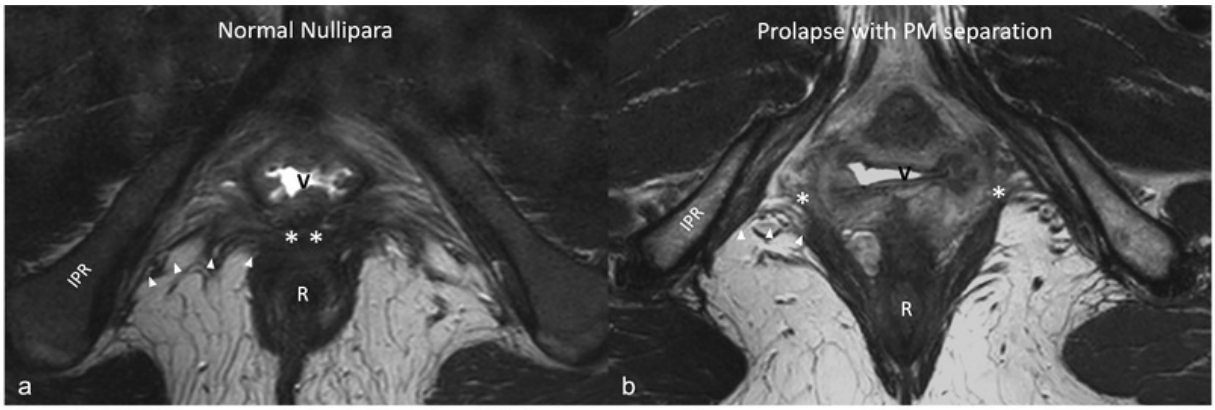


Figure 2. Axial MRI scans at the level of PM. Panel (a) shows a young nulliparous woman with close proximity of the two medial ends of the PM (**). Panel (b) shows a woman with prolapse. Separated ends of PM are each marked (*). White arrowheads indicate the dorsal limit of PM and are placed unilaterally for comparison with other side. Abbrev.: V, vagina; R, rectum; IPR, ischiopubic ramus.

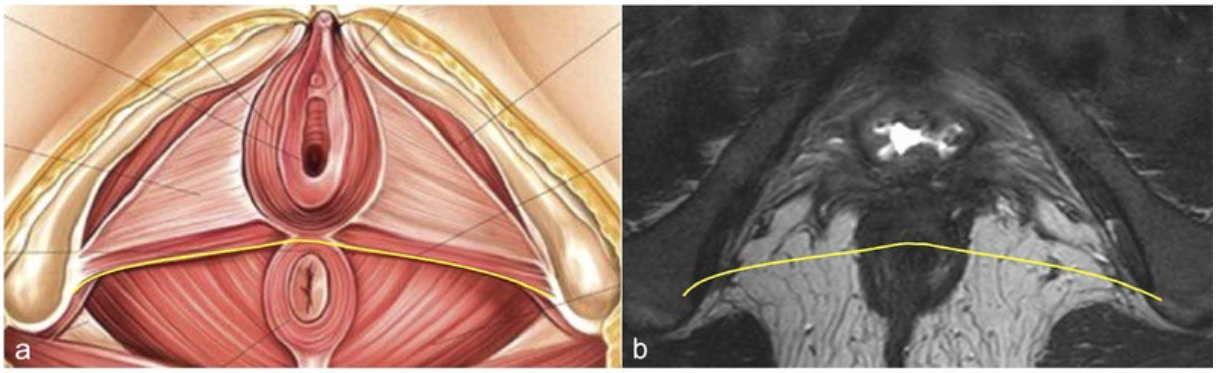


Figure 3. Comparison of typical medical illustration of PM (a) to its appearance on MRI (b). The solid yellow line shows the dorsal edge from a typical illustation superimposed on the MRI of a nullipara indicating its location far more dorsally than the anatomy seen in living women.

Conclusions: Detailed anatomy of the PM can be seen on MRI. Structural abnormalities can be documented and their relationship to other pelvic floor injuries investigated. Depictions of the PM extending to a line between the ischial tuberosities are not correct. Comment: As reproducible techniques for assessing PM structural failure evolve with MRI and ultrasound, the biomechanical consequences of these abnormalities and potential surgical approaches to correct them can be explored. 1:AUGS/IUGA 2021; 2:PMID 33893825; 3:PMID 19375575

Norethindrone Dosing for Adequate Menstrual Suppression in Adolescents

Theresa L. Rager, Sarah D. Compton, Olivia K. Winfrey, Monica W. Rosen

Background: We sought to study factors predictive of achieving menstrual suppression with norethindrone versus norethindrone acetate in adolescents, as optimal dosing is unknown. Secondary outcomes included analyzing prescriber practices and patient satisfaction.

Methods: We performed a retrospective chart review of adolescents ages <18 years presenting to an academic medical center from 2010-2022. Data collected included demographics, menstrual history, and norethindrone and norethindrone acetate use. Follow-up was measured at one, three, and 12 months. Main outcome measures were starting norethindrone 0.35mg, continuing norethindrone 0.35mg, achieving menstrual suppression, and patient satisfaction. Analysis included Chi-square and multivariate logistic regression.

Results: Of 262 adolescents initiating norethindrone or norethindrone acetate, 219 completed ≥1 follow-up. Providers less often started norethindrone 0.35mg for patients with body mass index ³25 kg/m2, prolonged bleeding, or younger age at menarche, but more often for patients who were younger, had migraines with aura, or were at risk of venous thromboembolism. Those with prolonged bleeding or older age at menarche were less likely to continue norethindrone 0.35mg. Obesity, heavy menstrual bleeding, and younger age were negatively associated with achieving menstrual suppression. Patients with disabilities reported greater satisfaction.

Conclusions: While younger patients more often received norethindrone 0.35mg versus norethindrone acetate, they were less likely to achieve menstrual suppression. Patients with obesity or heavy menstrual bleeding may achieve suppression with higher doses of norethindrone acetate. These results reveal opportunities to improve norethindrone and norethindrone acetate prescribing practices for adolescent menstrual suppression.

Increasing volume and the role of gynecologic oncologists in peripartum hysterectomies – A single center study of 109 cases over 7 years (008)

Aimee Rolston, Caitlin Clifford, Alissa Carver, Kevin McCool, Alli Straubhar, Shitanshu Uppal

Objectives: To evaluate the surgical volume, surgical outcomes, and the evolving role of gynecologic oncologists in peripartum hysterectomies (PPH).

Methods: We conducted an IRB-approved retrospective chart review of PPH cases performed at our institution from June 1, 2014, to June 30, 2021. Clinical-pathologic information was abstracted into a REDCap database. All analyses were conducted using STATA 17.

Results: A total of 109 cases were performed over the 7-year period. Gynecologic oncologists (GYO) involvement in the cases increased from 33% in 2014 to 80% in 2021. The mean age was 36 (range: 23-47) years. Most patients were White (81/109, 74.3%), and the median BMI was 30.7 (range: 21-57) kg/m2. Surgical indications included placenta accreta syndrome (PAS) in 84 (77%) cases, uterine atony in ten (9.2%), uterine rupture in three (2.8%), malignancy in five (4.6%), and hemorrhage other than atony in seven cases (6.4%). Intraoperative complications included bladder injury (or intentional dissection) in eight (7.3%), ureter injury in four (3.7%), vascular injury in three (2.8%), and femoral pseudoaneurysm in one (0.9%) of the cases. Postoperative complications included urinary tract infection in 11 (10.1%), nerve injury in one (0.9%), surgical site infection in 13 (11.2%), and venous thromboembolism in five (4.6%) cases. Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) usage started in 2019 with one case followed by six cases in 2020 (31.6%) and 3/16 cases in the first half of 2020 (15.8%). A higher REBOA usage in 2020 corresponded with blood products shortages during the COVID crisis.

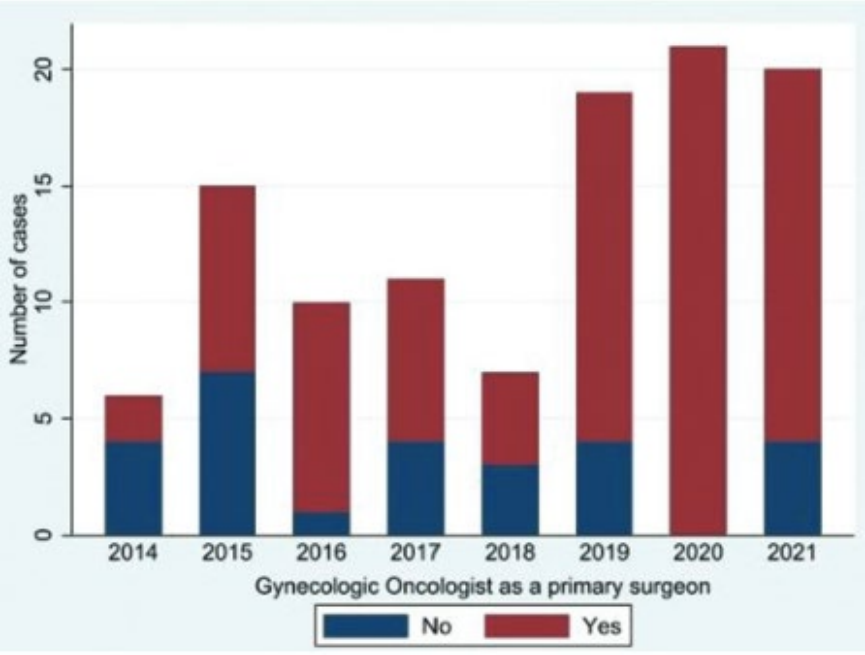


Fig. 1

Conclusions: Overall volume and complexity of peripartum hysterectomy are increasing. This trend is likely driven by an increased incidence of placenta accreta syndrome cases. Gynecologic oncologists are increasingly delegated as primary surgeons in many institutions. Fellowship training programs should strongly consider training in peripartum hysterectomy for trainees.

Peripartum Hysterectomy and Operating Room Safety Culture: A Single Institution Experience

Aimee Rolston, Caitlin Clifford, Alissa Carver, Shitanshu Uppal

Objectives: To assess provider and staff perception of safety in the operating room (OR) during peripartum hysterectomies.

Methods: The validated short form of the Safety Attitudes Questionnaire (SAQ) was used to assess OR safety culture. For purposes of this study, questions for three domains (Teamwork Climate, Safety Climate, and Working Conditions) were used. The survey was administered to all OR providers and staff following each peripartum hysterectomy performed at our institution from January 2020 to September 2021. Case-specific information and perioperative outcomes were obtained through our institution's REDCap database. Cases were categorized as scheduled or unscheduled and whether a major immediate postoperative complication occurred. SAQ responses were evaluated by domain. Percent agreement scores (SAQ scores) were calculated by measuring the percentage of positive responses for each item (response of "agree" or "strongly agree" for each positively worded item and "disagree" or "strongly disagree" for each negatively worded item). SAQ scores were calculated for the overall cohort as well as for each provider/staff group. Respondents who answered ≥5 items were included. Scheduled and unscheduled cases were compared. Correlational analyses were used to assess the relationship between SAQ scores and postoperative complications. Significance was considered at $p<0.05$. We analyzed data using STATA 17.0.

Results: Forty peripartum hysterectomies occurred during the study time period. Hundred percent of cases were represented in the 365 survey responses received (overall response rate 52%). A gynecologic oncologist was present in the majority of cases. Hundred percent of scheduled and 53% of unscheduled cases occurred due to abnormal placentation. There were no significant differences in median blood loss, surgical complexity, or major postoperative complications between scheduled and unscheduled cases. SAQ scores for Safety Climate and Teamwork Climate domains were significantly lower for unscheduled versus scheduled cases (75.5 vs 84.2% and 79.0 vs 90.1%, respectively). The Working Conditions domain had the lowest SAQ scores. Overall domain SAQ scores were modestly correlated with the occurrence of a major postoperative complication.

Table 1.

	Scheduled Case (n = 23)	Unscheduled Case (n = 17)	Total (n = 40)	P value
Case characteristics				
Delivery Mode				**0.03**
Cesarean	22 (96%)	13 (76%)	35 (88%)	
Vaginal	0 (0%)	3 (18%)	3 (8%)	
Other (D&C, gravid hysterectomy)	1 (4%)	1 (6%)	2 (5%)	
Hysterectomy Indication				**<0.01**
Abnormal Placentation	23 (100%)	9 (53%)	32 (80%)	
Uterine Atony	0 (0%)	5 (29%)	5 (13%)	
Uterine Rupture	0 (0%)	1 (6%)	1 (3%)	
Hemorrhage (other than atony)	0 (0%)	2 (12%)	2 (5%)	
Surgeon Services Present				
Gynecologic Oncology	20 (87%)	16 (94%)	36 (90%)	0.48
Maternal Fetal Medicine	23 (100%)	11 (65%)	34 (85%)	**<0.01**
General ObGyn	0 (0%)	9 (53%)	9 (23%)	**<0.01**
General Surgery	15 (65%)	5 (29%)	20 (50%)	**0.03**
Vascular Surgery	1 (4%)	2 (12%)	3 (7%)	0.36
Other	3 (13%)	3 (18%)	6 (15%)	0.65
Surgical Complexity (Y/N)	6 (26%)	3 (18%)	9 (23%)	0.53
EBL (Median; IQR)	2500 (2000-4000)	4000 (2000-6550)	2750 (2000-5100)	0.25
Major Postoperative Complication* (Y/N)	20 (87%)	11 (65%)	31 (78%)	0.10
Survey Results				
Provider Role				**<0.01**
Surgeon				
General ObGyn	0 (0%)	12 (8.4%)	12 (3.3%)	
MFM	21 (9.5%)	10 (7.0%)	31 (8.5%)	
Gyn Oncology	12 (5.4%)	12 (8.4%)	24 (6.6%)	
General Surgery	11 (5%)	1 (0.7%)	12 (3.3%)	
Anesthesia Attending	19 (8.6%)	14 (9.8%)	33 (9.0%)	
Trainee				
Resident	28 (12.6%)	26 (18.2%)	54 (14.8%)	
Fellow	32 (14.4%)	15 (10.5%)	47 (12.9%)	
Scrub tech	23 (10.4%)	12 (8.4%)	35 (9.6%)	
Nursing	66 (29.7%)	33 (23.1%)	99 (27.1%)	
Other	10 (4.5%)	8 (5.6%)	18 (4.9%)	
SAQ - Teamwork Climate (% agreement)	90.1%	79.0%	85.8%	**<0.01**
SAQ - Safety Climate (% agreement)	84.2%	75.5%	80.8%	**0.03**
SAQ - Working Conditions (% agreement)	62.2%	67.6%	65.5%	0.22
Correlational Analysis				

Nursing SAQ scores were, in general, more strongly correlated with postoperative complications than other provider/staff groups (Table 1).

Conclusions: SAQ scores for Safety Climate and Teamwork Climate domains in the OR for peripartum hysterectomies were significantly lower for unscheduled cases. SAQ scores are modestly correlated with postoperative outcomes. Given the relatively uncommon but high acuity and complex nature of these cases, institutions should consider safety culture assessments to benchmark current practices. Future efforts should focus on adapting protocols used in scheduled cases for unscheduled cases and developing routine opportunities to train potentially involved providers/staff in these protocols to optimize outcomes and minimize morbidity.

Complications Following Orchiectomy and Vaginoplasty for Gender Affirmation: An Analysis of Concurrent Versus Separate Procedures Using a National Surgical Database

Colin Russell, Christopher Hong, Pamela S. Fairchild, C. Emi Bretschneider

Introduction: Feminizing gender-affirming genital surgery commonly involves multiple concurrent or staged procedures to achieve the patient's desired outcome. Among these procedures are orchiectomy and vaginoplasty, each with its own associated surgical risks. Orchiectomy can be performed in isolation, as a bridge to vaginoplasty, or concurrently with vaginoplasty. Prior small, single-center studies on orchiectomy and vaginoplasty have primarily described mid- to long-term complications. There is a paucity of data on immediate postoperative outcomes following orchiectomy and vaginoplasty, particularly concurrent versus separate procedures, to aid preoperative counseling and surgical planning.

Objective: To compare 30-day outcomes following gender-affirming orchiectomy with and without concurrent vaginoplasty as well as vaginoplasty with and without concurrent orchiectomy using the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database.

Methods: We performed a retrospective cohort study of patients undergoing gender-affirming orchiectomy and/or vaginoplasty between 2015 and 2020 in the ACS NSQIP database. Patients were identified using International Classification of Diseases-10 (ICD-10) codes for gender dysphoria and classified into the following groups based on Current Procedural Terminology (CPT) codes: (1) orchiectomy alone, (2) vaginoplasty alone, or (3) concurrent orchiectomy and vaginoplasty (O&V). The primary outcome was composite 30-day outcomes. Secondary outcomes included major complications (deep/organ surgical site infection, sepsis and septic shock, pneumonia, renal failure, myocardial infarction, thromboembolism, and unplanned readmission or reoperation) and minor complications (superficial surgical site infection, urinary tract infection, and blood transfusion). Bivariate comparisons were made using Wilcoxon rank-sum, Chi-squared, and Fisher's exact tests, as appropriate. Multivariable logistic regression was used to assess odds of 30-day complications while adjusting for confounders. A p-value of <0.05 was considered statistically significant.

Table 1: Demographics of patients undergoing orchiectomy and/or vaginoplasty, stratified by isolated and concurrent procedures

Demographics	Orchiectomy only (n = 337)	*p*-value	Vaginoplasty only (n = 104)	*p*-value	Concurrent orchiectomy and vaginoplasty (n = 164)
Age (years)	34.0 (27.0-44.0)	0.98	38.5 (29.0-49.0)	0.04	34.0 (27.0-47.0)
Race		<0.01		<0.01	
White	224 (66.5%)		72 (69.2%)		129 (78.7%)
Black	48 (14.2%)		20 (19.2%)		14 (8.5%)
Other *	17 (5.0%)		3 (2.9%)		14 (8.5%)
Unknown	48 (14.2%)		9 (8.7%)		7 (4.3%)
BMI (kg/m^2)		0.22		0.35	
< 30	249 (74.6%)		78 (75.0%)		131 (79.9%)
≥ 30	85 (25.4%)		26 (25.0%)		33 (20.1%)
Diabetes	12 (3.6%)	0.70	6 (5.8%)	0.57	7 (4.3%)
ASA Class		0.04		0.06	
1, 2	302 (89.6%)		92 (88.5%)		156 (95.1%)
≥ 3	35 (10.4%)		12 (11.5%)		8 (4.9%)
Tobacco use within last year	53 (15.7%)	0.02	9 (8.7%)	0.82	13 (7.9%)
COPD	4 (1.2%)	0.31	2 (1.9%)	0.15	0 (0%)
Hypertension	31 (9.2%)	0.64	10 (9.6%)	0.66	13 (7.9%)
Bleeding disorders	3 (0.9%)	0.66	1 (1.0%)	>0.99	2 (1.2%)

* Other includes Asian, Native American, Native Hawaiian and Pacific Islander race.
Continuous outcomes are presented as median (interquartile range). Categorical outcomes are presented as count (%).
P-values compare each individual procedure (orchiectomy only, vaginoplasty only) with the concurrent procedure (O&V) group.
BMI = body mass index; ASA = American Society of Anesthesiology; COPD = chronic obstructive pulmonary disease

Results: Of the 605 orchiectomy and/or vaginoplasty procedures for gender dysphoria performed during the study period, 337 (55.7%) consisted of orchiectomy alone, 104 (17.2%) were vaginoplasty alone, and 164 (27.1%) involved concurrent O&V. Patient demographics are presented in Table 1. On bivariate analysis, concurrent O&V had higher composite (17.7%), major (9.8%), and minor (9.8%) complications compared to orchiectomy alone (5.3% [P < 0.01], 4.2% [P = 0.01], 1.5% [P < 0.01], respectively), and similar composite, major, and minor complications compared to vaginoplasty alone (12.5% [P = 0.25], 7.7% [P = 0.66], 5.8% [P = 0.36], respectively) (Table 2). On adjusted logistic regression analysis, concurrent O&V was associated with a higher rate of composite (adjusted odds ratio [aOR] 4.21, 95% confidence interval [CI] 2.19-8.10), major (aOR 2.58, 95% CI 1.18-5.63), and minor (aOR 9.02, 95% CI 3.06-26.65) complications compared to orchiectomy alone. Concurrent O&V was associated with similar composite (aOR 2.03, 95% CI 0.95-4.32), major (aOR 2.03, 95% CI 0.77-5.30), and minor (aOR 2.16, 95% CI 0.78-6.00) complications compared to vaginoplasty alone (Table 2).

Table 2: 30-day perioperative outcomes of patients undergoing orchiectomy and/or vaginoplasty, stratified by isolated and concurrent procedures

Surgical Factors	Orchiectomy only (n = 337)	*p*-value	Adjusted Odds Ratio (95% CI)	Vaginoplasty only (n = 104)	*p*-value	Adjusted Odds Ratio (95% CI)	Concurrent orchiectomy and vaginoplasty (n = 164)
Total Operative Time (minutes)	53 (39-229)	<0.01		224 (90-343)	<0.01		336 (273-396)
Any Complications	18 (5.3%)	<0.01	4.21 (2.19-8.10)	13 (12.5%)	0.26	2.03 (0.95-4.32)	29 (17.7%)
Major Complications	14 (4.2%)	0.01	2.58 (1.18-5.63)	8 (7.7%)	0.66	2.03 (0.77-5.30)	16 (9.8%)
Minor Complications	5 (1.5%)	<0.01	9.02 (3.06-26.65)	6 (5.8%)	0.36	2.16 (0.78-6.00)	16 (9.8%)
Superficial Surgical Site Infection	4 (1.2%)	0.16		3 (2.9%)	>0.99		5 (3.0%)
Deep Surgical Site Infection	2 (0.6%)	>0.99		2 (1.9%)	0.56		1 (0.6%)
Organ/Space Surgical Site Infection	3 (0.9%)	0.55		0 (0%)			0 (0%)
Pneumonia	0 (0%)	0.33		0 (0%)	>0.99		1 (0.6%)
Pulmonary Embolism	0 (0%)			1 (1.0%)	0.39		0 (0%)
Urinary Tract Infection	1 (0.3%)	<0.01		2 (1.9%)	0.49		7 (4.3%)
Bleeding Requiring Transfusion	0 (0%)	<0.01		1 (1.0%)	0.41		5 (3.0%)
Deep Vein Thrombosis / Thrombophlebitis	0 (0%)			1 (1.0%)	0.39		0 (0%)
Sepsis	3 (0.9%)	0.55		0 (0%)			0 (0%)

Continuous outcomes are presented as median (interquartile range). Categorical outcomes are presented as count (%).
P-values compare each individual procedure (orchiectomy only, vaginoplasty only) with the concurrent procedure (O&V) group.

Conclusions: Among patients undergoing feminizing gender-affirming genital surgery, concurrent orchiectomy and vaginoplasty was associated with an increased odds of 30-day complications compared to orchiectomy alone; similar odds of 30-day compilations were observed compared to vaginoplasty alone. These data can be helpful for preoperative risk counseling, especially among patients desiring orchiectomy and considering concurrent versus staged vaginoplasty.

Gender Differences of Endowed Professorship in Obstetrics and Gynecology Departments at Top Academic Institutions

Colin B. Russell, Courtney Burns, Kent Griffith, Timothy R. Johnson, Reshma Jagsi

Introduction: Barriers to gender equality permeate academic medicine. A recent study demonstrated that women are less likely to hold endowed professorships in internal medicine from top schools. Given the resources and prestige that accompany endowed professorships, this designation can gauge diversity within medicine's leaders. We assessed endowed professorships within obstetrics and gynecology departments at leading American medical schools.

Methods: Obstetrics and gynecology faculty lists were obtained from the top 25 academic institutions, as determined by 2020 National Institutes of Health (NIH) ranking. Data on faculty position, endowed professorship/chair, gender, graduate degrees held, graduation year, publication and citation numbers, H-index, and NIH funding as a principal investigator were collected from departments or publicly available sources (e.g., institutional websites, Scopus [Elsevier], NIH Reporter). Multivariable regression models were constructed to explain holding endowed professorships.

Results: Of the 680 total professors, 400 (58.8%) were women and 280 (41.2%) were men. From these groups, 64 (49.2%) women and 66 (50.8%) men held endowed professorships. On multivariable analysis, there were no significant differences between men and women in attainment of endowed professorships (P =.83). Faculty with non-MD doctorates (P =.006) and rank of associate professor (P <.001) were less likely to have endowed chairs. Those in the top two quartiles of number of publications (P <.001) and in the highest funding quartile (P =.004) were more likely to have endowed professorships. Endowed professorships were not significantly related to decade of graduation (P =.86).

Conclusion: Despite previous findings of gender inequity among endowed professorships from internal medicine departments, obstetrics and gynecology departments at leading institutions show no significant role of gender at the level of endowed chairs.

Effect of Pregnancy Level Hormones on Coronary Artery Smooth Muscle Cells: An In Vitro Study of Spontaneous Coronary Artery Dissection

Ajleeta Sangtani, Cameron Pinnock, Santhi Ganesh

Objectives: Spontaneous coronary artery dissection (SCAD) has a high prevalence during times of hormonal change, such as pregnancy and perimenopause, but the contribution of hormonal influence has yet to be characterized. We studied the effects of pregnancy level hormones (high estradiol and progesterone) and perimenopausal level hormones (lowe estradiol and progesterone) on coronary artery smooth muscle cells (CA-SMC).

Methods: CA-SMC cell lines from three female patients were mainted, using cells from P5-P9. After being cultured to 90% confluence, cells were treated with differing concentrations of β-estradiol (E2) and progesterone (P4) for 48 hours. Wound healing assays, traction force studies, and dispersion studies were conducted. RNA was then extracted from the cells and RNA sequencing (RNASeq) was performed to obtain transcriptome profiles. These experiments were then repeated with E2 withdrawal conditions, where cells were treated with E2 for 24 hours, then control medial for 24 hours. In order to specifically study targets identified in a SCAD genome-wide study, quantitative polymerase chain reaction (qPCR) performed for estradiol-only conditions for expression.

Results: In traction force studies, estradiol and progesterone conditions exhibited a higher traction force when induced with 60μM KCl in a dose-dependent fashion (1.22nN v 1.27nN v 1.36nN, $p<0.01$). Cell migration was enhanced by the presence of estradiol and progesterone as well as estradiol alone. Gene ontology analysis of the RNASeq data revealed increased expression of biologic processes relating to cell adhesion, biologic adhesion, and cell proliferation. None of the mapped genes were statistically significant in the transcriptome data, but qPCR did reveal decreased expression of ADAMTSL4 in estradiol-only conditions.

Conclusions: In these experiments, we generate evidence to support a hormonal mechanism for pre-existing risk of SCAD by clearly demonstrating the effect of hormones on CA-SMCs. Given that pregnancy is a state of high hormonal change, this study provides a potential target for future interventions.

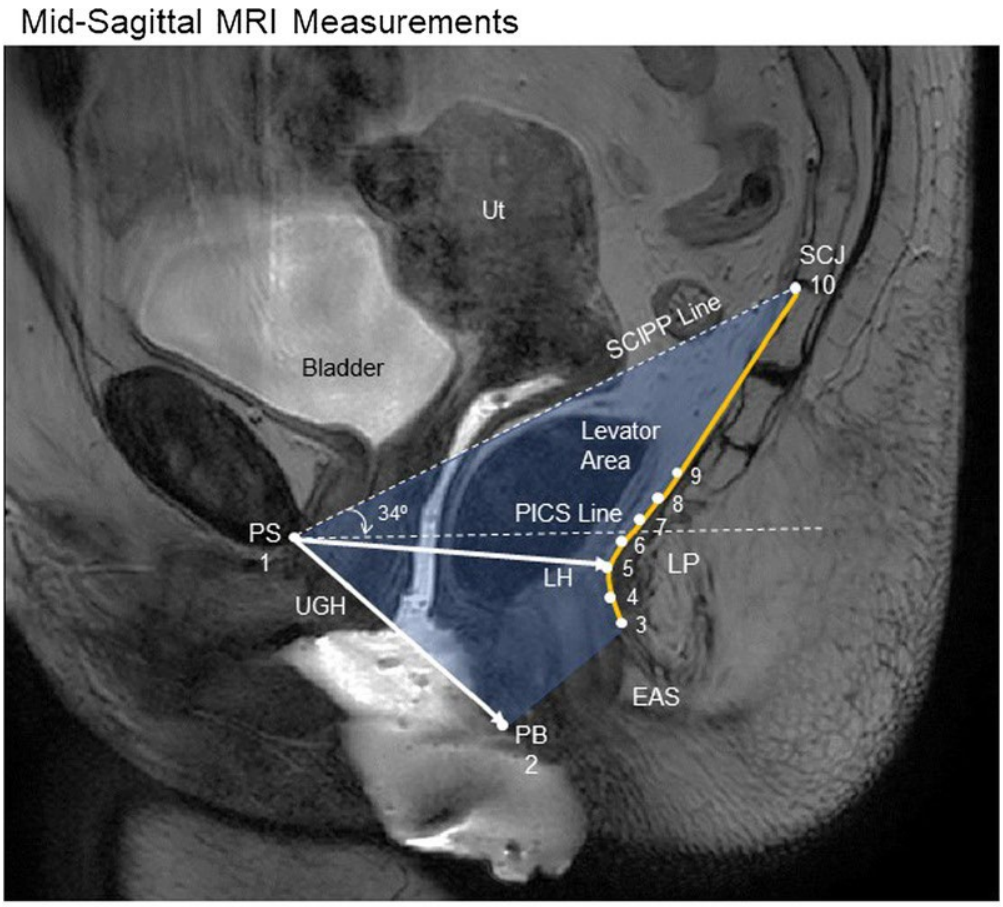
Native Tissue and Mesh-Augmented Prolapse Repairs Improve Resting Level I but not Level II/III Pelvic Floor Support: A Preliminary Pre- and Postoperative MRI Analysis

Payton Schmidt, Elena Rociu, Robin van der Ewiden, Mary Duarte Thibault, Luyun Chen

Introduction: Enlarged pre- and postoperative resting Level II/III levator ani MRI measures, but not lower apical (Level I) measures, have been associated with increased risk of long-term recurrence after prolapse repair.1,2 We hypothesize that reconstructive prolapse surgeries are effective at improving Level I support but not Level II/III levator ani support.

Objective: To compare pre-and short term postoperative resting MRI-based anatomical measures following native tissue and mesh-augmented prolapse repairs.

Methods: This was a secondary analysis study, using two primary prospective studies of women who underwent MRIs for research preoperatively and postoperatively 3 months after undergoing native tissue (NT) or 6 months after mesh-augmented (MA) (laparoscopic sacrocolpopexy) prolapse repairs. Demographic, clinical, and surgical data were abstracted. Resting mid-sagittal MRIs were used to perform measurements including: apex location, urogenital hiatus (UGH), levator hiatus (LH), levator area (LA), and to trace the levator plate (LP) (Figure 1). Principal component shape analysis was used to quantify two independent shape variations in LP shape (PC1 and PC2) and principal component (PC) scores calculated. Negative PC1 scores corresponded to a more



PS: pubic symphysis, UGH: urogenital hiatus, PB: perineal body, EAS: external anal sphincter, LP: levator plate, LH: levator hiatus, SCJ: sacrococcygeal joint, SCIPP line: sacrococcygeal to inferior pubic point line; Ut: Uterus, PICS line: horizontal reference line. 11 anatomical points were marked with points 3-9 placed equidistant along the levator plate from the top of the EAS to the bottom of the coccyx. From Schmidt 2021.

horizontal position and negative PC2 scores corresponded to a more caudad position relative to the body axis. MR measures and PC scores were compared between (1) native tissue versus mesh-augmented prolapse repair groups using independent t-test and (2) pre- to postoperatively using a paired t-test.

Results: Thirty-eight participants were included with mean age of 63.4 ± 12.3 years and BMI 36.6 ± 4.7 mg/kg2. Sixteen women underwent NT and 22 women underwent MA prolapse repairs. There were no differences in age, BMI, or parity between groups. The native-tissue group had a larger preoperative Ba (median 3.0 cm IQR (3.0, 4.0) vs 0.0 (-2.0, 1.0), P < .001), GH (5.0 cm (4.5, 6.0) vs 3.0 (3.0, 4.0), P < .001), and TVL (9.0 cm (8.0, 9.5) vs 8.0 (8.0, 8.0), P = .001), however there were no significant differences in resting preoperative MRI measures (Table 1). Apex location was higher after both NT (preoperative 2.3 ± 0.2 cm vs postoperative 4.4 ± 0.1 cm, <.001) and MA (preoperative 2.8 ± 0.2 cm vs postoperative 3.9 ± 0.2 cm, P = .004) prolapse repairs. However, there were no significant differences between pre- and postoperative UGH, LH, LA, LP shape in both the NT and MA groups (Table 1).

	Native Tissue (NT) n=16			Mesh-augmented (MA) n=22			Preoperative NT vs MA	Postoperative NT vs MA
	preop	postop	p	preop	postop	p	P	p
Apex location (cm)	2.3±0.2	4.4±0.1	<.001	2.8±0.2	3.9±0.2	.004	.3	.2
Levator hiatus (cm)	6.8±0.7	6.9±0.8	0.42	6.6±0/8	6.7±0.7	.9	.6	.4
Levator Area (cm^2)	26.2±6.0	27.0±6.2	0.46	26.3±8.2	26.4±6.4	.8	.9	.8
LP shape								
PC1 score	-2.8±9.2	-5.6±12.3	0.24	1.6±19.0	1.0±13.1	.7	.4	.2
PC2 score	-0.1±13.5	2.3 ± 16.1	0.3	0.2±10.5	-0.6±13.1	.6	.9	.6

Conclusions: Native tissue and mesh-augmented prolapse repairs improve apex location (Level I) in the short term postoperatively, however neither procedure type induces significant changes in Level II/III levator ani support measures. Innovative prolapse repair procedures are needed to better address Level II/III levator ani support.

Obesity-related alterations in protein expression in human follicular fluid from women undergoing in-vitro fertilization (IVF)
Samantha Schon

This was a translational study that utilized proteomics to understand differences in follicular fluid from women with and without obesity undergoing IVF. We found a number of differences in protein expression including expected increases in adipokines and inflammatory markers as well as some proteins with less clear etiology. The lesson/tip I could discuss would be leveraging our currently available OB/GYN biorepositories since this was a study I was able to complete relatively quickly using samples that were all available through RSRSR.

The Impact of Obesity and Adiposity on Anti-Mullerian Hormone (AMH) Levels in a Latina/Latinx Population

Samantha B. Schon, Charley Jiang, Ali A. Bazzi, Felix Valbuena Jr., Donna D. Baird, Erica E. Marsh

Objective: Research suggests that obesity has an adverse effect on ovarian reserve, as assessed by AMH. Previous studies have explored this association predominantly in Caucasian non-Hispanic and African American cohorts. Additionally, studies have predominantly utilized BMI to categorize patients as having obesity. The objective of this study was to examine the association of obesity/adiposity with AMH in a Latina/LatinX population using multiple measures of obesity/adiposity.

Materials and Methods: This cross-sectional study utilized data from the Environment, Leiomyomas, Latinas, and Adiposity Study (ELLAS). ELLAS is a prospective longitudinal cohort study conducted in Michigan following Latina/LatinX females for 5 years. All participants were between the ages of 21-50 at time of consent and data from the first study visit was utilized for analysis. Anthropometric measurements, bioelectrical impedance analysis (BIA) and serum AMH (pico-AMH assay, Ansh Labs, Wesbster, TX) were included in the analysis. The effects of BMI and waist/hip ratio (w/h) on AMH were assessed as both continuous and categorical outcomes. The impact of adiposity including fat percentage, and visceral fat percentage on AMH was also assessed as a continuous variable. Statistical associations were determined using Chi-square, Wilcoxon rank-sum and linear or logistic regression as appropriate.

Results: A total of 720 women are enrolled in ELLAS. 603 completed the first study visit and had BMI, w/h and AMH data available. BIA data was available on 571 participants. The mean age of study participants was 37.4± 6.95 years. The mean BMI of the study population was 30.1 ± 6.76 kg/m2, with 470 (78%) of participants classified as having obesity by BMI (BMI≥30 kg/m2). BMI was significantly associated with AMH (β=-0.055 p=0.014), however, this association was no longer significant after adjusting for age. Similarly, percent body fat and visceral fat percentage were also negatively associated with AMH (β=-0.058 p= 0.013, and β=-0.256 p<0.001), however this association did not hold after adjusting for age.

Conclusions: Among a cohort of Latina/LatinX females, obesity and adiposity as assessed by BMI, waist/hip circumference and percent body fat were not associated with AMH. These findings demonstrate the importance of study population in considering the impact of obesity on AMH levels and highlights the need for additional studies in diverse populations.

Impact Statement: In contrast to findings in populations who self-identify as White or African American, obesity as assessed by BMI, waist/hip and percent body fat is not associated with AMH in this Latina/Latinx cohort of reproductive aged females.

Concurrent Testosterone (T) During Ovarian Stimulation Negatively Affects Embryo Development After In Vitro Fertilization (Ivf) in a Transmasculine Mouse Model

Amanda R. Schwartz, Min Xu, Nicholas Henderson, Cynthia Dela Cruz, Daniel Pfau, Vasantha Padmanabhan, Ariella Shikanov, Molly B. Moravek

Objective: Current data on the impact of T on ovarian function show variable results with potential for a detrimental effect on reproductive capacity and uncertain reversibility. The objective of this study was to determine the impact of active T treatment and T cessation on IVF outcomes in a mouse model of masculinizing hormone treatment. We hypothesized that current or prior T treatment would not have an impact on IVF outcomes.

Materials and Methods: C57BL/6N (n = 40) female mice were assigned to 4 treatment groups: 1) current T implant 2) current sham implant 3) T cessation 4) control cessation. All mice received silastic tubing implants with ethanol alone or 10 mg T enthanate in ethanol at 10 weeks. Daily cytology was performed prior to implantation and continued until all T treated mice ceased cycling and biweekly serum samples were collected throughout the study duration. At 12 weeks post implantation, group 1 and 2 mice were stimulated with 0.2 mL intraperitoneal CARD HyperOva followed by 7.5 I.U. human chorionic gonadotropin (hCG) 48 hours later. Oocytes were collected at 14 hours post hCG, fertilized in vitro with sperm from B6D2F1/J male mice and cultured to blastocyst stage. Group 3 and 4 mice were explanted after 12 weeks and stimulated two weeks post explantation using the same protocol. The study was designed to have 90% power to detect a 28% difference in the number of blastocysts between the current T and sham groups. Data were analyzed using Chi squared and unpaired t-tests with Prism 9.0.

Results: Compared to current sham, current T mice had significantly higher terminal T (2.87 vs 0.26 ng/mL; $p < 0.0001$), lower terminal progesterone (32.19 vs 43.02 ng/mL; $p = 0.009$) and lower single ovary weight (8.26 vs 10.78 mg; $p = 0.002$) with no difference in terminal anti-mullerian hormone or estradiol. Mice with current T treatment had fewer total oocytes (15.00 vs 32.60; $p < 0.0001$), mature oocytes (14.40 vs 32.56; $p < 0.0001$), 2 cell embryos (12.50 vs 30.44; $p < 0.0001$), 4-8 cell embryos (12.40 vs. 30.88; $p < 0.0001$), morulas (11.90 vs. 30.13; $p < 0.0001$), blastocysts (10.00 vs 25.00; $p < 0.0001$), and hatching blastocysts (5.00 vs 11.00; $p = 0.0003$) compared to controls. Fertilization rate was reduced in mice with current T implant (86.81% vs 93.52%; $p = 0.019$) vs controls. When comparing the T cessation group to sham cessation, there was no difference in oocyte yield (25.60 vs 33.20; $p = 0.084$), 2 cell embryos (24.60 vs 29.29; $p = 0.261$), 4-8 cell embryos (24.40 vs 28.30; $p = 0.336$), morulas (23.70 vs 27.10; $p = 0.401$), blastocysts (22.10 vs 23.10; $p = 0.799$) or hatching blastocysts (12.50 vs 10.50; $p = 0.560$).

Conclusions: In a mouse model of gender-affirming T treatment, current T treatment negatively impacted oocyte yield, fertilization and embryo development; however, these negative effects were not seen following T cessation.

Impact Statement:
The effect of concomitant T treatment during ovarian stimulation in transmasculine people is currently unknown. If translatable to humans, further research is needed to determine the optimal T cessation period and to balance the benefit of T cessation on IVF outcomes with the potential for increased gender dysphoria.

Testosterone Treatment Negatively Impacts the Reproductive Potential of First Generation Female Offspring Conceived by In Vitro Fertilization

Amanda R. Schwartz, Min Xu, Cynthia Dela Cruz, Daniel Pfau, Vasantha Padmanabhan, Ariella Shikanov, Molly B. Moravek

Objective: The objective of this study was to examine in vitro fertilization (IVF) outcomes of first generation offspring conceived from oocytes with long-term testosterone (T) exposure versus control. We hypothesized that there would be no difference in outcomes.

Materials and Methods: C57BL/6N female mice were implanted with silastic tubing with either 10 mg of T enthanate in ethanol (n = 9) or ethanol alone (n = 10) at 10 weeks. At 12-weeks post implantation, mice underwent ovarian stimulation with 0.2 mL intraperitoneal CARD HyperOva followed 48 hours later by 7.5 international units (IU) of intraperitoneal human chorionic gonadotropin (hCG) with collection of oocytes from oviducts at 14 hours post hCG. Oocytes were fertilized and cultured to two-cell embryos, which were transferred into the oviducts of pseudopregnant recipient females to obtain first generation offspring. At 8 weeks, female offspring (n = 10) were stimulated by the same protocol with oocytes fertilized and cultured to blastocyst. Offspring were sacrificed for oocyte collection and terminal blood collected. For male offspring (n = 8), sperm was retrieved at 12-weeks and used to fertilize oocytes from 6-week female mice via a split fertilization method. Data were analyzed using Chi squared and unpaired t-tests with Prism 9.0.

Results: Female offspring conceived with oocytes from T-treated mice had fewer oocytes retrieved (51.80 vs 63.00; p = 0.035), mature oocytes (22.80 vs 30.00; p = 0.050), 2 cell embryos (22.60 vs 30.00; p = 0.046), 4-8 cell embryos (22.40 vs 30.00; p = 0.043), morulas (22.20 vs 29.60; p = 0.036) and blastocysts (19.60 vs 27.00; p = 0.031) as compared to control offspring. There was no difference in individual ovarian weight (p = 0.061), maturity rate (p = 0.466), fertilization rate (p = 0.250) or hatching rate (p = 0.723). Female offspring from T-exposed oocytes had lower terminal anti-mullerian hormone (180.2 vs 236.6; p = 0.022) and progesterone (31.85 vs 56.05; p = 0.015) with no difference in terminal estradiol (54.42 vs 38.72; p = 0.110) or T levels (24.93 vs 32.06; p = 0.167). First generation male offspring from T-treated oocytes had no difference in fertilization rate (84.46 vs 87.55; p = 0.763), blastulation rate (71.71 vs 79.11; p = 0.558) or hatching rate (41.87 vs 46.15; p = 0.683) as compared to controls. Additionally, there was no difference in individual testis weight (p = 0.085), sperm concentration (p = 0.086) or sperm motility (p = 0.607) between male offspring from T-treated oocytes versus controls.

Conclusions: In a mouse model of gender-affirming hormone treatment, testosterone exposure had a detrimental impact on female offspring IVF outcomes with no change noted in male offspring.

Impact Statement: Reproductive consequences of gender-affirming testosterone in transmasculine people are currently unknown with our mouse model suggesting a detrimental impact on female offspring. Further research is needed to determine whether these results are translatable to humans and whether effects are duration dependent or reversible with a period of testosterone cessation.

Fertility Preservation in Sub-Saharan Africa: Awareness and Attitude of Healthcare Professionals

Promise E. Sefogah , Alim Swarray-Deen A, Nana E. Oduro, Nuamah, C. Ozioma, Mercy A. Nuamah

Objective: Women are increasingly delaying childbirth to a later age commonly in pursuit of career and professional advancement. Fertility preservation (FP) provides the opportunity for individuals who may have varied reasons for deferring childbirth as well as those undergoing cancer treatment by protecting oocytes, sperm, embryos, or reproductive tissue that makes a biological family possible in the future. Little is known about level of awareness and attitude of healthcare professionals in Sub-Saharan Africa towards FP.

Method: This was a cross-sectional survey conducted among 318 healthcare professionals in Ghana. Healthcare professionals, including doctors, nurses, pharmacists, and laboratory staff across various facilities in Ghana were surveyed. Structured pre-tested online self-administered questionnaire distributed nationwide. Data was obtained on sociodemographic of participants, knowledge on fertility decline, fertility preservation and their attitudes to fertility preservation. Resulting data were analyzed using SPSS-22 and student-test used to determine associations with $p<0.05$ considered significant. Study had ethical approval.

Results: Of 318 healthcare professionals surveyed, 72.3% were women. Overall, 97.8% had knowledge about female age-related fertility decline, while 52.7% knew about male-age-related fertility decline (ARFD). Level of knowledge on ARFD was higher among HCPs with 1-5 years work experience than those with over 5-years' experience ($p<0.017$). Participants who were aware of ARFD in women were seven times more likely to know about fertility decline in men. While 51.6% of respondents indicated female fertility declines from age 35-39years, 60.9% indicated male fertility declines from 50years.

A significant 64.6% participants were aware of fertility preservation ($p<0.001$), 52.1% of whom learned of FP from their professional training, and 25% through social media. Significantly, 87.4% and 83.2% knew about egg and sperm freezing respectively.
While 33.1% would consider FP, 36.7% will not and 30.2% were unsure. Cost would be the main barrier to FP in 70% participants and concerns about hormonal medication for 33.2%. Majority (65.6%) support FP for cancer patients and 59.2% support fertility preservation for social reasons ($p<0.003$).

Conclusion: Our study found overwhelming knowledge on female age-related fertility decline, but lower level of knowledge on fertility preservation among HCPs in Ghana. One-third of HCPs would consider undertaking FP. Healthcare professionals demonstrate greater support for FP for cancer patients than for social reasons.

Legal And Ethical Challenges In Assisted Reproductive Technology Practice In Ghana
Promise E. Sefogah, Theresa Barnes T, Gordon Abakah-Nkrumah, Oboshie Anim-Boamah

Background: Infertility remains a global challenge globally, with assisted reproductive technology (ART) progressively gaining relevance in developing countries including Ghana. However, associated ethico-legal challenges have not received the needed attention from policymakers. This study explored the legal and ethical challenges of assisted reproductive technology practice in Ghana.

Methods: The study employed exploratory phenomenological approach to examine Assisted Reproductive Technologies in Ghana, focusing on ethics and law governing this practice. A semi-structured interview guide was used for collecting data from 16 respondents comprising ART practitioners, managers, facility owners, surrogacy/gamete donor agencies, and regulatory bodies representatives. The respondents were interviewed, recorded and their responses transcribed for onward analysis.

Results: It emerged that, there are no ethical and legal framework on ART practice in Ghana, and this affects ART practice adversely. The ethical challenges identified border on informed consent, client's privacy and protection of clinical data, gamete donation issues, multiple gestations, single gestations issues, single parenting, social and religious issues. The legal challenges identified are; the non-existence of a legal regime for regulating ART practice, and the absence of professional body with clear-cut guidelines on ART practice. In the absence of legal and ethical frameworks in Ghana, practitioners intimated that they do comply with internationally accepted principles and general ethics in medical practice.

Conclusion: There are no regulations on ART in Ghana. Legal and ethical guidelines are essential to the provision of safe and successful ART practice to protect providers and users. Governmental efforts at regulation in Ghana need to be prioritized.

Racial and Socioeconomic Disparities in 2019 Emergency Department Utilization for Fibroids in the United States

Nicole Sekula, Charley Jiang, Anita Malone, Martina T. Caldwell, Lauren A. Wise, Erica E. Marsh

Objective: Uterine fibroids are benign tumors of the myometrium that can cause significant morbidity. Fibroids disproportionately affect Black females at 2-3 times the incidence of White females1. While fibroid symptoms are ideally treated in an outpatient clinic, there are more than 65,000 annual U.S. emergency department (ED) visits for fibroids.2 We assessed the association between race and sociodemographic characteristics on fibroid-related emergency care utilization and admission.

Materials and Methods: The 2019 Healthcare Cost and Utilization Project Nationwide Emergency Department Sample (NEDS) database was used to identify patients aged 21-60 years who utilized the ED with a primary diagnosis of fibroids (ICD10 codes D25, D25.0-25.2, D25.9). NEDS first included race in 2019, which is the most recent year of available data. Explanatory variables assessed included race, income, insurance type/status. We used linear and logistic regression models to estimate associations of interest.

Results: Of the 143 million ED visits in 2019, 42.29 million were among female patients aged 21-60 years. In this age group, 2.1% of patients identified as Asian-American/Pacific Islander (AAPI), 24.8% Black, 16.0% Hispanic, 0.6% Native American (NA), 3.3% Other, and 51.6% White. Among the 66,150 visits coded with a primary diagnosis of fibroids, 2.9% of patients identified as AAPI, 45.6% Black, 21.5% Hispanic, 0.4% NA, 4.1% Other, and 24.6% White. A higher rate of Black patients used the ED for fibroids compared to all other primary diagnoses ($p<0.001$) and a similar trend was seen for Hispanic patients ($p<0.001$), whereas White patients used the ED less for fibroids ($p<0.001$). Among patients with fibroids, ED visits were highest for those using private insurance (42.1%) and those in the lowest income quartile (36.2%). Odds of hospital admission were similar between insurance types and income quartiles. Race ($p<0.0005$) and age ($p<0.0001$) were associated with significant differences in admissions with Black patients being admitted less than other groups. Mean charges associated with fibroid-related ED visits were $8,954, compared to mean charges of $4,990 associated with all other ED visits. Mean ED fibroid charges differed by race, with the lowest charges for NA patients at $7,235 followed by Black patients at $8,323 ($p=0.0154$).

Conclusions: Black patients made up almost half of fibroid-related ED visits (45.6%) despite accounting for only 24.8% of ED visits overall. Black patients were admitted at lower rates than other races and had one of the lowest mean associated charges, suggesting potential inequities in fibroid treatment in EDs. The high proportion of ED visits among patients in the lowest income quartile also suggests possible inequities in access to primary gynecological services.

Impact Statement: Here, we identify racial differences in ED utilization and admission for fibroids in the U.S. Future work should investigate health inequities in fibroid care and develop strategies that make primary outpatient gynecologic care more accessible and equitable.

Breaking it Down: Adherence to Guidelines for DNA Fragmentation Testing in Male Infertility Patients

Adrienne N. Shami, Marie Menke, James M. Dupree, Samantha B. Schon

Objective: The use of DNA fragmentation assays for infertility patients remains controversial. Guidelines published by ASRM/AUA in October 2020 recommend offering testing in the setting of recurrent pregnancy loss. They also note that some causes of DNA fragmentation are easily reversible, and testicular sperm may be utilized in select cases. The objective of this study is to better understand current national practice patterns for use of DNA fragmentation testing, treatment options, and patient costs.

Materials and Methods: Electronic surveys were distributed to members of the Society for Reproductive Endocrinology and Infertility (SREI) between March and April 2022. Survey data collected general provider characteristics, DNA fragmentation utilization patterns including reasons for/against testing, test type, cost, treatment plans, patient use, and changes to practice due to ASRM/AUA guidelines.

Results: A total of 82 SREI members responded (9.9% response rate). All participants were Reproductive Endocrinologists, with a mean of 19.51 years in practice. Over half of participants offered sperm DNA fragmentation testing (59.8%). The most common reason to not offer testing was an expectation that the results would not change treatment (69.7%). Of those using DNA fragmentation testing, just over half utilize ASRM/AUA societal guidelines on when to offer testing. Many respondents did not make changes to their practice based on these guidelines (44.4%), though 33% did begin offering testing to more patients. In practices where testing was utilized, an average of 15.2% of patients were offered testing, most frequently in the context of recurrent pregnancy loss or previous IVF cycle with poor fertilization or embryo development. The primary testing modality used was Sperm Chromatin Structure Assay (SCSA, 89.6%), typically performed as a send-out test. Once offered the test, respondents estimated that an average of 73.3% of patients completed testing. Though many providers (30.6%) did not know the cost of the test, others estimated it to range between $100-300 (24.5%) or $300-500 (34.7%). Further, respondents report that the most common reason for patients declining testing was due to cost (59.2%). This was followed by the patient perceiving that the test would not change treatment plans (49%). When changes in treatment were offered, these most often included oral antioxidants (59.2%) and IVF with (51%) or without (36.7%) testicular sperm. Other common interventions were IVF with microfluidic sperm sorting (28.6%) or frequent ejaculation (28.6%).

Conclusions: Despite the release of ASRM/AUA guidelines in 2020, the field remains divided on their utility in clinical practice. High costs and unclear interventions remain factors limiting their use from both a provider and patient standpoint.

Impact Statement: These data provide insight into barriers to implementation and standardization of practice patterns with regards to DNA fragmentation, highlighting the need for further translational research into these assays and whether pregnancy outcomes could improve with targeted testing and specific interventions.

Uterine cramping and bleeding in transgender and nonbinary individuals on gender-affirming testosterone therapy

Jeffrey C. Sobieraj, Luca Borah, Sarah M. Peitzmeier, Molly B. Moravek, K. Todd, M. McGovney, Daphna Stroumsa

Objectives: Among transgender and nonbinary individuals assigned female at birth (transmasculine), the vast majority retain their uterus. However, little is known regarding long-term effects of testosterone on the reproductive tract. Emerging data describe new-onset bleeding, pelvic pain, and cramping among transmasculine people following initiation of testosterone, likely due to endometrial and myometrial response to testosterone. We sought to understand the significance and life impact of these symptoms.

Methods: We conducted semi-structured interviews with transmasculine individuals on testosterone (n=13). Participants aged 18–45 were recruited using social media and snowball sampling. Interviews were inductively and deductively coded and thematically analyzed. A community advisory board directed the methodology.

Results: Participants described their experiences along axes of (1) psychological and emotional significance, (2) accessing healthcare, (3) physical impact, (4) social functioning, and (5) methods of coping. We define three themes: a) threat (to safety, to identity, to health); b) self vs. other (tension between internal experience and interaction with the surrounding world); and c) trans stigma (structural, interpersonal, and internalized negative emotions attached to transness).

Conclusions: Pelvic pain and bleeding can have significant quality of life impacts on transmasculine individuals. These symptoms threaten their physical and emotional well-being, can undermine their identity, and raise the specter of discovery and physical harm. Addressing structural transphobia can mitigate many of the externally derived negative effects of these symptoms. Legislation affecting access to care and to safe spaces furthers the impact of the symptoms. Urgent clinical and policy solutions are needed.

Structural Racism in Newborn Drug Testing: Healthcare and Child Protective Professional Perspectives

Carol Shetty, Amanda Costa, Victoria Waidley, Emily Madlambayan, Madgean Joassaint, Sebastian Schoneich, Katharine McCabe, Courtney Townsel, Justine P. Wu, Christopher J. Frank, Lauren Oshman, P. Paul Chandanabhumma

Objective: To explore the attitudes and experiences of health care professionals (HCP) and Child Protective Services (CPS) professionals regarding newborn drug testing (NDT) and the perceived influence of structural racism on racial inequities in NDT practices.

Methods: We conducted 30 semi-structured small group and individual interviews with physicians, midwives, nurses, social workers, and CPS professionals at an academic medical center in the Midwestern United States. We conducted iterative, inductive thematic analysis of the interviews. The study approach was informed by community advocates and external consultants with expertise in public health approaches to addressing structural racism.

Results: Participants (n=30) included certified nurse midwives (n=5), Labor and Delivery nurses (n=4), Labor and Delivery social worker (n=1), physicians in Family Medicine (n=4), Medicine-Pediatrics (n=1), Obstetrics and Gynecology (n=3), and Pediatrics (n=8); and CPS professionals (n=4). We identified three primary themes: (A) Participants recognized that structural and obstetric racism contributed to higher rates of newborn drug testing in Black newborns, (B) HCPs applied newborn drug testing inconsistently, leading to racialized differences, and (C) HCPs lacked insight into the disproportionate harms of CPS reporting for Black families.

Conclusion: HCPs in this qualitative study were concerned about structural racism and its effects on NDT but lacked insight into its disproportionate harms to Black families. Institutional, state, and federal policy changes that delink medical treatment for prenatal substance exposure from reporting to CPS are needed to advance racial equity

Respecting autonomy and enabling diversity: Patient preferences and privacy in datasharing
Kayte Spector-Bagdady

Promising advances in precision health and other kinds of big data research rely on large datasets to analyze correlations between genetic variants, behavior, environment, and outcomes to improve population health. But to ensure equitable access to clinical advances, datasets must include patients reflecting the demographic distribution of disease. We also know that patients have privacy concerns about datasharing, and many are associated with demographic differences across patient populations. But how can we both respect the autonomy of individual patients while enabling just access to clinical advances? This talk will explain the goals of precision medicine, analyze a lack of equitable access to those promises and legal challenges, and explore actionable suggestions for clinicians to improve the system.

Effect of the Oral GnRH Antagonist Linzagolix on Uterine Fibroid-Related Severe Anemia
Elizabeth A. Stewart, Erica E. Marsh, Erica E., Jacques Donnez, Ayman Al-Hendy, Andrew Humberstone, Elizabeth Garner

Introduction: Iron-deficiency anemia is common in women with uterine fibroid (UF)-related heavy menstrual bleeding. Severe anemia is defined as hemoglobin (Hb) levels <10g/dL. The effect of linzagolix, an oral GnRH antagonist, on UF-related severe anemia was assessed in two Phase 3 trials.

Methods: PRIMROSE 1 and 2 are randomized, double-blind, placebo-controlled Phase 3 trials investigating the efficacy and safety of linzagolix 100 mg and 200 mg once daily, with or without hormonal add-back therapy (ABT) in the treatment of UF. Subjects were considered responders if an increase of ≥2g/dL from baseline was achieved. Patients with severe anemia were given iron supplements until they reached the Hb levels >12g/dL.

Results: In PRIMROSE 1, of 165 subjects with severe anemia, 57.9%, 61.5%, 82.1% and 65.2% of patients were responders at 24 weeks, in the respective treatment groups (100 mg, 100 mg+ABT, 200 mg and 200 mg+ABT), compared to 50% in the placebo group. In PRIMROSE 2, of 93 patients with severe anemia, 62.5%, 75%, 60% and 73.7%, respectively, were responders, compared to 46.2% for placebo. Given the small sample sizes, statistical significance was not reached. Improvements were maintained at week 52: in PRIMROSE 1, 69.2%, 62.5%, 81.3% and 75% of patients were responders in the respective treatment groups, compared to 40% in placebo, in PRIMROSE 2, 66.7%, 100%, 80%, 87% were responders, respectively.

Conclusion: High and low doses of linzagolix improved Hb levels in patients with UF suffering from severe anemia.

First in Human Fully Quantitative Numeric Assessment of Cervical Remodeling Over Pregnancy

Molly J. Stout, Methodius G. Tuuli, Adam K. Lewkowitz, Cassy Hardy, Emily Diveley, Julie Tumbarello, Peinan Zhao

Objective: To utilize a novel, fully quantitative cervical elastography system (FQ-CES) to numerically measure cervical stiffness over pregnancy to describe longitudinal trends in cervical remodeling.

Study Design: This is a prospective longitudinal cohort study of asymptomatic pregnant patients who underwent FQ-CES in the first, second, and third trimesters. We invented FQ-CES, which modifies a transvaginal ultrasound probe to quantify both pressure applied and tissue deformation, thereby yielding a fully quantified strain-based elastography system that provides a numeric quantification (Young's modulus) of cervical tissue stiffness. This system is operator independent and can be compared across patients and within patients over time. Singleton pregnancies were included and imaging to obtain both FQ-CES and cervical length (CL) was performed at 3 visits (visit 1: 11-14 weeks; visit 2: 18-23 weeks; visit 3: 28-34 weeks). Young's modulus was log transformed to achieve normality of distribution (logYM). Cervical tissue logYM from FQ-CES and CL were analyzed over pregnancy using linear mixed effect models.

Visit	Patients (N)	GA (mean weeks ± SD)	Young's modulus (kPa) (median IQR)	logYM (Mean±SD)	Cervical length (mm) (Mean±SD)
1	68	12.4±1.4	74.3 (45.6, 110.5)	11.2±0.7	38.1±5.2
2	66	19.7±1.3	47.8 (26.3, 66.6)	10.7±0.7	39.8±5.9
3	51	29.9±1.9	22.6 (16.1, 38.5)	10.1±0.7	38.9±7.2
Coefficient of variation				6.8%	15.6%

Results: A total of 93 patients were included. Cervical tissue stiffness (logYM) decreased progressively over pregnancy (P<0.001) corresponding to a cervical softening rate of approximately 6% per week. Comparatively, cervical length showed an insignificant trend over pregnancy(p=0.73) (Figure). The coefficient of variation (a measure of population variance) is 6.8% for FQ-CES and 15.6% for CL suggesting greater dispersion and higher variance of CL across the population compared to FQ-CES.

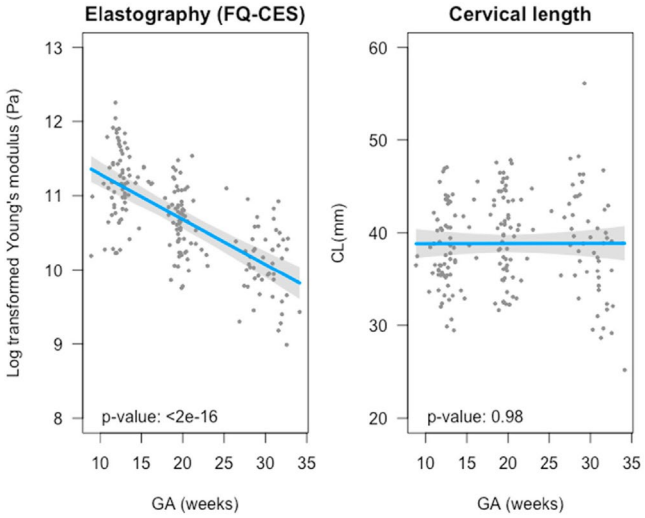


Figure: Side by side graph of cervical tissue stiffness (LogYM) from FQ-CES and cervical length over pregnancy demonstrating steadily decreasing cervical tissue stiffness detectable with FQ-CES and a stable trend of CL over pregnancy.

Conclusion: Cervical remodeling measurable by FQ-CES occurs gradually and progressively over pregnancy and shows less population variance than CL. FQ-CES has the ability to numerically quantify cervical tissue stiffness and may have improved predictive utility to identify pathologic premature or delayed cervical remodeling.

AWARD: Dr. Carlson Memorial Award for best Research in Ultrasound and Genetics

Fully Quantitative Cervical Elastography Demonstrates Detectable Differences in Cervical Remodeling Patterns by Parity

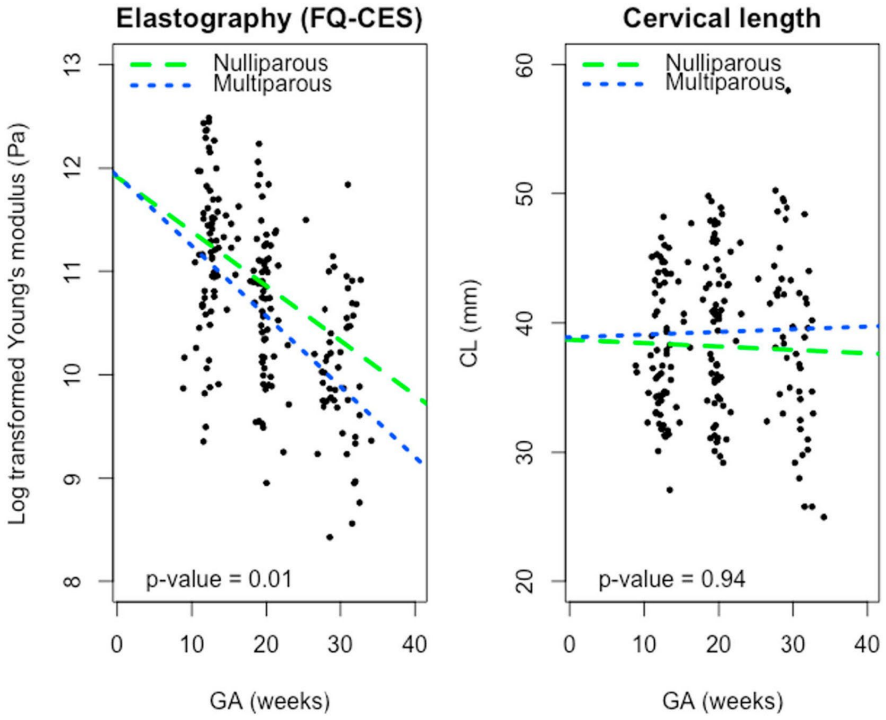
Molly J. Stout, Methodius G. Tuuli, Adam K. Lewkowitz, Cassy Hardy, Emily Diveley, Julie Tumbarello, Peinan Zhao

Objective: To utilize a novel, fully quantitative cervical elastography system (FQ-CES) to numerically measure cervical stiffness and examine how physiologic cervical remodeling differs in nulliparous versus multiparous patients.

Study Design: This is a prospective longitudinal cohort study of asymptomatic pregnant patients who underwent FQ-CES in the first, second, and third trimesters. We invented FQ-CES, which modifies a transvaginal ultrasound probe to quantify both pressure applied and tissue deformation, thereby yielding a fully quantified strain-based elastography system that provides a numeric quantification (Young's modulus) of cervical tissue stiffness. This system is operator independent and can be compared across patients and within patients over time. Singleton pregnancies were included and imaging to obtain both FQ-CES and cervical length (CL) was performed at 3 visits (visit 1: 11-14 weeks; visit 2: 18-23 weeks; visit 3: 28-34 weeks). Young's modulus was log transformed to achieve normality of distribution (logYM). Cervical tissue logYM from FQ-CES and CL were analyzed over pregnancy using linear mixed effect models stratified by parity.

Results: A total of 93 patients (37 nulliparous and 56 multiparous) patients were included. Cervical tissue stiffness decreased progressively over pregnancy ($P < 0.001$), 6.7% per week in multiparous patients and 5.2% per week in nulliparous patients (interaction term p=0.01) (Figure 1). Cervical length trend over pregnancy was insignificant (neither increased nor decreased) and did not differ by parity.

Conclusion: Cervical softening detectable by FQ-CES differs by parity. Normative FQ-CES values to describe normal and abnormal cervical ripening over pregnancy should be defined differently in nulliparous versus multiparous individuals.



Fully Quantitative Cervical Elastography Outperforms Cervical Length for Preterm Birth Prediction in Asymptomatic Patients

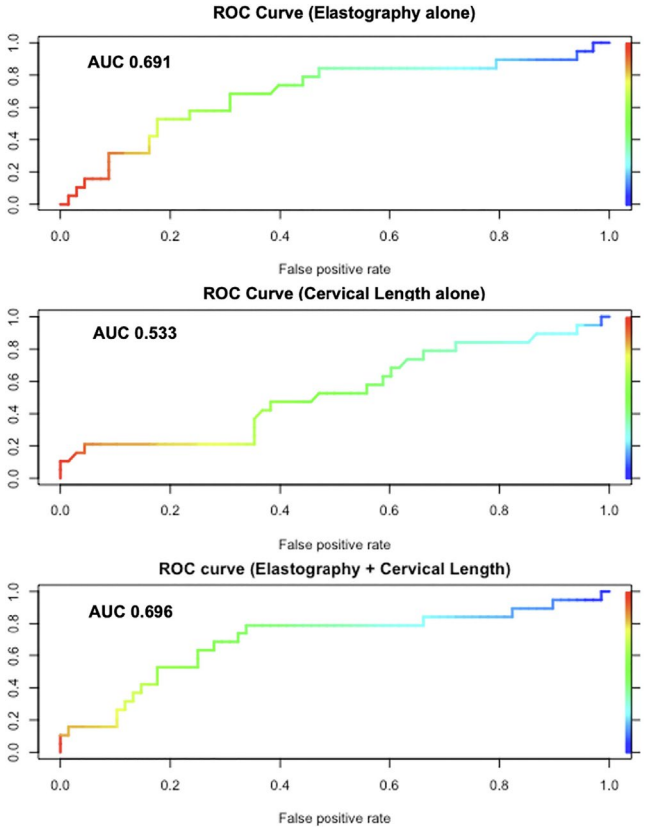
Molly J. Stout, Methodius G. Tuuli, Adam K. Lewkowitz, Cassy Hardy, Emily Diveley, Julie Tumbarello, Peinan Zhao

Objective: To test a novel, fully quantitative cervical elastography system (FQ-CES) for preterm birth prediction and compare predictive characteristics to cervical length in asymptomatic patients.

Study Design: This is a prospective longitudinal cohort study of asymptomatic pregnant patients who underwent FQ-CES in the first, second, and third trimesters.We invented FQ-CES, which modifies a transvaginal ultrasound probe to quantify both pressure applied and tissue deformation, thereby yielding a fully quantified strain-based elastography system that provides a numeric quantification (Young's modulus) of cervical tissue stiffness. This system is operator independent and can be compared across patients and within patients over time. Singleton pregnancies were included and imaging to obtain both FQ-CES and cervical length (CL) was performed at 11-23 weeks of pregnancy. Percentile rank of log-scaled Young's modulus (logYM) was calculated, and patients were dichotomized into high and low cervical stiffness by the optimal significance of chi-square test. Prediction performance by FQ-CES and CL for preterm delivery < 37 weeks was assessed using ROC curves

Results: A total of 87 patients were included. The 15th percentile (logYM) was identified as the optimal cut-point to define low cervical stiffness. Patients with low cervical stiffness had a significantly higher risk for PTB than those with normal cervical stiffness (>15th percentile) (RR=2.9 95%CI [1.4, 6.1]). The FQ-CES was overall more predictive of PTB than cervical length (AUC 0.69 versus 0.53) (p=0.18) (Table and Figure). The predictive characteristics of FQ-CES logYM ≤ 15th percentile for PTB were: sensitivity 31%, specificity 91%, positive predictive value 50%, and negative predictive value 83%.

Cervical Test	AUC (95%CI)
FQ-CES alone	0.69 (0.54-0.84)
CL alone	0.53 (0.38-0.69)
FQ-CES + CL	0.70 (0.55-0.85)



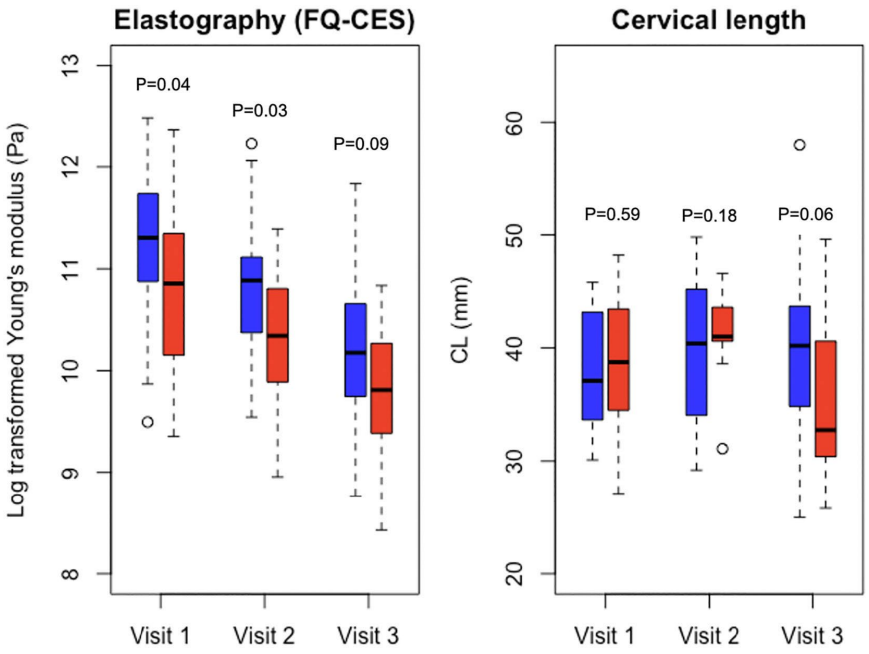
Conclusion: FQ-CES performed at 11-23 weeks of pregnancy has better performance for preterm birth prediction than cervical length and could be used to refine risk stratification both clinically and for targeted enrollment in PTB intervention trials.

Novel Fully Quantitative Cervical Elastography Detects Early Cervical Remodeling Patterns Ahead of Term and Preterm Birth

Molly J. Stout, Methodius G. Tuuli, Adam K. Lewkowitz, Cassy Hardy, Emily Diveley, Julie Tumbarello, Peinan Zhao

Objective: To utilize a novel, fully quantitative cervical elastography system (FQ-CES) longitudinally in pregnancy to measure cervical softening patterns ahead of preterm and term birth.

Study Design: This is a prospective longitudinal cohort study of asymptomatic pregnant patients who underwent FQ-CES in the first, second, and third trimesters. We invented FQ-CES, which modifies a transvaginal ultrasound probe to quantify both pressure applied and tissue deformation, thereby yielding a fully quantified strain-based elastography system that provides a numeric quantification (Young's modulus) of cervical tissue stiffness. This system is operator independent and can be compared across patients and within patients over time. Singleton pregnancies were included and imaging to obtain both FQ-CES and cervical length (CL) was performed at 3 visits (visit 1: 11-14 weeks, visit 2: 18-23 weeks, visit 3: 28-34 weeks). PTB was defined as delivery < 37 weeks. Log-scaled Youngs modulus and cervical length were compared at each visit timepoint between term and preterm births using two-sided t-test.



Results: A total of 93 patients were included. Cervical tissue stiffness as measured by FQ-CES decreased progressively over pregnancy (P < 0.001) while CL showed no significant shortening over pregnancy (P=0.73) . FQ-CES in early and mid-pregnancy demonstrated significant differences in cervical stiffness between patients with subsequent term versus preterm birth. Specifically, individuals with preterm birth had a cervical Young's modulus 38.6% softer than those with term birth at visit 1 (p=0.04), 42.3% softer at visit 2 (p=0.03), and 35.0% softer at visit 3 (p=0.09). Cervical length measured at visit 1 ,visit 2 and visit 3, demonstrated no significant difference between patients with subsequent term and preterm birth (Figure).

Conclusion: Cervical stiffness measured by FQ-CES may be a better marker of subsequent PTB than cervical length and could be used to more accurately risk stratify patients and refine scientific cohorts for testing interventions in targeted populations at risk for PTB.

Novel Fully Quantitative Cervical Elastography Predicts Delivery in 7 Days in Patients with PTL Symptoms

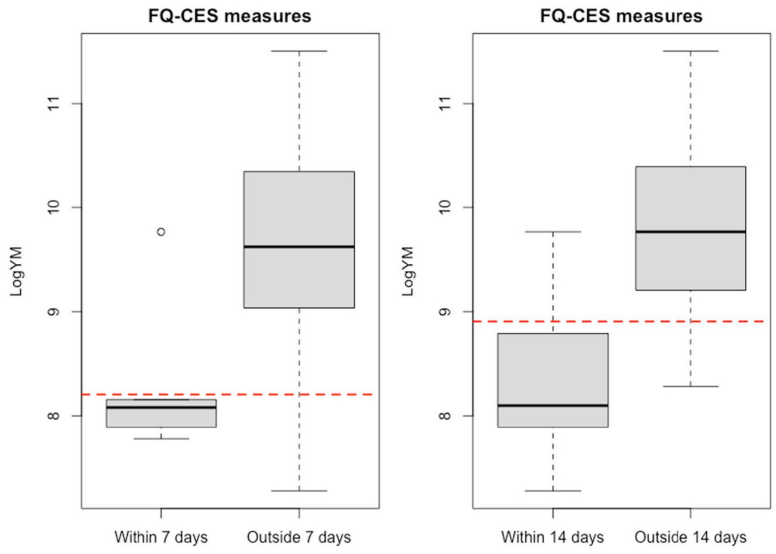
Molly J. Stout, Methodius G. Tuuli, Adam K. Lewkowitz, Cassy Hardy, Emily Diveley, Julie Tumbarello, Peinan Zhao

Objective: To utilize a novel, fully quantitative cervical elastography system (FQ-CES) in patients with symptoms of preterm labor (PTL) to predict delivery within 7 and 14 days

Study Design: This is a prospective cohort study of asymptomatic pregnant patients undergoing FQ-CES during evaluation for PTL symptoms in our obstetric triage unit. We invented FQ-CES, which modifies a transvaginal ultrasound probe to quantify both pressure applied and tissue deformation, thereby yielding a fully quantified strain-based elastography system that provides a numeric quantification (Young's modulus) of cervical tissue stiffness. This system is operator independent and can be compared across patients and within patients over time. Patients with singleton gestation, intact membranes, cervix < 4 cm dilated at ≤ 35 weeks who were presenting for evaluation for PTL were included. FQ-CES was performed by trained research nurse sonographers. Young's modulus was log transformed to achieve normality (logYM). Results were not known to the treating obstetric team and management was per the primary obstetric team. The primary outcome was delivery within 7 and 14 days.

Results: A total of 44 patients were included. 5 (11%) delivered within 7 days and 10 (23%) delivered within 14 days. Cervical tissue stiffness measured by FQ-CES was significantly softer in patients who delivered within 7 days (p-value=0.007) and within 14 days (p-value < 0.001) compared to those who did not. A level of ≤ 8.2 logYM was associated with a significant increase in PTB within 7 days (57.1% versus 2.7%, RR 21.1 95% CI (2.8, 162.1, p=0.001). Similarly, a level of ≤ 8.9 logYM was significantly associated with birth within 14 days (81.8% versus 3.0%, RR 27.0, 95% CI (3.8, 189.8)). Predictive characteristics for PTB within 7 and 14 days are shown in the table.

	Delivery within 7 days	Delivery with 14 days
Sensitivity	80.0%	90.0%
Specificity	92.3%	94%
PPV	57%	82%
NPV	97.3%	97%



Conclusion: FQ-CES numerically quantifies cervical stiffness and is a useful predictor of risk for delivery within 7 and 14 days in patients presenting with symptoms of preterm labor. FQ-CES could be tested in larger populations to refine decisions such as need for hospitalization and maternal transport.

Tailored opioid prescribing in gynecologic oncology: Michigan prescription opioid reduction tool (MiPORT)

Alli Straubhar, Olivia de Bear, Cynthia Stroup, Liam Dalton, R. Kevin Reynolds, Karen McLean, Jean Siedel, Aimee Rolston, Shitanshu Uppal

Objectives: To evaluate the implementation of a Gynecologic Oncology quality-improvement intervention aimed at tailoring opioid prescriptions to meet individual patient needs whilst not overprescribing.

Methods: Our previously published opioid prescribing algorithm was implemented on January 1, 2021. This opioid reduction tool accounts for patient age, risk factors for opioid usage (history of anxiety, depression, substance abuse, chronic pain, or current opioid use), surgical modality, and inpatient opioid usage. This tool was used preoperatively to generate individualized opioid prescriptions for patients who underwent minimally invasive surgery or laparotomy by the Gynecologic Oncology service. Patients completed a 30-day postoperative standard questionnaire regarding the number of opioid pills used and any opioid refill requests. Opioid refill requests were cross-referenced with the state department's automated prescription system. Patients were identified in our institution's prospectively curated quality improvement surgical database from January 1, 2021, through July 31, 2021. Patients were included if they received the 5 mg oxycodone pills as per the standardized opioid prescribing algorithm. Prescriber compliance was defined as not prescribing more than the predicted patient needs determined by the opioid calculator. An excessive prescription was defined as the patient reporting more than three pills remaining after 30 days.

Results: Two-hundred and thirteen patients were included in the analysis, where 56% (n=119) underwent laparoscopy, and 44% (n=94) underwent laparotomy. Eighty-three patients (39%) had at least one risk factor for opioid usage. The median number of opioid pills prescribed following laparotomy was 6 (range: 0-16), and the median after laparoscopy was three pills (range: 0-15). The rate of prescriber compliance was 87% (n=185/213). Of the 28 patients who received a higher number of opioid pills than what was recommended by the opioid calculator, 19 (68%) patients received only 1-3 pills more than the recommended amount. Four patients received larger amounts (10 pills) early in the implementation of the program and five larger prescriptions due to patient requests. The 30-day opioid refill request rate was 8% (n=17/213). Of the patients who received a larger prescription, 14% (n=4/28) received an opioid refill within 30 days. Thirty-four (21%) patients had more than three pills remaining after 30 days (excessive prescription rate).

Conclusions: Using this tailored opioid calculator led to a high prescriber compliance rate and a low refill request rate while limiting the number of excessive opioid prescriptions.

“They Had the Lunch Lady Coming up to Assist”: The Experiences of Menarche and Menstrual Management for Adolescents with Physical Disabilities

Courtney Streur, Jodi Kreshmer, Susan Ernst, Elisabeth Quint, Monica W. Rosen, Daniela Wittmann, Claire Kalpakjian

Background: Menarche is a pivotal time in an adolescent’s life,but can be experienced differently by adolescents with physical disabilities and their families. Current studies are limited to retrospective chart reviews and viewpoints of health care providers. Little is known about these experiences from the perspective of the families.

Objective: We sought to understand the experience of menarche and menstrual management in adolescent girls with physical disabilities and their families from the perspective of their parents.

Methods: Individual semi-structured interviews were conducted with a parent of an adolescent girl with a physical disability ages 7-26. Interviews were coded by 2 reviewers using Grounded Theory, with disagreements resolved by consensus.

Results: Six themes emerged regarding the parent’s perception of their and their daughter’s experiences, including 1) parental knowledge correlating to daughter’s preparation for menarche, 2) variation in emotional responses to menarche, 3) parent’s perception of their daughter’s experience with menses and menstrual symptoms, 4) cross-section of disability and menstrual management, 5) menstrual management at school, and 6) desires for health care provider support.

Conclusions: A physical disability may directly impact the experience of menarche and menstrual management for adolescent girls with physical disabilities and their parents. Although variable, even girls with mild disabilities experienced unique educational, emotional, or physical difficulties with menses and menstrual management. Managing periods at schools was particularly burdensome. Health care providers should proactively counsel families on potential differences prior to menarche and offer guidance and support based on family’s individual preferences.

Associations Between Urologic Chronic Pelvic Pain Symptom Flares and Quality of Life, Health-Care Seeking Activity, and Illness Impact: Findings from the Multidisciplinary Approach to the Study of Chronic Pelvic Pain Symptom Patterns Study

Siobhan Sutcliffe, Craig Newcomb, Catherine Bradley, J.Quentin Clemens, Bradley Erickson, et al.

Hypothesis/Aims of Study: Symptoms of urologic chronic pelvic pain syndrome (UCPPS, including interstitial cystitis/bladder pain syndrome and chronic prostatitis/chronic pelvic pain syndrome) are well-known to fluctuate, with symptom exacerbations – periods of time when symptoms are much worse than usual – often referred to as "flares." Previous studies have shown that flares are associated with decreased quality of life (QOL) and greater health-care utilization, with the degree of impact driven by the frequency, pain intensity, duration, and unpredictability of flares.

Despite their negative impact on patients' lives, flares are rarely documented in UCPPS research. Most UCPPS studies monitor changes in participants' condition by assessing changes in their typical or average levels of pain and urinary symptoms or their impression of changes in their condition over time (i.e., global response assessment). Both of these measures have been shown to correlate with QOL and illness impact, supporting their use as outcomes in UCPPS research. Although flares have also been shown to impact QOL, no studies, to our knowledge, have investigated whether flares influence QOL, health-care seeking behavior, and illness impact independently of typical pain intensity, and thus whether they merit consideration as additional outcomes in UCPPS research (i.e., whether reducing flare frequency without reducing mean pain intensity may still be important to patients). Therefore, we used data from the Multidisciplinary Approach to the Study of Chronic Pelvic Pain (MAPP) Symptom Patterns Study to investigate associations between flares and QOL, health-care seeking activity, and illness impact, independent of mean pain levels. We hypothesized that flares would be associated with QOL, health-care seeking activity, and illness impact, independent of typical pain intensity, and that this impact would be greatest for patients with the highest flare frequency.

Study Design, Materials and Methods: The MAPP Symptom Patterns Study was a three-year longitudinal study of UCPPS patients designed to investigate the "usual-care" natural history of UCPPS and to identify patient sub-groups with possible differing etiology and clinical course. Initial study participation involved attending a "screening" visit (week 0); completing three weekly, online "run-in" assessments (weeks 1, 2, and 3); and then attending a "baseline" study visit at week 4. After the baseline visit, participants were followed by quarterly online assessments and in-person visits at 6, 18, and 36 months of follow-up. Recruitment began in July 2015 and ended in February 2019.

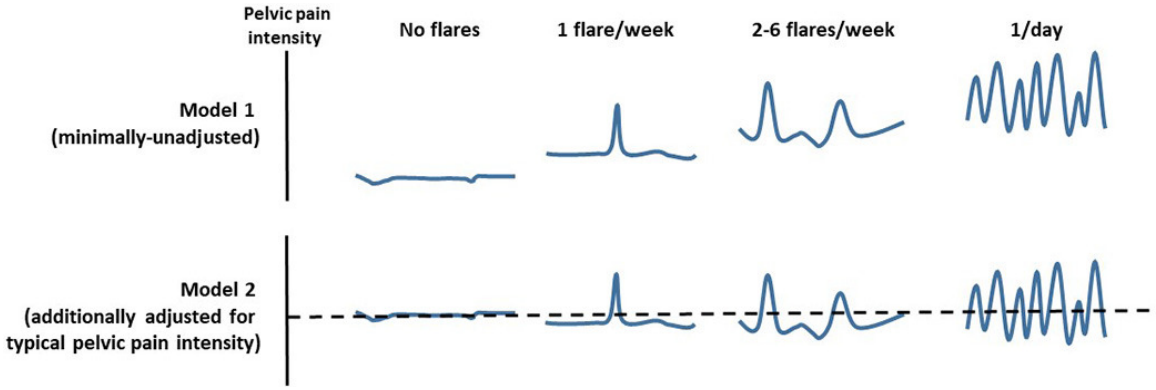
At the screening visit and each run-in assessment, participants were asked to report their frequency of flares and typical pelvic pain levels; as well as to provide information on condition-specific QOL (Genitourinary Pain Index Quality of Life Impact Sub-Scale), condition-specific health-care seeking activity (MAPP-specific item), and general illness impact or disability (World Health Organization Disability Assessment Schedule). Standardized beta coefficients were calculated by generalized estimating equations and used to estimate associations between flare frequency and QOL, health-care seeking activity, and illness impact, independent of typical pelvic pain levels (Figure 1).

Results: Overall, 592 of 620 Symptom Patterns Study participants were eligible for the analysis. In minimally-adjusted models, participants who reported at least 1 flare/week had worse condition-specific QOL, and those who reported at least 2 flares/week had greater health-care seeking activity and general disability than those who reported no flares in the past week. After adjustment for typical

pelvic pain intensity, associations attenuated, but remained statistically significant for at least one flare/week with worse condition-specific QOL, at least 2 flares/week with greater health-care seeking activity, and at least 1 flare/day with worse overall disability (Table 1 and Figure 1).

Flare frequency	Model	Condition-specific		General
		Quality of life	Health-care seeking activity	Disability
Reference: 0 flares				
1/week	1	**0.27 (0.17-0.36)**	0.13 (-0.01-0.09)	0.03 (-0.04-0.09)
	2	**0.12 (0.03-0.20)**	0.07 (-0.07-0.22)	-0.02 (-0.09-0.04)
2-6/week	1	**0.54 (0.45-0.62)**	**0.24 (0.11-0.36)**	**0.14 (0.08-0.21)**
	2	**0.28 (0.21-0.36)**	**0.12 (0.00-0.24)**	0.04 (-0.03-0.10)
1/day	1	**0.65 (0.53-0.76)**	**0.55 (0.29-0.80)**	**0.24 (0.14-0.35)**
	2	**0.31 (0.20-0.42)**	**0.40 (0.14-0.66)**	**0.11 (0.00-0.20)**

Estimates with p-values<0.05 are bolded and shaded in grey.
Model 1: Adjusted for typical urinary symptom intensity, typical non-pelvic pain intensity, age, and sex.
Model 2: Additionally adjusted for typical pelvic pain intensity.



Interpretation of Results: Our findings suggest that patients who experience flares have worse QOL and greater health-care seeking activity and illness impact than patients who do not experience flares, independent of typical pelvic pain levels. Our findings also suggest greater impact with increasing frequency of flares.

Concluding Message: Our observation of independent associations between flares and QOL, health-care seeking behavior, and illness impact suggest that patients may benefit from treatment and management strategies that reduce their flare frequency, even if they do not reduce their overall pain intensity. For this reason, we propose that flares are worth considering as additional outcomes in clinical trials and other research studies, as well in clinical practice.

Trauma-Informed Pelvic Examination Practices Among Clinicians

Stephanie Terrell, Kathleen Mehari, Lauren Oshman, Alana K. Otto, Allison Ruff, Lauren Owens

Introduction: Most people have experienced assault, an adverse childhood event, or other trauma. Trauma adversely impacts reproductive health outcomes and patients' experiences of health care. Survivors' preferences for trauma-informed pelvic care are established in the literature, but there are scant data on clinicians' adherence to these practices. This study assessed clinicians' knowledge, attitudes, and practices regarding trauma-informed care (TIC) and pelvic examinations.

Methods: The study team distributed an anonymous Qualtrics survey to 1,017 clinicians across 12 departments at a large academic medical center in June 2021. Clinicians who had performed at least one pelvic examination in the last year were eligible. Descriptive statistics are reported.

Results: Of 1,017 clinicians contacted, 362 responded, for a response rate of 35.6%. Overall, 81 (22.4%) reported no familiarity with TIC, and 106 (29.3%) had no training in TIC. Although 203 (56.1%) thought it was extremely important to use a trauma-informed approach to the pelvic examination when patients had a known history of trauma, only 88 (24.3%) thought it was extremely important to use a trauma-informed approach when no trauma history was known. Ninety-seven clinicians (26.8%) endorsed using trauma-informed practices during pelvic examinations “often” or “always.”

Conclusion: Clinicians reported a lack of training in TIC. They did not see the need for universal application of TIC, and they reported inconsistent usage of trauma-informed practices during pelvic examinations. These data demonstrate a pressing need to improve training for clinicians and appropriate care for patients.

Perspectives of Postpartum Pain Management Among Patients With Prenatal Opioid Exposure

Courtney Townsel, Emma Keer, Sanaya Irani, Buu-Hac Nguyen, Alex Hallway, Alex F. Peahl

Introduction: Opioid-sparing protocols can reduce postpartum opioid prescribing in opioid-naïve patients; however, patients with a history of opioid use disorder (OUD) and chronic pain are typically excluded from evaluations. We assessed the postpartum pain experience in patients who were not opioid-naïve before delivery.

Methods: We conducted a phone survey assessing maternal postpartum pain experiences for all patients with OUD and chronic pain on opioids prenatally who delivered between January 2020 and August 2021 at a single hospital. In this IRB exempt study, verbal informed consent was obtained for all participants. Analyses included simple descriptive statistics.

Results: Of 24 patients successfully contacted, 17 (71%) participated. Patients were predominantly White (100%, 17/17), publicly insured (76%, 13/17), multiparous (82%, 14/17), had a vaginal delivery (53%, 9/17), and had an average age of 32. Patients were most commonly identified as having OUD (88%, 15/17) followed by chronic pain (12%, 2/17). About a quarter (4/17, 24%) reported poor pain control (7/10 or greater) in the hospital and one week after discharge. Among patients with vaginal deliveries, 11% (1/9) used opioids postpartum, 78% (7/9) used acetaminophen, and 67% (6/9) used ibuprofen. Among cesarean births, 50% (4/8) used opioids postpartum, 100% (8/8) used acetaminophen, and 75% (6/8) used ibuprofen. Of the 69% (11/16) who reported breastfeeding, 45% (5/11) reported some pain interference.

Conclusion: Many patients on maintenance opioids prenatally reported poor postpartum pain control. Non-opioid medications were not optimized in patients undergoing cesarean delivery, suggesting an opportunity for better opioid-sparing pain management strategies.

Placental Epigenetic Regulation in Opioid Exposed Pregnancies

Courtney Townsel, Margaret Quaid, Burnley Truax, Jonathan Covault, Dana Dolinoy, Jaclyn Goodrich

Objective: Neonatal opioid withdrawal syndrome (NOWS) results from chronic in utero opioid exposure and its severity is unpredictable. Inter-individual variability in placental opioid metabolism and transfer mediated by epigenetic changes may impact fetal opioid exposure and NOWS severity. We assessed DNA methylation in placental metabolizing enzymes and transporters on in utero opioid exposure and NOWS severity.

Study Design: Prospective multicenter cohort study of mother-baby dyads on medication for opioid use disorder (MOUD) in pregnancy. Inclusion: >18yo, on MOUD (methadone or buprenorphine), ≥34 weeks, singleton. Exclusion: major fetal anomalies, no biospecimen collection. Placental biopsies from all four quadrants inclusive of the syncytiotrophoblast collected within 1 hour of delivery. Placental DNA methylation levels of genes (ABCG1, ABCG2, CYP19A1 and HSD11B2) were quantified across many sites per gene via pyrosequencing following bisulfite conversion. CYP19A1 mRNA levels were determined by rtPCR. Umbilical cord drug levels were determined by LC-MS. Maternal and neonatal characteristics were abstracted from the electronic medical record. Severe NOWS was diagnosed when Finnegan scores exceeded 24 in a 12-hour period. P-value < 0.05 was deemed significant.

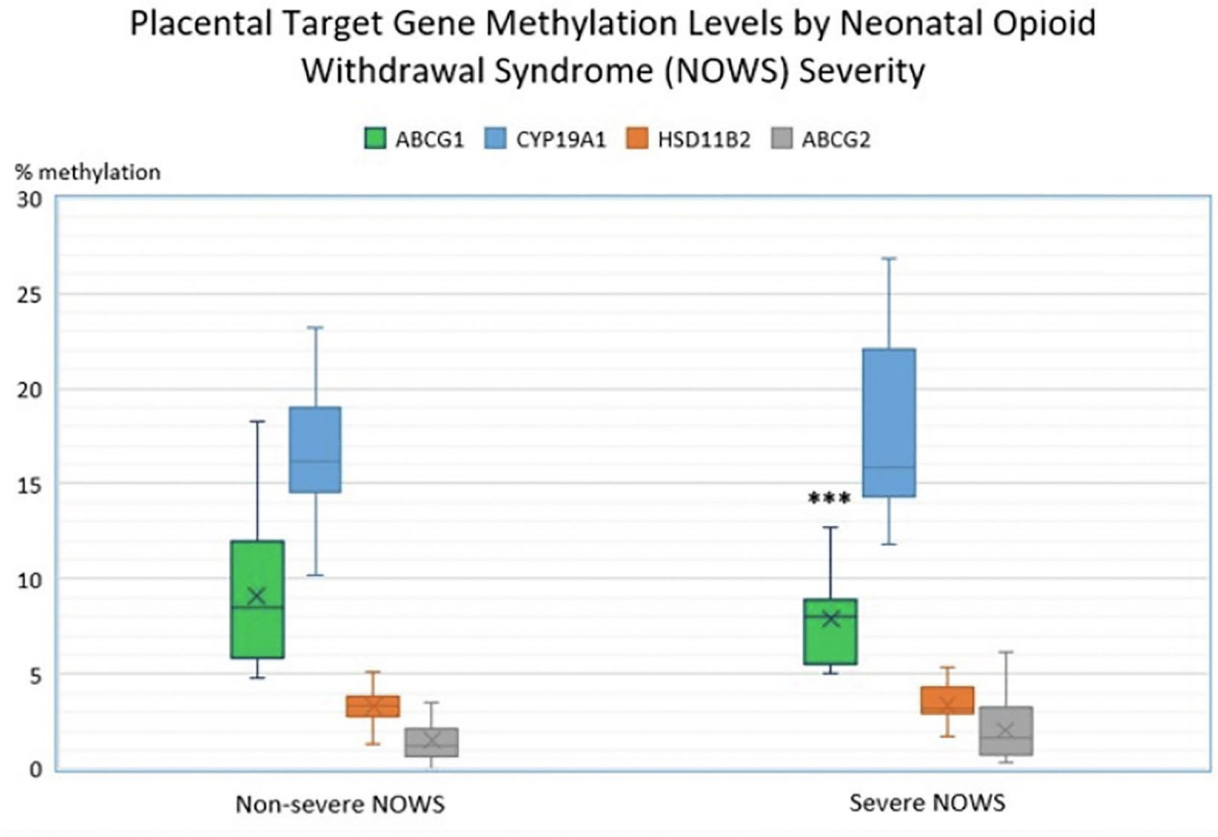
Results: Thirty-eight dyads on chronic MOUD were enrolled (Table 1). Promoter region methylation for placental transporter ABCB1 was lower in severe NOWS (non-severe NOWS 4.93 ±1.66 vs

Table 1. Maternal and neonatal characteristics by neonatal opioid withdrawal syndrome severity

	Cohort (n=38)	Non-Severe NOWS (n=19)	Severe NOWS (n=19)	p-value
Maternal Characteristics				
Maternal Age (years)	30 ± 4	32 ± 4	29 ± 4	0.09
Gravida	3 ± 2	3 ± 2	3 ± 1	0.34
Race				
White	36 (96%)	19 (100%)	17 (90%)	
African American	1 (2%)	0	1 (5%)	
Other	1 (2%)	0	1 (5%)	0.35
Ethnicity				
Non-Hispanic	34 (89%)	18 (95%)	16 (84%)	
Hispanic	4 (11%)	1 (5%)	3 (16%)	0.32
Opioid Medication				
Methadone	29 (76%)	13 (68%)	16 (84%)	
Buprenorphine	9 (23%)	6 (32%)	3 (16%)	0.25
Smoker	29 (76%)	13 (68%)	16 (84%)	0.25
Mood Disorder	20 (53%)	11 (58%)	9 (47%)	0.50
Psychiatric Medication	15 (40%)	8 (42%)	6 (32%)	0.52
Hepatitis C infection	10 (26%)	8 (42%)	6 (32%)	0.52
Length of stay (days)	4 ± 1	4 ± 1	4 ± 1	0.15
Cesarean	18 (47%)	10 (53%)	8 (42%)	0.51
Medicaid Insurance	36 (96%)	17 (89%)	19 (100%)	0.15
Neonatal Characteristics				
Gestational age at delivery	39 ± 2	39 ± 2	39 ± 1	0.77
Gestational weight (grams)	3025 ± 535	3044 ± 513	3005 ± 569	0.83
Male	21 (55%)	11 (58%)	10 (53%)	0.74
NICU admission	16 (42%)	2 (11%)	14 (74%)	<0.01*
Peak Finnegan Score	10 ± 4	7 ± 2	13 ± 3	<0.01*
Length of stay	11 ± 8	8 ± 3	16 ± 9	<0.01*

Continuous variables are presented as means and standard deviation
Categorical variables are presented as counts and precents
p-value <0.05 is significant (*)

severe NOWS 3.62 ±1.73, p< 0.05). There were no methylation differences between groups for placental CYP19A1, ABCG2 and HSD11. Placental CYP19A1 methylation was inversely correlated with CYP19A1 mRNA levels (r= -0.30, p< 0.05) and umbilical cord norbuprenorphine levels across multiple loci (r= 0.82- 0.98, p=0.004). ABCB1, ABCG2 and HSD11B2 methylation was not associated with umbilical cord drug levels.



-Thirty-three patients had biospecimen for analysis
*** difference significant with p-value <0.05

Conclusion: Lower placental ABCB1 methylation was associated with severe NOWS. Higher placental CYP19A1 methylation correlated with lower CYP19A1 mRNA expression and higher umbilical cord norbuprenorphine levels in severe NOWS cases.

Ambulatory Follow-up After Hypertensive Disorders of Pregnancy in Michigan

Jourdan E. Triebwasser, Kristen M. Palframan, Chelsea Abshire, Molly J. Stout, Phillip Levy, Michelle Moniz

Objective: The American College of Obstetricians & Gynecologists recommends early follow-up after hypertensive disorders of pregnancy (HDP) to encourage primary prevention of cardiovascular disease (CVD). We characterized postpartum ambulatory care among patients with HDP across the state of Michigan and assessed factors associated with follow-up.

Study Design: This retrospective cohort study included patients in the Michigan Value Collaborative's commercial claims dataset with a 90-day episode of care for childbirth, as well as an ICD-10-CM diagnosis of HDP between January 2016 and December 2021. The primary outcome was postpartum ambulatory continuity follow-up care, excluding routine obstetric postpartum care (Z39.x), identified by a professional claim 1-90 days following index hospitalization discharge indicating an in-person or telehealth office visit with Family Medicine, Internal Medicine, Nurse Practitioner, Physician Assistant, Preventive Medicine, or General Practice. We used a multivariable Poisson regression model with robust error variance to model the adjusted relative risk of receiving postpartum ambulatory follow-up care associated with patient characteristics.

Results: Among 21,633 patients with HDP (Table 1), 6687 (31.8%) attended at least one continuity care visit by 90 days postpartum. Overall primary care visit rates did not change over time (p=0.06). Compared to patients with cHTN, those with superimposed preeclampsia (PEC) were more likely (aRR 1.20, 95% CI 1.11-1.29), and those with PEC or gestational HTN were less likely to have continuity care follow-up (Table 2). Factors associated with increased follow-up included older age category (p< 0.001), cesarean birth (aRR 1.07, 95% CI 1.03-1.11), additional medical comorbidities (p< 0.001), and residence in a rural zip code (aRR 1.13, 95% CI 1.07-1.20).

Table 1. Patient characteristics

Characteristics	90-day Follow-up		p-value
	Yes (n=6887)	No (n=14746)	
Age, categorical			<.001
18 to <25	843 (27.6)	2215 (72.4)	
25 to <30	1834 (29.5)	4385 (70.5)	
30 to <35	2360 (31.5)	5132 (68.5)	
35 to <40	1458 (37.4)	2440 (62.6)	
40+	392 (40.6)	574 (59.4)	
Race*			0.11
Asian or Pacific Islander	42 (31.6)	91 (68.4)	
Black	233 (29.6)	553 (70.4)	
White	1655 (31.7)	3566 (68.3)	
Other	94 (33.5)	187 (66.6)	
Unknown	215 (27.4)	571 (72.7)	
Rurality of Patient Zipcode			0.002
Urban	5975 (31.5)	13013 (68.5)	
Rural	912 (34.5)	1733 (65.5)	
Mode of Delivery			<.001
Vaginal Delivery	3864 (30.0)	9039 (70.1)	
Cesarean Delivery	3023 (34.6)	5707 (65.4)	
HDP			<.001
cHTN	1328 (38.1)	2158 (61.9)	
cHTN with superimposed PEC	621 (47.2)	694 (52.8)	
Severe PEC	1143 (33.0)	2320 (67.0)	
PEC	1044 (31.2)	2308 (68.9)	
gHTN	2751 (27.5)	7266 (72.5)	
Number of MCC**			<.001
0	5124 (29.7)	12135 (70.3)	
1	1534 (39.2)	2379 (60.8)	
2+	229 (49.7)	232 (50.3)	

*Available only for index admissions 1/1/18-9/30/20, N=7,207, not included in modeling

** Including chronic respiratory, heart, liver, kidney disease; pregestational diabetes; sickle cell disease; substance use disorder

cHTN, chronic hypertension; gHTN, gestational hypertension; PEC, preeclampsia; MCC, maternal chronic condition

Table 2. Association between continuity follow-up and patient characteristics

Characteristic	Adjusted relative risk (95% CI)
Year of delivery	
2016	reference
2017	1.00 (0.93-1.08)
2018	0.97 (0.90-1.04)
2019	1.02 (0.95-1.10)
2020	0.95 (0.89-1.02)
2021	1.04 (0.97-1.11)
Age category	
18 to <25	reference
25 to <30	1.09 (1.02-1.17)
30 to <35	1.14 (1.07-1.22)
35 to <40	1.30 (1.21-1.40)
≥ 40	1.37 (1.24-1.51)
Resides in rural zip code*	1.13 (1.07-1.20)
Cesarean birth	1.07 (1.03-1.11)
Hypertensive disorder	
cHTN	reference
CHTN with superimposed PEC	1.20 (1.11-1.29)
PEC with severe features	0.89 (0.84-0.95)
PEC	0.86 (0.81-0.92)
gHTN	0.77 (0.73-0.82)
Number of MCC	
0	reference
1	1.27 (1.22-1.33)
≥ 2	1.54 (1.40-1.69)

* Compared to urban zip code

cHTN, chronic hypertension; gHTN, gestational hypertension; MCC, maternal chronic condition; PEC, preeclampsia

Conclusion: Less than one third of patients with HDP receive continuity care follow-up within 3 months of delivery, and those without pre-existing hypertension are even less likely to receive care. Improving postpartum care transitions represents an important target to reduce CVD burden.

Standardizing Induction of Labor Improves Clinical Outcomes

Jourdan E. Triebwasser, Maya Diab, Rebekah Sugarman, Ashley Hesson, Molly J. Stout

Objective: To assess the impact of a standardizing induction of labor (IOL) practices on length of IOL and maternal morbidity.

Study Design: This is a single center quality improvement project examining impact of standard IOL recommendations. The pre-implementation (pre) period was 8/1/2021-1/31/2022. The post-implementation (post) period was 3/1/2022-5/1/2022. Patients admitted for IOL with singleton gestation, intact membranes, and vertex presentation were included. We excluded patients with prior cesarean and fetal demise. The standardized recommendations included 1) combined ripening with foley balloon and misoprostol; 2) vaginal misoprostol preferred over buccal; 3) early amniotomy (≤ 4 cm); and 4) labor progress assessments every 4 hours. The primary outcome was duration of IOL. Length of time from oxytocin to rupture of membranes (ROM) was a process measure reflecting timing of amniotomy. Secondary outcomes included cesarean birth, chorioamnionitis, endometritis, and postpartum hemorrhage (PPH) defined as quantitative blood loss of > 1000 mL. Multiple linear regression adjusted the primary outcome for nulliparity and epidural use.

Results: There were 513 patients included (pre n=324, post n=189). There were no significant differences in age, race/ethnicity, initial cervical dilation, initial induction agent, parity, or gestational age at admission between pre and post (Table 1). Elective IOL accounted for almost half of IOL in both groups. Length of IOL was shorter in the post group overall (p=0.006, Table 2), among nulliparas (p=0.02), and among multiparas (p=0.001). After adjustment, post intervention demonstrated significantly shorter length of IOL by 2.4 (95% CI 1.4-3.5) hours. Time from oxytocin initiation to ROM (5.4 [95% CI 3.2-8.6] vs. 6.7 hours [95% CI 4.1-10.8], p=0.003) and chorioamnionitis (0.5 vs. 5.3%, p=0.005) were decreased post-intervention. There were no differences in cesarean, endometritis or PPH between groups.

Conclusion: Given increasing frequency of IOL, standardizing IOL management can improve delivery outcomes and is a useful target to optimize labor and delivery efficiency.

Table 1. Baseline obstetric & demographic characteristics

Characteristic	Pre (n=324)	Post (n=189)	p
Age	30.9 (5.09)	30.7 (5.7)	0.75
BMI	32.0 (28.8-36.9)	31.2 (27.8-37.4)	0.17
Race/Ethnicity			0.75
Black	39 (12.0)	27 (14.3)	
White	233 (71.9)	126 (66.7)	
Asian	21 (6.5)	14 (7.4)	
Hispanic/Latinx	6 (1.9)	6 (3.2)	
Other/multiracial	8 (2.5)	7 (3.7)	
Not reported	17 (5.3)	9 (4.8)	
Nulliparous	145 (44.8)	95 (50.3)	0.23
GA at admission	39.0 (38.0-40.0)	39.0 (37.9-39.9)	0.48
Epidural	220 (67.9)	147 (77.8)	0.02
Elective IOL	147 (45.4)	85 (45.0)	0.93
Initial cervical dilation, cm			0.81
0	65 (20.1)	40 (21.2)	
1	116 (35.8)	62 (32.8)	
2	51 (15.7)	35 (18.5)	
3	92 (28.4)	52 (27.5)	

BMI, body mass index; IOL, induction of labor

Table 2. Clinical outcomes

Outcome	Pre (n=324)	Post (n=189)	p
Length of IOL, hours	18.2 (11.4-27.1)	15.6 (9.4-23.6)	0.006
Nulliparous	25.6 (17.1-37.1)	22.5 (14.3-29.7)	0.02
Multiparous	13.6 (9.3-19.8)	10.0 (8.2-16.6)	0.001
Cesarean	66 (20.4)	44 (23.3)	0.57
Chorioamnionitis	17 (5.3)	1 (0.5)	0.005
Endometritis	2 (0.6)	0 (0.0)	0.53
Postpartum hemorrhage	55 (17.0)	35 (18.5)	0.66

IOL, induction of labor

Patient Safety Culture and Challenges to Labor and Delivery Teamwork Pre- and Post-Arrive Trial

Emily White VanGompel, Lavisha Singh, Emma Keer, Francesca Carlock, Jill Brown, Kathryn Moore, Lisa Kane Low

Research Objective: In 2018, the ARRIVE trial, which found elective induction of labor at 39 weeks reduced cesarean delivery for low risk first-time pregnancies, created a potentially practice-changing shift in intrapartum care. These findings have seen mixed reception among professional groups; however, little is known about how team members are assimilating this information in practice. The objective of this study was to explore and quantify disciplinary differences in attitudes towards elective induction prior to and after the ARRIVE trial, and determine if hospital patient safety culture impacts disparate attitudes.

Study Design: A mixed-methods study utilizing cross-sectional survey responses to a quantitative survey of labor unit culture linked to hospital characteristics and cesarean delivery rates, and qualitative content analysis of an open-ended question.

Population Studied: Physicians, midwives, and nurses delivering intrapartum care at hospitals in California (2017) and Michigan (2020) participating in statewide initiatives to reduce cesarean delivery overuse that achieved a minimum 30% survey response rate.

Principal Findings: 1718 clinicians from 35 hospitals in California (pre-ARRIVE) and 3151 clinicians from 57 hospitals in Michigan (post-ARRIVE) met inclusion criteria. Physicians' attitudes demonstrated a significant shift towards elective induction of labor at hospitals performing within the top 3 quartiles for cesarean delivery rate (mean agreement with reducing inductions of labor as a strategy to reduce cesarean overuse 3.48 vs 2.81 at top quartile hospitals, $p<.01$; 3.05 vs 2.66 at 25th-75th quartile hospitals, $p<.01$) whereas nurses' attitudes did not ($p>.05$ for all hospital performance categories). Physicians at under-performing hospitals (NTSV cesarean rate at the 75th percentile or above) did not show differences in personal attitudes pre- vs post-ARRIVE, and were the most likely to disagree with reducing inductions in both samples. Post-ARRIVE, disciplines' attitudes were closer in alignment at hospitals with stronger patient safety cultures. For every one unit of increase in composite safety culture score, the cumulative odds of disagreement with reducing elective induction of labor increased for nurses [cumulative odds ratio (OR) 1.69, 95% CI 1.40-2.06], and decreased for physicians (OR 0.59, 95% CI 0.41-0.86). Of 377 comments mentioning induction of labor in relation to cesarean delivery, 357 were negative in tone towards induction and 20 were positive. Key themes included (a) timing of induction matters; (b) who should have inductions; (c) need for protocols and staff; and (d) ideas to improve the induction of labor process.

Conclusions: Physician attitudes towards induction of labor significantly differed in the pre-ARRIVE compared with the post-ARRIVE sample; however, nursing attitudes did not. Post-ARRIVE, nurses and physicians with higher composite safety culture scores showed similar attitudes towards reducing induction of labor. Qualitative analysis demonstrated primarily negative perceptions of elective induction of labor at 39 weeks among all disciplines, which centered around its perceived impact on cesarean delivery and lack of adequate adherence to proper criteria and protocols.

Implications for Policy or Practice: Disciplinary discordance can erode quality team-based care. Hospital leaders incorporating ARRIVE trial findings on their maternity units should engage all maternity care professionals, including nurses, to create policies that address eligibility criteria and induction of labor protocols that optimize health outcomes and patient care experiences.

A Simulation Model of the Effects of Tailored Prenatal Care Delivery on Care Access
Nicholas Zacharek, Samuel Hocher, Meghana Kandiraju, Claire Dawson, Amy Cohn, Alex F. Peahl

Introduction: New national prenatal care delivery guidance, the Plan for Appropriate Tailored Healthcare in Pregnancy (PATH), recommends tailoring the prenatal visit number, with 8-9 visits for low-risk patients and 12-14 visits for high-risk patients. We used simulation to explore how tailored prenatal care recommendations affect care access.

Methods: To evaluate the operational effects of tailored recommendations compared to usual care, a discrete event simulation was developed in C++. This model simulates dynamic patient arrivals, heterogeneous patient classifications, tailored pathways, and patient flow through the system until the end of each patient's care pathway (e.g., delivery). Patients were assigned to medically low-risk (9 visit) and high-risk (12 visit) groups based on the presence or absence of any medical conditions. Metrics captured included patient delays, overbooked appointments, and utilization. Simulation parameters were derived from a 1-year–long historical data set from a single institution. The model was run for a 52-week horizon for 1,000 replications. This study of de-identified data was deemed exempt by the institutional review board.

Results: The majority of patients in the parent dataset were medically high risk (3,527/4,968; 71%). Transitioning to the new prenatal care delivery model reduced mean delay to appointment per patient by 1 week. The percentage of patients overbooked was reduced from 27% to 24%. The average percent capacity utilized by each clinic decreased from 74% to 71%.

Conclusion: In this dataset with many high-risk patients, tailoring prenatal care to medical risk factors modestly improved access parameters. Tailoring prenatal care is operationally feasible and may facilitate more equitable distribution of services.

How Equitable is Our Care?

We observed disparities in a survey evaluating patient satisfaction and cultural competence in MM OB/GYN clinics.

246 patients completed a survey following their visit in an OB/GYN clinic.

Participants reported positive healthcare experiences:

- **Listened to (91%)**
- **Felt respected (95%)**
- **Satisfied with treatment discussion (84%)**
- **Comforted during sensitive exams (96%)**

(P = 0.02)

Those with high-school education **less likely to feel listened to by staff**, than those with college education.

(P = 0.01)

Black/African American patients were **less satisfied** with staff **understanding racial experiences.**

(P = 0.002)

Black/African American patients were **less satisfied** with staff understanding that **people of their race vary.**

(P = 0.008)

Black/African American patients most likely to report **unfair treatment because of their race**.

Julia Bhuiyan, Charisse Loder, MD
Department of Obstetrics and Gynecology, Michigan Medicine, Ann Arbor, Michigan

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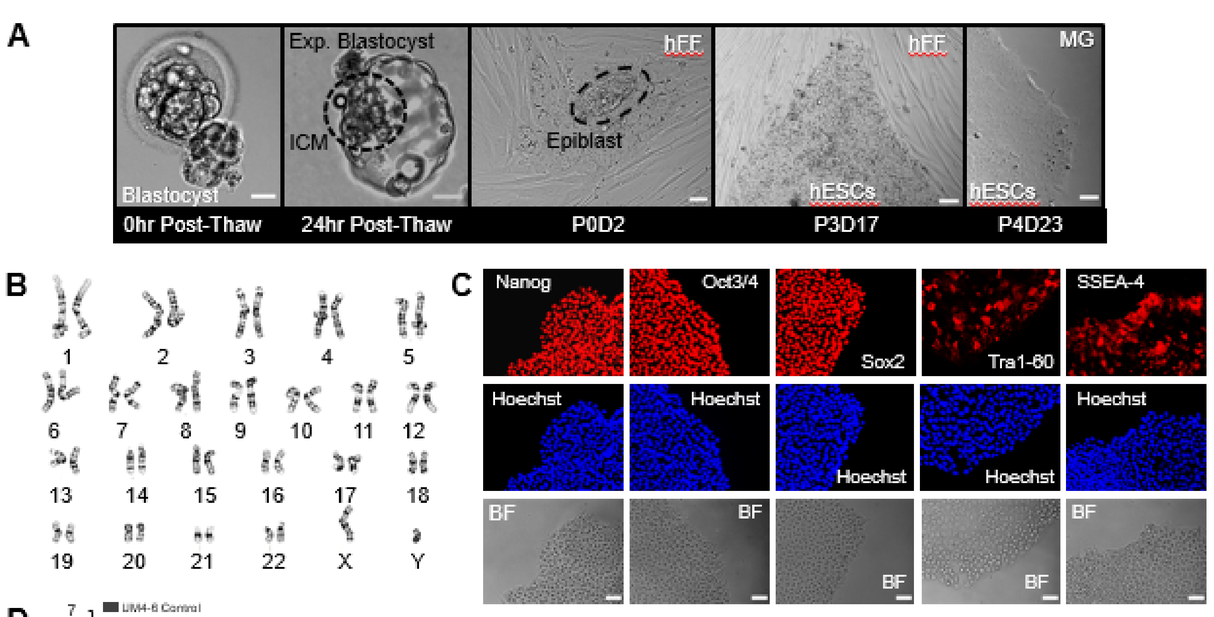
Establishment and Characterization of Human Spinal and Bulbar Muscular Atrophy (SBMA) Disease Specific Human Embryonic Stem Cell (hESC) Line

Indri Erliandri[1], Laura Keller[1], Agamjot Sangotra[2], Andrew P. Lieberman[2], Gary D. Smith[1]

[1]Department of Ob/Gyn, Physiology, Urology; [2]Department of Neurology, Pathology, University of Michigan, Ann Arbor

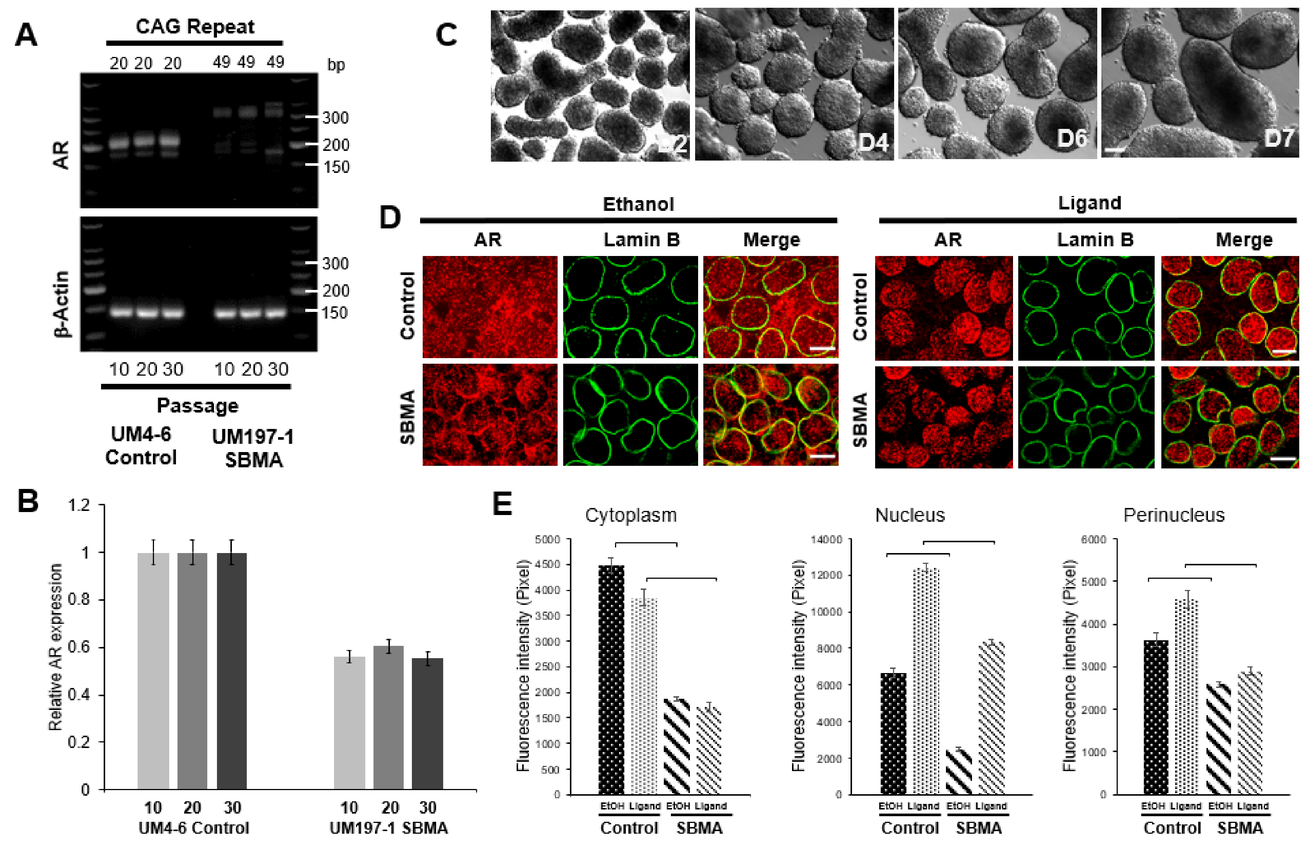
The Spinal and Bulbar Muscular Atrophy (SBMA) syndrome is a X-linked motor neuron disease causing progressive muscle weakness and atrophy. SBMA onset is in adulthood and associated with an Androgen Receptor (AR) gene mutation on the X chromosome at the locus Xq11-Xq12. Expansion of a CAG repeat of the AR is transmitted from parent to offspring. The polyQ encoding CAG repeat in the AR gene of SBMA patients are longer than non-SBMA individual, with the expansion 40-68, compare to 13-32 CAGs, respectively. Transcriptional activity of AR is inversely related to polyglutamine repeat length, where transcription is less active in AR with longer polyglutamine repeats. Here we report derivation and characterization of the first SBMA-specific human embryonic stem cell (hESC), referred to here as SBMA-hESCs. The Inner Cell Mass (ICM) of a day-5 SBMA-affected (X,Y) human embryo was biopsied and cultured on HFF feeders in Xeno-Free (XF) media, followed by maintenance and expansion on MG-coated plates. The cytogenetic analysis of G-banded metaphase cells demonstrated a karyotype of 46, XY and the DNA STR profiling confirmed presence of a single cell line and alleles did not match DNA fingerprint patterns of cell lines published in the ATCC, NIH or DSMZ websites. Derived human SBMA-hESC, refer to here as UM197-1, was accepted on the NIH registry of approved hESC lines in 2019 (registration # -0399). The stemness of SBMA-hESC was displayed by the expression of pluripotency markers; Nanog, Oct3/4, Sox2, Tra1-60 and SSEA4. The abilities to differentiate into three germ layers; endoderm, mesoderm and ectoderm were demonstrated in SBMA-hESC generated embryoid bodies (EBs) with the expression of AFP and Gata4, Brachyury and VE-Cadherin, Tuj1 and Krt18, respectively. Sequencing analysis revealed that CAG repeat was expanded in the SBMA-hESCs, and AR expression was 0.5 of that of normal control hESCs. Cellular localization of AR in SBMA-hESCs was accumulated in the perinuclear region, like AR localization in SBMA patients. The newly established SBMA-hESC offers a valuable resource to study SBMA mechanisms of disease onset, disease modelling and progression, and preclinical pharmaceutical treatment assessment and screening.

SBMA-hESC Line Establishment and Characterization



(**A**) A SBMA preimplantation genetic-tested and –affected blastocyst. The Inner Cell Mass (ICM) was dissected by laser and plated on Human Foreskin Fibroblast (HFF) feeders in Xeno-free (XF) media. Epiblast was identified, grown, split and expanded forming a human Embryonic Stem Cells (hESCs) colony on HFF. hESC was expanded and maintained on Matrigel (MG)-coated dish. Scale bar = 100μm. (**B**) G-banded karyotype analysis of UM197-1 SBMA-hESC. (**C,D**) Expression of pluripotency markers (red): Nanog, Oct3-4, Sox2, Tra1-60 and SSEA-4. Scale bar = 100 μm. (**E**) Differentiation marker expression in embryoid bodies differentiated from SBMA-hESC and normal control-hESC.

CAG Polyglutamine Repeat Size and AR Expression



(**A**) CAG repeat size of UM4-6 normal control and UM197-1 SBMA in undifferentiated hESCs were stable throughout passaging. Sequence analysis and rt(q) PCR demonstrated size of CAG repeat in SBMA was more than double compared to normal control. (**B**) AR mRNA levels were expressed at approximately 0.05 compared to the normal control, demonstrating Androgen Receptor (AR) transcriptional activity inversely associated with polyglutamine repeat length. (**C**) Self aggregated embryoid bodies (Ebs) of hESCs. Differentiated EBs at Day 7 were collected to determine CAG repeat expansion and mRNA expression level of differentiated hESCs. Result revealed the identical data with undifferentiated hESCs, indicated the stability of CAG repeat and AR expression in control and SBMA lines. (**D**) Immunofluorescence images demonstrated AR (red) and Lamin B (green). Fluorescence intensity of AR expression was lower in SBMA-hESC compared to normal control hESCs. AR nuclear localization were increased in hESC treated with ligand compared to ethanol vehicle alone (EtOH). The high level of AR accumulation in perinucleus was displayed in SBMA-hESC as demonstrated by distinct colocalization of AR with nuclear envelope marker, Lamin B. This phenomenon was similar to SBMA patients. (**E**) The summary of fluorescence intensity measurement of AR in three different cellular sites; cytoplasm, nucleus and perinucleus in normal control and SBMA hESC lines. T Test P value < 0.01.

Conclusion

We have developed and characterized SBMA-hESC from a SBMA-affected human embryo, with NIH approval registration number NIH hESC-19-0399, as a new SBMA disease model.

Funded by: National Institute of Neurological Disorders and Stroke. (R01).
"Mechanisms of neuromuscular degeneration in Spinal and Bulbar Muscular Atrophy (SBMA)"

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Do the voices of doctors who provide abortion care impact public support for abortion? If so, how?

In prior research we developed messaging recommendations for doctors who provide abortion care. Here we **tested the impact** of those recommendations.

Messaging Recommendations

1) Know, and meet, your audience's psychological and emotional needs
2) Lean into nuance and complexity
3) Don't pivot from hard issues/questions
4) Speak as a caregiver not a political pundit
5) Model holding the "tension of opposites"

1,506 participants surveyed, before and after viewing two 3-minute physician messaging videos where doctors used research-based messaging recommendations that center abortion's complexities

We assessed pre-post **attitudes about:**

- doctors who provide abortion care
- abortion legal status
- restrictive abortion legislation

Before messaging...
- **50%** of participants said doctors' voices made **no difference** in their support abortion restrictions

After messaging...
- Only **31%** agreed with this statement

This shift was associated with:

more support of legal abortion (+7%*)

less support of abortion restrictions (-23%*)

*p<.0001

Why did attitudes shift?
- *Because we replaced negative images of doctors who provide abortion care with positive ones.**

After messaging, participants were...

more likely to say doctors listen, are non-judgmental, compassionate, & trustworthy

less likely to say doctors are motivated by money, harmful, & unqualified

** However... only increased endorsement of positive descriptors (not decreased endorsement of negative ones) generated shifts in support for abortion.

- ***Doctors who provide abortion care are effective messengers when they use messaging recommendations designed to meet audience needs***
- ***Audiences may not know they need to hear from doctors, but when they do, they shift.***
- ***It is essential to replace flawed negative stereotypes of doctors who provide abortion care with new, positive ones.***

Doctors' Voices Can Increase Public Support for Abortion Care.
Lisa H. Harris, Meghan Seewald, Lisa A. Martin, Jennifer Villavicencio, Amy Simon

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The lived experience of providing abortion care can involve emotional and moral complexities. How does speaking about such nuances and complexities impact public support for abortion?

1,506 participants surveyed, before and after viewing two 3-minute physician messaging videos where doctors used research-based messaging recommendations that center abortion's complexities

Public discourse often presents abortion as a matter of being simply "pro-choice" or "pro-life," yet many people have complex or conflicting feelings about abortion.

Messaging recommendations:

- Meet audience's psychological and emotional needs
- Speak as caregivers, not political pundits
- Don't pivot from difficult questions
- **Lean into abortion's complexities**
- **Model holding the "tension of opposites"**

After watching videos:

59%

of respondents reported <u>both</u> positive and negative reactions.

Black participants were most likely to experience complex emotional responses.
(AOR=1.06; p<.05)

These complex emotional responses led to:

Increased support for legal abortion
(AOR=1.78;p<.001)

Decreased support for abortion restrictions
(AOR=1.65;p<.001)

Doctors are effective in shifting public opinion when they speak about abortion in ways that evoke complex emotional responses in audiences. Doing so meets audience needs and is not harmful to support for abortion.

Effective Physician Abortion Communication: Nuanced and Complex. Meghan Seewald, Lisa A. Martin, Jennifer Villavicencio, Amy Simon, Lisa H. Harris

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MStem Cell Laboratory: Production, Characterization, Distribution, and Facilitation of Monogenic Disease-In-A-Dish Research

Laura Keller, Indri Erliandri, Gary D. Smith

Department of Obstetrics & Gynecology, University of Michigan, Ann Arbor, MI

In November, 2008, Michigan voters approved amending the state constitution allowing production of human embryonic stem cells (hESC) in Michigan. With this approval, the University of Michigan established the state's first hESC derivation facility. Embryo donation is performed under an approved IRB protocol with informed consent. Any couple participating in IVF and embryo production within the United States can voluntarily donate embryos for hESC derivation. These embryos fall into two categories; either i) cryopreserved embryos no longer needed for reproductive purposes, or ii) embryos tested with Preimplantation Genetic Testing (PGT) and affected with monogenic diseases or aneuploidies (not suitable for implantation). To date most embryo donations have been from PGT-tested and –affected cycles, where the donated embryos would otherwise be discarded. Production of hESCs has opened the door for stem cell research yielding results that are increasing knowledge of a wide range of diseases. MStem Cell Lab is the leading U.S. academic institution in the production of monogenic, disease-specific hESC lines placed on the National Institutes of Health (NIH) hESC registry.

MStem Cell Lab derivation research cannot be federally funded; however, hESC lines can be studied using federal funds once accepted on the NIH registry and are utilized as research models by investigators across the U.S. MStem Cell Lab can provide unique single gene disorder human cell systems to the research community to gain a greater understanding of monogenic disorders and to the ensuingdevelopment of therapies and cures for these diseases of significant healthcare burden. MStem Cell Lab has derived 51 monogenic disease-specific and aneuploidy hESC lines and 22 normal control hESC lines. These hESC lines are also being used to understand fundamental genetic stability, chromatin segregation in human preimplantation embryos, and causes of miscarriages.

MStem Cell Lab Mission and Goal(s)

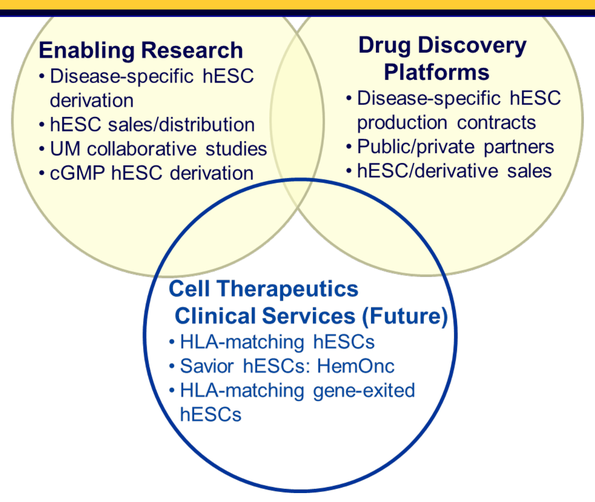
- Derive and distribute new hESC lines into the University of Michigan (and Worldwide) research community.
- Accelerate our understanding of human diseases and develop new treatments and cures using novel disease-specific hESC lines.
- Engage and educate public and research communities.

MStem Cell Lab Collaborations

- MStem Cell Lab is an **active** initiator, facilitator, and participant in Transdisciplinary Collaborations

J. Fink and A. Moser (Johns Hopkins) - Adrenoleukodystrophy modeling
H. Paulson - Spinocerebellar Ataxia 3 modeling and therapeutic screening
H. Paulson, E. Feldman, S. Barmada - C9orf72 hESC/iPSC modeling of ALS and FTD
S. Day, M. Russell, T. Herron, J. Jalife – Hypertrophic Cardiomyopathy modeling
B. Bohnsack, R. Rao, R. Ali - hESC modeling of Sight Disorders
P. Todd and J. Parent - Epigenetic regulation of FMRP Frag-X hESCs and iPSCs
D. Michele – hESC models of Muscular Dystrophies
W. Dauer and R. Walker (Columbia) - Establishing a hESC model of McLeod Syndrome
R. Mody and R. Hutchinson – Retinoblastoma and Retinitis Pigmentosa hESCs
B. Lawlor – Stem cells, oncogene activation, and Ewing Sarcoma
V. Castle – hESC models of familial cancers (Neuroblastoma)
M. Markovitz – hESC models for *"Centrosomic Drive of Embryonic Aneuploidies"*
S. Kalantry - Nascent X-inactivation
A. Chinnaiyan - lncRNAs functions in hESCs, testis, and cancers
YOU

Advancing hESC Healthcare Impact

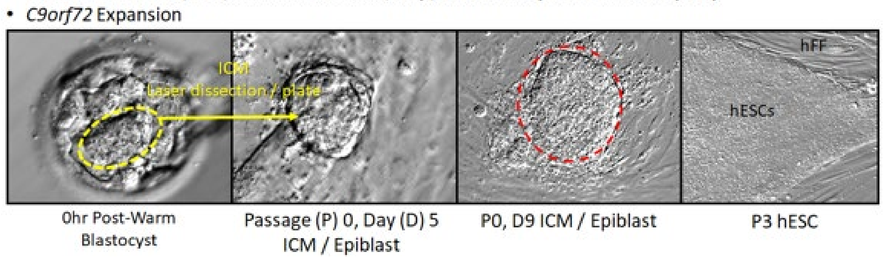


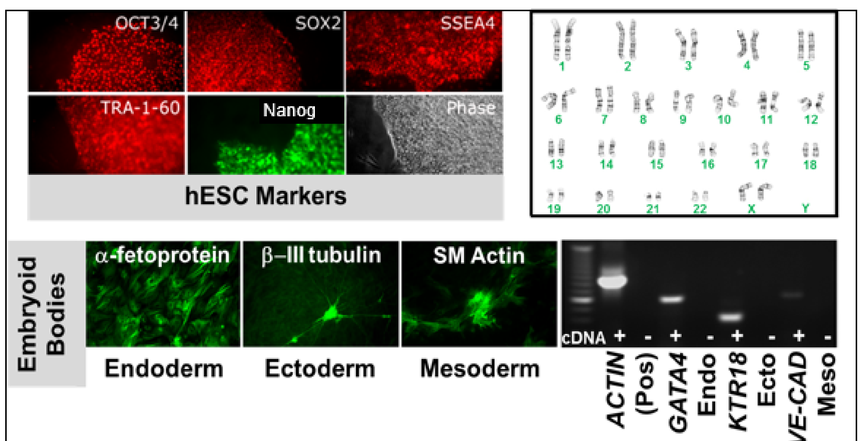
MStem Cell Lab Funding

- UM President's Office
- UM Medical School Dean's Office / EVPMA
- A. Alfred Taubman Medical Research Institute
- UM Department of Ob/Gyn
- UM Development (Anonymous Donor)

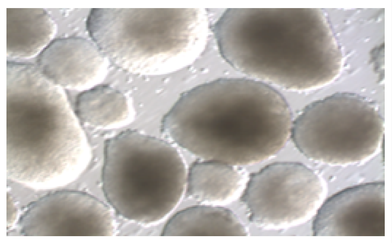
hESCs Derived by MStem Cell Lab

- **UM141-6-PGD** Amyotrophic Lateral Sclerosis (**ALS**) / **Frontotemporal Dementia (FTD)**
- *C9orf72* Expansion



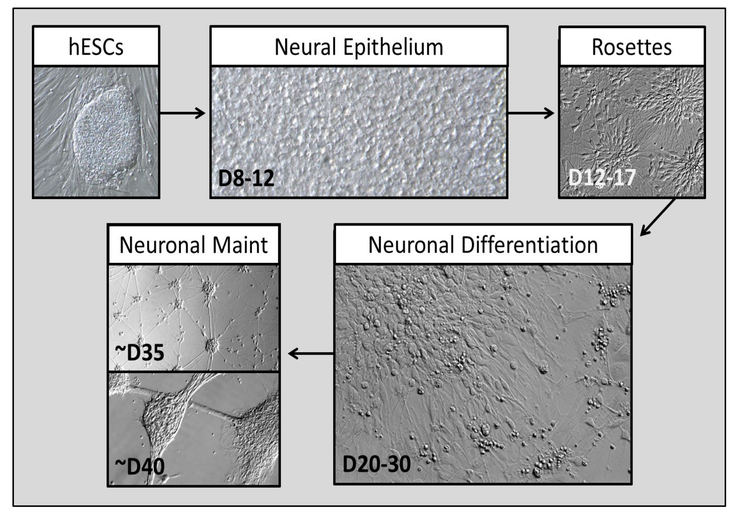


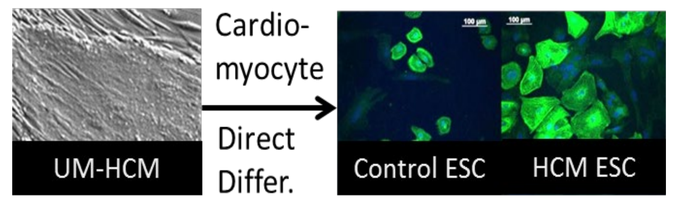
- Continuous expansion with minimal differentiation
- Expression of pluripotency markers
- Normal karyotype
- Confirmation of monogenic mutation/expansion/aneuploidy

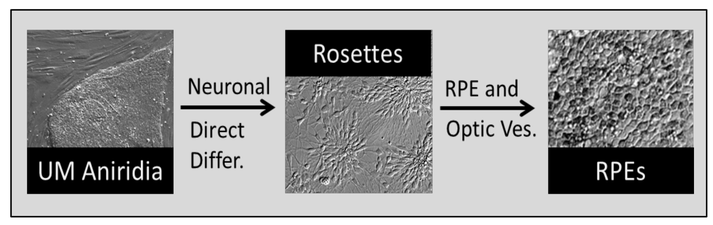


- Production of embryoid bodies
- Expression of linage markers

hESC Directed Differentiation







MStem Cell Lab hESC Derivation

09/2022 Disease Specific/Aneuploidy, n=51; Total, N=73

1. UM150-1 Actin Nemaline Myopathy
2. UM150-3 Actin Nemaline Myopathy
3. UM150-4 Actin Nemaline Myopathy
4. UM112-1 Adrenoleukodystrophy
5. UM112-2 Adrenoleukodystrophy
6. UM153-1 Adrenoleukodystrophy
7. UM141-6 ALS/FTD-C9orf72
8. UM217-1 ALS/FTD-C9orf72
9. UM217-2 ALS/FTD-C9orf72
10. UM281-1 ALS/FTD-C9orf72
11. UM29-2 Aniridia
12. UM29-3 Aniridia
13. UM66-3 Aniridia
14. UM11-1 Charcot Marie Tooth-1A
15. UM59-2 Charcot Marie Tooth-1A
16. UM59-4 Charcot Marie Tooth-1A
17. UM89-3 Charcot Marie Tooth-1A
18. UM89-5 Charcot Marie Tooth-1A
19. UM159-1 Cystic Fibrosis
20. UM90-1 Duchenne-Becker-MD
21. UM139-2 Fragile X Syndrome
22. UM9-1 Hemophilia B
23. UM17-1 Huntington's Disease
24. UM103-1 Huntington's Disease
25. UM15-4 Hydroxyster. Dehydro. Def.
26. UM38-2 Hypertrophic Cardiomyo.
27. UM245-2 Incontinentia Pigmenti
28. UM245-3 Incontinentia Pigmenti
29. UM197-1 Spinal Bulbar Musc. Atro.
30. UM89-1 Marfan Syndrome
31. UM89-4 Marfan Syndrome
32. UM57-1 Mult. Endo. Neoplasia-2A
33. UM57-3 Mult. Endo. Neoplasia-2A
34. UM207-3 Neurofibromatosis-2
35. UM207-4 Neurofibromatosis-2
36. UM161-1 Niemann Pick-C
37. UM181-1 Non-syndromic Hear. Loss
38. UM274-1 Retinoblastoma
39. UM76-1 Robertsonian Transloc.
40. UM302-1 Smith-Lemli-Opitz Syndr.
41. UM206-2 Spastic Paraplegia-31
42. UM134-1 Spinocerebellar Ataxia-3
43. UM300-1 Spinocerebellar Ataxia-3
44. UM300-2 Spinocerebellar Ataxia-3
45. UM204-1 Stickler Syndrome
46. UM204-4 Stickler Syndrome
47. UM204-7 Stickler Syndrome
48. UM90-12 Trisomy 16
49. UM152-1 Trisomy 21
50. UM202-1 Trisomy 21
51. UM229-1 Trisomy 21
52. – 73. Normal hESC lines

Same Disease | Familial-Linked

MSTEM CELL Advancing Stem Cell Science

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What ethical principles do medical students describe on their Ob/Gyn clerkship?

Frances Knapp, Andrea Hess, MD, Charisse Loder, MD

We analyzed 33 essays written by medical students on their ob/gyn clerkship from 2019-2022.

Medical students observe cases involving autonomy and informed consent while examining their role as part of the team.

Autonomy

> One must consider whether there is a point that a physician can make a decision that supersedes the patient's for their own benefit (and in this case baby's as well) when the patient is fully conscious, aware, and understanding of the consequences, but willing to risk them.

Informed Consent

> The last thing she[the patient] says to the attending before she falls is, 'Don't take my tubes!' We find the ectopic pregnancy, isolate it, stop the bleeding, and remove it. The ectopic rupture had left the tube nonfunctional. We now faced the question: do we remove the entire fallopian tube or leave the rest?

Exploring Professional Identity

> I came into medical school without much consideration of what would go into being a doctor. Aside from having some unsubstantiated confidence that I would someday make a good one, the thought of day-to-day life as a doc was relatively far from my mind as I applied

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Social Vulnerability and Complications after Hysterectomy

- 32,406 hysterectomy insurance claims
- 2015-2021
- BCBSM, Medicare, and Medicaid

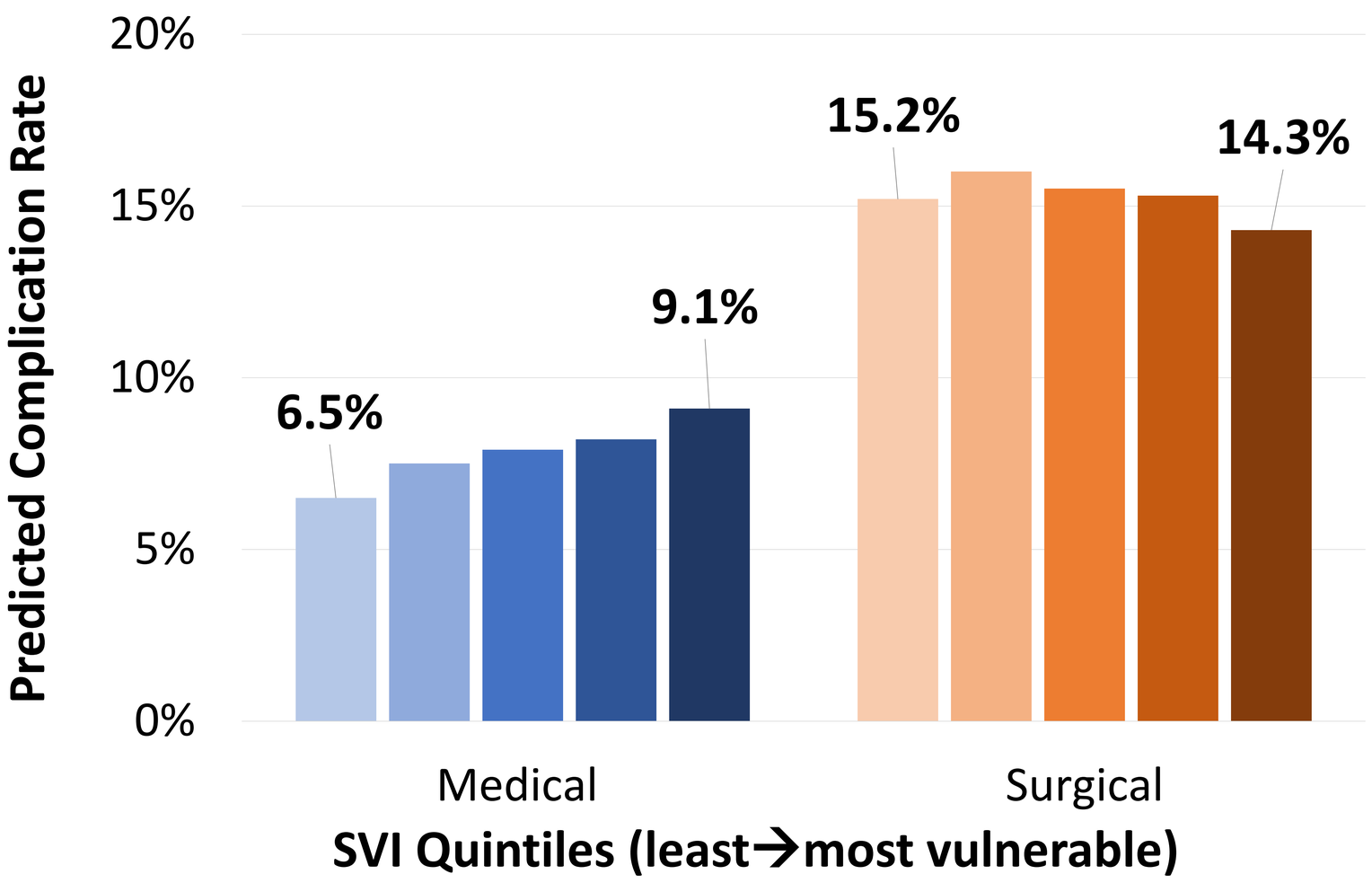
The four themes of the CDC's Social Vulnerability (SVI) Index

Socioeconomic Status

Housing/ Transportation

Minority Status/ Language

Household Composition/ Disability



Medical complications:

✓ associated with Socioeconomic Status

✕ but not with Housing/ Transportation, Minority Status/ Language, Household Composition/ Disability

Individuals in socially vulnerable areas are more likely to experience medical complications but not surgical complications.

Social vulnerability and postoperative complications after hysterectomy. Daniel Morgan, Anita Malone, Morgen Miller, Brian Madden, and Michelle Moniz

Acknowledgment: Sarah Block

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Who benefits from the current state of applicant/residency communications?

Survey Respondents:

- ✓ 726 OBGYN Applicants
- ✓ 79 Clerkship Directors
- ✓ 206 OBGYN Program Directors

82.9% of applicants communicated interest to residency programs

Key Findings

Applicants reaching out to programs:

White (89%) /Asian (87%) applicants → Black (74%) or Latin(x)/Hispanic (81%) applicants (p=0.02)

Faculty reaching out on behalf of applicants:

MD (44%) applicants → DO(20%) or IMG (23%) applicants (p>0.001)

White (40%) /Asian (43%) applicants → Black (11%) or Latin(x)/Hispanic (29%) applicants (p=0.01)

***Program Directors** were more influenced by **faculty they knew and fellow program directors** than other forms of advocacy.*

BOTTOM LINE:

- **The current state of communications may increase inequities in the application processes.**
- **A standard means for applicants to convey their interest to residency programs is urgently needed.**

Morgan HK, Winkel A, George K, Strand E, Banks E, Byrne F, Marzano D, Hammoud M. Current Communication Practices between Obstetrics and Gynecology Residency Applicants and Program Directors: The Case for Formal Program Signaling *JAMA Network Open.* 2022.

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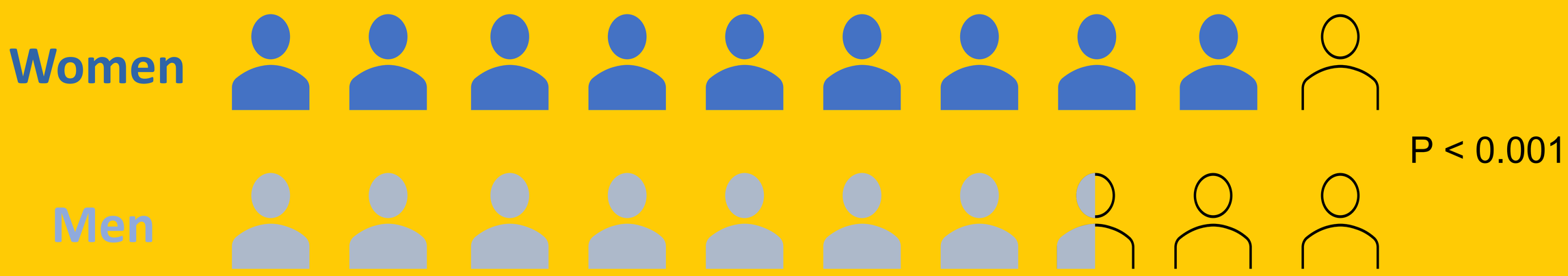
The Potential for Increased Gender Equity with Employer-Covered Oocyte Cryopreservation in Medical Training

A survey of 630 male and female medical students in SE Michigan

Students feel pressure to delay childbearing due to medical training



Lack of employer-coverage is prohibitive

12%
would pursue
WITHOUT coverage

60%
would pursue
WITH coverage

Availability of egg freezing coverage would alter career trajectories

Fellowship training

Specialty selection

Length of residency

Residency program ranking

Hana Murphy; Kiernan Bloye; Sarah Compton, PhD, MPH;
Molly Moravek, MD, MPH, MSCI; Monica Rosen, MD (2023)

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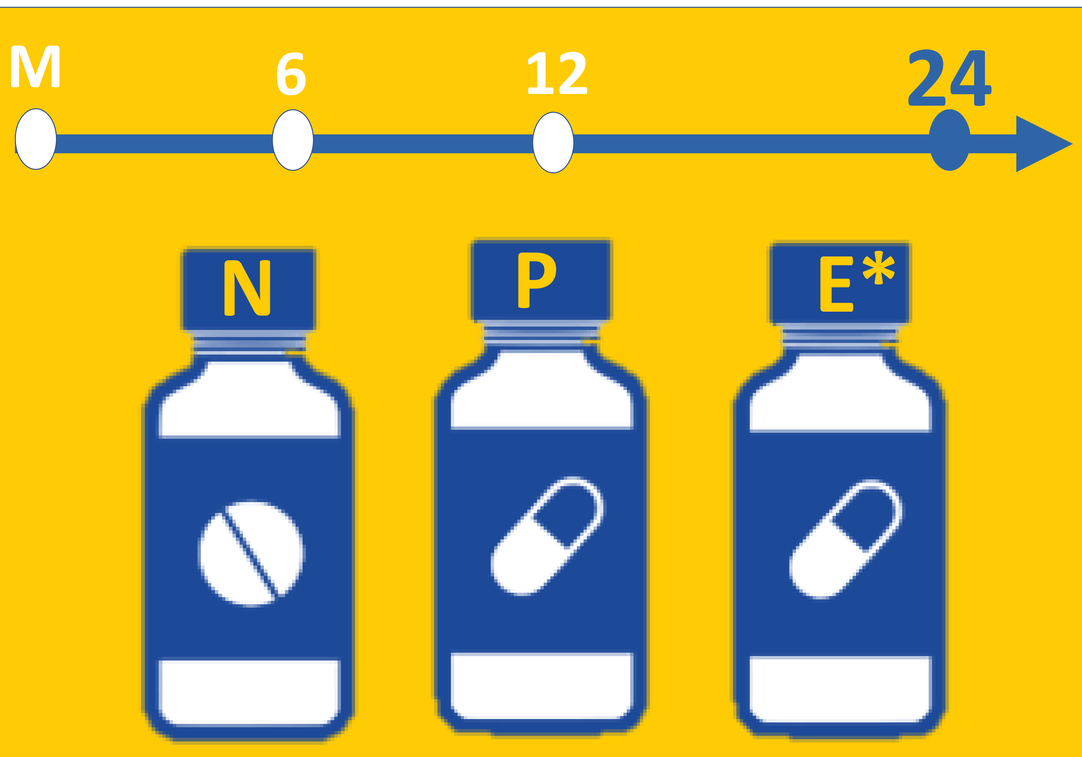
Estrogen Therapy for Heavy Menstrual Bleeding: Does it Really Impact Height in Adolescents?

Jessie M. Nelson, BS[1], Sarah D. Compton, PhD, MPH[1], Mina M. Farahzad, MD, PhD[2], Olivia K. Winfrey, MD, MPH[2], Monica W. Rosen, MD[2]

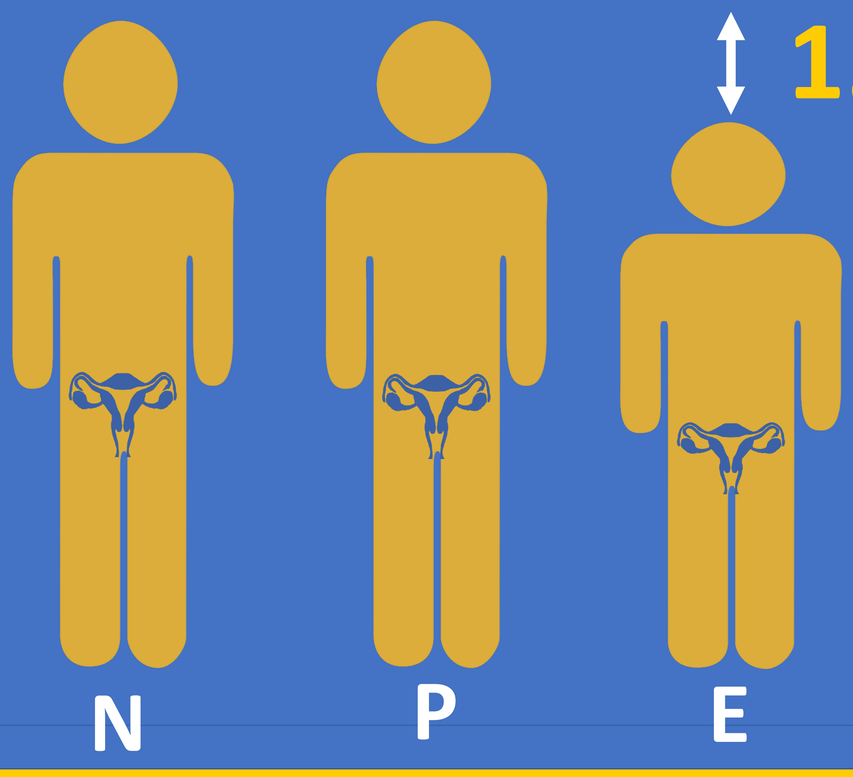
80

Adolescents between 10-15 years with heavy menstrual bleeding near menarche were grouped by primary treatment type



At **24** months after menarche

adolescents in the Estrogen group were significantly shorter than those in the Non-hormonal or Progesterone groups



Adolescents on Estrogen grew

1.8 cm less

AND

For every **1** year younger they were at menarche, they grew **1** fewer cm

[1]University of Michigan Medical School, Ann Arbor, MI
[2]Obstetrics and Gynecology, University of Michigan, Ann Arbor, MI

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What are the rates and predictors of contraceptive choice for birthing people with opioid use disorder? (OUD)?

121 birthing people with OUD presenting to a substance use disorder clinic, 2017-2021

91% chose a form of contraception

41% Long-acting reversible contraception (LARC)

16% Sterilization

14% Depo-Provera

Adherence to scheduled prenatal visits and attendance at the postpartum visit were the strongest predictors of contraception use

Contraceptive Choices of Postpartum Patients with Opioid Use Disorder
Regina Onishchenko, Sanaya Irani, Ellery Sarosi, Emma Keer, Mingyi Tang, Yang Chen, Courtney Townsel

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What are the rates and predictors of breastfeeding initiation and exclusivity at hospital discharge for birthing people with opioid use disorder (OUD)?

121 birthing people with OUD, 2017-2021

Eat-Sleep-Console (ESC) program implemented in 2020 to support dyads with opioid exposure

Especially after ESC implementation, rates of breastfeeding initiation and exclusivity increased over the study period

56% ⟶ **65%**

Initiation

24% ⟶ **33%**

Exclusivity

Hospital characteristics play a role in breastfeeding initiation and exclusivity

Despite increases, rates still lag behind those of non-opioid-exposed dyads

Breastfeeding Initiation and Exclusivity Among Patients with Opioid Use Disorder

Ellery Sarosi, Sanaya Irani, Regina Onishchenko, Emma Keer, Mingyi Tang, Yang Chen, Courtney Townsel

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Pregnancy Outcomes in Patients with Obstructed Hemivagina Ipsilateral Renal Agenesis (OHVIRA)

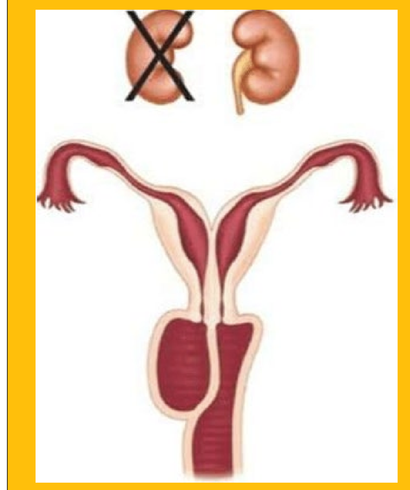
A retrospective case series

Elizabeth Erkkinen, Mina Farahzad, MD PhD, Kathleen O'Brien MD, and Monica W. Rosen, MD

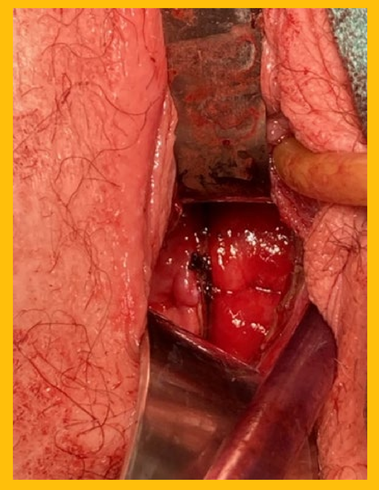
University of Michigan Health System

INTRODUCTION

- Congenital anomalies of the female genital tract arise from defects in differentiation, fusion or absorption of the Mullerian ducts during fetal development
- Prevalence of such congenital anomalies has been estimated as high as 5.5% to 9.8%
- Congenital uterine anomalies can result in adverse pregnancy outcomes including spontaneous abortion, recurrent pregnancy loss, low birth weight, preterm delivery and fetal malpresentation
- OHVIRA is usually diagnosed soon after menarche, when patients present with pain due to an outflow obstruction of menstrual blood from the hemivagina
- The exact incidence of OHVIRA is not known, with some reports estimating between .1-3.8% of all female genital tract malformations while others report 7%
- Treatment involves vaginal septal repair to relieve the obstruction



Schematic representation of OHVIRA syndrome



Two cervices side by side following vaginal septum repair

OBJECTIVE

To characterize pregnancy outcomes in patients with OHVIRA

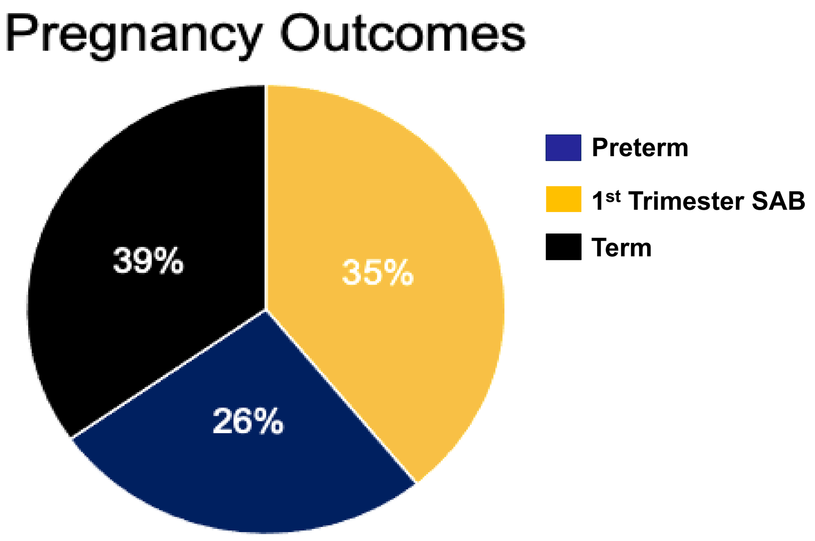
METHODS

- Retrospective case study of patients presenting to an academic medical center between 2000-2022
- Patients identified by searching ICD Codes 9 and 10 for OHVIRA and pregnancy.
- Exclusion criteria:
  - Having a uterus didelphys, renal agenesis or an oblique vaginal septum but no formal diagnosis of OHVIRA
  - if pregnancy care was not completed at a medical center where detailed records could be obtained
- Data collected on demographics, age of diagnosis and repair, gynecologic history, and pregnancy outcomes

RESULTS

Patient	Age of OVHRIA Dx	Age of surgery
1	13	13
2	10	10
3	21	22
4	16	16
5	11	11
6	13	13
7	27	27
8	Unknown	Unknown
	Average: 15.85	Average: 16

TABLE 1: *Age of OHVIRA diagnosis and surgical repair. The only documented post-septal repair complication was one post operative bleed (Patient #4).*



GRAPH 1: *Pregnancy outcomes (n=23). There were 9 term pregnancies, 6 preterm pregnancies, and 8 first-trimester spontaneous abortions (SAB)*

Patient	Infertility	Total	Term	Preterm	SABs in 1st trimester
1	No	1	1	0	0
2	No	2	2	0	0
3	No	2	1	0	1
4	Yes	4	3	0	1
5	No	1	0	1	0
6	Yes	4	0	1	3
7	Yes (IVF)	5	0	2	3
8	No	4	2	2	0
		Avg=2.875 Sum= 23	Avg = 1 Sum = 9	Avg = .875 Sum = 6	Avg=1 Sum = 8

TABLE 2: *Fertility, number of pregnancies and outcome. Of the 23 pregnancies, there were 9 term pregnancies, 6 preterm pregnancies, and 8 spontaneous abortions in the first trimester. On average, the 1st pregnancy was 8 (range 2 to 21) years after surgery for OHVIRA and resulted in a live birth in 75% (6/8) women.*

Patient	Pregnancy #	Gestational Age	Delivery Method	Pregnancy Complications	Delivery Complications
1	1	39w1d	Vaginal	0	Retained Placenta
2	1	41w3d	Vaginal, forceps assisted	0	0
	2	37w4d	Vaginal	0	0
3	2	37w4d	Vaginal	IUGR	0
4	1	39w0d	C/S	0	Breech
	3	37w0d	C/S (repeat)	IUGR	0
	4	37w0d	C/S (repeat)	0	0
5	1	34w0d	C/S	Pre-eclampsia with severe fet.	Breech
6	4	36w0d	C/S	Pre-eclampsia with severe fet.	Breech
7	1	36w2d	C/S	PPROM	Breech
	5	36w3d	C/S (repeat)	0	Breech
8	1	35w0d	C/S	0	Breech
	2	36w0d	C/S (repeat)	0	0
	3	39w0d	Vaginal	0	0
	4	37w1d	C/S	Di Di twins, one pregnancy in each horn	0

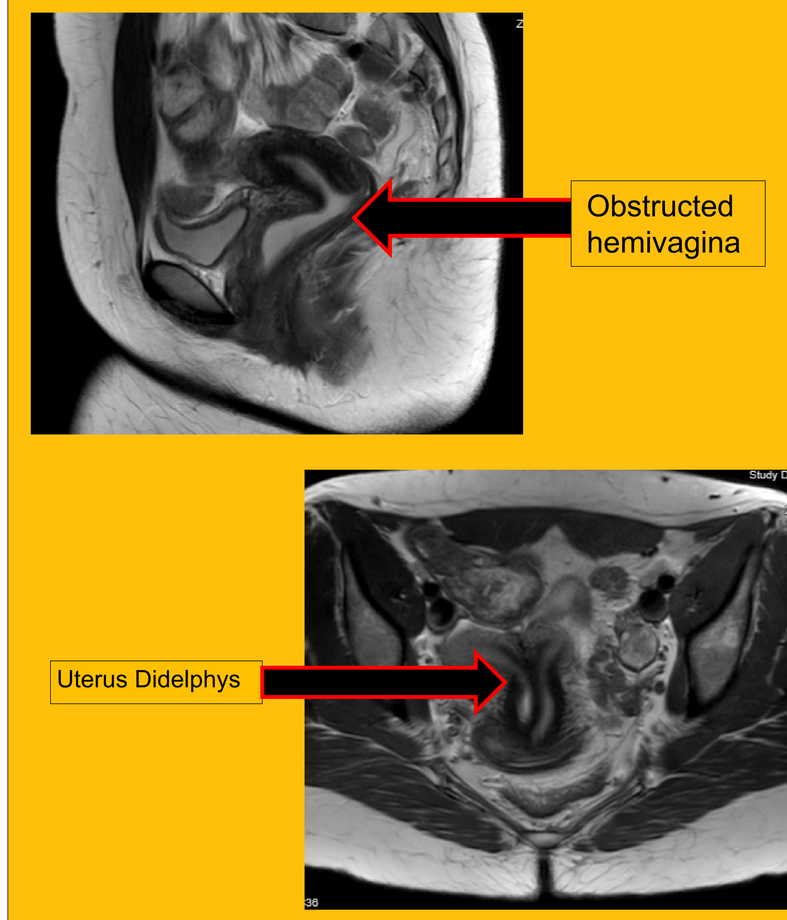
TABLE 3: *Gestational age, delivery method, pregnancy and delivery complications in each pregnancy resulting in live birth (n=15).The average gestational age at delivery was 37weeks 2 days. The most common pregnancy complications were intrauterine growth restriction (2/15) and pre-eclampsia with severe features (2/15). There were 10 C-sections: 3 primary for fetal malpresentation (breech), 5 repeat and 2 unscheduled (34wk & 36wk) due to pre-eclampsia with severe features. 1 patient experienced retained placenta following a normal spontaneous vaginal delivery requiring removal under ultrasound guidance.*

CONCLUSIONS

- To our knowledge this study is one of the first of its kind to look at pregnancy outcomes in patients with OHVIRA
- Among this cohort, there were higher incidences of spontaneous abortion (8/23 35%), preterm birth (6/23 26%), breech presentation (6/15 40%) and cesarean deliveries (10/15 66%) when compared to the general population
- Strengths include the remarkably long follow up interval; one patient had her first pregnancy 22 years after her septal repair
- This descriptive data set serves to address a knowledge gap in order to help clinicians advise patients with OHVIRA about pregnancy more effectively

MRI Images

These images from patient #4 are characteristic of OHVIRA



Elective Induction of Trial of Labor after Cesarean at 39 weeks: Is it Risk Reducing?

The University of Texas at Austin Dell Medical School

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Abstract

Objective: After the ARRIVE trial, induction of labor (IOL) at 39 weeks became ubiquitous. We aim to determine whether patients with a prior cesarean should undergo risk reducing induction of labor at 39 weeks or be expectantly managed beyond 39 weeks.

Methods: We created a decision analytic model to compare two management strategies in patients with a prior cesarean: 1) IOL at 39 weeks, 2) expectant management beyond 39 weeks. Patients expectantly managed beyond 39 weeks could: experience stillbirth, undergo indicated induction, or reach 40 weeks. At 40 weeks, patients could be induced or expectantly managed. We assumed all patients would be induced if they reached 41 weeks. We further assumed that all patients would attempt a trial of labor after cesarean (TOLAC) and all patients undergoing TOLAC were at risk for uterine rupture; the risk of uterine rupture was varied by IOL versus spontaneous labor and gestational age. Adverse maternal outcomes considered were maternal death, hysterectomy, operative injury (bowel or bladder injury). Neonatal outcomes considered were stillbirth, neonatal death, and hypoxic ischemic encephalopathy. Baseline risk estimates for uterine rupture, adverse events associated with uterine rupture, failed TOLAC, and successful TOLAC were obtained from the literature. One-way and multi-way sensitivity analyses were performed to address uncertainties in baseline assumptions.

Results: Within baseline assumptions, the model identified that IOL at 39 weeks resulted in fewer adverse maternal or neonatal events compared to expectant management and more vaginal deliveries (Table). The model is sensitive to the risk of uterine rupture associated with IOL at 39 weeks; if the incidence of uterine rupture exceeds 1.42% in those undergoing IOL at 39 weeks, the model favors expectant management. In Monte Carlo simulations, induction of labor was selected in 91.7% of simulations.

Conclusions: Risk-reducing IOL at 39 weeks should not be withheld from women undergoing TOLAC and, depending on the risk of uterine rupture, may be associated with more favorable outcomes than expectant management.

Background

- >30% of deliveries in the US are induced and continues to increase since ARRIVE trial
- TOLAC rates are 13% and have increased steadily since 2016
- TOLAC not included in ARRIVE
- Not clear if women undergoing TOLAC should undergo elective IOL at 39 weeks:
  - It may increase rates of women choosing TOLAC
  - It may increase successful VBAC
  - It may increase uterine rupture

Objective

- To use a decision analytic model to determine the risks (maternal and neonatal adverse outcomes) and benefits (successful TOLAC) with IOL versus expectant management (EM) at 39 weeks

Materials and Methods

- Decision analytic model that compared induction versus expectant management at 39 weeks
- Patients expectantly managed beyond 39 weeks could: experience stillbirth, spontaneously labor, undergo indicated induction, or reach 40 weeks
  - At 40 weeks, patients could be electively induced or expectantly managed
  - We assumed all patients would undergo IOL if they reached 41 weeks
- Risk estimates were obtained from literature review for uterine rupture, adverse events associated with uterine rupture, failed TOLAC, and successful TOLAC and varied by gestational age and induction of labor
- Maternal outcomes considered were: death, hysterectomy, operative injury (bowel or bladder injury)
- Neonatal outcomes considered were: stillbirth, neonatal death, hypoxic ischemic encephalopathy
- One-way and multi-way sensitivity analyses were performed to address uncertainties in baseline assumptions

Table 1: Key Assumptions

	After IOL	After Spontaneous Labor
Risk of Uterine Rupture		
39 wks	0.63 (0.15-5.9)	0.37 (0.31-0.72)
40 wks	0.62 (0.07-2.74)	0.5 (0.07-0.93)
41 wks	0.71 (0.45-2.75)	-
Probability of Successful VBAC		
39 wks	62.02 (49.98-77.2)	75 (65-85)
40 wks	63.59 (60.87-69.22)	75 (65-85)
41 wks	55.37 (54.22-63.29)	

Results

- Within baseline assumptions, the model identified that IOL at 39 weeks resulted in:
  - Fewer adverse maternal or neonatal events
  - More vaginal deliveries
- The model was highly sensitive to the risk of uterine rupture associated with IOL at 39 weeks:
  - When the risk exceeds 1.42%, the model favors expectant management
- IOL was selected in 91.7% of Montecarlo simulations

Table 2: Outcomes of baseline model (per 1,000 TOLAC Attempts)

	IOL at 39 Wks	Expectant Management at 39 Wks	Incremental Difference
Any Adverse Maternal or Neonatal Event	9.43	12.1	2.67
Any Adverse Maternal Event	6.34	8.53	2.19
Any Adverse Neonatal Event	3.09	3.57	0.48
Vaginal Delivery	620.2	448.71	-171.49

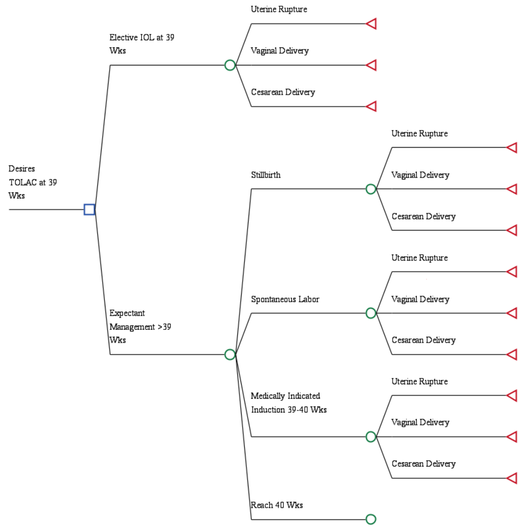

Figure 1: Baseline Model

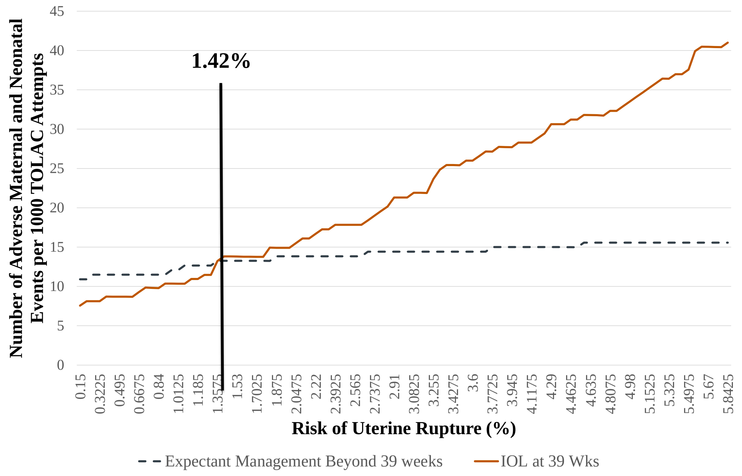

Figure 2: One Way Sensitivity Analysis of Uterine Rupture Risk with elective IOL at 39 weeks

Conclusions

- Risk reducing IOL at 39 weeks may be associated with more favorable outcomes than expectant management
- The preferred strategy depends on the risk of uterine rupture associated with IOL
  - Risk reducing IOL should not be withheld from women undergoing TOLAC

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Proving and Disrupting the Legitimacy Paradox

L. Harris, L. Martin, M. Seewald, A. Simon

BACKGROUND

- Our prior qualitative work generated a hypothesis: abortion stigma and silence work together to create a vicious cycle - the "**legitimacy paradox.**" We argued this cycle would persist, fueling restrictive laws, until caregivers shared their voices and were understood to be compassionate and skilled.

- We tested the role of physician voices in disrupting the legitimacy paradox cycle. Doctors used messaging that:
  - Met audience's psychological and emotional needs
  - Leaned into abortion's complexities
  - Modeled holding the 'tension of opposites'
  - Reflected caregiving roles, not political punditry
  - Didn't pivot from difficult questions

Scan to Request the Messaging Toolkit:

METHODS

1,508 participants surveyed, before & after physician messaging

BIPOC Participants Oversampled

We assessed participant perception of doctors who provide abortion care, and attitudes about abortion restrictions.

↓

Participants viewed messaging videos featuring a diverse sample of doctors emphasizing personal caregiving motivations, values, and experiences.

↓

We reassessed participant perception of doctors who provide abortion care, and attitudes about abortion restrictions.

↓

Analysis: T-tests, multiple linear and multivariable logistic regression.

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The legitimacy paradox is true, and doctors voices disrupt it. When doctors lean into caregiving roles, they replace negative stereotypes with images of compassion, caring, and skill.

Post-Messaging Shifts:

- **10 PT** ↑ Motivated by conscience
- **10 PT** ↑ Truthful
- **9 PT** ↑ Compassionate
- **8 PT** ↑ Ethical
- **13 PT** ↓ Motivated by money

The "Legitimacy Paradox"

New Cycle of Voice & Legitimacy

This shift in perception of doctors generates more support for legal abortion (Δ5%, AOR=1.54;p<0.001) and less support for restrictive laws (Δ14%, AOR=1.51;p<0.001).

Labor induction outcomes among patients with cardiovascular disease

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VON VOIGTLANDER WOMEN'S HOSPITAL
MICHIGAN MEDICINE

Objective

To characterize factors predictive of a successful induction of labor in patients with cardiac disease and to describe outcomes in high versus low risk lesions

Methods

- Retrospective cohort study of all patients followed in the University of Michigan Cardio-Obstetrics Program
- Medical records reviewed for demographic data and mode of delivery
- High cardiac risk defined as CARPREG II score of 2 greater: morbidity or mortality > 10%
- A random forest model was used to predict mode of delivery
- Maternal and fetal complication rates as well as breastfeeding outcomes were compared across risk groups

Random forest modeling explained

SCAN ME

255 patients reviewed

122 patients with planned cesareans

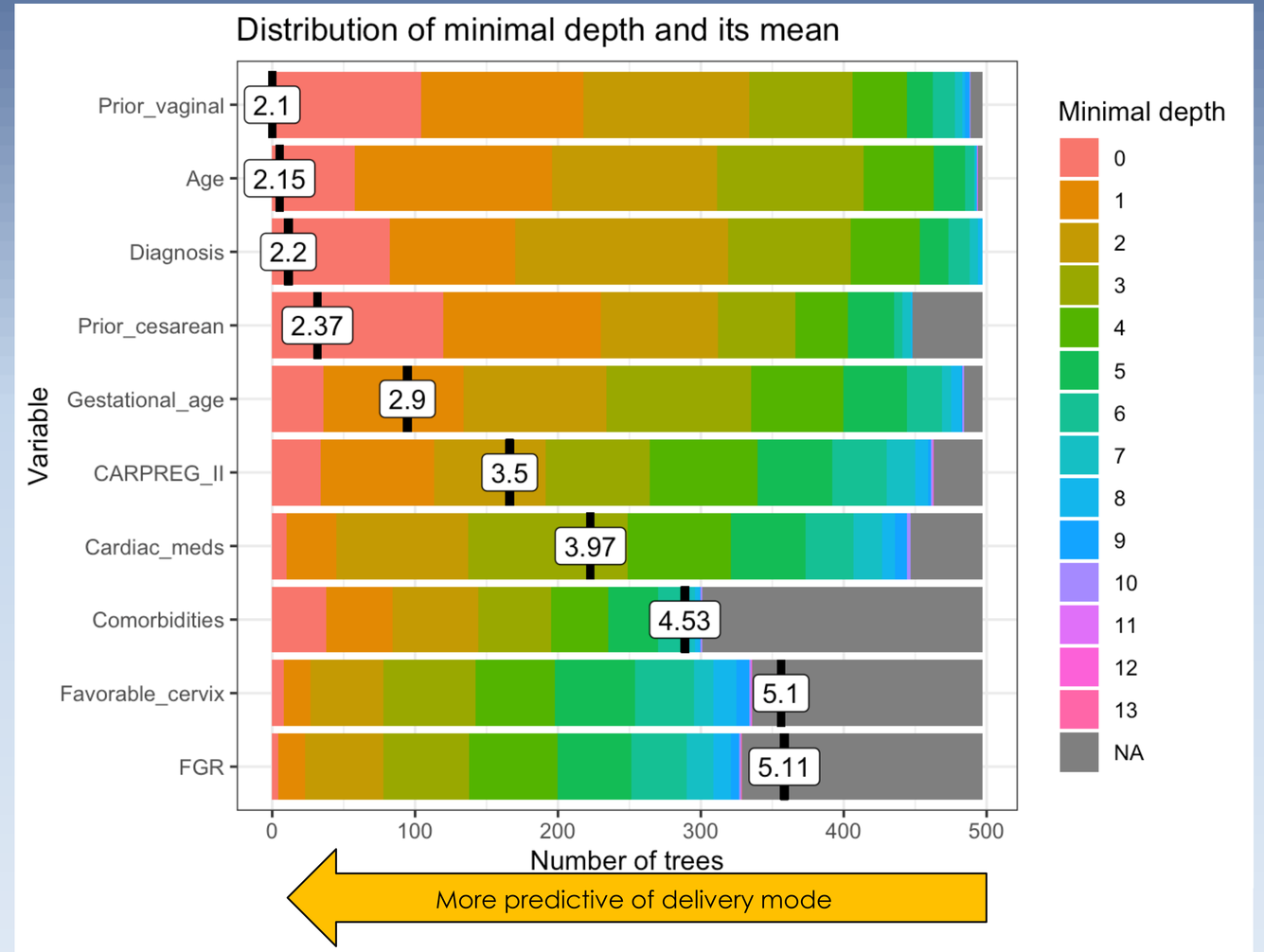
5 patients with cesareans for cardiac indications

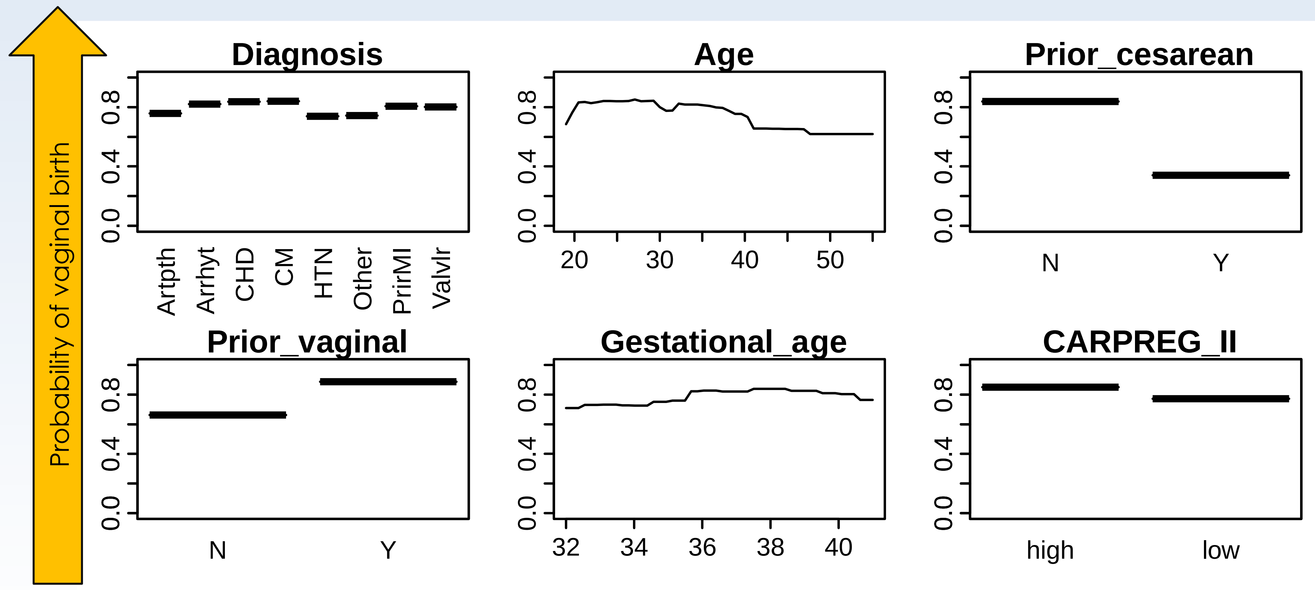
123 patients undergoing IOL included

Table 1: Baseline demographics by cardiac risk

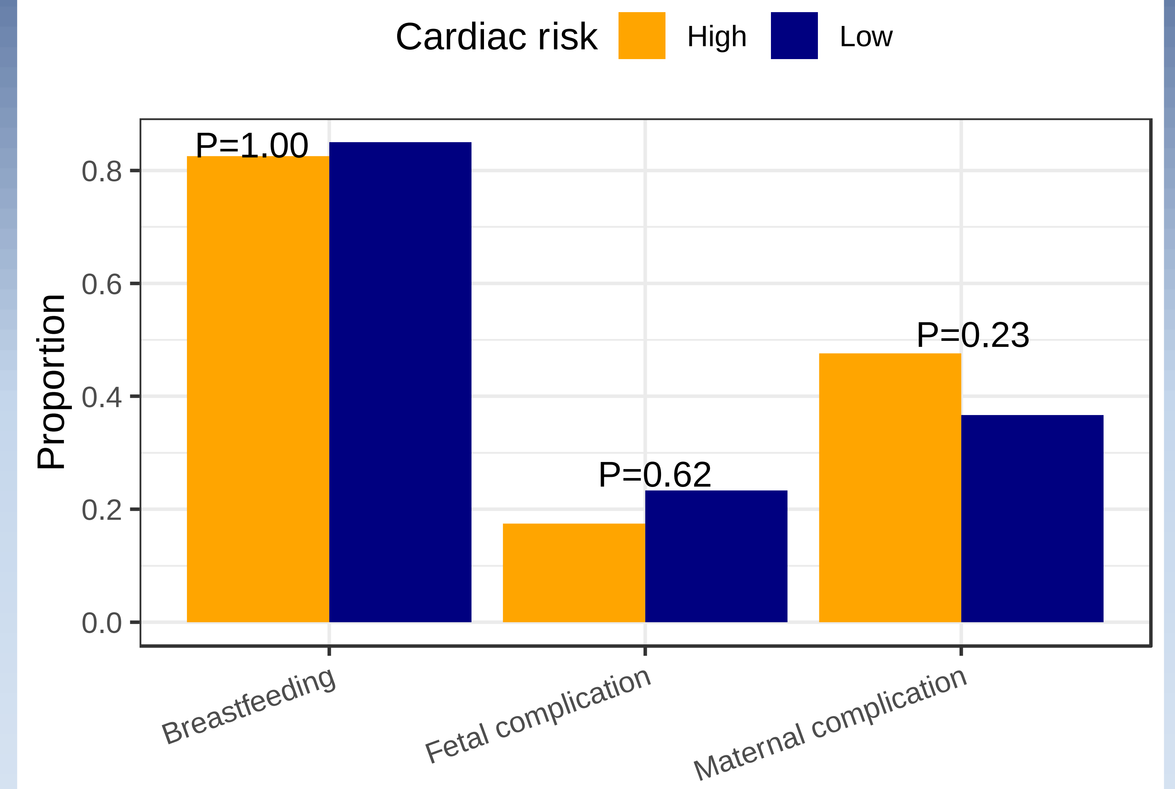
Characteristic	High (N=63)	Low (N=60)	p-value
Age	28.8 (5.6)	30.6 (6.4)	0.11
Proportion White	56 (89.9%)	46 (80.0%)	0.06
BMI	29.5 (8.8)	29.4 (8.0)	0.9
Parity	2.6 (2.1)	2.7 (2.3)	0.79
Type of heart disease			0.25
Congenital heart disease	19 (30.2%)	24 (40%)	
Prior MI	3 (4.8%)	1 (1.7%)	
Cardiomyopathy	14 (22.2%)	9 (15%)	
Aortopathy	1 (1.6%)	4 (6.7%)	
Valvular Disease	5 (7.9%)	8 (13.3%)	
Arrhythmia	13 (20.6%)	7 (11.7%)	
Other	4 (6.3%)	1 (1.7%)	
Hypertensive Disorder	4 (6.3%)	6 (10%)	
On cardiac meds meds	33 (52.4%)	26 (40%)	0.23

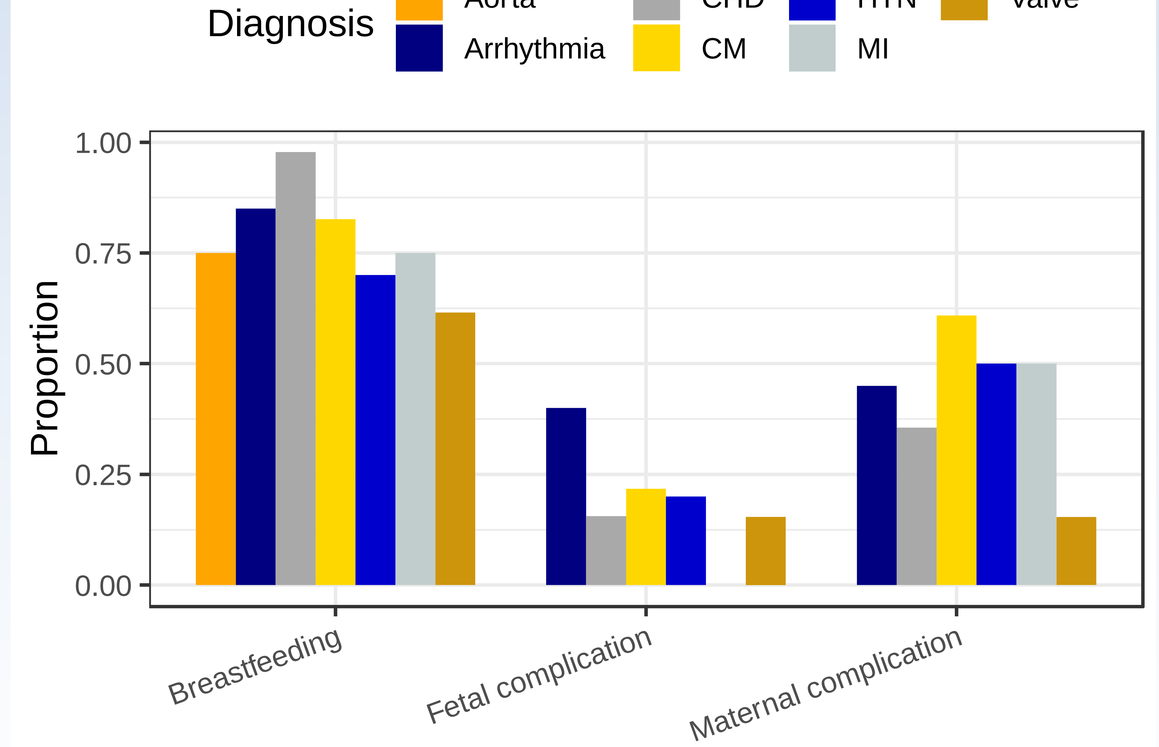
Predicting vaginal birth





Maternal and fetal outcomes





Conclusion

Underlying diagnosis is the most significant cardiac factor that predicts successful induction of labor in patients with cardiac diseases. Breastfeeding, fetal complications, and maternal complications are not predicted by cardiac risk.

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Changing the admission process in an OB triage to allow for confidential screenings

SCHOOL OF NURSING
VANDERBILT UNIVERSITY

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Vanderbilt University School of Nursing

Introduction

Intimate partner violence and sex trafficking can put obstetrical patients at risk for complications. Abuse screening is a JACHO requirement for every patient.

Topic
We are missing opportunities to assess patients' needs in OB triage.

Problem

- Patients are rarely alone, making it difficult to assess abuse/trafficking
- There are missed opportunities to assess patient's needs
- Survivors of sex trafficking who become pregnant may not be receiving the care or resources they need
- In Michigan in 2020, 845 survivors contacted the Human trafficking hotline by phone, text, email, online, or via online chat, and 295 human trafficking cases were reported

Aim

To change the flow of the obstetrical triage to allow for confidential screening, including initiation of a human trafficking (HT) screening tool. To use the established screening tool and the human trafficking screening tools with 95% of patients to assist the needs of patients from October to November 2022 in the University of Michigan's obstetrical triage unit

Objectives

1.)Educate all staff in the obstetrical unit on the use of HT tool and algorithm by 10/20/2022.
2.)Implement HT tool and algorithm on the OB unit from 10/21/22-11/21/22.
3.)Evaluate compliance of using the HT tool and algorithm in triage by 1/1/23
4.)Evaluate positive results of how many HT survivors were identified, how many confidential screenings were completed, if the HT education and HT tool increased staff knowledge on identifying a HT survivor by 1/1/23.

Methods

- Patients will be roomed separately.
- The patient's visitors will wait and be invited into the room after the questions are completed.
- An educational module will be implemented
- Two validated human trafficking questions will be added to the screening questions.

PDSA Cycle

1.)Educate staff on QI project, HT questions, risk factors for HT, and risk factors for HT
2.)pre-study survey
3.) implement the admission to triage process in one of three ways (clerk rooming patient the RN greeting/asking abuse questions, RN rooming patient and asking abuse questions, clerk rooming patient and handing patient abuse screening to be completed),
4.) post survey and analyze data
5.) adapt, abandon, adopt

Measures

- Compliance with abuse screening before and after implementing the change
- Pre-test and post-test scores on screenings will be analyzed using a Likert scale.

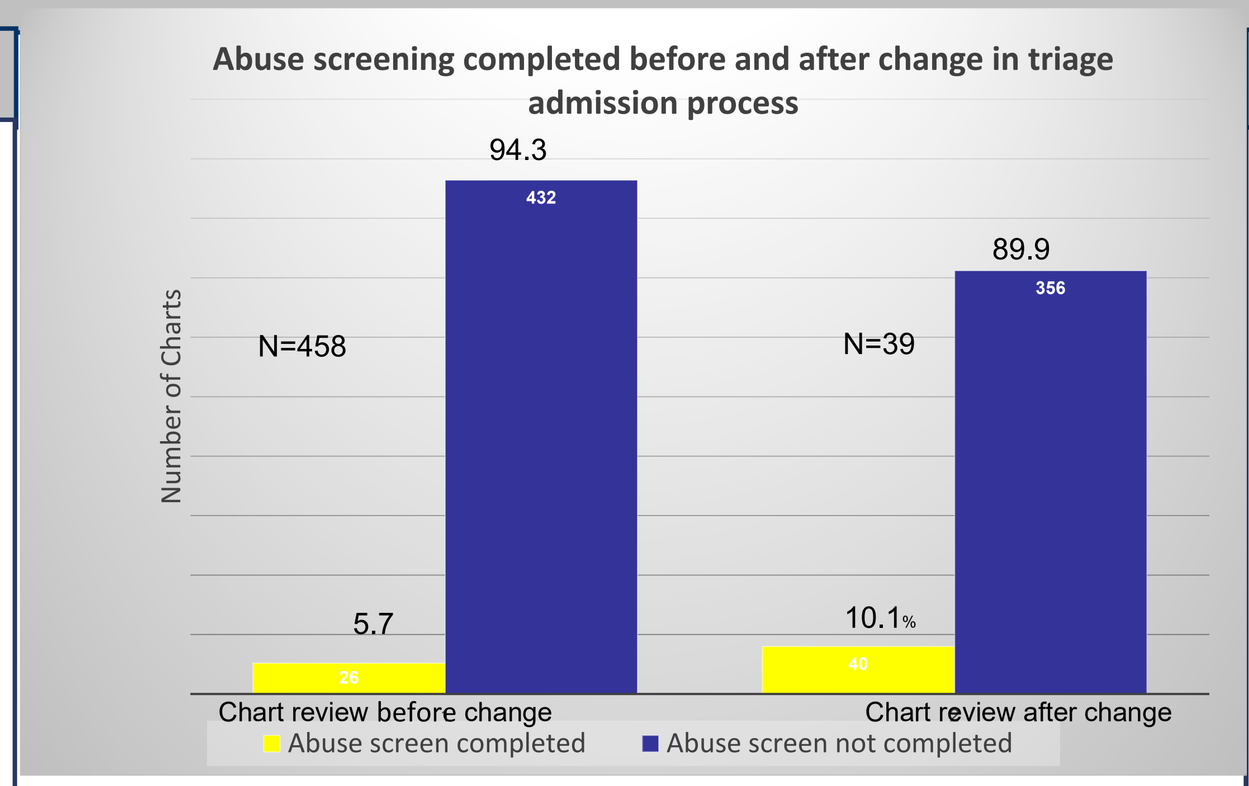


Figure_1. Pre and post-abuse screening completed

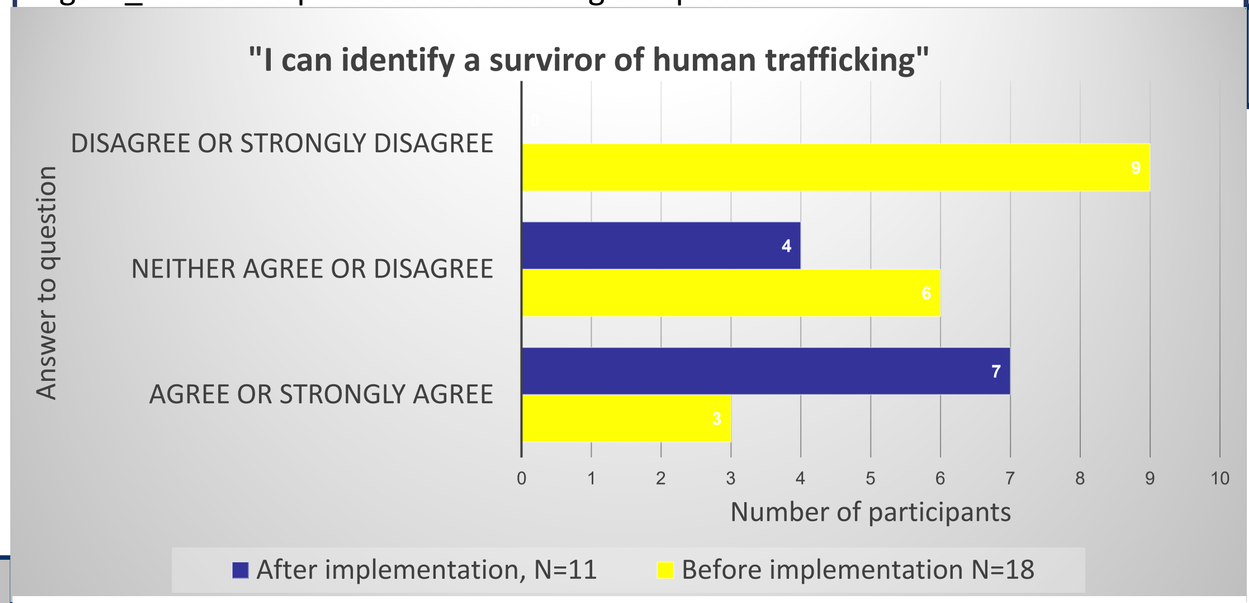


Figure_2. Human trafficking identification

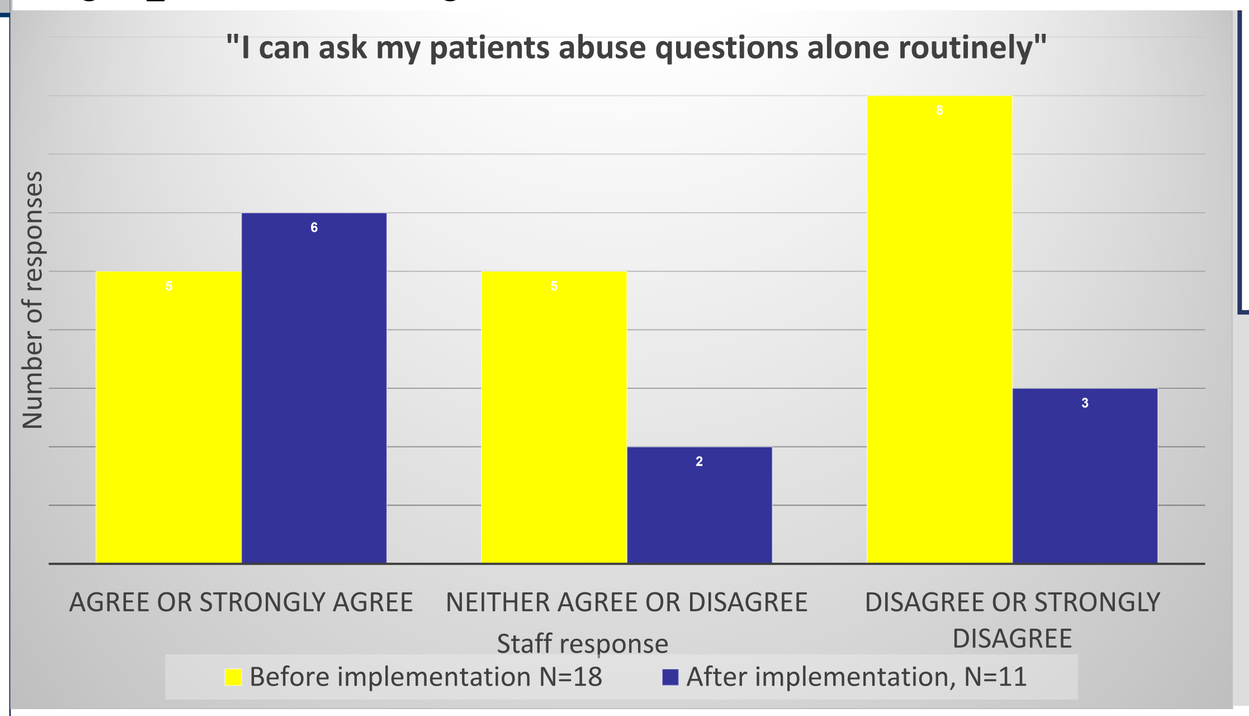


Figure_3. Identifying the ability to ask questions alone.

Results

After QI project implementation:

- Abuse screenings increased from 5.7% to 10.1%
- Two survivors of human trafficking and one survivor of sexual abuse identified.
- One patient admitted to being verbally and emotionally abused.
- Patients alone for 1 to 10 minutes
- 46.8% increase in identifying a human trafficking survivor after educational module and using the human trafficking screen tool.
- 31.8% increase in knowing what to do after survivor was identified
- 26.7% increase in ability to ask patient questions alone.
- 8.9% decrease in difficulty getting patients alone

Implications for Practice

-A HT screening tool should be used with every patient.

-Patients should be roomed by themselves

-Strong correlation of abuse screenings with rooming the patient alone

-Education on human trafficking should include:

- information on what to do once a survivor is identified
- Yearly reviews
- Increase in staff knowledge.

-Barriers to change and meeting goal of completing confidential screening with 95% of patients: busy unit, understaffing, union contract negotiations, resistance to change, and not willing to participate.

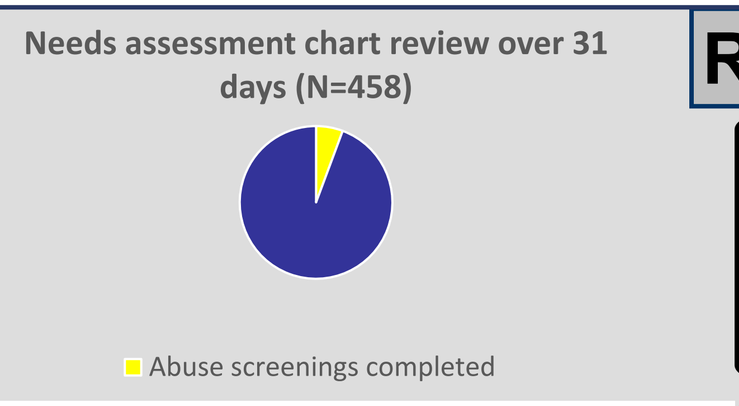


Figure_4. Chart review over 31 days. (N=458)

References

SCAN ME

Use of a novel device to quantify inter-individual differences in lower birth canal resistance to dilation during the late 1st stage of labor

Mariana Masteling, PhD[1], Molly J. Stout, MD, MSCI[2], John O. DeLancey, MD[2], James A. Ashton-Miller, PhD[1]
[1]Department of Biomedical Engineering, University of Michigan Medical Center, Ann Arbor, Michigan
[2]University of Michigan Medical Center, Department of Obstetrics and Gynecology, Ann Arbor, Michigan

Background

- Secondary analysis of the multicenter EASE clinical trial data (NCT 03973281).
- PREP device (Materna Medical, LLC, Mountain View, CA) is a pelvic floor dilator introduced into the first 4 cm of the vaginal canal in nulliparous women during 1st stage of labor. It is programed to expand to 8 cm diameter over ~60 min.
- Records dilation force, time and diameter (see Figure).

Method

- Quantify resistance to dilation in 56 nullipara (30.3 ± 5.6 years) (Table):
  - At 5.5 cm diameter
  - After a 5 min "hold" at 5.5 cm diameter
  - At maximum diameter

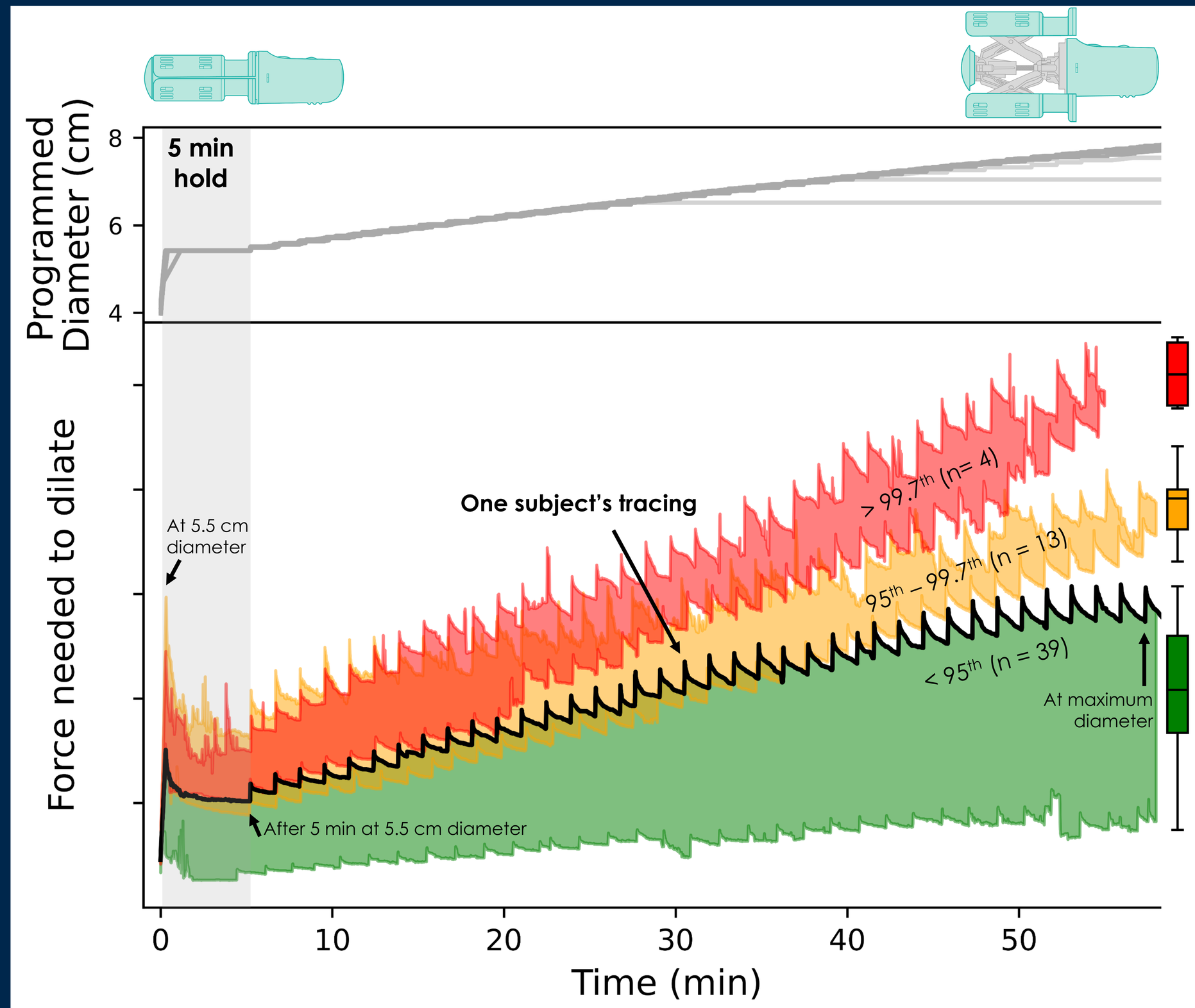
Results

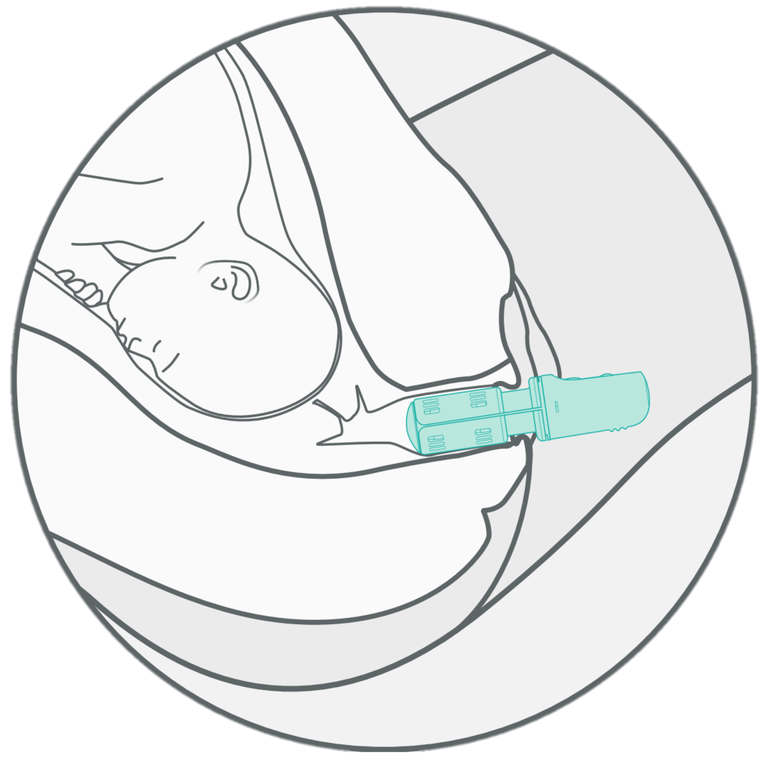
- Figure shows the distribution of lower birth canal resistance to dilation in these healthy nullipara.
- Table shows the ratio between the maximum and minimum resistance to dilation across all subjects.

Resistance to dilation	Ratio
At 5.5 cm diameter	5.5
After a 5 min "hold" at 5.5 cm diameter	7.0
At maximum diameter	6.1

Discussion

- Identified the normal range in birth canal resistance to dilation.
- The anatomical, hormonal and cellular factors responsible for these variations are unknown.
- Comment: greater resistance to dilation might logically be a risk factor for levator ani injury.





PREP inserted into the first 4 cm of the vaginal canal during the 1st stage of labor

Distribution of force needed to dilate the lower birth canal in 56 women using PREP.
Example subject in black. In green subjects with forces below the 95th percentile, orange subjects between the 95-99.7th percentile and red above the 99.7th percentile.

These first measurements of lower birth canal resistance to dilation in the first stage of labor show 6 to 7-fold differences

Questions? mastelin@umich.edu

The potential for increased gender equity with employer-covered oocyte freezing in medical training

Hana Murphy, Sarah Compton, PhD, MPH, Kiernan Bloye, Molly Moravek, MD, MPH, Monica Rosen, MD
University of Michigan Department of Obstetrics and Gynecology

Introduction

- One in four women physicians experience infertility, which is greater than their non-physician counterparts[1]
- Women now comprise the majority of medical school matriculants and the average age of entrance to medical school is increasing[2]
- The medical training path is also getting longer as more trainees are pursuing additional years of fellowship training[3]
- The lack of gender diversity in academic medicine senior leadership is well-established and has been attributed to factors such as the importance of starting a family and childbirth in women[4]
- Planned oocyte cryopreservation (POC), or elective egg freezing, provides a way to delay pregnancy and protect against age-related fertility decline[5]
- In the last decade there has been a 400% increase in oocyte cryopreservation, fueled in part by increasing employer coverage in law, finance, and tech[6,7]

Objective

We sought to better characterize the attitudes of reproductive-aged medical students towards planned oocyte cryopreservation and how employer coverage might impact medical career decision-making

Methods

- Conducted a cross-sectional, multi-institutional survey study which was distributed to all medical students at University of Michigan Medical School and Wayne State School of Medicine
- Survey questions spanned demographics, family planning goals, attitudes towards childbearing and POC, effect of employer coverage of POC on medical career decisions, and fertility knowledge
- All statistical analysis was performed with STATA using an alpha of 0.05

References

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2. Association of American Colleges. Washington, DC: Matriculating Student Questionnaire: 2019 All Schools Summary Report. Available from: https://www.aamc.org/media/50081/download
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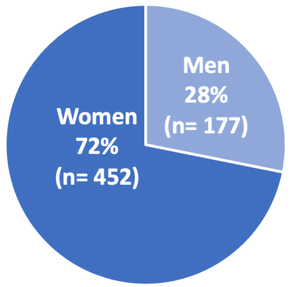
6. New York Times. Hope, Regret, Uncertainty: 7 Women on Freezing Their Eggs. https://www.nytimes.com/2022/12/23/well/family/egg-freezing-fertility.html Accessed January 14, 2023.
7. Society for Assisted Reproductive Technology. Final National Summary Report for 2019. https://www.sartcorsonline.com/rptCSR_PublicMultYear.aspx. Accessed February 2, 2023.

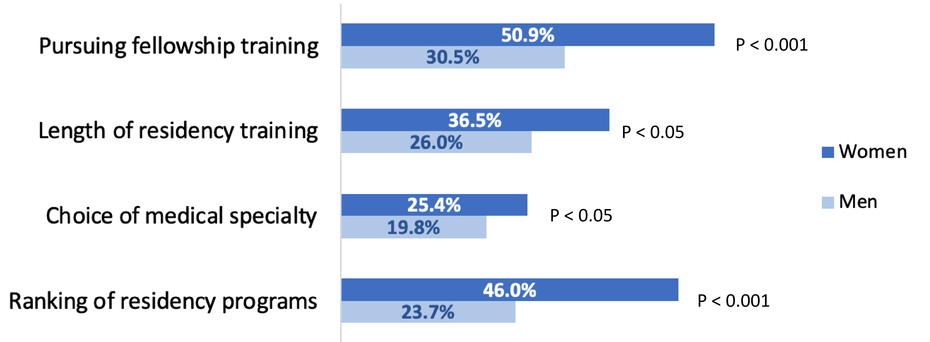
Results

Respondent Demographics

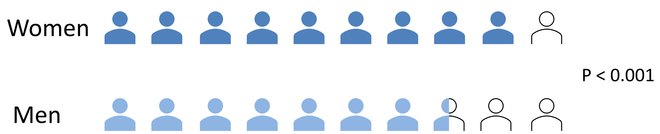
(n=630) response rate= 33%



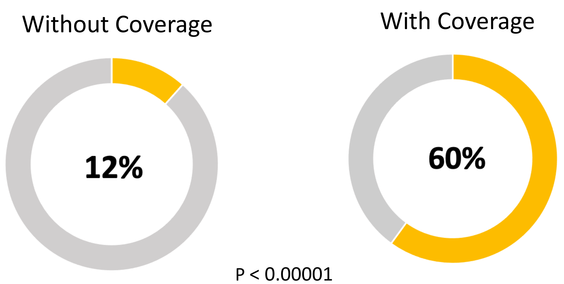
Career decisions influenced by availability of employer-covered POC



Proportion of respondents who feel pressure to delay childbearing due to medical training



Respondents who would pursue POC



Conclusions

- Medical students feel pressure to delay childbearing due to their medical training and many are concerned about their future fertility
- Both male and female medical students would pursue POC if offered financial coverage and would subsequently make different career choices if available
- With medical trainees becoming increasingly older and female, training programs must consider offering affordable POC resources if they are to support gender equity in medicine

In the face of rigorous medical training and age-related fertility decline, medical employers should consider coverage of planned oocyte cryopreservation for its trainees

Oophorectomy at the Time of Gender Affirming Hysterectomy in Young Adults

Katie O'Brien, MD[1]; Elisabeth Quint, MD[1]; Mina Farahzad, MD, PhD[1]; Becca Warwick, MD[2]; Monica Rosen, MD[1]; Yolanda Smith, MD[1]; Melina Dendrinos, MD[1]

[1]UM Department of Obstetrics and Gynecology; Division of Pediatric and Adolescent Gynecology; [2]UM Department of Pediatrics; Division of Adolescent Medicine

BACKGROUND

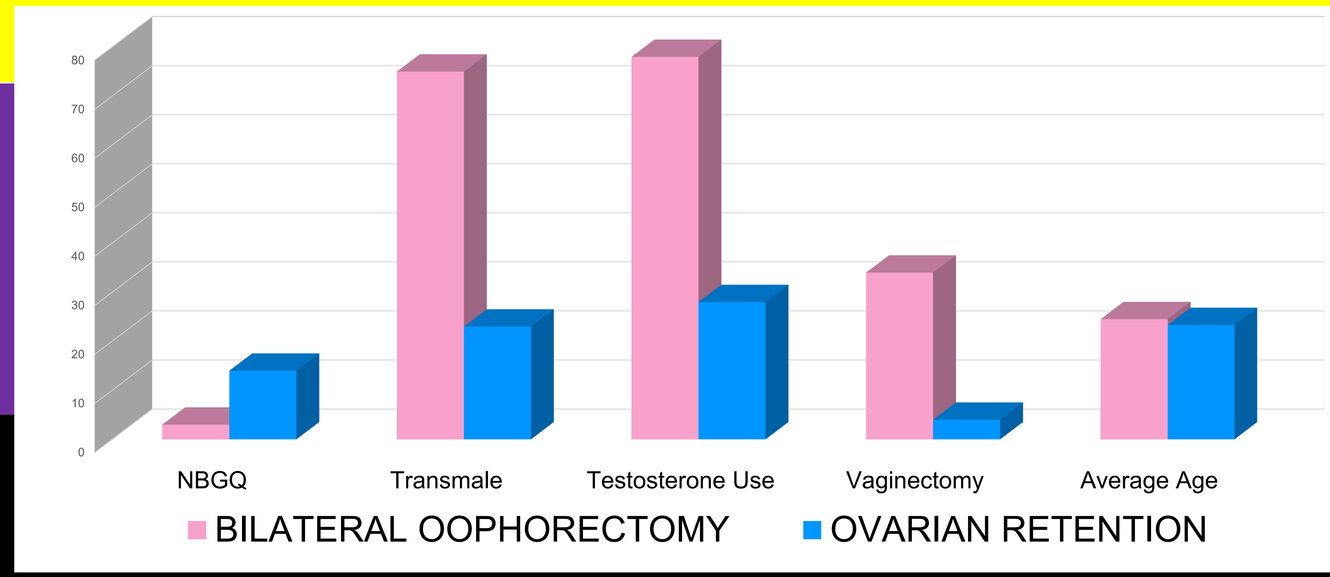
- Many transgender and gender diverse individuals who are assigned female at birth eventually decide to undergo gender affirming surgery, including hysterectomy with or without oophorectomy.
- The WPATH SOC 8 does not recommend for or against bilateral oophorectomy but, rather, defers to shared decision-making and patient preference.
- Limited data exist regarding oophorectomy rates at the time of gender affirming hysterectomy.
- The aim of this study is to identify factors associated with ovarian retention or removal at the time of gender affirming hysterectomy.

METHODS

- A retrospective chart review was performed at a single academic referral center for gender affirming care.
- IRB exemption was obtained.
- Patients aged 18 to 30 who underwent a gender affirming hysterectomy between January 2017 and October 2022 were identified using hysterectomy CPT codes and ICD-10 codes for gender identity disorder.
- Data were collected on demographics, medical history, completion of fertility preservation, parity, preoperative testosterone use, completed procedures, intraoperative findings, and surgical complications.
- Data were analyzed using paired t-tests and chi-square tests.

RESULTS

	One or both ovaries retained N = 37	Both ovaries removed N = 78	p-value
Affirmed Male Nonbinary/Genderqueer	**N = 23 N = 14**	**N = 75 N = 3**	**<0.0001**
Age (y)	23.32	24.51	0.07
Preoperative testosterone use	**0.76**	**1.00**	**<0.0001**
Length of testosterone use (y)	3.43	3.78	0.46
BMI	27.69	28.21	0.51
Rate of public insurance	0.35	0.29	0.54
Concurrent vaginectomy	**0.11**	**0.44**	**<0.0001**
History of ovarian pathology	0.03	0.08	0.30
Intraoperative ovarian pathology	0.05	0.08	0.68
Family history of ovarian cancer	0.03	0.04	0.76
Rate of surgical complication	0.08	0.09	0.88
Mental health diagnosis	0.78	0.72	0.45
PCOS diagnosis	0.03	0.04	0.76



DISCUSSION

- Our study identified a statistically significantly rate of bilateral oophorectomy in patients with male gender identity, with testosterone use prior to hysterectomy, and completion of additional bottom surgery, most commonly concurrent vaginectomy.
- It is unclear whether these differences represent inherent differences between patient populations, or if surgeon preferences play a role.
- Rates of bilateral oophorectomy differed among the 4 highest volume surgeons, but this study does not explore the reasons for potential differences among surgeons.
- Reasons for retaining one or more ovaries could include desire to avoid exogenous hormones, lack of dysphoria from natal female hormones, concern for surgical risks, and fear regarding loss of access to GAHT.

POTENTIAL FUTURE DIRECTIONS

- Qualitative study exploring preferences of gender diverse young adults regarding ovarian removal or retention
- Multi-center study to evaluate regional differences in rates of oophorectomy
- Survey to evaluate surgeon preference and practices of preoperative counseling regarding oophorectomy at the time of gender affirming hysterectomy.

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Risk Factors for Obstetrical Hemorrhage Among Nulliparous, Term, Singleton, Vertex Pregnancies

VON VOIGTLANDER WOMEN'S HOSPITAL
UNIVERSITY OF MICHIGAN HEALTH

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See the digital version here:

Introduction

- Postpartum Hemorrhage (PPH) is one of the leading causes of severe maternal morbidity in the US.
- Identifying patients at risk for PPH is a strategy used for prevention, however, risk prediction tools lack specificity for the nulliparous population.

Objective

To evaluate the labor course of nulliparous, singleton, vertex (NTSV) patients to 1) identify factors associated with PPH and 2) use these results to inform an intrapartum risk assessment tool.

Methods

- Design: retrospective cohort study
- Data collected from women admitted to la single abor and delivery unit between January 2015-October 2020
  - Inclusion criteria: nulliparous, term(gestational age ≥ 37/0), singleton, vertex pregnancies admitted for spontaneous labor or induction of labor
  - Exclusion criteria: Scheduled cesarean delivery and patients who delivered precipitously upon presentation
- Primary outcome: PPH defined as ≥1000mL
- Bivariate analyses and multivariable logistic regression model were used to develop a nomogram for prediction of PPH.

Results

- Among 7,805 NTSV patients, 1,395(17.5%) had PPH.
- 78.4% of NTSV patients had a vaginal delivery → PPH 8.7%
- 21.6% of NTSV patients had a CD → PPH 51.0%
- Demographic characteristics associated with PPH
  - Higher age
  - Non-Hispanic White
  - Higher BMI
  - Higher gestational age at delivery
- Obstetric characteristics associated with PPH
  - Smaller cervical dilation at admission
  - Longer latent and active labor
  - Shorter second stage
- Patients who received any oxytocin augmentation had a higher risk of PPH compared to patients in spontaneous non-augmented labor
- Nomogram of risk factors available from demographic and labor characteristics can prospectively quantify PPH risk as labor progresses

Table 1: Demographics of NTSV patients with hemorrhage and without hemorrhage

Characteristic	Total (n= 7805)	Hemorrhage (n=1395)	No Hemorrhage (n=6410)	P
Age, years	29 (25.0, 32.0)	30.0 (27.0, 33.0)	29.0 (25.0, 32.0)	<.001
Race, n (%)				<.001
Non-Hispanic Black	795 (10.7%)	104 (7.9%)	691 (11.3%)	
Non-Hispanic White	5235 (70.2%)	953 (72.2%)	4282 (69.8%)	
Hispanic	322 (4.3%)	61 (4.6%)	261 (4.3%)	
Other non-Hispanic	1101 (14.8%)	202 (15.3%)	899 (14.7%)	
Pregnancy BMI, Kg/m^2	29.9 (26.7, 34.4)	31.8 (28.1, 36.6)	29.5 (26.4, 33.8)	<.001
Gestational age at delivery, weeks	39.9 (39.0, 40.6)	40.0 (39.1, 40.7)	39.9 (39.0, 40.6)	
Fetal Weight at delivery, g	3369.0 (3069.0, 3659.0)	3519.0 (3204.0, 3845.0)	3335.0 (3045.0, 3619.0)	<.001

Figure 1: NTSV Patients by delivery mode & presence of PPH (Maize) or no PPH (Blue).

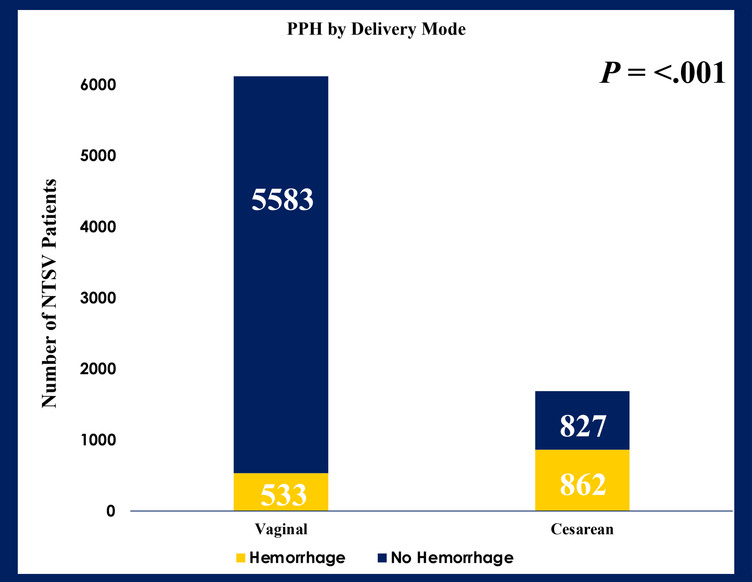


Figure 2: Rate of PPH among vaginal deliveries, by labor type, n = 6102

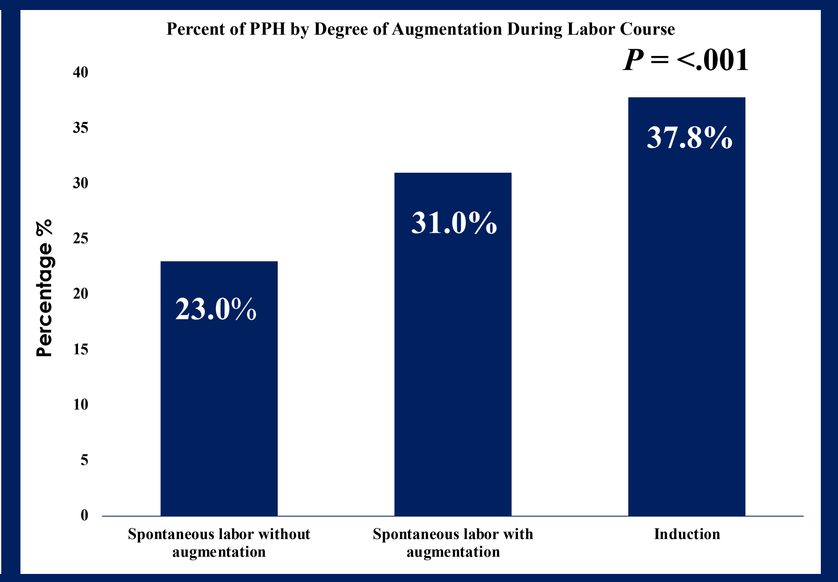


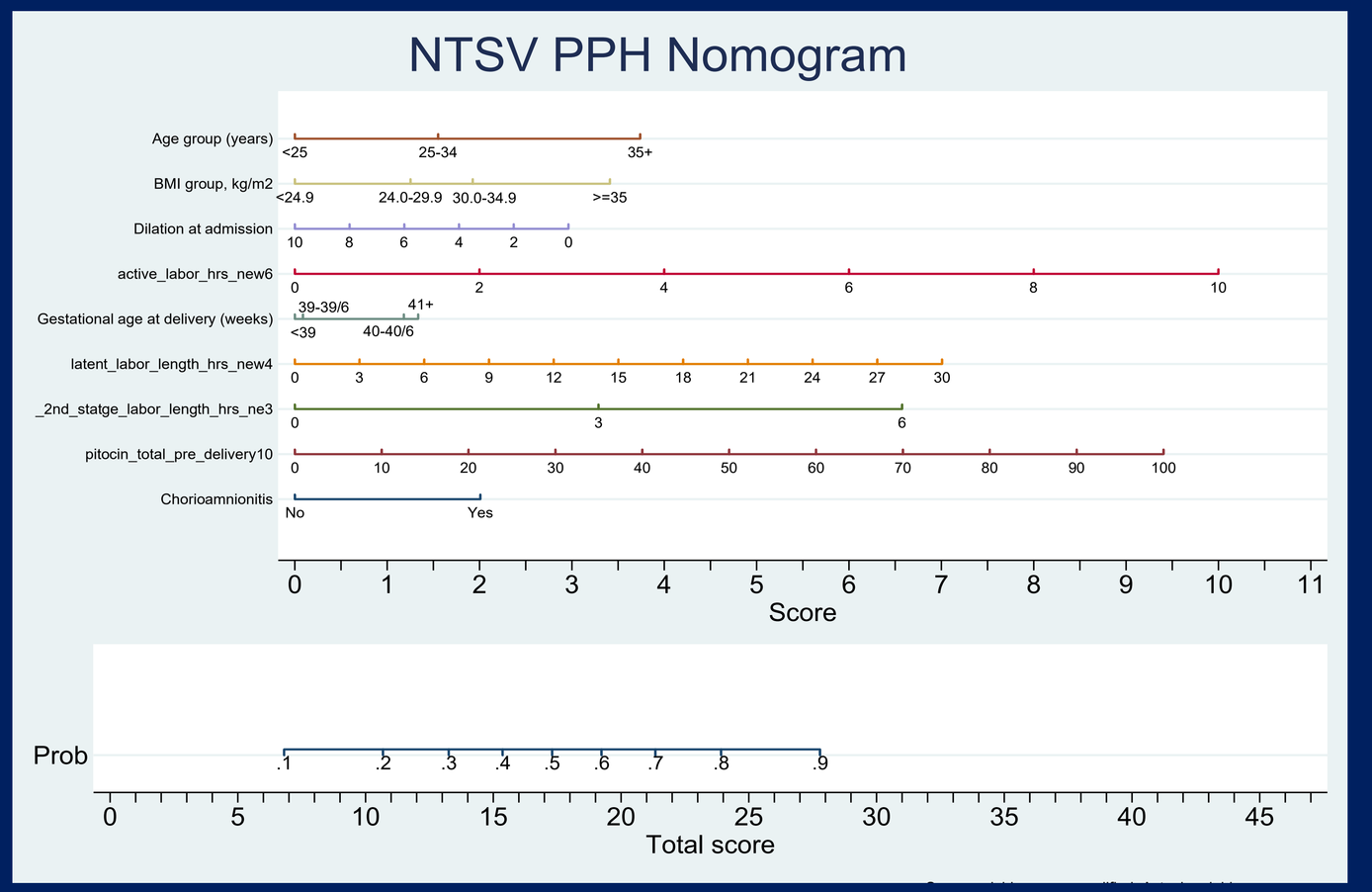
Table 2: Obstetrical Characteristics of NTSV patients with and without hemorrhage

Characteristic	Total (n= 7805)	Hemorrhage (n=1395)	No Hemorrhage (n=6410)	P
Cervical dilation at admission, cm	2.0 (1.0, 4.0)	1.0 (1.0, 3.0)	3.0 (1.0, 4.0)	<.001
Length of latent labor, hours	11.4 (4.9, 21.0)	17.4 (8.4, 29.0)	10.4 (4.4, 19.2)	<.001
Length of active labor, hours	2.5 (1.0, 5.9)	3.7 (1.0, 8.3)	2.4 (1.0, 5.5)	<.001
Length of second stage	1.2 (0.4, 2.7)	1.0 (0.0, 3.8)	1.2(0.5, 2.6)	<.001
Exams in latent labor, number	2.0 (1.0, 4.0)	3.0 (2.0, 5.0)	2.0 (1.0, 4.0)	<.001
Chorioamnionitis Diagnosis, n (%)	498 (6.4%)	156 (11.2%)	342 (5.3%)	<.001
Any Pitocin (pre-delivery), n (%)	5359 (68.7%)	1175(84.2%)	4184(65.3%)	<.001
Forceps assisted, n (%)	70 (0.9%)	17 (1.2%)	53 (0.8%)	0.16
Vacuum assisted, n (%)	183 (2.3%)	12(0.9%)	171(2.7%)	<.001
Epidural, n (%)	4993(64.0%)	1096(78.6%)	3897(60.8%)	<.001

Table 4: Factors associated with hemorrhage, among NTSV patients

Factor	Unadjusted Odds Ratio	Adjusted Odds Ratio	95% Confidence Interval	P
Age Category				
<25 Years	REF	REF	REF	REF
25-34 Years	1.39	1.38	1.17-1.64	<.001
≥ 35 Years	2.50	2.19	1.77-2.71	<.001
Pregnancy BMI				
<24.9 kg/m^2	0.50	0.67	0.52-0.85	0.001
25.0-29.9 kg/m^2	0.76	0.87	0.74-1.02	0.08
30.0-34.9 kg/m^2	REF	REF	REF	REF
≥ 35 kg/m^2	1.53	1.37	1.16-1.61	<.001
Gestational age at delivery				
37/0-38/6 weeks	1.14	1.02	0.85-1.22	0.84
39/0-39/6 weeks	REF	REF	REF	REF
40/0-40/6 weeks	1.21	1.28	1.09-1.51	0.003
≥ 41/0 weeks	1.59	1.32	1.10-1.59	0.003
Dilation at admission	0.82	0.94	0.90-0.98	0.003
Latent labor length, per 4 hours	1.13	1.05	1.03-1.08	<.001
Active labor length, per 6 hours	1.43	1.23	1.13-1.34	<.001
Second stage length, per 3 hours	1.27	1.26	1.15-1.38	<.001
Predelivery Pitocin, per 10 Units	1.04	1.02	1.01-1.03	<.001
Chorioamnionitis	2.23	1.52	1.23-1.89	<.001

Figure 3: Nomogram predicting PPH in NTSV based on factors in Table 4. Cstat = 0.715



Key Takeaways and Implications

- **These data suggest that demographic and obstetric characteristics can predict PPH as a patient progresses through labor.**
- **These findings could be used to modify clinical readiness to prevent excessive blood loss at delivery.**

Norethindrone Dosing for Adequate Menstrual Suppression in Adolescents

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[a]University of Michigan Medical School, Ann Arbor, MI, [b]Department of Obstetrics & Gynecology, Michigan Medicine, Ann Arbor, MI

Introduction

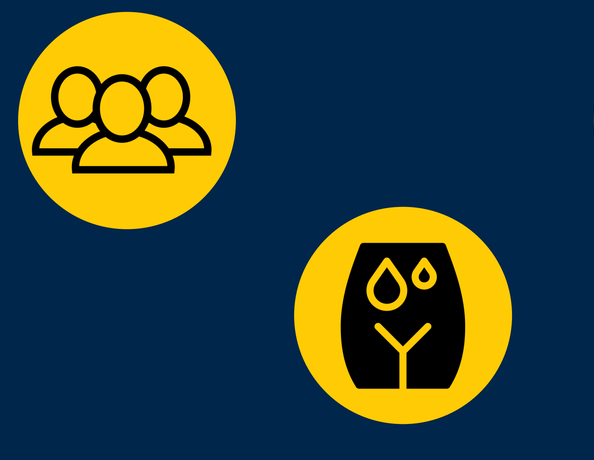
- Adolescents may desire menstrual suppression for dysmenorrhea, irregular menstrual bleeding, heavy menstrual bleeding, or management of medical conditions such as menstrual migraines or catamenial seizures. Adolescents with disabilities and their caregivers may desire menstrual suppression to aid with menstrual hygiene, caregiver burden, or menstrual symptoms.
- Combined hormonal contraceptives are among the most common methods for menstrual suppression, yet many adolescents have contraindications to estrogen. Estrogen interacts with several drug classes including anti-epileptic drugs and psychotropic medications.
- Up to 76% of users may achieve amenorrhea with progestin-only pills (POPs). POPs allow for easy cessation of therapy and easy dose escalation for improved pharmacologic effect.
- Norethindrone is the only available low-dose progestin (0.35mg). This formulation is also an FDA-approved contraceptive. NA is biosimilar and can also be prescribed in higher doses, up to 15mg daily, which allows for easy dose titration.
- While amenorrhea rates for norethindrone POPs have been reported as low as 10%, norethindrone is commonly used for menstrual suppression, particularly for patients seeking non-estrogen containing methods or low-dose formulations of hormones. However, there is a paucity of literature investigating the effectiveness of norethindrone 0.35mg for menstrual suppression in adolescents.

Objectives

- Determine patient characteristics associated with achieving menstrual suppression using norethindrone 0.35mg
- Evaluate patient characteristics that affect providers' likelihood of prescribing varying doses of norethindrone or NA
- Analyze patient satisfaction with norethindrone 0.35mg for menstrual management

Methods

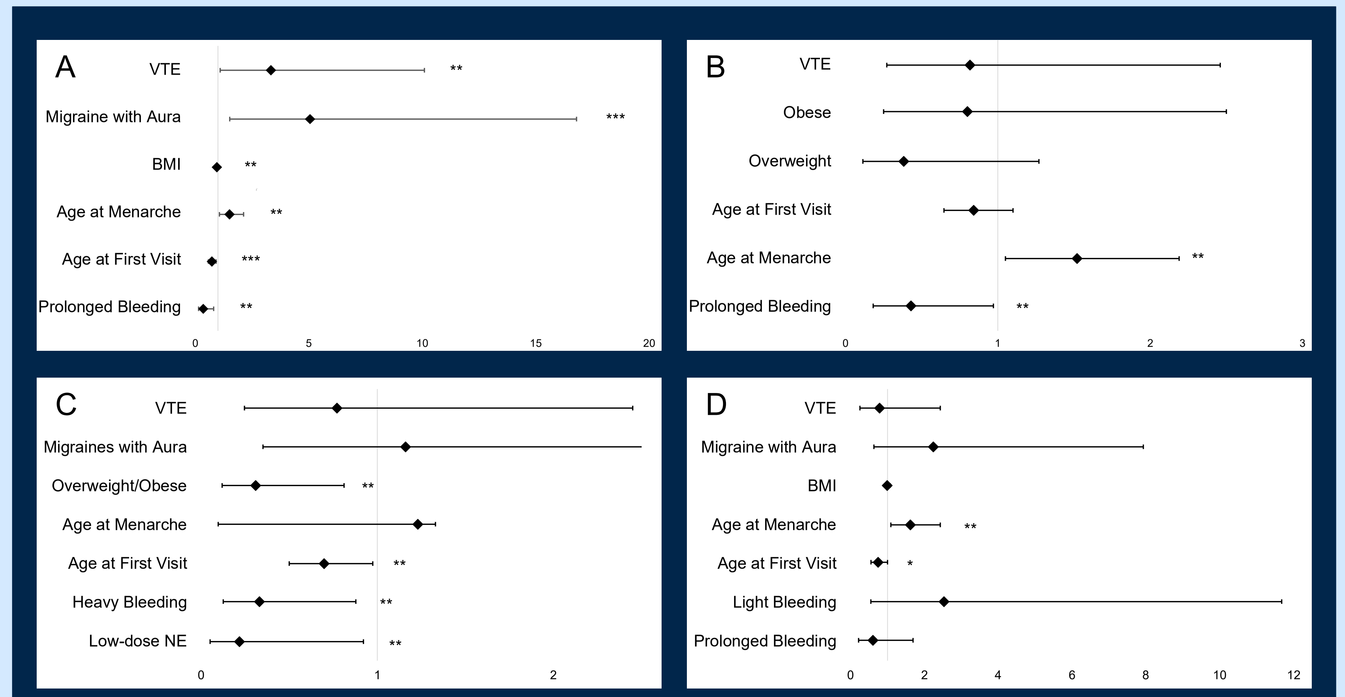
This is a retrospective cohort study of adolescents ages 9-18 who presented between 2010-2022. Those with previous hormone therapy were excluded. Data were collected on demographics, menstrual history, bleeding patterns, NA indication, and NA dose. Follow-up care was measured at one, three, and 12 months and included office or virtual visits and portal messages. Data was analyzed using Chi-square or Fisher's exact test. Multivariate logistic regression models assessed outcomes: 1) starting NA 0.35mg; 2) continuing NA 0.35mg; 3) achieving light bleeding or amenorrhea; and 4) reporting satisfaction with bleeding pattern. The study was deemed exempt by Institutional Review Board.



Patient characteristics can **predict likelihood of achieving menstrual suppression** on low-dose norethindrone and should be used to guide **prescribing practices** and **counsel patients**.

Results

Of 262 adolescents who initiated norethindrone, 219 completed at least one follow-up. Providers were less likely to initiate NE 0.35mg for patients with elevated BMI (p=0.044), prolonged bleeding (p=0.015), or younger age at menarche (p=0.019), but more likely to if patients were younger (p=0.009) or had estrogen contraindications. Those with prolonged bleeding were 13.1% less likely to continue NE 0.35mg (p=0.043). For each year older at menarche, patients were 2.6% less likely to continue NE 0.35mg (p=0.026). Patients with a disability were more likely to continue NE 0.35mg at three and 12 months (p=0.031, p=0.044). Patients were less likely to achieve menstrual suppression if they were overweight (BMI=25-30kg/m²) (p=0.01), younger (p=0.034), or had heavy menstrual bleeding (p=0.03). Patient satisfaction with NE 0.35mg was negatively associated with irregular bleeding (p<0.001). Irregular bleeding led to significantly more follow-up visits compared to those with weight gain or mood side effects (p<0.001).



Patient Characteristics Associated with A) Initiating NE 0.35mg B) Continuing NE 0.35mg C) Achieving Menstrual Suppression D) Satisfaction on NE 0.35mg.
* = significance at p=0.1, ** = significance at p=0.05, *** = significance at p=0.001

Conclusions

Providers were more likely to prescribe low-dose norethindrone to younger patients, but these patients were less likely to achieve menstrual suppression on this dose. Patients who were overweight or had heavy menstrual bleeding were also less likely to achieve menstrual suppression with NE 0.35mg. These results reveal opportunities for improved prescribing practices to help patients achieve menstrual suppression.

Provider and hospital-level predictors of variation in postpartum opioid prescribing: a statewide analysis

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VON VOIGTLANDER WOMEN'S HOSPITAL
UNIVERSITY OF MICHIGAN HEALTH

Introduction

- Opioid prescribing after birth is common nationally after cesarean and vaginal birth and is associated with long-term harms including new persistent opioid use and dependence.
- Documented variation in postpartum opioid prescribing suggests an opportunity for quality improvement.
- Identifying the hospital-level and provider characteristics associated with opioid prescribing can help to design and target QI efforts.

Objective

1) **To describe variation in opioid prescribing following childbirth across a statewide quality collaborative.**
2) **To assess the proportion of variation due to provider and hospital characteristics.**

Methods

- **Design**: retrospective cohort study
- **Population**: Individuals with nulliparous, term, singleton, vertex births cared for in one of 68 hospitals participating in a statewide maternity care quality collaborative from January 2020 to June 2021.
- Hospitals that did not complete quality measures (e.g., labor culture survey) were excluded.
- **Primary outcome**: Hospital rate of opioid prescribing

- **Secondary outcomes**: Average prescription size/hospital, provider/hospital-level predictors of opioid prescribing and prescription size
- **Analysis:** Mixed effects logistic regression, adjusting for patient characteristics, assessed provider and hospital-level predictors of prescribing. All analyses were performed separately for vaginal and cesarean birth.

Results

- 32,496 patients gave birth in the study period
  - Vaginal birth: 72.5% (29.412 / 32,496)
  - Cesarean birth: 27.5% (11,177/ 32,496)
- **Hospital rates of opioid prescription fills**:
  - Following vaginal birth: 3% (872/29,412)
  - Following cesarean birth: 87.8% (9812/11,177)
- **Hospital median prescription size in OMEs (Oral Morphine Equivalents)**:
  - Following vaginal birth: 60 (IQR 45-90)
  - Following cesarean birth: 90 (IQR 75-112.5)

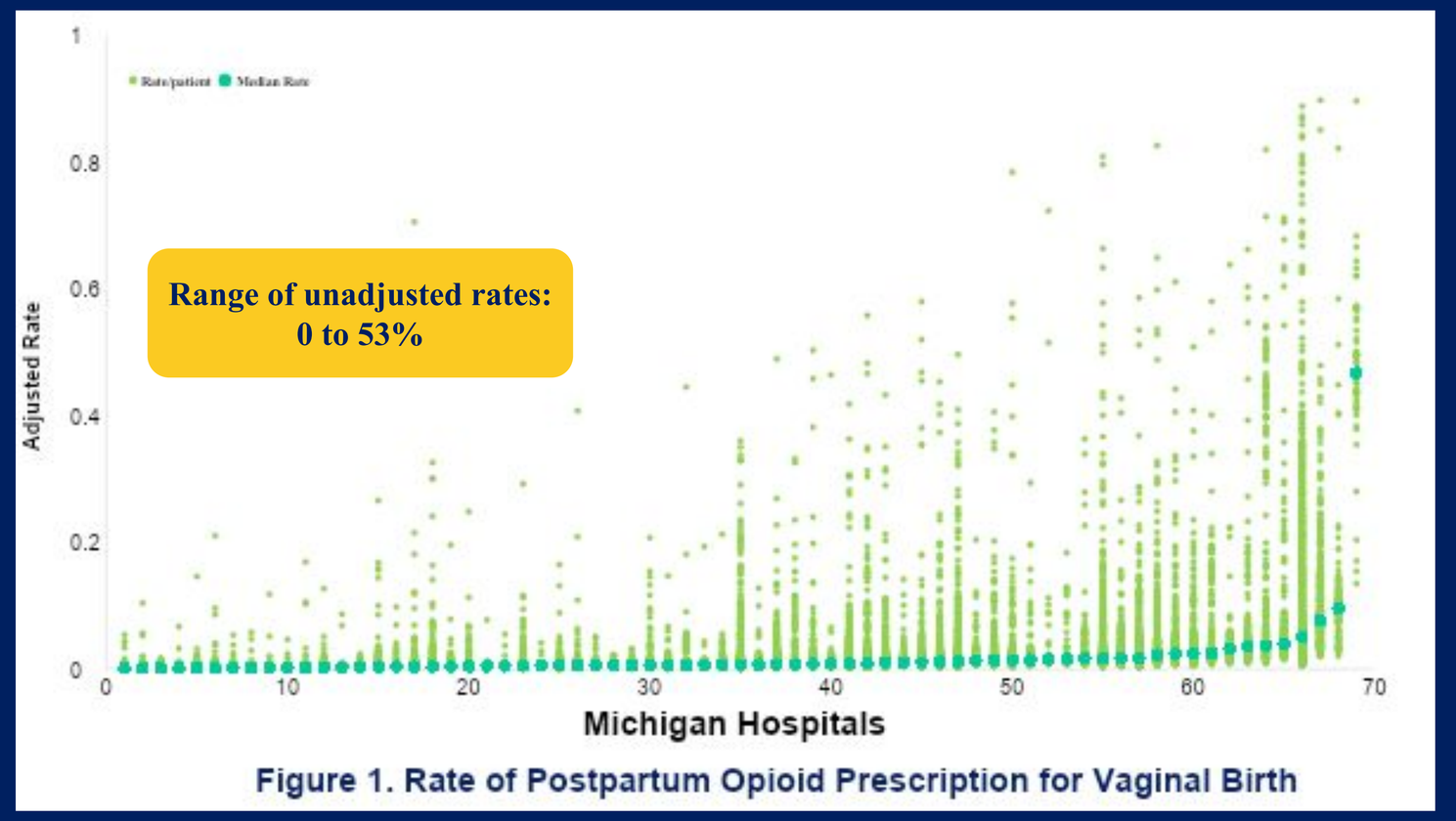

Figure 1. Rate of Postpartum Opioid Prescription for Vaginal Birth

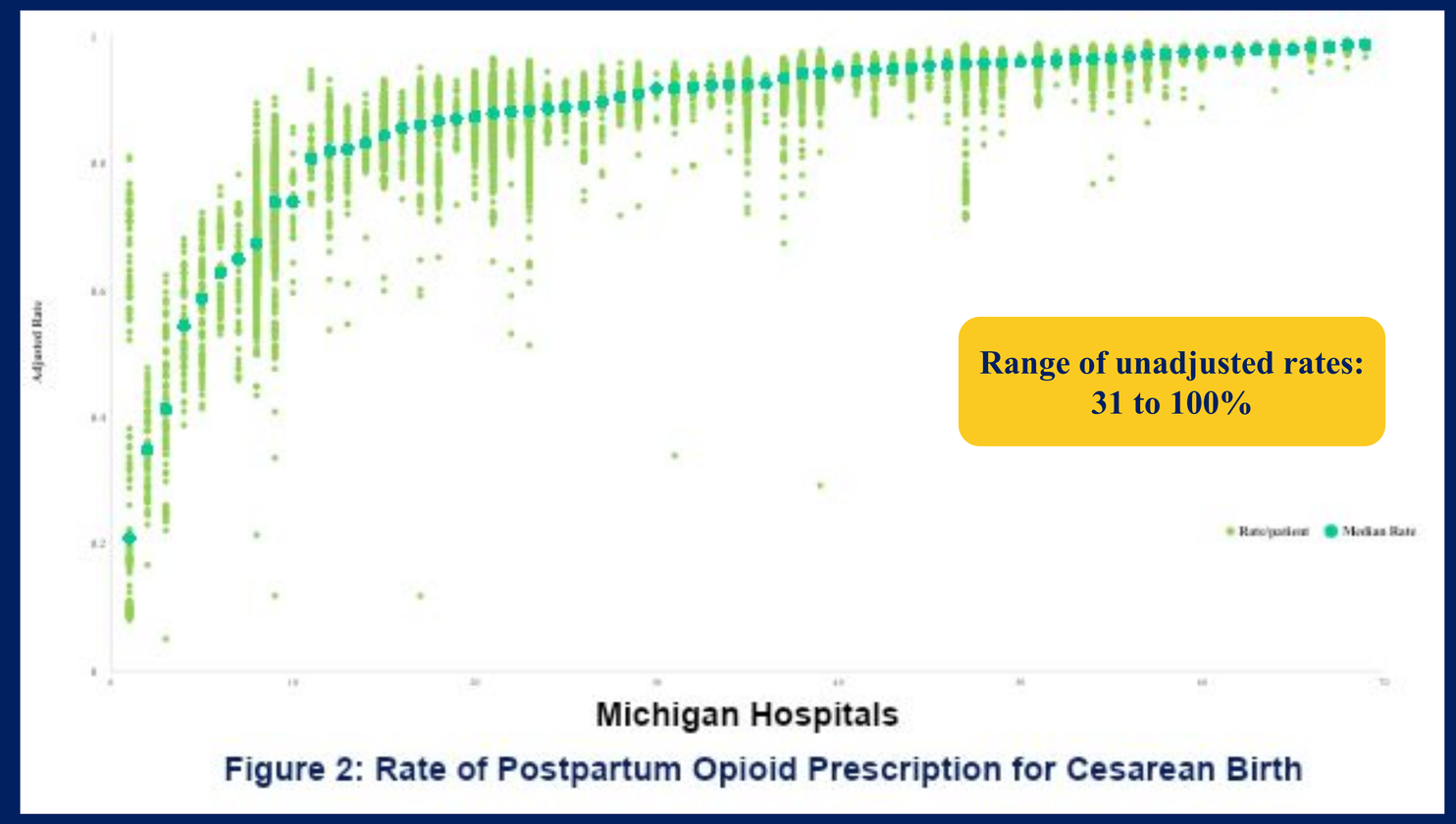

Figure 2: Rate of Postpartum Opioid Prescription for Cesarean Birth

Factors associated with HIGHER opioid prescribing following birth (aOR, 95% CI):

Patient

Non-Hispanic Black: 1.2 (1.01-1.48)
Asian: 1.46 (1.11-1.93)
Cesarean: 899.2 (755.2-1070.7)
Fourth Degree Laceration: 26.0 (17.6-38.4)

Hospital

Midsized hospital (2401-3600 births): 5.88 (1.8-19.8)
For-profit hospital: 5.45 (1.4-20.6)

More of the variation in prescribing was explained by hospitals: Hospitals: 44% Providers: 6%

Factors associated with LOWER opioid prescribing following birth:

Provider

Midwifery Care: 0.63 (0.48-0.83)
Family Medicine Care: 0.62 (0.41-0.95)

Hospital

NICU available: 0.34 (0.12-0.91)
High labor culture safety score: 0.37 (0.15-0.88)

Patient Characteristics	All Births (n=40,589)	
	n	%
Discharged w/ Opioid Prescriptions	10684	26.3%
Age: Mean (Std Dev)	26.5 (5.4)	
Race/Ethnicity		
Non-hispanic White	27211	67.0%
Non-hispanic Black	6776	16.7%
Hispanic	2252	5.5%
Asian	1576	3.9%
Multirace	236	0.6%
Others	233	0.6%
Unknown	2305	5.7%
Health Insurance/Payer*		
Private	24754	61.0%
Medicaid	13705	33.8%
Multiple Payment Methods	1142	2.8%

Provider and Hospital Characteristics	All Births (n=40,589)	
	n	%
Provider Characteristics:		
Female	28094	69.2%
Specialty		
OB/GYN MD	32720	80.6%
General Practice/Family Medicine MD	979	2.4%
Midwife/NP/PA	4099	10.1%
Hospital Characteristics:		
Hospital Annual Delivery Volume*		
<1200	11881	29.3%
1201 - 2400	7880	19.4%
2401 - 3600	7360	18.1%
>3600	13468	33.2%
Teaching Hospital	36452	89.8%
NICU Available	24255	59.8%
Policy Authority		
Non-for-profit	36840	90.8%
For-profit	2503	6.2%
Public/Governmental owned	1246	3.1%
Hospital Location*		
Urban	17156	42.3%
Suburban	2798	6.9%
Rural	635	1.6%

Discussion

- Variation in postpartum opioid prescribing after birth is high and driven largely by hospital level factors.
- A positive culture of quality improvement on the labor floor is associated with lower opioid prescribing, suggesting a positive spillover across different maternity care domains
- Opioid stewardship efforts targeted at the hospital level may be effective for reducing harms of opioid prescribing.
- **Next steps**: development of evidence-based, patient centered CPG and hybrid type-2 implementation study across the state of Michigan.

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The effect of tailored prenatal care policies with telemedicine on outpatient clinic utilization

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Background

- Prenatal care is a critical preventive service for the health of mothers and their infants
- Prenatal care requires >40 hours/low-risk patient: a significant burden for patients and clinics facing capacity constraints.
- **Targeted visit schedules** (8 to 9 visits for patients without risk factors) and **telemedicine** (virtual visits) are innovative strategies launched during the COVID-19 pandemic
- These innovative strategies are promising for improving clinic operations, access, and capacity. but their actual effects in clinical practice have not yet been explored.

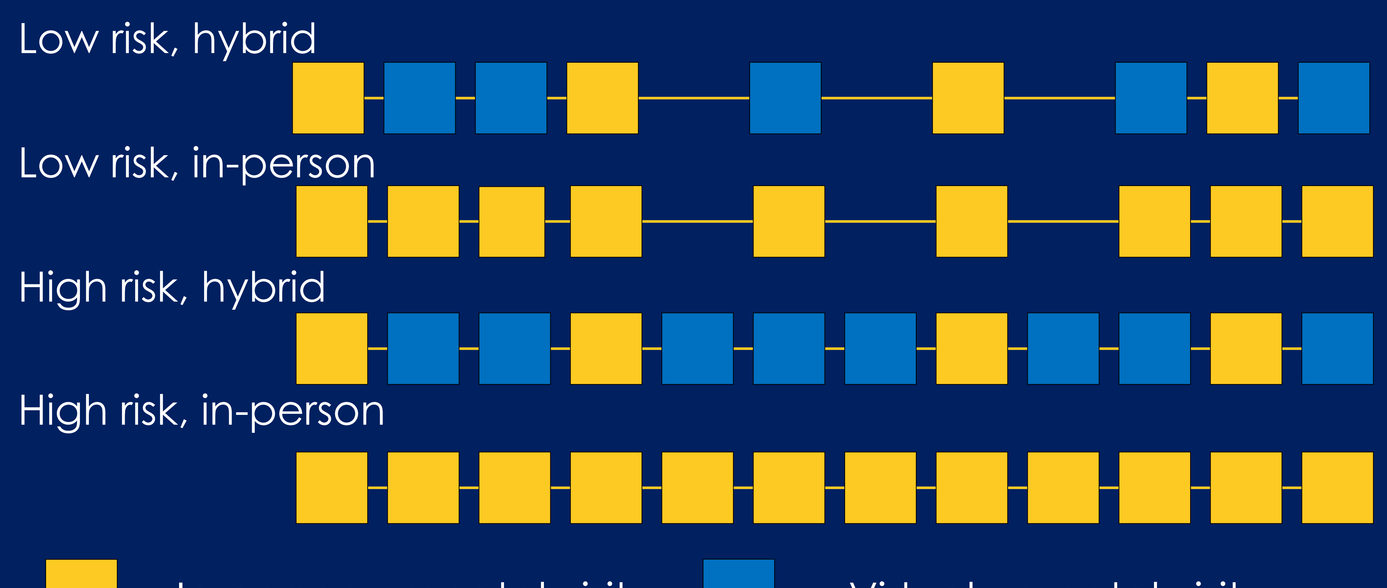
Objective

To describe changes in clinical operations and efficiency following implementation of a prenatal care policy including telemedicine visits.

Methods

- Study design: Discrete event simulation study in C++
- Simulation parameters:
  - Dynamic patient arrivals
  - Patient preference for hybrid care
  - Patient risk level (Low/High)
  - Run over 1000 replications across 10-year time horizon
- Dataset: EHR data collected via DataDirect
- Population: all pregnant patients giving birth at a single, midwestern academic institution
- Time frame: Jan 1 2021- Dec 31 2021
  - Inclusion criteria: received at least some prenatal care (>1 prenatal visit), gave birth at the study site
  - Exclusion criteria: received only a high-risk consultation or ultrasound at the study site prior to birth

Simulated Prenatal Care Policies



Medically Low Risk	Medically High Risk
No medical conditions +/- pregnancy complications	Chronic medical conditions +/- pregnancy complications

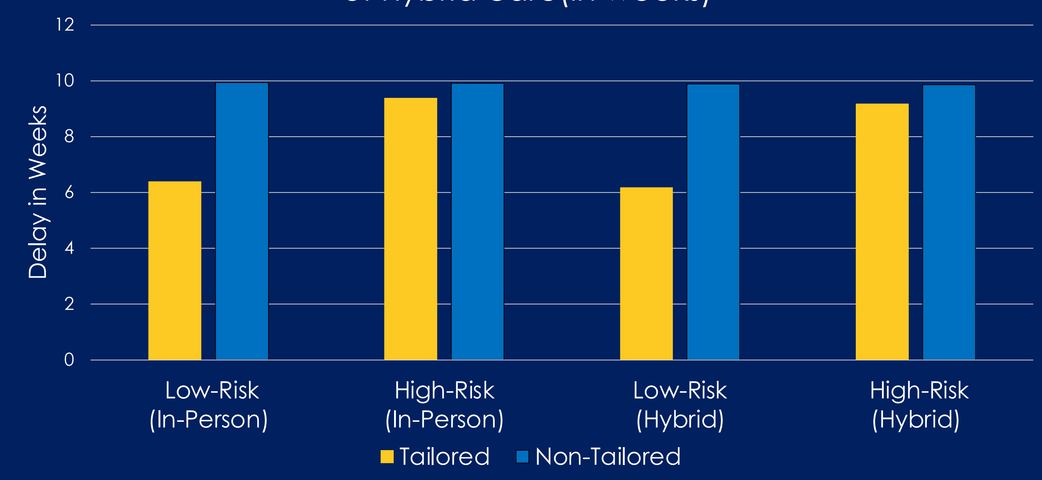
Key outcomes

1. **Patient delay (in weeks)**
2. **Percentage of overbooked appointments**
3. **Overall appointment utilization**

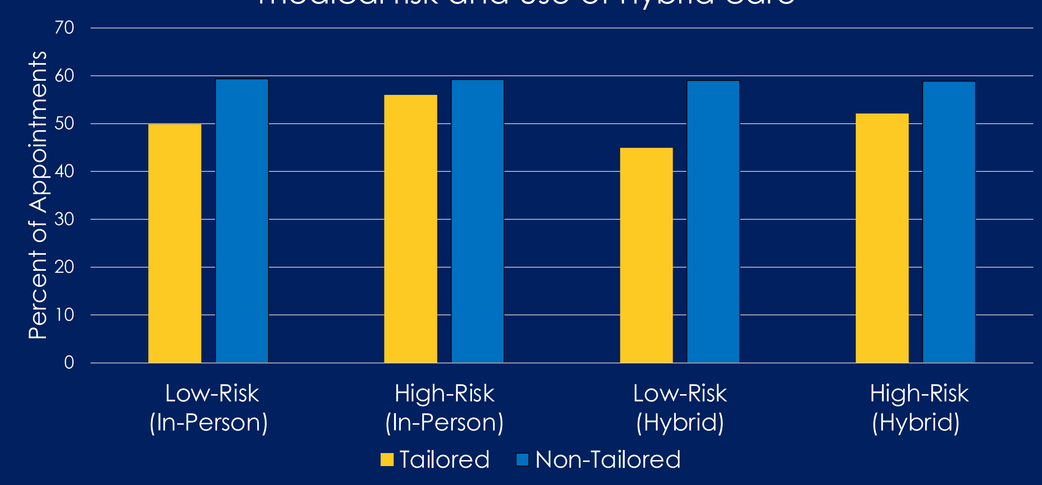
Results

- N=4681 patients
- 71% White; 1.8% Latinex
- 29% low-risk; 71% high-risk
- Unused clinic capacity decreased by 3% with tailored care

Average appointment delay by medical risk and use of hybrid care(in weeks)



Average percent of overbooked appointments by medical risk and use of hybrid care



Discussion

- Primary Finding(s): Tailored prenatal care models improve clinical operations
- Strengths: Use of robust simulation methods and detailed electronic health record data on care utilization
- Limitations: single-site data set, need for incorporation of outcomes data
- **Next steps**: incorporating dynamic patient risk factors (development of complications, timing of childbirth)

MICHIGAN MEDICINE

Frequency and trends in usage of eponyms in gynecologic anatomical terminology

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Background

- The SGS Pelvic Anatomy Group recommends use of accepted, standardized anatomic terminology.
- Eponyms are non-preferred terms but their use in scientific texts and literature remains common.

Objective: To assess frequency and trends in use of gynecologic eponyms compared to standardized anatomic synonyms in published works.

Study Design

- The Google NGrams Viewer platform was used to analyze the English 2019 Google corpus, a collection of five million books containing 360 billion words.
- This tool allows users to search terms and abstract yearly usage frequencies.
- Usage frequencies of eponyms and accepted anatomic terminology, as per *Terminologia Anatomica* (TA), were abstracted.
- Ratios between usage frequencies were calculated each year from 2000-2019.

Analysis: The mean ratio between eponym and TA term usage was calculated. Linear regression was used to assess trends in ratios from 2000-2019.

Reference: Hill AJ, Balgobin S, Mishra K, et al. Recommended standardized anatomic terminology of the posterior female pelvis and vulva based on a structured medical literature review. Am J Obstet Gynecol. Aug 2021;225(2):169.e1-169.e16.

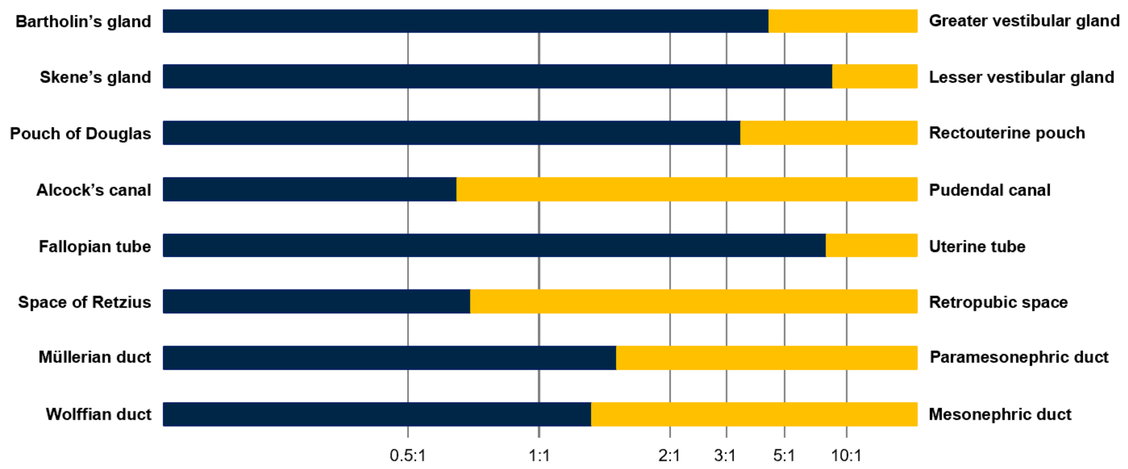

Figure 1. Relative frequency in usage of eponyms compared to standardized *Terminologia Anatomica* terms

On average, eponyms are used ***2.3x more frequently*** compared to standardized terminology for gynecologic anatomy

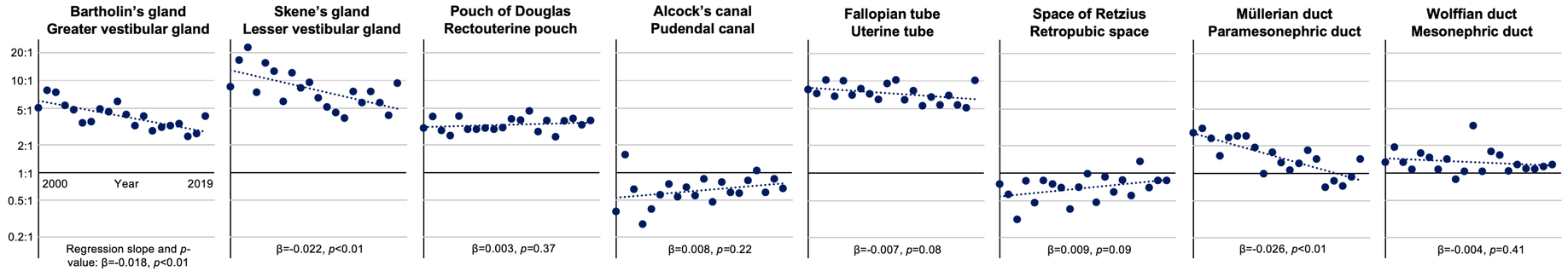

Figure 2. Trends in the ratio of eponym to standardized *Terminologia Anatomica* term usage from 2000-2019. Slopes are represented by the β coefficient.

Results

- Eponyms are used more frequently compared to their preferred TA term counterparts (mean ratio 2.26:1, 95% confidence interval [CI] 1.94-2.64:1).
- While three eponym terms decreased in use, an overall trend in the ratio of term usage was not identified (β=-0.007, p=0.23).

Conclusions

- Our findings, which show the frequent and ongoing use of eponyms, highlight the need to promote use of standardized anatomic terminology.
- *Comment*: Eponyms are non-scientific, nondescript, and do not provide the necessary anatomic context for proper comprehension and communication.

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Fully Quantitative Cervical Elastography Demonstrates Detectable Differences in Cervical Remodeling by Parity

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Background

- Cervical ripening is currently not clinically measurable in a quantifiable fashion
- Inability to numerically quantify cervical remodeling limits knowledge of normal and abnormal cervical remodeling
- Inability to describe normal and detect abnormal cervical remodeling limits clinical and scientific progress on disorders with abnormal cervical remodeling
- We have invented a device (patent pending) based on transvaginal cervical ultrasound that can numerically quantify cervical remodeling : **Fully Quantitative Cervical Elastography System (FQ-CES)**
  - Operator Independent
  - Can be compared across patients and within patients over time

Objective

To test a novel cervical imaging device and quantify cervical softening patterns over pregnancy in nulliparous versus multiparous patients

Methods

- Prospective longitudinal cohort study of asymptomatic patients with singleton gestations at the University of Michigan
- Vitis 1 11-14 weeks; Visit 2 18-23 weeks; Visit 3 28-34 weeks
- Device: Modified transvaginal ultrasound probe and imaging algorithm → quantifies pressure applied and tissue deformation → fully quantified strain-based cervical elastography
- FQ-CES –Youngs Modulus → log transformed
- Cervical length obtained according to CLEAR criteria
- Linear mixed effect models stratified by parity

See the digital version here:

Results

- N = 93 patients (37 nulliparous and 56 multiparous)
- Cervical tissue stiffness decreased progressively over pregnancy
- Slow and steady ripening over pregnancy
  - 6.7% softening per week in multiparous patients
  - 5.2% softening per week in nulliparous patients
  - Interaction term p=0.01
- Cervical length trend over pregnancy was insignificant (neither increased nor decreased) and did not differ by parity

Table 1: Demographic description of cohort stratified by parity

Demographics	Nulliparous (N=37)	Multiparous (N=56)	P-value
Age (mean)	31.6 (4.2)	31.7 (5.4)	0.12
BMI	27.1 (6.2)	30.9 (7.8)	0.01
Parity	0	1.8 (1.5)	
GA of visit 1	12.2 (1.5)	12.0 (1.5)	0.42
GA of visit 2	19.5 (1.1)	19.4 (1.0)	0.74
GA of visit 3	30.6 (2.4)	29.7 (2.1)	0.09
Race:			0.58
Black	3 (8,1)	10 (17.9)	
White	32 (86.5)	42 (75.0)	
Asian	1 (2.7)	2 (3.6)	
GA of delivery	38.0 (4.7)	36.7 (5.2)	0.24
PTB	6 (16.2)	11 (19.2)	0.89

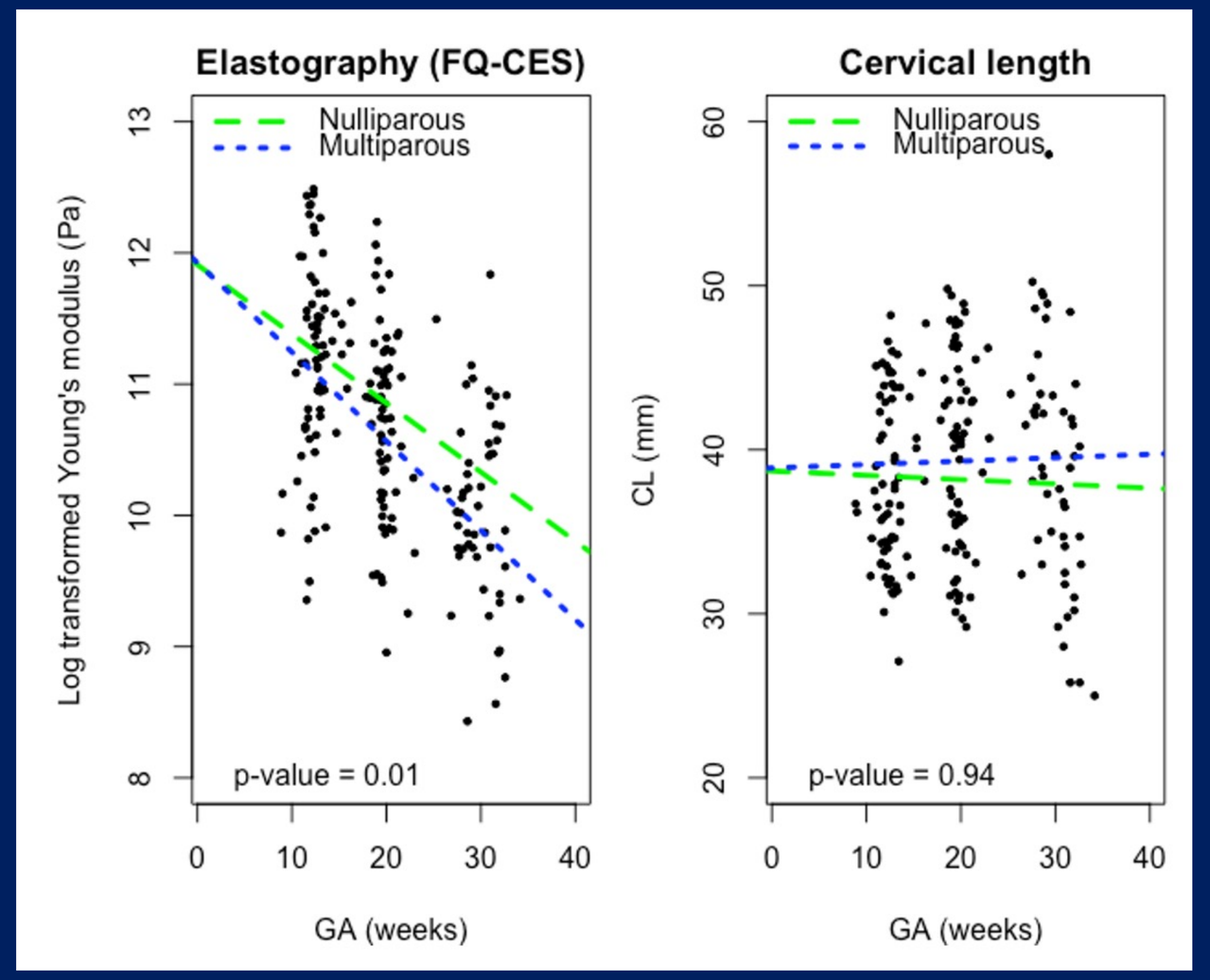

Figure 1. FQ-CES softening (left) and cervical length (right) trends showing steady softening over pregnancy which is more rapid in multiparous patients compared to nulliparous patients and no change in cervical length

Discussion

1. **Cervical softening is numerically quantifiable over pregnancy in an operator independent fashion**
2. **Cervical softening rate differs in nulliparous and multiparous patients with multiparous patients demonstrating more rapid cervical softening**

Key Scientific Opportunity: Fully quantified, operator-independent, numeric assessment of cervical softening allows description of population norms, repeated measurements within the same patient, comparisons between patients and presents a major opportunity to detect conditions of abnormal cervical ripening (preterm birth or post-term birth)

MICHIGAN MEDICINE

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Fully Quantitative Cervical Elastography Outperforms Cervical Length for Preterm Birth Prediction in Asymptomatic Patients

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[1]University of Michigan Medical Center, Department of Obstetrics and Gynecology, Ann Arbor, Michigan; [2]Women and Infants Hospital of Rhode Island, Brown University; [3]Washington University in Saint Louis

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Background

- Cervical ripening is currently not clinically measurable in a quantifiable fashion
- Inability to numerically quantify cervical remodeling limits knowledge of normal and abnormal cervical remodeling
- Preterm birth prediction and prevention could be improved if actual cervical tissue remodeling could be measured prior to cervical dilation
- We have invented a device (patent pending) based on transvaginal cervical ultrasound that can numerically quantify cervical remodeling : **Fully Quantitative Cervical Elastography System (FQ-CES)**
  - Operator Independent
  - Can be compared across patients and within patients over time

Objective

To test a novel cervical imaging device to quantify cervical ripening and predict preterm birth in asymptomatic patients

Methods

- Prospective longitudinal cohort study of asymptomatic patients with singleton gestations at the University of Michigan
- Vitis 1 11-14 weeks; Visit 2 18-23 weeks
- Device: Modified transvaginal ultrasound probe and imaging algorithm → quantifies pressure applied and tissue deformation → fully quantified strain-based cervical elastography
- FQ-CES –Youngs Modulus → log transformed
- Cervical length obtained according to CLEAR criteria
- Dichotomized into high and low cervical stiffness using optimal cutoff identified by chi-square test
- PTB = birth less than 37 weeks
- Prediction performance for FQ-CES and CL using ROC curves

Results

- N = 87 patients from 11-23 weeks
- 15th percentile of log-Youngs modulus from FQ-CES was the optimal cut-point to define low cervical stiffness
- Low cervical stiffness:
  - RR 2.9 (95%CI 1.4-6.1)
  - Sensitivity 31%
  - Specificity 91%
  - Positive predictive value 50%
  - Negative predictive value 83%
- FQ-CES performed better than CL for PTB prediction
  - AUC FQ-CES 0.69 versus AUC CL 0.53 (p=0.18)
- Adding CL to FQ-CES did not improve prediction

Table 2: AUC of FQ-CES and CL for prediction of PTB <37 weeks

FQ-CES alone	0.69 (0.54-0.84)
CL alone	0.53 (0.38-0.69)
FQ-CES + CL	0.70 (0.55-0.85)

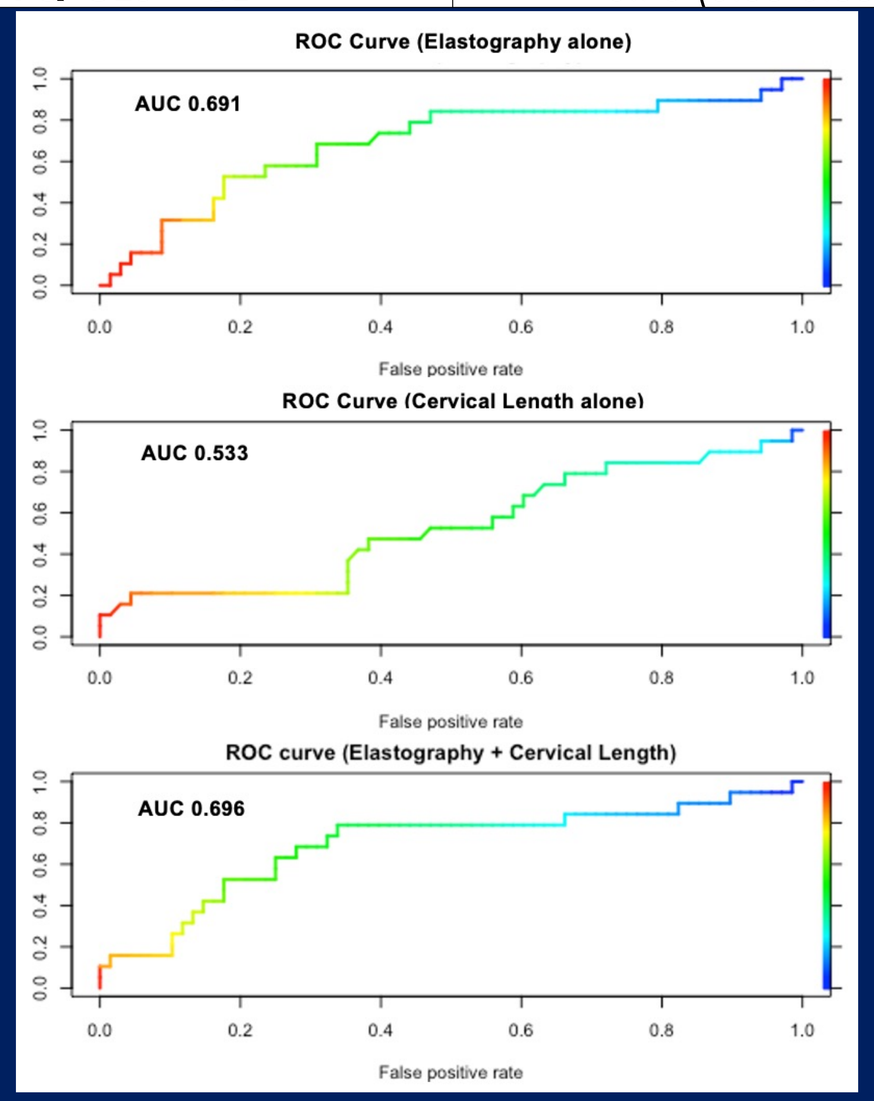

Table 1: Demographic description of patients with low versus high cervical stiffness

Demographics	Low stiffness (N=27)	High stiffness (N=60)	P-value
Age (mean)	31.5 (4.6)	33.2 (4.7)	0.11
BMI	30.9 (8.3)	28.8 (7.1)	0.24
Parity	18 (66.7%)	35 (58.3)	0.62
GA of visit	15.8 (4.2)	16.2 (3.7)	0.59
Race:			0.38
Black	3 (11.1)	10 (16.7)	
White	22 (81.5)	47 (78.3)	
Asian	0 (0)	2(3.3)	
Prior PTB	8 (29.6)	8 (13.3)	0.13
Number of prior PTB	0.33 (0.55)	0.23 (3.46)	0.54
GA of delivery	35.3 (7.4)	38.1 (3.5)	0.02
PTB	9 (33.3)	6 (10.0)	0.02

Discussion

1. **Cervical softening is numerically quantifiable over pregnancy in an operator independent fashion**
2. **Low cervical stiffness detectable at 11-23 weeks is associated with a 3-fold increased risk for PTB <37 weeks**
3. **Predictive characteristics of FQ-CES may be better than current clinical practice of CL with similar lead-time for application of prevention therapies**

Key Scientific Opportunity: Fully quantified, operator-independent, numeric assessment of cervical softening allows description of population norms, repeated measurements within the same patient, comparisons between patients. This presents a major opportunity to improve PTB prediction and improve PTB prevention trials by targeting populations at risk for PTB

MICHIGAN MEDICINE

Novel Fully Quantitative Cervical Elastography Detects Early Cervical Remodeling Patterns Ahead of Term and Preterm Birth

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[1]University of Michigan Medical Center, Department of Obstetrics and Gynecology, Ann Arbor, Michigan; [2]Women and Infants Hospital of Rhode Island, Brown University; [3]Washington University in Saint Louis

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Background

- Cervical ripening is currently not clinically measurable in a quantifiable fashion
- Inability to numerically quantify cervical remodeling limits knowledge of normal and abnormal cervical remodeling
- Preterm birth prediction and prevention could be improved if actual cervical tissue remodeling could be measured prior to cervical dilation
- We have invented a device (patent pending) based on transvaginal cervical ultrasound that can numerically quantify cervical remodeling : **Fully Quantitative Cervical Elastography System (FQ-CES)**
  - Operator Independent
  - Can be compared across patients and within patients over time

Objective

To test a novel cervical imaging device to examine cervical softening patterns ahead of term and preterm birth

Methods

- Prospective longitudinal cohort study of asymptomatic patients with singleton gestations at the University of Michigan
- Vitis 1 11-14 weeks; Visit 2 18-23 weeks; Visit 3 28-34 weeks
- Device: Modified transvaginal ultrasound probe and imaging algorithm → quantifies pressure applied and tissue deformation → fully quantified strain-based cervical elastography
- FQ-CES –Youngs Modulus → log transformed
- Cervical length obtained according to CLEAR criteria
- PTB = birth < 37 weeks
- Trends in FQ-CES and CL described with linear mixed models
- FQ-CES and CL compared at each visit in patients with eventual term and preterm birth and compared using a 2-sided t-test

Results

- N = 93 patients
- Cervical tissue stiffness decreased progressively over pregnancy (p<0.001)
- Cervical stiffness is significantly softer in preterm birth detectable in early pregnancy
  - 11-14 weeks 38.6% softer in preterm birth (p=0.04)
  - 18-23 weeks 42.4% softer in preterm birth (p=0.03)
  - 28-34 weeks 35.0% softer in preterm birth (p=0.09)
- Cervical length showed no significant shortening over pregnancy (p=0.73)

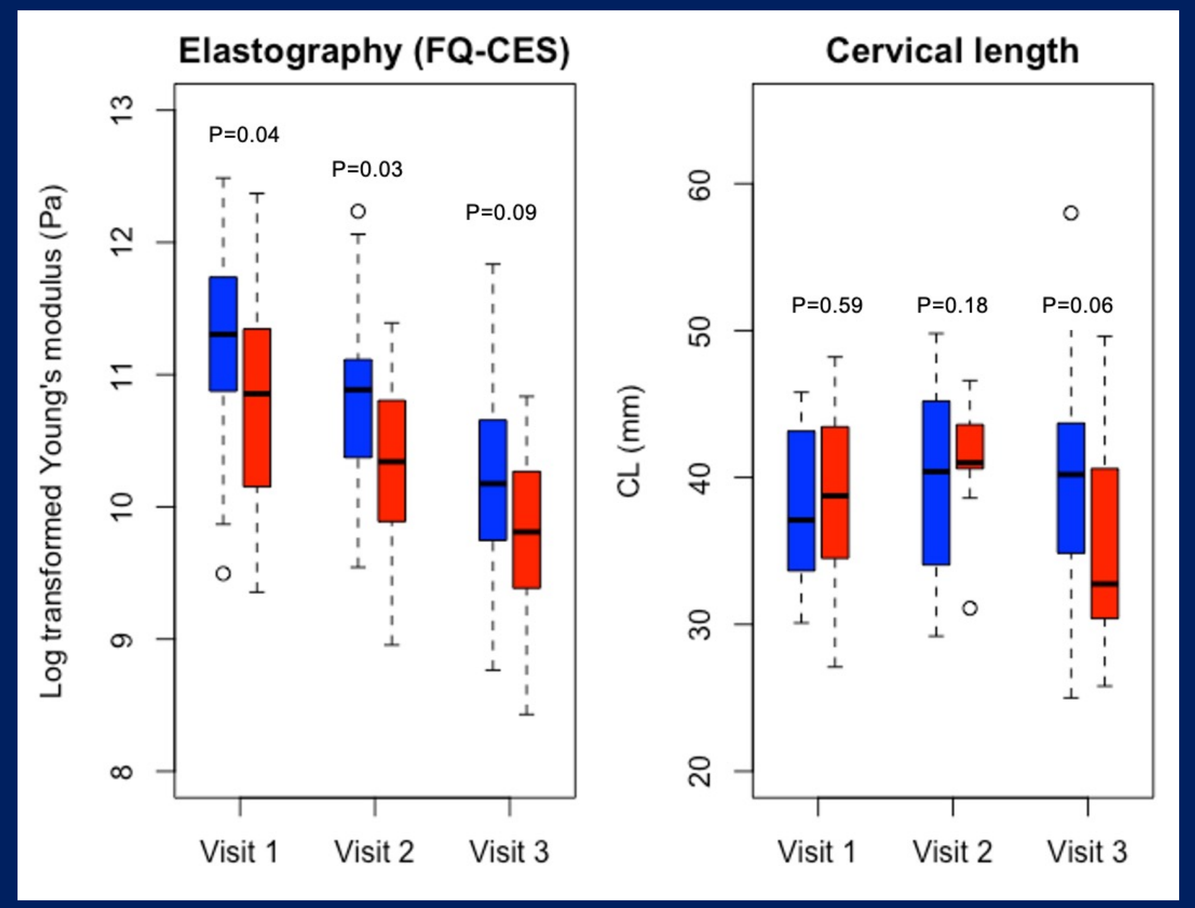

Table 1: Demographic description of patients with term and preterm birth

Demographics	PTB (N=17)	Term Birth (N=76)	P-value
Age (mean)	32.1 (5.3)	32.7 (4.6)	0.65
BMI	30.9 (8.9)	29.0 (7.1)	0.35
Nulliparity	11 (64.7)	45 (59.2)	0.89
Race:			0.72
Black	3 (17.6)	10 (13.2)	
White	13 (76.5)	61 (80.3)	
Asian	0 (0)	3 (3.9)	
Prior PTB	9 (52.9)	8 (10.5)	<0.001
Number of prior PTB	0.82 (1.24)	0.13 (0.41)	<0.001
Interval since last pregnancy (years)	2.43 (1.53)	2.91 (2.96)	0.56
GA delivery	34.9 (2.6)	37.7 (5.3)	0.03

Discussion

1. **Cervical softening is numerically quantifiable over pregnancy in an operator independent fashion**
2. **Low cervical stiffness based on FQ-CES is significantly different at 11-14 weeks and at 18-23 weeks in patients with subsequent preterm birth**
3. **FQ-CES detects progressive softening and detectable differences in term and preterm birth whereas the current clinical standard of cervical length does not**

Key Scientific Opportunity: Fully quantified, operator-independent, numeric assessment of cervical softening allows description of population norms, repeated measurements within the same patient, comparisons between patients. This presents a major opportunity to improve PTB prediction and improve PTB prevention trials by targeting populations at risk for PTB.

MICHIGAN MEDICINE

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Placental epigenetic regulation in opioid exposed pregnancies

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3 Department of Nutritional Sciences, University of Michigan

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Background

- Neonatal opioid withdrawal syndrome (NOWS) results from chronic *in-utero* opioid exposure and its severity is unpredictable.
- Maternal opioid formulation and dose, length of opioid use, and maternal serum opioid concentrations **do not correlate** with NOWS severity
- Placental ***CY19A1*** (aromatase) is the major enzyme responsible for metabolizing both methadone and buprenorphine.
- Placental efflux transporters ***ABCB1***, encodes P-glycoprotein (P-gp), and ***ABCG2***, encodes breast cancer resistance protein (BCRP), and facilitate placental efflux of methadone and buprenorphine back into the maternal circulation, potentially reducing fetal opioid exposure.
- Inter-individual variability in placental opioid metabolism and transfer **mediated by epigenetic changes** may impact fetal opioid exposure and NOWS severity.

Figure 1. Key Regulators of Placental Opioid Metabolism and Transport

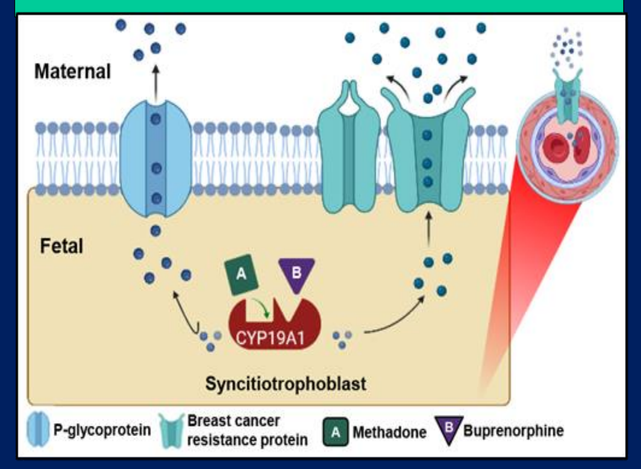
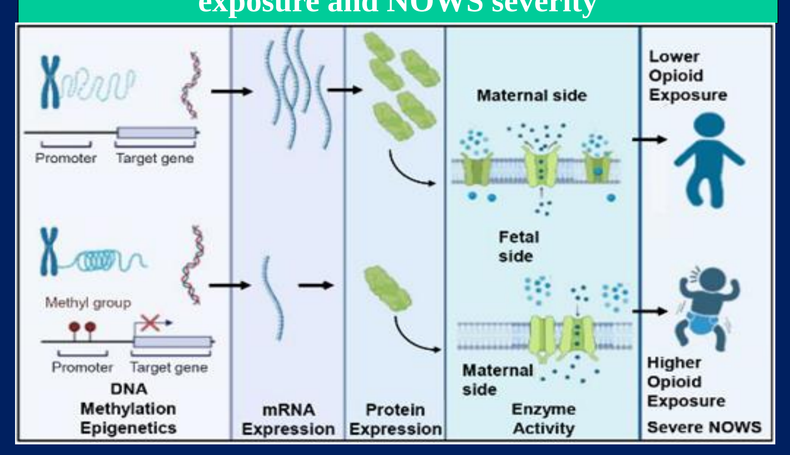


Figure 2. Proposed mechanism of placental methylation differences impacting fetal opioid exposure and NOWS severity



Hypothesis

Severe NOWS is associated with greater neonatal methylation of the genes encoding for placental opioid metabolism (*CYP19A1*) and efflux transporters (*ABCB1* and *ABCG2*).

Methods

- Prospective multicenter cohort study of mother-baby dyads on medication for opioid use disorder (MOUD) in pregnancy.
- Inclusion: >18yo, on MOUD (methadone or buprenorphine), ≥34 weeks, singleton. Exclusion: major fetal anomalies, no biospecimen collection.
- Placental biopsies from all four quadrants inclusive of the syncytiotrophoblast collected within 1 hour of delivery and placed in RNALater.
- Placental DNA methylation levels of genes (ABCG1, ABCG2, CYP19A1 and HSD11B2) were quantified in triplicates across many promoter region sites per gene via pyrosequencing following bisulfite conversion.
- CYP19A1 mRNA levels were determined by rtPCR and umbilical cord drug levels were determined by LC-MS.
- Maternal and neonatal characteristics were abstracted from the electronic medical record.
- Severe NOWS was diagnosed when Finnegan scores exceeded 24 in a 12-hour period.
- P-value <0.05 was deemed significant.

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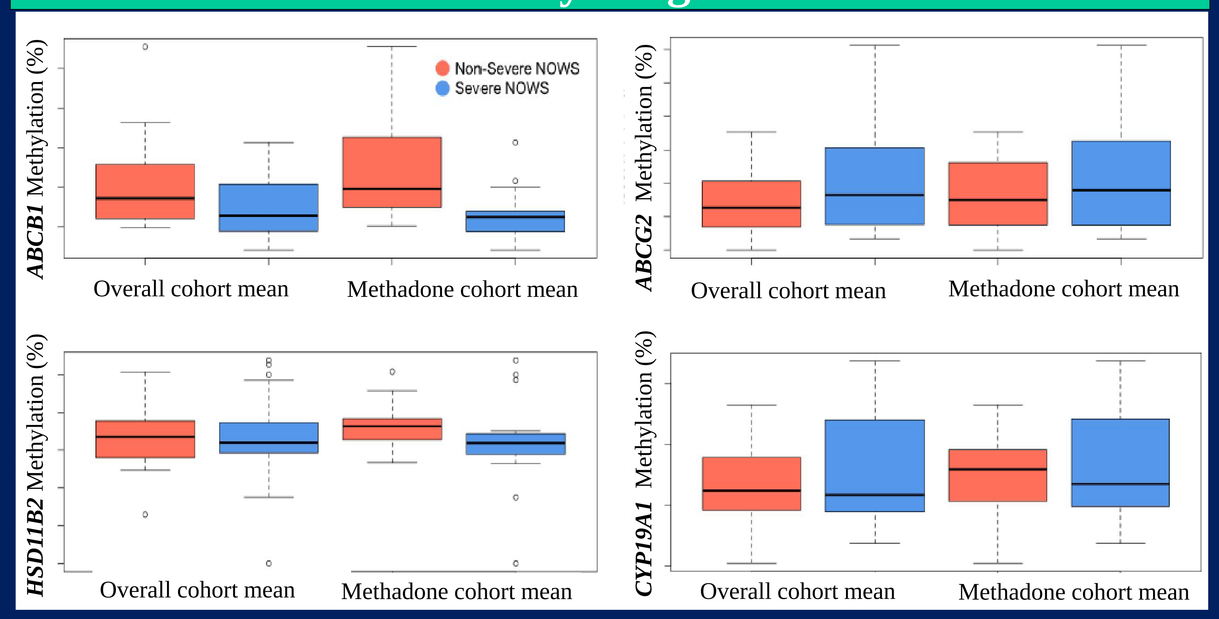
Results

- Thirty-eight dyads on chronic MOUD were enrolled (Table 1).
- Aside from maternal age, maternal characteristics were similar between groups.
- Neonates in the severe NOWS group had higher rates or neonatal intensive care unit admission, longer lengths of stay and higher peak Finnegan scores.

Table 1. Maternal and neonatal characteristics

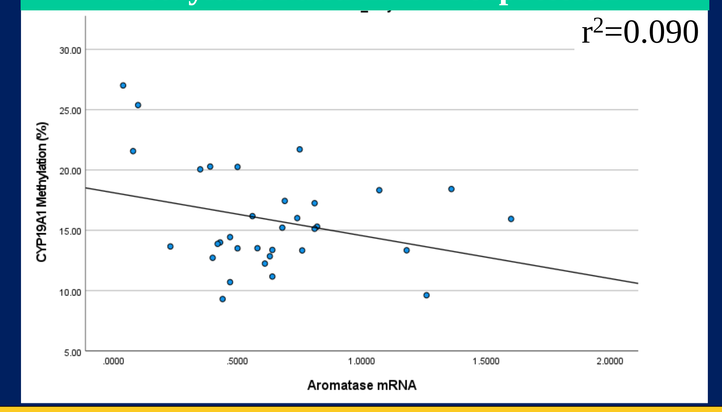
	Cohort (n=38)	Non-Severe NOWS (n=19)	Severe NOWS (n=19)	p-value
Maternal Characteristics				
Maternal Age (years)	30 ± 4	32 ± 4	28 ± 4	0.01*
Gravida	3 ± 2	3 ± 2	3 ± 1	0.34
Race				
White	36 (96%)	19 (100%)	17 (90%)	
African American	1 (2%)	0	1 (5%)	
Other	1 (2%)	0	1 (5%)	0.35
Ethnicity				
Non-Hispanic	34 (89%)	18 (95%)	16 (84%)	
Hispanic	4 (11%)	1 (5%)	3 (16%)	0.32
Opioid Medication				
Methadone	29 (76%)	13 (68%)	16 (84%)	
Buprenorphine	9 (23%)	6 (32%)	3 (16%)	0.25
Smoker	29 (76%)	13 (68%)	16 (84%)	0.25
Mood Disorder	20 (53%)	11 (58%)	9 (47%)	0.50
Psychiatric Medication	15 (40%)	8 (42%)	6 (32%)	0.52
Hepatitis C infection	10 (26%)	8 (42%)	6 (32%)	0.52
Length of stay (days)	4 ± 1	4 ± 1	4 ± 1	0.15
Cesarean	18 (47%)	10 (53%)	8 (42%)	0.51
Medicaid Insurance	36 (96%)	17 (89%)	19 (100%)	0.15
Neonatal Characteristics				
Gestational age at delivery	39 ± 2	39 ± 2	39 ± 1	0.77
Gestational weight (grams)	3025 ± 535	3044 ± 513	3005 ± 569	0.83
Male	21 (55%)	11 (58%)	10 (53%)	0.74
NICU admission	16 (42%)	2 (11%)	14 (74%)	<0.01*
Peak Finnegan Score	10 ± 4	7 ± 2	13 ± 3	<0.01*
Length of stay	11 ± 8	8 ± 3	16 ± 9	<0.01*

Promoter Region Methylation in Non-Severe and Severe NOWS by Target Gene



	Overall Cohort			Methadone Cohort		
	Non-Severe NOWS Mean (95% CI)	Severe NOWS Mean ((95% CI)	P-value	Non-Severe NOWS Mean (95% CI)	Severe NOWS Mean (95% CI)	P-value
ABCB1	6.2 (1.3-11.1)	4.94 (1.80- 8.08)	0.1	6.77 (1.3,12.2)	4.64 (1.88, 4.64)	0.05
CYP19A1	16.6 (9.8-23.4)	17.85 (9.01-26.7)	0.37	17.48 (10.1-24.8)	18.24 (9.09-27.4)	0.66
HSD11B2	3.3 (1.6-5.0)	3.36 (0.77-5.95)	0.89	3.69 (2.3-5.1)	3.21 (0.66-5.76)	0.24
ACBG2	1.49 (-0.6-2.04)	2.04 (-1.04-5.12)	0.24	1.67 (-2.5-5.9)	1.23 (-2.0-4.46)	0.41

Association between CYP19A1 Promoter Methylation and mRNA expression



- No methylation differences between groups for placental *CYP19A1, ABCG2* and *HSD11*.
- Placental ***CYP19A1*** methylation was inversely correlated with *CYP19A1* mRNA levels (r^2= -0.09).
- Target gene methylation was not associated with umbilical cord drug levels.

Discussion

- Lower placental *ABCB1* methylation was associated with severe NOWS, particularly among methadone-exposed pregnancies
- Higher placental *CYP19A1* methylation correlated with lower CYP19A1 mRNA expression
- **Limitations:** small cohort, low buprenorphine use. **Strengths:** prospective placenta sample collection, triplicate sample analysis, limited confounders
- **Next steps**: Consider case-control study, include higher rate of Buprenorphine-exposed
- pregnancies, complete mRNA and protein assessment for other target genes.

MICHIGAN MEDICINE

Ambulatory follow-up after hypertensive disorders of pregnancy in Michigan

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Background

- Hypertensive disorders of pregnancy (HDP) are associated with short- and long-term cardiovascular morbidity.
  - Hypertension
  - Stroke
  - Heart Failure
- Since 2017, major professional societies have recommended early follow-up after HDP
- Data on ambulatory follow-up after HDP is limited and driven by practices prior to 2014.

Objective

To characterize contemporary postpartum ambulatory care among patients with HDP across the state of Michigan and assess patient-level factors associated with follow-up.

Methods

- Design: Retrospective cohort study of patients delivering at hospitals participating in the Obstetrics Initiative
- Dataset: Michigan Value Collaborative claims for BCBSM and BCN commercially insured patients
- Cohort: 90-day episode of care for childbirth + ICD-10 diagnosis of HDP, January 2016-December 2021
- Primary exposure: hypertensive disorder
- Primary outcome: ambulatory care visit in the 90-day postpartum period
  - Professional claim for office visit with Family Medicine, Internal Medicine, nurse practitioner, physician assistant, Preventative Medicine, or General Practice
  - Excluding routine obstetric postpartum care (Z39.X)
- Multivariable Poisson regression model with robust error variance to model adjusted relative risk of follow-up care

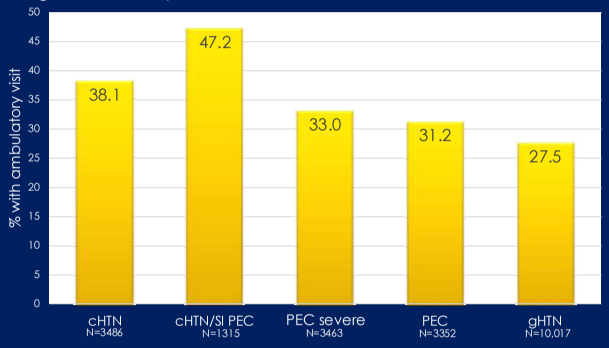
Characteristic	Adjusted Relative Risk (95% CI)
Age, years	
18 to <25	Reference
25 to <30	1.09 (1.02-1.17)
30 to <35	1.14 (1.07-1.22)
35 to <40	1.30 (1.21-1.40)
≥ 40	1.37 (1.24-1.51)
Hypertensive disorder	
cHTN	Reference
cHTN with SI PEC	1.20 (1.11-1.29)
PEC with severe features	0.89 (0.84-0.95)
PEC	0.86 (0.81-0.92)
gHTN	0.77 (0.73-0.82)
Cesarean birth	1.07 (1.03-1.11)
Maternal chronic conditions	
0	Reference
1	1.27 (1.22-1.33)
≥2	1.54 (1.40-1.69)
Resides in rural zip code	1.13 (1.07-1.20)

cHTN, chronic hypertension; gHTN, gestational hypertension; PEC, preeclampsia; SI, superimposed

Results

- 21,633 patients with HDP
- 6,887 (31.8%) with ≥ 1 ambulatory visit within 90 days
  - Proportion with ambulatory visit did not change over time (p=0.06)
- Compared to those with chronic hypertension:
  - Superimposed preeclampsia more likely to follow-up
  - Preeclampsia and gestational hypertension less likely to follow-up
- Patient factors associated with follow-up:
  - Older age
  - Cesarean birth
  - Other comorbidities
  - Resides in rural zip code

Figure 1. Follow-up after HDP



Discussion

- **Primary Finding: Less than one third of patients with HDP receive ambulatory care follow-up within 3 months of delivery, representing an important quality improvement target to reduce CVD burden.**
- Strengths: large sample size, recent cohort
- Limitations: limited race/ethnicity data, content of visit cannot be assessed
- Next steps: identify hospital and provider-level factors that may be modifiable to encourage needed follow-up

VON VOIGTLANDER WOMEN'S HOSPITAL
UNIVERSITY OF MICHIGAN HEALTH

Standardizing induction of labor improves clinical outcomes

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Background

- Induction of labor (IOL) is common.
- Recent observation and trial data suggest elective IOL at 39 weeks is a risk-reducing procedure.
- However, increasing duration of IOL is associated with adverse outcomes:
  - Cesarean
  - Chorioamnionitis/endometritis
  - Postpartum hemorrhage (PPH)
- There are multiple trials demonstrating shorter time to delivery with 1) dual agent cervical ripening and 2) early amniotomy
- There is limited but promising data that a standardized approach to IOL improves outcomes and decreases racial disparities.

Objective

To assess the impact of standardizing IOL practices on length of IOL and maternal morbidity.

Methods

- Single center quality improvement project
  - Pre-implementation (PRE): 8/1/2021-1/31/2022
  - Post-implementation (POST): 3/1/2022-5/1/2022
- Inclusion: admission for IOL; singleton; vertex presentation; Intact membranes
- Exlclusion: stillbirth; prior cesarean
- Evidence-based, standardized recommendations:
  - Combined foley balloon/misoprostol for cervical ripening
  - Vaginal misoprostol preferred over buccal
  - Early amniotomy (≤ 4 cm)
  - Labor progress assessments at least every 4 hours
- Primary exposure: time period (PRE vs. POST)
- Primary outcome: duration of IOL
- Multiple linear regression adjusted for parity and epidural use

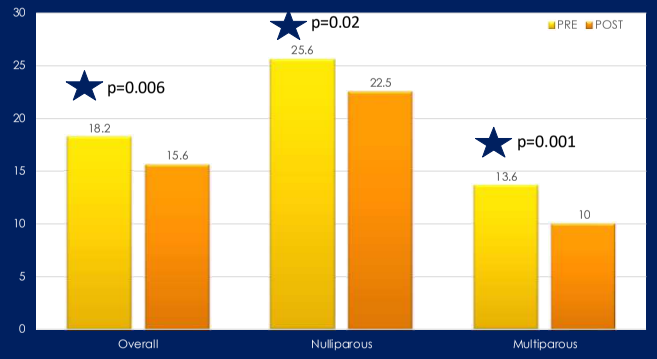
Table. Baseline obstetric & demographic characteristics

Characteristic	PRE (n=324)	POST (n=189)	p-value
Age, years	30.9 (5.1)	30.7 (5.7)	0.75
BMI, kg/m²	32.0 (28.8-36.9)	31.2 (27.8-37.4)	0.17
Race/ethnicity	1.09 (1.02-1.17)		0.75
Asian	21 (6.5)	14 (7.4)	
Black	39 (12.0)	27 (14.3)	
Hispanic/Latinx	6 (1.9)	6 (3.2)	
Other/Multiracial	8 (2.5)	7 (3.7)	
White	233 (71.9)	126 (66.7)	
Not reported	17 (5.3)	9 (4.8)	
Nulliparous	145 (44.8)	95 (50.3)	0.23
Gestational age, weeks	39.0 (38.0-40.0)	39.0 (37.9-39.9)	0.48
Epidural	220 (67.9)	147 (77.8)	0.02
Elective IOL	147 (45.4)	85 (45.0)	0.93
Initial cervical dilation, cm			0.81
0	65 (20.1)	40 (21.2)	
1	116 (35.8)	62 (32.8)	
2	51 (15.7)	35 (18.5)	
3	92 (28.4)	52 (27.5)	

Results

- 513 patients admitted for IOL
  - PRE: n=324
  - POST: n=189
- No significant differences in age, race/ethnicity, parity, cervical dilation, initial agent, or gestational age at admission (**Table**)
- Adjusted length of IOL shorter by 2.4 hours (95% CI 1.4-3.5) post-implementation (**Figure**)
- Time from oxytocin administration to ROM shorter POST
- Decreased chorioamnionitis POST (0.5 vs. 5.3%, p=0.005)
- No difference in cesarean (p=0.57), endometritis (p=0.53), or PPH (p=0.66)

Figure. Adjusted length of IOL (hours)



Discussion

- Primary Finding(s): after implementation of standardized, evidence-based IOL practices, IOL was both shorter and associated with less chorioamnionitis
- Strengths: large sample size, generalizable to large L&D units (multiple provider types)
- Limitations: not randomized, fidelity to recommendations not assessed
- **Takeaway: standardizing IOL management can improve birth outcomes and is a useful target to optimize L&D efficiency.**

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Effective Physician Abortion Communication: Caregiver Not Pundit

J. Villavicencio, M. Seewald, L. Martin, A. Simon, L. Harris

BACKGROUND

- Doctors who provide abortion care are commonly stereotyped as motivated by political agendas, not patients' well-being.
- Prior research found that physician messaging is most effective when doctors lean into caregiving roles and avoid political punditry. Doctors should:
  - Meet audience's psychological and emotional needs
  - Lean into abortion's complexities
  - Model holding the 'tension of opposites'
  - Not pivot away from difficult questions
  - Speak as a caregiver, not a political pundit

Scan to Request the Messaging Toolkit:

METHODS

1,508 participants surveyed, before & after physician messaging

BIPOC participants oversampled

Participants rated their attitudes about abortion restrictions and agreement with: "*Doctors who provide abortions are more focused on their pro-abortion political agendas than on the individual.*"

↓

Participants viewed messaging videos featuring a diverse sample of doctors who provide abortion care; videos emphasized personal caregiving motivations, values, and experiences.

↓

Participants rated their support for abortion restrictions and agreement again.

↓

Analysis: T-tests, multiple linear and multivariable logistic regression

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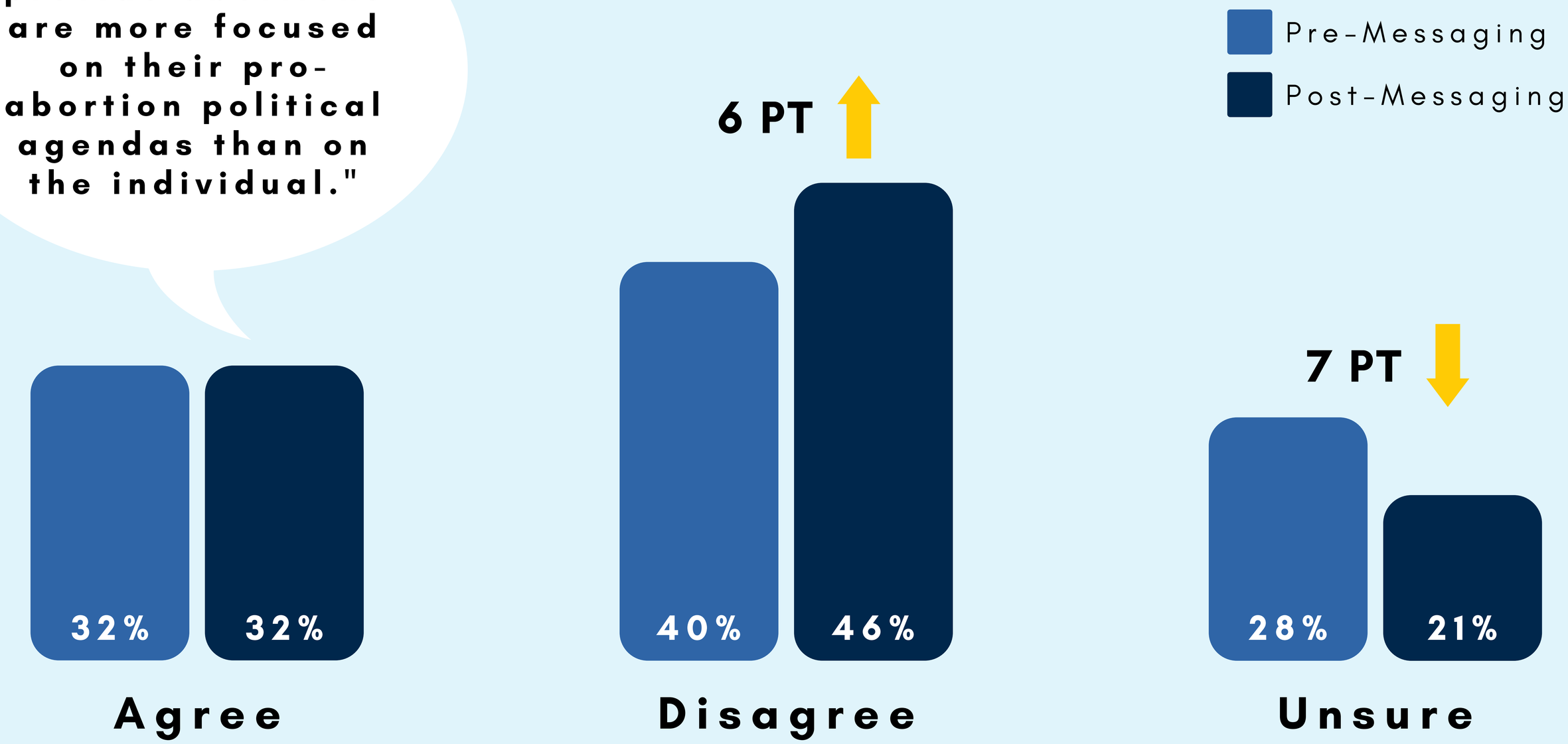
Messaging materials that emphasized doctors' caregiving motivations, values, and experiences made audiences less likely to see them as politically motivated.

"Doctors who provide abortions are more focused on their pro-abortion political agendas than on the individual."



Shifting to seeing doctors as less politically motivated predicted a shift to less support for abortion restrictions. (AOR=1.54;p<0.001)

Effective Communication: Later Abortion

J. Villavicencio, M. Seewald, L. Martin, A. Simon, L. Harris

BACKGROUND

- Recently, states have introduced legislation aimed at restricting access to abortion in the second and third trimesters.
- Prior research found that physician communication can successfully shift public opinion about abortion when doctors:
  - Meet audience's psychological and emotional needs
  - Lean into abortion's complexities
  - Model holding the 'tension of opposites'
  - Speak as a caregiver, not a political pundit
  - Don't pivot from difficult questions

Scan to Request the Messaging Toolkit:

- We sought to determine if these strategies are successful when communicating about later abortion specifically.

METHODS

1,508 participants surveyed, before & after physician messaging

BIPOC Participants Oversampled

Participants completed attitudinal measures before viewing videos.

↓

Participants viewed messaging videos featuring a diverse sample of doctors who provide abortion care. Two-thirds were randomly assigned videos featuring doctors talking about **later** abortion care.

↓

Participants completed attitudinal measures after viewing these videos.

↓

Analysis: Descriptive analysis and T-tests were used to determine messaging impact

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Physicians can talk about later abortion in ways that lead to increased support for it.

Participants who viewed later abortion messaging materials demonstrated more favorable attitudes post-messaging:

We need to trust women to make decisions about later abortion care by themselves, with the support of their doctors**

7 PT increase in **agreement**

I think later abortions happen because something has gone terribly wrong during the pregnancy***

13 PT increase in **agreement**

I believe doctors weigh many considerations when providing later abortion care including ethics, laws, and policies***

8 PT increase in **agreement**

Nothing justifies an abortion late in pregnancy***

12 PT increase in **disagreement**

***p<0.001; **p<0.01

Whether abortion messaging includes a discussion of later abortion or not, we see less support for abortion restrictions (Δ11% for no later abortion; Δ16% for later abortion, t=-1.67, p=0.953).

Physicians don't need to avoid talking about later abortion, provided they do so in ways that meet audience needs.

OBGYN Faculty and Fellows Index