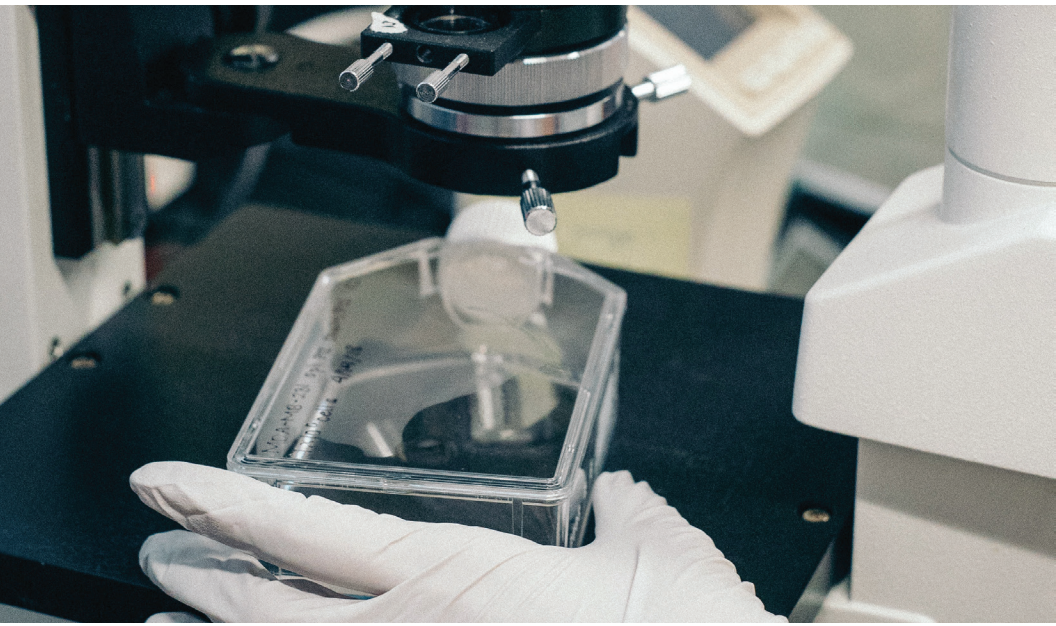
# THE ANNUAL CHARLES B. HAMMOND, MD RESEARCH DAY

Department of Obstetrics and Gynecology
Duke University Medical Center
Durham, North Carolina

**Friday, May 3, 2024**



Duke Obstetrics & Gynecology
Duke University School of Medicine

# Foreword

Charles B. Hammond, MD, Research Day is a time to celebrate and honor Duke Obstetrics and Gynecology trainees for their exceptional achievements in research and their dedication to impacting the future of women's health. Dr. Hammond was an internationally recognized leader, educator, researcher and advocate for women's health. He was a mentor to many, me included. As Chair and Residency Program Director for more than 20 years, he was committed to ensuring that residents and fellows developed into well rounded academic obstetrician/gynecologists with outstanding clinical skills, a sharp scientific mind and a compassionate heart.

Annually, we commemorate the impressive and tireless research efforts of our residents and fellows, and we honor the legacy of the renowned physician scientist whose commitment to research, education and patient care represents Duke Ob/Gyn's standard of excellence: the late Charles B. Hammond, MD.

## *Honoring Dr. Charles B. Hammond*

Dr. Hammond was the E.C. Hamblen Distinguished Professor of Reproductive Biology and Family Planning and Chair of the Department of Obstetrics and Gynecology from 1980 to 2002. He received his medical degree from Duke University in 1961. During the next nine years, he completed an internship in surgery, a residency in obstetrics and gynecology, a one-year training interval in the research training program — all at Duke — and two years as a clinical associate in the endocrinology branch at the National Cancer Institute in Bethesda, Maryland.

He joined the faculty at Duke in 1969 and had enormous impact on ob/gyn and women's health over more than 40 years in academia. A nationally recognized expert in menopause and hormone replacement therapy, Dr. Hammond was also a pioneer in the treatment of gestational trophoblastic disease and founded the Southeast Regional Trophoblastic Disease Center. Countless lives were saved because of his innovative research and the development of treatment regimens for this once life-threatening condition.

Dr. Hammond served as President of the North Carolina Society of Obstetricians and Gynecologists, the American Fertility Society (now ASRM), the American Association of Obstetricians and Gynecologists Foundation, the American Gynecological and Obstetrical Society, and the American College of Obstetrics and Gynecology. He received many honors throughout his career, including being named a National Association for Women's Health Lifetime Achievement Award recipient, a fellow of the Royal College of Obstetricians and Gynaecologists, and a member of the Institute of Medicine, now the Academy of Medicine. He was granted a Lifetime Achievement Award from the American College of Obstetrics and Gynecology in 2015.

*Charles B. Hammond, MD, was honored by Duke Medicine in June 2011 as a Professor and Chairman Emeritus in the Department of Obstetrics and Gynecology. Scan the QR code below to watch a brief video about his legacy.*

Hammond Research Day is a significant and impactful opportunity for our residents and fellows to demonstrate their accomplishments and dedication to their research in obstetrics and gynecology and is intended to advance medical knowledge, education and research in reproductive medicine. We are proud to present this event once again, and to honor the legacy of Dr. Hammond. Thank you for joining us.

Sincerely,

Matthew D. Barber, MD, MHS
W. Allen Addison, MD, Distinguished Professor and Chair
Department of Obstetrics and Gynecology
Duke University Medical Center

# GRADUATING FELLOWS 2023-2024

**Jennifer J. M. Cate, MD**

| | |
|---|---|
| Medical School: | Michigan State University College of Human Medicine |
| Residency: | Yale University |
| Fellowship: | Duke University Medical Center<br>Division of Maternal-Fetal Medicine |
| Future Plans: | University of Michigan<br>Ann Arbor, Michigan |

**Ronan P. Sugrue, MBBCh, MPH**

| | |
|---|---|
| Medical School: | University College Dublin School of Medicine and Medical Science |
| Graduate School: | Harvard School of Public Health |
| Residency: | Brigham and Women's Hospital |
| Fellowship: | Duke University Medical Center<br>Division of Maternal-Fetal Medicine |
| Future Plans: | The Coombe University Hospital<br>University College Dublin<br>Dublin, Ireland |

**Pamela N. Peters, MD**

| | |
|---|---|
| Medical School: | University of Chicago Pritzker School of Medicine |
| Residency: | University of California, San Francisco |
| Fellowship: | Duke University Medical Center<br>Division of Gynecologic Oncology |
| Future Plans: | Sutter East Bay Medical Group<br>East Bay, California |

**Shilpi Agrawala, MD**

| | |
|---|---|
| Medical School: | University of Texas Southwestern Medical School |
| Residency: | Baylor College of Medicine |
| Fellowship: | Duke University Medical Center<br>Division of Reproductive Endocrinology and Infertility |
| Future Plans: | Dallas IVF<br>Dallas, Texas |

**Douglas B. Timmons, MD, MPH**

| | |
|---|---|
| Medical School: | University of Miami Miller School of Medicine |
| Graduate School: | University of Miami Miller School of Medicine |
| Residency: | University of Miami |
| Fellowship: | Duke University Medical Center<br>Division of Reproductive Endocrinology and Infertility |
| Future Plans: | IVF Florida Reproductive Associates<br>Margate, Florida |

**Alejandro Gómez-Viso, MD**

| | |
|---|---|
| Medical School: | New York University Grossman School of Medicine |
| Residency: | New York University |
| Fellowship: | Duke University Medical Center<br>Division of Urogynecology and Reconstructive Pelvic Surgery |
| Future Plans: | Institute for Women's Health and Body<br>Miami, Florida |

# GRADUATING RESIDENTS 2023-2024

**Katherine E. Baumann, MD, MPH**
Medical School: New York University School of Medicine
Graduate School: New York University College of Global Public Health
Future Plans: Fellowship in Gynecologic Oncology
Beth Israel Deaconess Medical Center, Boston, Massachusetts

**Kristen N. Carrillo-Kappus, MD, MPH**
Medical School: University of South Carolina School of Medicine — Greenville
Graduate School: Emory University
Future Plans: Ob/Gyn Generalist
Isabella Citizens for Health, Inc., Mt. Pleasant, Michigan

**Lauren E. Farmer, MD**
Medical School: New York Medical College
Future Plans: Academic Generalist
Columbia University, New York, New York

**Elizabeth P. Howell, MD**
Medical School: Duke University School of Medicine
Future Plans: Fellowship in Urogynecology and Reconstructive Pelvic Surgery
Duke University, Durham, North Carolina

**Meagan A. Kelly, MD**
Medical School: University of Florida College of Medicine
Future Plans: Ob/Gyn Generalist
New England OB-GYN, Chestnut Hill, Massachusetts

**Sloane A. Mebane, MD**
Medical School: Harvard Medical School
Future Plans: Fellowship in Reproductive Endocrinology and Infertility
Duke University, Durham, North Carolina

**Ravyn S. T. Njagu, MD**
Medical School: Duke University School of Medicine
Future Plans: Ob/Gyn Generalist
Chapel Hill Obstetrics and Gynecology, Chapel Hill, North Carolina

**Carmen M. Santoli, MD**
Medical School: Oregon Health Sciences University School of Medicine
Future Plans: Fellowship in Maternal-Fetal Medicine / Genetics
University of California San Francisco, San Francisco, California

**Alexandra C. Sundermann, MD, PhD**
Medical School: Vanderbilt University School of Medicine
Graduate School: Vanderbilt University
Future Plans: Academic Generalist
Vanderbilt University Medical Center, Nashville, Tennessee

# 2024-2025 FELLOWS

**Urogynecology and Reconstructive Pelvic Surgery**

Abbigail K. Woll, MD (2025)

Annika Sinha, MD (2026)

Elizabeth P. Howell, MD (2027)

**Gynecologic Oncology**

Angela C. Nolin, MD (2025)

Mary K. Anastasio, MD (2026)

Katherine C. Fitch, MD (2027)

**Maternal-Fetal Medicine**

Miriam L. Estin, MD, PhD (2025)

Virginia Y. Watkins, MD (2025)

Osinakachukwu C. Mbata, MD (2026)

Anthony E. Melendez Torres, MD (2026)

Lillian B. Boettcher, MD (2027)

Sara I. Jones, MD (2027)

**Minimally Invasive Gynecologic Surgery**

Stephanie L. Lim, MD (2025)

**Quality and Safety in Women's Health**

Joseph W. Lafferty, MD (2025)

**Reproductive Endocrinology and Infertility**

Hilary S. Friedlander, MD (2025)

Abigail L. Bernard, MD (2026)

Sloane A. Mebane, MD (2027)

Damla C. Gonullu-Rotman, MD (2027)

# RESIDENTS

**CLASS OF 2025**

Susan M. Carlson, MD

Alice J. Darling, MD

Dayana M. Hernandez Calderon, MD

Colleen P. Judge-Golden, MD, PhD

Bobby L. May, Jr., MD

Thao N. Nguyen, MD

Anna Shvygin, MD

Janice Wong, MD, MS

Jenny Wu, MD

**CLASS OF 2026**

LaMani D. Adkins, MD

Maxwell E. Edmonds, MD, PhD

Dayne L. Filer, MD, PhD

Jessie Y. Li, MD

Alexandra E. Norton, MD, MPH

Erica J. Odukoya, MD, MPH

Jaxon C. Olsen, MD

Jennifer Talbott, MD, MPH

Lester A. Watch, MD

**CLASS OF 2027**

Jasmine E. Arrington, MD, MPH

Aya M. Bashi, MD, MPH

Shelby N. Davis-Cooper, MD

Shakira E. Harding, MD, MS

Isabel A. Josephs, MD

Hannah C. Kelly, MD

Tahireh Y. Markert, MD

Kelsey L. McNew, MD, PhD

Natalie E. Wickenheisser, MD

**CLASS OF 2028**

Ghazal Aghagoli, MD

Edith Amponsah, MD, MPH

Canice L. Dancel, MD

Dana Hazimeh, MD

Benjamin M. Jacobs, MD

Maya K. Nitecki, MD, MPH

Katherine N. Penvose, MD

Alexandra R. Piselli, MD, MS

Madeline J. Thornton, MD, MPH

# CHARLES B. HAMMOND, MD RESEARCH DAY

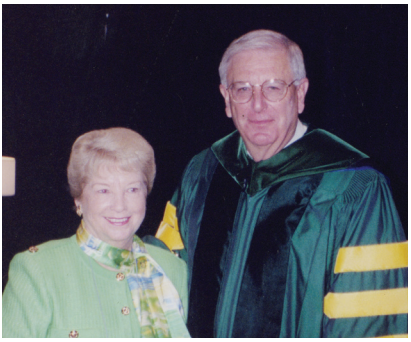
**Charles B. Hammond, MD**

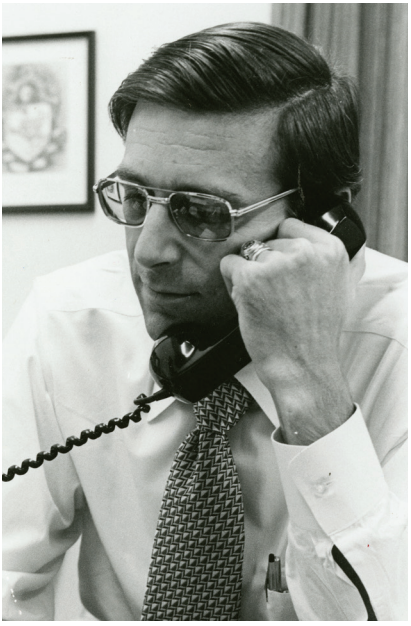
*1936-2021*

Edwin Crowell Hamblen Distinguished Professor of Reproductive Biology

Chairman Emeritus, Department of Obstetrics and Gynecology
Duke University Medical Center

## Dr. Charles Hammond



# Previous Charles B. Hammond Lecturers

| | |
|---|---|
| 2004 | Sterling B. Williams, MD |
| 2005 | William N.P. Herbert, MD |
| 2006 | David G. Mutch, MD |
| 2007 | John T. Queenan, MD |
| 2008 | Frank C. Miller, MD |
| 2009 | James R. Scott, MD |
| 2010 | Jennifer R. Niebyl, MD |
| 2011 | Michael T. Mennuti, MD |
| 2012 | Matthew D. Barber, MD, MHS |
| 2013 | William C. Dodson, MD |
| 2014 | William A. Cliby, MD |
| 2015 | William T. Creasman, MD |
| 2016 | Barbara S. Levy, MD |
| 2017 | Alan H. DeCherney, MD |
| 2018 | Laura E. Riley, MD |
| 2019 | Geoffrey W. Cundiff, MD |
| 2021 | Laurel W. Rice, MD |
| 2022 | Emily S. Jungheim, MD, MSCI |
| 2023 | Courtney A. Schreiber, MD, MPH |

# FEATURED LECTURER AND DISTINGUISHED JUDGE

**Mary E. D'Alton, MD**

Willard C. Rappleye Professor and Chair
Department of Obstetrics and Gynecology
Columbia University Irving Medical Center

Mary E. D'Alton, MD, is obstetrician and gynecologist-in-chief and chair at NewYork-Presbyterian/Columbia University Irving Medical Center. As chair of the Department of Ob/Gyn, Dr. D'Alton has worked to fill the gaps in women's health, building and strengthening NYP/CUIMC's programs in infertility, minimally invasive gynecologic surgery, gynecologic oncology, family planning and integrated women's health care.

Her work to advance education, research, clinical practice and policy in women's health has won national recognition, including her election to the National Academy of Medicine in 2013. Dr. D'Alton has served as president of the American Gynecological and Obstetrical Society (AGOS) and of the Society for Maternal Fetal Medicine (SMFM), which honored her with a Lifetime Achievement Award in 2006. In 2019, she was awarded the Seymour Milstein Distinguished Service Award. She is the author or contributor to over 320 publications.

# DISTINGUISHED JUDGE

**Ashley E. Veade, MD**

Assistant Professor, Department of Obstetrics and Gynecology
Associate Residency Program Director
Washington University School of Medicine in St. Louis
President, F. Bayard Carter Society

Ashley Veade, MD, is an obstetrician-gynecologist currently serving as an assistant professor at Washington University in St. Louis within the Division of Academic Specialists. She also holds the role of associate program director within the residency program, where she passionately guides the next generation of Ob/Gyn professionals.

Dr. Veade completed her residency training at Duke University, where she honed her expertise in reproductive health. Her research endeavors focus on investigating physician opioid prescribing practices and advocating for improved physician infertility coverage. Furthermore, she is deeply committed to enhancing resident education and refining gynecology training through ultrasound simulation, reflecting her dedication to advancing medical knowledge and improving patient care within the field of obstetrics and gynecology.

# DISTINGUISHED JUDGE

**Jennifer M. Wu, MD, MPH**

Vice Dean for Academic Affairs, UNC School of Medicine
Professor, Department of Obstetrics and Gynecology
Division of Urogynecology and Reconstructive Pelvic Surgery
University of North Carolina at Chapel Hill

Jennifer Wu, MD, MPH, is originally from Frederick, Maryland. She earned her BA in biology from Harvard College and her MD from the University of California at San Francisco. She trained in obstetrics and gynecology at Brigham and Women's Hospital and Massachusetts General Hospital in Boston, Massachusetts, and then completed a fellowship in female pelvic medicine and reconstructive surgery at the University of North Carolina at Chapel Hill. Concurrently, she received her MPH in epidemiology at the UNC School of Public Health. From 2007-2012, Dr. Wu served on the faculty at Duke University.

Dr. Wu rejoined the Division of Urogynecology and Reconstructive Pelvic Surgery at UNC-Chapel Hill in 2013, and she was appointed division director in 2018. In addition to her clinical/surgical practice, she is actively engaged in clinical trials and epidemiologic research of pelvic floor disorders, and she is dedicated to training future subspecialists in female pelvic medicine and reconstructive surgery. She is currently the president of the American Urogynecologic Society.

At UNC-Chapel Hill, she has served in a number of leadership roles including interim chair of the Department of Ob/Gyn and senior vice chair in Ob/Gyn. In March 2021, she became the vice dean for academic affairs for UNC School of Medicine, which is a role that oversees the educational enterprise as well as faculty affairs and leadership development.

Duke Obstetrics & Gynecology
Duke University School of Medicine

# The Annual Charles B. Hammond, MD, Research Day
# Friday, May 3, 2024

## ACADEMIC AGENDA

*Please take a moment to view the poster displays of research by current third-year medical students and PhD candidates working with Duke Ob/Gyn faculty members. Learn more on page 41.*

**9:00 am** **Opening Remarks**

**9:10 am** **Susan M. Carlson, MD**
Resident comfort in taking care of pregnant patients with physical disabilities

**9:25 am** **Shilpi Agrawala, MD**
Ovarian tissue cryopreservation by vitrification vs slow freezing: no difference in epigenetic age or follicle density

**9:40 am** **Alice J. Darling, MD**
Patterns of adjuvant therapy for endometrial cancer with sentinel lymph node biopsy

**9:55 am** **Dayana M. Hernandez Calderon, MD**
ARRIVING at equity: patient characteristics and their association with clinician recommendation for risk reducing labor induction post ARRIVE

**10:10 am** **Jennifer J. M. Cate, MD**
The impact of a protocol on equitable labor and delivery substance use screening

**10:25 am** **Colleen P. Judge-Golden, MD, PhD**
Patient preferences for provider specialization for abortion and miscarriage care

**10:40 am** **Break**

**10:50 am** **Alejandro Gómez-Viso, MD**
Initial validation of AUGS-PERFORM: construct validity and test-retest reliability

**11:05 am** **Bobby L. May, Jr., MD**
Frα and B7-H4 expression in endometrial cancer: assessing the promise of antibody drug conjugate therapies

**11:20 am** **Thao N. Nguyen, MD**
Role of endometrial sampling to differentiate between advanced endometrial versus ovarian malignancy: a retrospective cohort study

**11:35 am** **Pamela N. Peters, MD**
Oncolytic adenovirus MEM-288 encoding membrane-stable CD40L and IFNβ induces an anti-tumor immune response in high grade serous ovarian cancer

**11:50 am** **Department Photo**

**12:10 pm** **Lunch**

**12:45 pm** **Afternoon Session Begins**

**12:55 pm** **Mary E. D'Alton, MD**
**Featured Lecturer and Distinguished Judge**
Gaps in Women's Health

**1:45 pm** **Anna Shvygin, MD**
Relationship between preoperative neutropenia and incidence of infectious complications after interval debulking surgery for advanced epithelial ovarian cancer

**2:00 pm** **Ronan P. Sugrue, MBBCh, MPH**
Systematic review of red blood cell alloimmunization associated with red blood cell transfusion following standard ABO+D versus additional cEK matching protocols

**2:15 pm** **Jenny Wu, MD**
Transcutaneous electrical nerve stimulation for analgesia during outpatient endometrial biopsy: a randomized controlled trial

**2:30 pm** **Douglas B. Timmons, MD, MPH**
An investigation into the metabolic changes of endometrial stromal cells before and after decidualization

**2:45 pm** **Janice Wong, MD, MS**
Wounds to wisdom: exploring risk factors and outcomes for surgically managed post-cesarean wound infections

**3:00 pm** **Closing Remarks**

**3:15 pm** **Awards Presentation**

# ABSTRACTS

**Title:** Resident comfort in taking care of pregnant patients with physical disabilities

**Resident:** Susan M. Carlson, MD

**Faculty Mentor:** Sarah K. Dotters-Katz, MD, MMHPE

**Objective(s):** To assess comfort level of US OBGYN residents in caring of pregnant patients with physical disabilities.

**Methods:** After IRB-approval, a 19-question e-survey was developed based on literature review from other specialties. A survey was piloted for content and face validation. A likert scale is used to assess comfort in caring for pregnant patients with physical disabilities. The e-survey was sent to US OBGYN residents via CREOG-coordinator listserv in 2/2024, with 3 reminder emails. The descriptive statistics used to analyze the data, variables with clinical and statistical significance were considered for adjustment in regression models.

**Results:** Eighty-eight residents responded to the survey. The mean age was 29 years; 88% identified as female. All 5 ACOG regions were represented. Only 8% of respondents reported formal education in residency on this topic, though 44% received formal education on the topic in medical school. 73% of residents reported they were not comfortable positioning patients for a pelvic examination, 59% felt uncomfortable discussing sexual health practices with patients with physical disabilities, and 89% felt uncomfortable making recommendations regarding obstetrical mode of delivery. Those without education in residency were 91% less likely to be comfortable with mode of delivery (aRR:0.09,95%CI 0.01,0.59). Only 30% of residents were comfortable discussing lactation and breastfeeding with patients with physical disabilities, and residents without personal experience were 66% less likely to be comfortable (aRR:0.34, 95%CI:0.12,0.99). Nearly all (92.5%) of residents wanted more education in this space and of those 62/75 said didactics, 53/75 said patient panel, 53/65 said sim, 29/75 said shadowing.

**Conclusion:** In conclusion, among responding residents comfort caring for pregnant patients with physical disabilities is overall exceptionally low. Additional education on the subject was requested, and necessary to adequately care for this population.

**Title:** Ovarian tissue cryopreservation by vitrification vs slow freezing: no difference in epigenetic age or follicle density

**Fellow:** Shilpi Agrawala, MD

**Faculty Mentor:** Kelly H. Acharya, MD

**Objective(s):** Ovarian tissue cryopreservation (OTC) involves removal and cryopreservation of ovarian cortex for future reproductive use and is the only method of fertility preservation available for some female cancer patients. Two OTC methods, controlled-rate "slow" freezing and ultra-rapid vitrification, have been utilized; studies vary in the effect of method on tissue survival and viability. It is unknown whether either cryopreservation method accelerates the "epigenetic age" of the tissue. This study sought to determine the impact of OTC on epigenetic age and surviving follicle count.

**Methods:** Bovine ovaries were harvested from nine Black Angus heifers. The ovarian cortex was isolated and processed in one of three ways: (a) fresh, (b) slow-freezing, and (c) vitrification. The slow-frozen and vitrified tissue was then thawed. DNA was isolated from half of the strips, while half were used for histologic analysis. Extracted DNA was used to estimate epigenetic age using a methylation array. The epigenetic ages between the three groups were compared using ANOVA. Targeted sequencing was performed to compare methylation marks in individual CpG sites in the gene DENND1A and compared with ANOVA. The histologic analysis was performed by a blinded pathologist, and the intact follicle counts were compared using a student's t-test.

**Results:** Bovine epigenetic ages for all groups (fresh, slow frozen, vitrified) were similar and were predicted at 4-4.6 years of age ($p > 0.05$). Likewise, the post-thaw surviving primordial follicle counts did not differ between the two methods of cryopreservation, with 37% intact follicles (vitrification) vs 30% (slow freezing), $p = 0.73$. DENND1A site methylation did not differ between treatment method.

**Conclusion:** OTC using either vitrification or slow freezing did not alter the epigenetic age of the tissue. This provides reassurance that OTC does not prematurely age the cryopreserved tissue; however, further studies are needed.

**Title:** Patterns of adjuvant therapy for endometrial cancer with sentinel lymph node biopsy

**Resident:** Alice J. Darling, MD

**Faculty Mentor:** Emma C. Rossi, MD

**Objective(s):** In previous studies, patients who underwent less extensive staging lymphadenectomy (LND) for early endometrial cancer, received more adjuvant radiation. If historical trends remain true, sentinel lymph node biopsy (SLNB) may be associated with an increased prescription of external beam radiation therapy (EBRT), potentially offsetting the morbidity benefits of a less radical nodal dissection.

**Methods:** Patients with surgical stage I endometrial cancer diagnosed between 2017-2020 were identified from the SEER database. Descriptive statistics were presented for demographic and clinical characteristics of those who underwent SLNB, LND or no lymph node assessment. Multinomial logistic regression was used to control for confounding variables.

**Results:** From 2017-2020, there were 26,380 patients who received primary surgery for stage 1 endometrial cancer. Patients who had LND received more EBRT than the SLNB and no lymph node assessment groups (7.3% vs 5.5% vs 4.1%; P<0.001). Those who underwent SLNB versus LND were more likely to have low-grade cancer (60.4% vs 49.5%, P<0.001) and low-risk histology (85.4% vs 80.68%, P<0.001). After adjusting for confounders, there was no difference in the odds of EBRT for patients who underwent SLNB versus LND, evidenced by overlapping confidence intervals, when compared to no nodal assessment (SLNB 0.41, 95% CI[0.34,0.5] vs LND 0.47, 95% CI[0.40-0.55]).

**Conclusion:** Since 2017, SLNB for endometrial cancer increased almost three-fold. Rates of EBRT are lower for patients with SLNB versus LND, but in adjusted analyses method of lymph node assessment is not an independent driver of radiation type. This may reflect high provider confidence in the SLNB staging method and the appropriate direction of adjuvant therapy towards patients with higher risk disease.

**Title:** ARRIVING at equity: patient characteristics and their association with clinician recommendation for risk reducing labor induction post ARRIVE

**Resident:** Dayana M. Hernandez Calderon, MD

**Faculty Mentor:** Sarahn M. Wheeler, MD, MHSc

**Objective(s):** Society guidelines advise that low-risk nulliparous patients are counseled on the option for risk reducing induction of labor at 39 weeks because this strategy decreased the rate of cesarean section and gestational hypertension in the ARRIVE trial. Patient characteristics including race, ethnicity, language, payor have been shown to impact obstetric care received and outcomes. We investigated the rate of documentation of risk reducing induction of labor counseling and patient characteristics associated with documentation of clinician counseling in low-risk nulliparous patients.

**Methods:** This is a retrospective cohort study of low-risk nulliparous women who delivered at a single Southeastern tertiary care center in 2019. All live nulliparous singleton deliveries with electronic medical records were included. Exclusion criteria were contraindication to vaginal delivery, indication for <39-week delivery. Patient characteristics were determined by electronic record review. All outpatient obstetric clinician notes between the 28th – 39th week of gestation were reviewed for documentation of counseling on risk reducing induction of labor. Logistic regression was performed to examine the association between patient characteristics and documentation of counseling. Additionally, delivery outcomes were summarized based on documentation of provider counseling.

**Results:** There were 622 patients meeting our criteria, including: 384 (61.7%) White, 131 (21.1%) Black and 72 (11.6%) Asian. Only 5% were Hispanic and 90% were privately insured. Overall, 256 (41%) had documentation of counseling and there was no detectable association between race, ethnicity, or payor type, and documentation of counseling. Delivery outcomes were not significantly different between groups with and without documentation of counseling.

**Conclusion:** Below half of ARRIVE-eligible patients had documented clinician counseling on risk reducing induction of labor. Neither patient race, ethnicity, nor payor was significantly associated with likelihood of counseling in this cohort. There is an opportunity to improve rates of documentation of counseling about risk reducing labor induction. Standard protocols may be an important next step.

**Title:** The impact of a protocol on equitable labor and delivery substance use screening

**Fellow:** Jennifer J. M. Cate, MD

**Faculty Mentor:** Sarahn M. Wheeler, MD, MHSc

**Objective(s):** To evaluate the impact of an obstetric substance use screening protocol on validated substance use screening, documentation of urine drug screen (UDS) indication, patient assent prior to UDS and disparities in UDS across race, ethnicity and payor status, pre and postintervention.

**Methods:** We carried out a retrospective cohort study using electronic health record data with pre (July 1, 2020-June 9, 2021) and postintervention (June 10, 2021-May 31, 2022) design after implementation of an obstetric substance use screening protocol at a tertiary care center. Documentation of validated substance use screening, UDS indication and patient assent for UDS were assessed among individuals with UDS, pre- and postintervention. Association of self-reported race, ethnicity, and payor status with UDS was assessed using generalized estimating equations models, pre- and postintervention. Chi square and Fisher's exact tests were used to compare categorical variables.

**Results:** UDS occurred less frequently postintervention compared to preintervention (1.9%, n=6412 vs 7.8%, n=5658) (p<0.0001). Preintervention, Black individuals had higher odds of UDS (OR 2.11 95% CI 1.64, 2.70) compared to White individuals. Postintervention, there were no differences in UDS in Black (OR 1.23 95% CI, 0.81, 1.87) compared to reference White individuals. Privately insured individuals had lower odds of UDS preintervention (OR 0.23, CI 95%, 0.18, 0.30) and postintervention (OR 0.08 CI 95%, 0.04, 0.15) compared to individuals with government insurance. Among those with UDS, none (0/441) underwent validated screening preintervention compared to 36.3% (45/124) postintervention. 27.9% (123/441) had a documented UDS indication preintervention, compared to 55.7% (69/124) postintervention (p < 0.001). Documented verbal assent occurred in 0.5% (2/441) of encounters preintervention compared to 47.6% (59/124) postintervention (p<0.001).

**Conclusion:** Implementation of an obstetric substance use screening protocol was associated with a decrease in UDS and increase in NIDA screening, documented UDS indication and patient assent. Racial disparities in UDS were reduced postintervention, however, suboptimal screening remained with persistent disparities by payor status.

**Title:** Patient preferences for provider specialization for abortion and miscarriage care

**Resident:** Colleen P. Judge-Golden, MD, PhD

**Faculty Mentor:** Jonas J. Swartz, MD, MPH

**Objective(s):** Most abortions are provided by abortion specialists, despite knowledge and skills overlap with other disciplines, particularly general obstetrics and gynecology. We assessed patient preferences for abortion and miscarriage care from family planning specialists versus other providers. Given legal and logistical barriers to abortion care, we hypothesized that abortion-seeking participants would prefer non-specialist care.

**Methods:** We conducted a cross-sectional survey among 165 individuals ages 18-44 receiving abortion (n=54) or non-abortion gynecologic care (n=111) in a North Carolina hospital-based general gynecology or family planning clinic between April-October 2023. The primary outcome was preference for abortion care from a family planning specialist versus other provider types. Secondary outcome was provider specialization preference for miscarriage care. We evaluated bivariate and multivariable associations between appointment type, participant characteristics and outcomes.

**Results:** This was a racially diverse population with 50% using public health insurance. Abortion-seeking participants were younger (median age 27 versus 31.5, $p<0.001$) and more likely to have private health insurance (53.7% versus 33.9%, $p=0.02$) than non-abortion participants. Half of the sample (n=83) reported any prior abortion, and 73% felt abortion is “morally acceptable and should be legal.” Over half (52.7%) preferred abortion care from a family planning specialist, with no statistical difference by appointment type (61.1% abortion-seeking versus 48.7% non-seeking participants; $p=0.13$). Higher educational attainment ($p=0.03$) and Democratic political party affiliation ($p=0.02$) were independently associated with preference for specialist abortion care, but no predictors remained associated in multivariable analysis. One-third (32.7%) of participants preferred a family planning specialist for miscarriage care (33.3% abortion-seeking versus 32.4% non-seeking; $p=0.91$), with no associated participant characteristics.

**Conclusion:** Over half of patients presenting for abortion or general gynecologic care preferred abortion care from a specialist, versus one-third for miscarriage care. These exploratory results suggest differential patient conceptualization of miscarriage versus abortion care, despite identical medical management.

**Title:** Initial validation of AUGS-PERFORM: construct validity and test-retest reliability

**Fellow:** Alejandro Gómez-Viso, MD

**Faculty Mentor:** Nazema Y. Siddiqui, MD, MHSc

**Objective(s):** The American Urogynecologic Society's Prolapse pERFORmance Measure (AUGS-PERFORM) is a novel 11-item patient-reported outcome measure designed to assess several symptom domains that are relevant for the treatment of pelvic organ prolapse (POP). We sought to test AUGS-PERFORM's construct validity and test-retest reliability.

**Methods:** For this prospective validation study, we recruited English-speaking participants, over 18 years of age, at a single academic institution, seeking care for POP. Participants completed AUGS-PERFORM, the PFDI-20, and several PROMIS short forms at baseline. We calculated percent agreement, Kappa statistics, and used linear regression modeling to assess construct validity between the 11 AUGS-PERFORM items and items testing the same concepts on existing validated questionnaires. Two weeks later and prior to any POP therapy, participants completed AUGS-PERFORM a second time. We calculated intraclass correlation coefficients (ICC) between baseline and 2-week AUGS-PERFORM summary scores to assess test-retest reliability.

**Results:** We enrolled 148 participants: 81% self-identified as White, 56% were sexually active, and 84% elected surgery for treatment. AUGS-PERFORM items assessing bulge presence and bother had a high percent agreement and fair to moderate Kappa with the PFDI-20 item #3 (83.5 and 70%; 0.53 and 0.39, respectively). The percent agreement ranged from 69 to 75% for items assessing urinary and defecatory symptoms, and from 49 to 56% for pain-related questions. Sexual function items had an expected statistically significant negative correlation with the corresponding PROMIS short form items. The ICC was estimated to be 0.87, indicating excellent test-retest reliability.

**Conclusion:** AUGS-PERFORM demonstrated good construct validity for prolapse, urinary incontinence, defecatory dysfunction, and sexual function questions, as well as strong test-retest reliability.

**Title:** Frα and B7-H4 expression in endometrial cancer: assessing the promise of antibody drug conjugate therapies

**Resident:** Bobby L. May, Jr., MD

**Faculty Mentor:** Angeles Alvarez Secord, MD, MHSc

**Objective(s):** Endometrial cancer (EC) is the most lethal gynecologic malignancy, and there is an unmet need for novel therapies. To determine the utility of available antibody drug conjugates (ADCs), we investigated the frequency of folate receptor alpha (FRα) and B7-H4 expression in advanced EC specimens. Associations between FRα and B7-H4 expression, clinicopathologic characteristics, and survival outcomes were assessed.

**Methods:** Patients with advanced EC were identified from the Endometrial Cancer Molecularly Targeted Therapy Consortium database. Archival tumors were evaluated for FRα and B7-H4 expression using immunohistochemistry in two independent cohorts. High expression was defined as tumor proportion score ≥75%. Kaplan-Meier method estimated progression-free survival (PFS) and overall survival (OS). Cox proportional hazards models estimated the hazard ratios for high FRα and B7-H4 expression.

**Results:** FRα and B7-H4 expression was present in approximately 82% of ECs with 10.0% (8/80) and 28.6% (24/84) demonstrating high expression, respectively. FRα and B7-H4 cohorts included low-grade endometrioid (33.8%, 20.2%), high-grade endometrioid (18.8%, 23.8%), carcinosarcoma (1.3%, 23.8%), serous (33.8%, 21.4%), and clear cell (12.5%, 10.7%) histologic subtypes, respectively. FRα was not associated with histology. However, tumors with abnormal p53 expression, indicative of TP53 mutations, were more likely to highly express FRα (21% vs 0%; p=0.01). B7-H4 was associated with histology, and high expression was more common in low-grade compared to high-grade ECs (53% vs 5%-39%; p=0.01). There were no overlapping cases with high expression of both FRα and B7-H4 (n=42; Spearman correlation coefficient=0.16). FRα and B7-H4 expression were not associated with PFS or OS.

**Conclusion:** Either high FRα or B7-H4 expression was present in approximately 40% of advanced EC. High FRα expression was more frequent in p53 abnormal cancers, while high B7-H4 expression was most common in low-grade EC. These findings suggest FRα and B7-H4 are promising targets for ADCs in select molecular and histologic EC subtypes.

**Title:** Role of endometrial sampling to differentiate between advanced endometrial versus ovarian malignancy: a retrospective cohort study

**Resident:** Thao N. Nguyen, MD

**Faculty Mentor:** Andrew Berchuck, MD

**Objective(s):** Distinguishing between advanced stage endometrial and ovarian cancer at diagnosis can be challenging, especially when patients do not present with abnormal uterine bleeding. Given emerging systemic therapies specific for ovarian versus endometrial cancers, it has become increasingly critical to establish the correct diagnosis at presentation to ensure appropriate treatment. This study evaluates the frequency with which advanced endometrial cancer is mistakenly presumed to be ovarian cancer.

**Methods:** A retrospective analysis was performed of patients with a final diagnosis of advanced endometrial cancer treated consecutively at a single academic institution between 2013¬¬–2022. Variables abstracted included abnormal uterine bleeding, endometrial sampling, and timing of endometrial cancer diagnosis. We quantified incorrect diagnoses made after 2018, when frontline targeted treatments differentiating advanced endometrial from advanced ovarian cancer became available.

**Results:** We identified 270 patients with an ultimate diagnosis of stage III or IV endometrial cancer. The most common presenting symptom was abnormal uterine bleeding (219/270, 81%) followed by abdominal or pelvic pain (48/270, 18%) and bloating (27/270, 10%). Forty-eight patients (18%) received neoadjuvant chemotherapy, of whom 11 (23%) had an incorrect diagnosis of ovarian cancer. Since 2018, 6 patients have received neoadjuvant chemotherapy for presumed ovarian cancer, 3 of whom received a systemic regimen specific for ovarian cancer when they, in fact, had endometrial cancer.

**Conclusion:** In patients with presumed advanced ovarian cancer dispositioned to neoadjuvant chemotherapy, endometrial sampling can identify some cases that are actually primary endometrial cancers. Correct diagnosis guides the use of appropriate antineoplastic therapies, optimizing response and survival outcomes while minimizing toxicity and cost of unindicated therapies.

**Title:** Oncolytic adenovirus MEM-288 encoding membrane-stable CD40L and IFNβ induces an anti-tumor immune response in high grade serous ovarian cancer

**Fellow:** Pamela N. Peters, MD

**Faculty Mentor:** Rebecca A. Previs, MD, MS*

**Objective(s):** Immune checkpoint inhibitors have been revolutionary in the treatment of multiple historically chemoresistant solid tumor types, but have limited efficacy in ovarian cancer. We evaluated the anti-tumor and immune stimulatory effects of a novel immunotherapy, oncolytic virus MEM-288 (encoding IFNβ and a modified membrane-stable CD40L), in pre-clinical models of high grade serous ovarian cancer.

**Methods:** We used ELISA and flow cytometry to confirm viral infection via expression of IFNβ and CD40L respectively, after MEM-288 treatment in vitro using multiple cell lines and cryopreserved human ascites. We evaluated immune activation in vitro via IFNβ ELISA using human ascites samples. We evaluated MEM-288 in vivo using an immune competent murine model. STOSE-luc ovarian cancer cells were injected intraperitoneally (IP) into FVB mice. Mice were randomized IP treatment with saline, GFP-expressing adenovirus (Adv-GFP) or MEM-288. Flow cytometry and immunohistochemistry were used to evaluate immune populations in the tumor microenvironment. Systemic tumor-specific immune response was evaluated with IFN-β enzyme-linked immunospot (ELISPOT) assay. ANOVA or Kruskal-Wallis tests were used to determine statistical significance.

**Results:** Viral infection of ovarian cancer cell lines and primary human ascites was confirmed by increased IFNβ concentrations on average 181x higher after MEM-288 treatment compared to Adv-GFP and saline-treated controls ($p=0.0001$) and CD40L upregulation ($p=0.0001$). In vivo, MEM-288 treated mice demonstrated improved tumor control (vs Adv-GFP), with complete absence of ascites ($p<0.0001$), 18% fewer metastatic sites ($p=0.03$), and 55% reduction in tumor burden ($p=0.004$). These anti-tumor effects correlated with increased anti-tumor macrophages in the tumor microenvironment ($p<0.0001$) and fewer angiogenic vessels within tumors ($p=0.02$). MEM-288 treated mice had tumor-specific systemic immune response, as measured by increased IFNβ secreting splenocytes ($p<0.0001$) (Fig. 1G).

**Conclusion:** MEM-288 has potent anti-tumor activity in vitro and in vivo. Intraperitoneal MEM-288 caused local and systemic activation of the immune response and improved tumor control.

**no longer at Duke*

**Title:** Relationship between preoperative neutropenia and incidence of infectious complications after interval debulking surgery for advanced epithelial ovarian cancer

**Resident:** Anna Shvygin, MD

**Faculty Mentor:** Andrew Berchuck, MD

**Objective(s):** Neoadjuvant chemotherapy (NACT) followed by interval debulking surgery (IDS) is an increasingly common strategy for the management of advanced-stage epithelial ovarian carcinoma (EOC). The effects of NACT/IDS with respect to perioperative outcomes remain a subject of investigation. We aim to investigate the impact of neutropenia, a common side effect of chemotherapy, on the timing and outcomes of IDS.

**Methods:** This retrospective analysis included 337 patients from a single institution who underwent NACT for EOC from 2000 to 2022. Patient demographics, preoperative characteristics, and postoperative outcomes were assessed. The incidence of postoperative infectious complications was assessed as a function of preoperative neutropenia severity, defined by ANC <1,500 cells/mm3 on preoperative labs.

**Results:** Of the 337 patients, 54 (16%) exhibited clinically significant neutropenia prior to IDS. The average interval between last NACT cycle and IDS was 34 days in patients with neutropenia and 33 days in those without. Postoperative infectious complications were observed in 31 patients (9.2%), 25 without neutropenia and 6 with neutropenia (8.6% vs 14.3%, p = 0.39). No significant relationship between neutropenia and infectious complications was identified. Occurrences of pneumonia (p = 0.44), superficial surgical site infections/wound hematomas (p = 0.08), intra-abdominal abscess (p = 0.53), C difficile colitis (p = 0.07), and urinary tract infections (p = 0.47) were not significantly influenced by incidence of neutropenia. Among the 6 patients with severe preoperative neutropenia (ANC < 500 cells/mm3), no infectious complications were documented.

**Conclusion:** In this study, preoperative neutropenia was not associated with postoperative infectious complications in patients undergoing IDS following NACT for advanced-stage EOC. These findings highlight the safety surgery in appropriately selected neutropenic patients and underscore the importance of timely surgical intervention following completion of NACT. Further research is warranted to validate these results and explore additional factors influencing postoperative outcomes in this patient population.

**Title:** Systematic review of red blood cell alloimmunization associated with red blood cell transfusion following standard ABO+D versus additional cEK matching protocols

**Fellow:** Ronan P. Sugrue, MBBCh, MPH

**Faculty Mentor:** Jerome J. Federspiel, MD, PhD

**Objective(s):** Few institutions in the United States (U.S.) routinely match donors beyond ABO and D antigens (ABO+D). Several studies have compared new alloimmunization among recipients of red blood cells (RBCs) matched for ABO+D to RBCs additionally matched for c, E and Kell (cEK). The aim of this study was to systematically review and meta-analyze their outcomes.

**Methods:** The search protocol was peer-reviewed and published on PROSPERO international database of meta-analyses (CRD42023411620). Three online databases (Medline, Scopus, Embase) were searched on March 28, 2023, for cohort studies comparing ABO+D and cEK donor match protocols where new alloimmunization was a primary outcome. All citations were imported into Covidence, a systematic review matching software. Case reports, literature reviews and studies of non-human subjects were excluded. Two teams of two reviewers independently screened 3,595 studies. Conflicts were resolved by a fifth reviewer.

**Results:** In the 10 studies that met inclusion criteria, data were extracted according to Cochrane guidelines. 85,385 patients were transfused, of whom 36,980 (43.3%) received only cEK-matched blood. Random effects meta-analysis was used to combine effect estimates. cEK-matching was associated with a significantly lower rate of new alloimmunization compared with ABO+D (OR: 0.36, 95% CI: 0.18-0.74). Secondary analyses showed similar reductions when excluding studies of intrauterine fetal transfusions (OR 0.27, 95% CI: 0.13-0.58) and when only examining cEK alloimmunization (OR 0.26, 95% CI: 0.13-0.53). As expected, no reduction in D alloimmunization was noted (OR 0.77, 95% CI: 0.24-2.52) with extended cross matching. Risk of bias of the included studies, measured using ROBINS-I and RoB-2 tools, was low.

**Conclusion:** New alloimmunization is significantly reduced using extended cEK-matching protocols. Given sequelae of alloimmunization in pregnancy and thereafter, establishing routine cEK-matching in adults of pregnancy potential merits consideration. Future steps include a cost-effectiveness analysis of this approach.

**Title:** Transcutaneous electrical nerve stimulation for analgesia during outpatient endometrial biopsy: a randomized controlled trial

**Resident:** Jenny Wu, MD

**Faculty Mentor:** Laura J. Havrilesky, MD, MHSc

**Objective(s):** To evaluate whether transcutaneous electric nerve stimulation (TENS) decreases pain at the time of outpatient endometrial biopsy (EMB).

**Methods:** We conducted a randomized, double-blind trial of active TENS as compared to placebo TENS at the time of endometrial biopsy. The primary outcome was pain measured on a 0-100 mm visual analog scale (VAS) immediately after biopsy, with secondary outcomes including satisfaction and tolerability of TENS and pain scores at other procedural timepoints. To detect a 15 mm reduction in pain with 80% power and a significance level of 0.05, 64 participants were required in each arm.

**Results:** From December 2022 through December 2023, 135 participants were randomized with 67 in the placebo TENS arm and 68 in the active TENS arm. Baseline demographic and clinical characteristics were similar between groups. The median pain score immediately after biopsy was 50 mm (IQR 20-80) in the active TENS group and 60 mm (IQR 40-100) in the placebo TENS (p=0.039). Pain scores at other time intervals were not statistically significantly different. In a sensitivity analysis, participants with higher than median baseline anxiety had a difference in pain scores of 50 mm (IQR 40-80) in the active TENS group compared to 80 mm (IQR 50-100) in the placebo TENS group. Overall satisfaction with pain control (100 mm representing completely satisfied) was 87.5 mm (IQR 60-100) for active and 70 mm (IQR 41-100) for placebo TENS; 85.3% of participants in the active group would use TENS in a future EMB. Minimal side effects were associated with TENS with one participant reporting itching at the pad sites.

**Conclusion:** There was a statistically but not clinically significant difference in pain outcomes after EMB between the active and placebo TENS use during endometrial biopsy, and satisfaction was higher in the active TENS group. Patients with higher baseline anxiety may benefit from the use of TENS during EMB.

**Title:** An investigation into the metabolic changes of endometrial stromal cells before and after decidualization

**Fellow:** Douglas B. Timmons, MD, MPH

**Faculty Mentor:** Steven L. Young MD, PhD

**Objective(s):** Endometrial stromal cells comprise a significant proportion of endometrial tissue and following ovulation stromal cells undergo the process of decidualization which leads to significant structural and functional changes. We hypothesized that significant metabolic differences would be seen when comparing non-decidualized and decidualized stromal cells, and our primary objective was to assess the metabolic differences and stromal cell glucose utilization by non-decidualized and decidualized endometrial stromal cells.

**Methods:** To investigate our hypothesis, both an immortalized stromal cell line and primary endometrial stromal cells obtained from female patients with no known gynecologic disorders were studied. Half were cultured with media containing factors for decidualization and half were cultured without. A Seahorse XF analyzer was used to assess mitochondrial function of the endometrial stromal cells under non-decidualized and decidualized conditions. Additionally, glucose uptake by stromal cells under non-decidualized and decidualized conditions were also evaluated.

**Results:** Contrary to our hypothesis, primary non-decidualized stromal cells compared to decidualized demonstrated increased mitochondrial function and showed higher basal metabolic profiles and higher ATP production with no differences seen in maximal respiration. No differences seen in immortalized cells. Additionally, non-decidualized stromal cells showed overall higher glucose uptake compared to decidualized cells.

**Conclusion:** Our results do show significant energy differences between non-decidualized and decidualized stromal cells, but non-decidualized cells had higher energetic profiles than decidualized. Significant unknowns remain regarding the overall metabolic functions of both non-decidualized and decidualized stromal cells, and further investigation into their metabolic profiles could unlock future targets for therapeutic interventions.

**Title:** Wounds to wisdom: exploring risk factors and outcomes for surgically managed post-cesarean wound infections

**Resident:** Janice Wong, MD, MS

**Faculty Mentor:** Sarah K. Dotters-Katz, MD, MMHPE

**Objective(s):** Post-cesarean surgical site infections (SSIs) contribute substantially to maternal morbidity and healthcare costs, yet understanding of their surgical management remains limited. Our study aims to investigate risk factors associated with surgical management for post-cesarean SSIs and evaluate the impact of surgical management on patient morbidity compared to conservative management.

**Methods:** We carried out a retrospective cohort study of patients delivering via cesarean at a single healthcare system from 6/2013-7/2022 with an SSI within 30 days of delivery. Demographic, clinical, and outcomes data were abstracted. Primary analysis examined the rate and risk factors for surgical intervention. Secondary analysis included only patients evaluated in hospital setting (triage/ED/inpatient), comparing morbidities and outcomes among those requiring surgical intervention and those managed conservatively. Descriptive statistics and multivariable logistic regression models were used.

**Results:** Of 533 patients included, 69 (12.9%) required surgical management. Patients requiring surgical management were less likely to have private insurance (21.7% vs 55.4%,p<0.001) and were more likely to have diabetes (gestational 15.9% vs 9.7% and pre-gestational 18.85% vs 8.0%, p=0.002) compared to those managed conservatively. Factors independently associated with surgical intervention included BMI 40-49.9 (OR 4.13, 95% CI 1.43-11.91), BMI ≥ 50 (OR 6.72, 95% CI 2.29-19.73), hypertensive disorders of pregnancy (OR 2.06, 95% CI 1.15-3.68), general anesthesia (OR 3.61, 95% CI 1.50-8.69), and penicillin allergy (OR 2.03, 95% CI 1.10-3.77). Among 297 patients evaluated in hospital setting, patients requiring surgical intervention (n=69, 23.2%) experienced higher rates of morbidity including sepsis (8.7% vs. 1.3%,p=0.002), acute kidney injury (7.2% vs. 1.8%,p=0.02), and fascial dehiscence (29.0% vs. 0.0%,p<0.001). Patients requiring surgical intervention had higher rate of inpatient admission (97.1% vs 32.0%,p<0.001), higher rate of intensive care unit admission (5.8% vs 1.3%,p=0.03), and significantly longer length of readmission (5.0 days vs 3.0 days,p=0.004).

**Conclusion:** Patients with higher BMI, hypertensive disorders of pregnancy, general anesthesia, and penicillin allergies may warrant closer monitoring for signs of wound complications and possible need for surgical management.

# RESIDENT RESEARCH PROJECT FIRST PLACE PRIZE WINNERS

1982 Michelle R. Dudzinski, MD

1983 Claude L. Hughes, MD, PhD

1984 Deborah A. Metzger, MD, PhD

1985 Claude L. Hughes, MD, PhD

1986 Bruce A. Lessey, MD, PhD

1987 John W. Schmitt, MD

1988 Susan E. Jenkins, MD

1989 Margaret A. Dahmus, MD

1990 Jodell J. Boyle, MD

1991 Clemens M. Grosskinsky, MD

1992 Stephen G. Somkuti, MD, PhD

1993 Kerry J. Rodabaugh, MD

1994 Martha L. Ehrmann, MD

1995 Amy P. Murtha, MD

1996 Susann L. Clifford, MD

1997 Angeles A. Alvarez, MD

1998 Laura J. Havrilesky, MD, MHSc

1999 Katharine H. Taber, MD

2000 A. Marcus Gustilo-Ashby, MD

2001 Mildred R. Ridgway, MD

2002 K. Quynh Pham, MD

2003 Paula S. Lee, MD

2004 Serina E. Floyd, MD, MSPH

2005 Elizabeth L. Jewell, MD

2006 Virginia G. Branham, MD

2007 Jeanette R. Chin, MD

2008 Tina A. Ayeni, MD

2009 Kara O. King, MD, MSPH

2010 Robin A. Laskey, MD

2011 Jason S. Yeh, MD

2012 Jennifer B. Gilner, MD, PhD

2013 Lisa N. Brunengraber, MD
Paige W. Halvorson, MD, MBS

2014 Juan Sebastian Sandoval Leon, MD

2015 Joseph A. Dottino, MD, MPH

2016 Allison M. Puechl, MD

2017 Laura K. Newcomb, MD

2018 Benjamin S. Harris, MD, MPH

2019 Charlotte M. Page, MD

2020 Vivienne T. Meljen, MD

2021 Esther H. Chung, MD

2022 Stephanie L. Lim, MD
Mary Katherine Anastasio, MD

2023 Elizabeth P. Howell, MD

# FELLOW RESEARCH PROJECT FIRST PLACE PRIZE WINNERS

2000 Andra H. James, MD, MPH

2001 Angeles Alvarez, MD

2002 Laura J. Havrilesky, MD, MHSc

2003 Michael K. Flynn, MD

2004 Robert M. Wenham, MD

2005 Christopher V. Lutman, MD

2006 Monique A. Spillman, MD

2007 Mille A. Behera, MD

2008 Julie Tantibhedhyangkul, MD

2009 Chad A. Grotegut, MD, MHSc

2010 Nazema Siddiqui, MD, MHSc

2011 Kristina C. Hawkins, MD

2012 Daniel M. Kraus, MD
Ravindu P. Gunatilake, MD

2013 Michael P. Smrtka, MD

2014 Ryan G. Steward, MD

2015 Jason S. Yeh, MD

2016 Sarahn M. Wheeler, MD

2017 Lauren P. Cobb, MD

2018 Jennifer A. Bickhaus, MD

2019 Kelly S. Acharya, MD

2020 Stephanie L. Smeltzer, MD

2021 Kathryn L. Shaia, MD, MHA

2022 Michele S. O'Shea, MD, MPH

2023 Kathleen M. Zacherl, MD

# PGY2 Research

**Project Title:** A nationwide analysis of adverse delivery outcomes among adolescents pre- and post-Dobbs decision

**Resident:** LaMani D. Adkins, MD

**Faculty Mentor:** Sarah K. Dotters-Katz, MD, MMHPE

**Research Question:** How has the Dobbs decision impacted delivery outcomes among adolescents in the United States? In recognizing the potential compounding effects of abortion restrictions on existing disparities, particularly for those with limited healthcare access, it is crucial to explore how the Dobbs has influenced these dynamics. This study seeks to assess adverse pregnancy and delivery outcomes among adolescents in states with an abortion trigger bans versus those with a statutory "right to abortion."

**Methods:** We will use the CDC Wide-Ranging Online Data for Epidemiologic Research (WONDER) and Natality Database to perform a retrospective, population-level, interrupted timed series(ITS) of US live births to adolescents during designated pre- and post-Dobbs periods. Our primary exposure is the Dobbs decision in June 2022. Our primary outcomes of interest are preterm birth and low birth weight. Secondary maternal outcomes include mode of delivery, diagnoses of gestational diabetes or gestational hypertension, or any maternal morbidity checked in database. Secondary neonatal outcomes include very low birth weight and NICU admission. A planned sub-analysis will include analyzing outcomes stratified by race and ethnicity. Our impact model will allow for both immediate and ongoing changes in temporal trends. The primary ITS model will be constructed using Poisson regression and adjusted for seasonality.

**Progress Made:** We have completed an initial literature review, received Duke IRB exemption, formatted our database, and begun our data extraction.

**Anticipated Challenges:** We anticipate narrowing variables of interest and interpreting data to be our major challenges given the limitations of available fields in the birth certificate registry.

**Project Title:** Photoacoustic imaging of developing mouse placenta after uterine injury: probing the placenta accreta murine model

**Resident:** Maxwell E. Edmonds, MD, PhD

**Faculty Mentor:** Liping Feng, MD, MS

**Research Question:** Placenta accreta spectrum (PAS) hallmarks arise from defects in the endometrial-myometrial interface (ie. uterine scar), therefore, mice with prior uterine surgery will develop PAS-similar hallmarks observable by imaging and histology.

**Methods:** This is a collaborative, interdisciplinary basic science project. The Feng and Yao labs have optimized a hybrid imaging tool, photoacoustic microscopy (PAM), which uses hemoglobin as an endogenous contrast agent during live microscopy, affording vessel-by-vessel mapping and O2 content quantification of the placenta. In our study, mice subjected to hysterotomy or cesarean delivery, will be compared with negative control sham surgery mice (laparotomy only), and their subsequent post-recovery pregnancies will be followed via PAM imaging across key timepoints of placental development (embryonic day 8.5 – 18.5). Afterwards, mice will be collected for necropsy, screening for histologic markers of PAS. Future experiments will investigate pro- and anti-inflammatory effects on hysterotomy healing and PAS hallmark development.

**Progress Made:** We have preliminary data using PAM to image mouse placenta (Zhu et al. Science Advances 2024). We have piloted the protocols for mouse hysterotomy, cesarean section, and sham laparotomy, and are scheduling future experimental trials for PAS characterization.

**Anticipated Challenges:** We anticipate our PAS model and PAM technique to be robust and repeatable, as both are published. Should unexpected PAM difficulties arise, we possess alternative imaging tools for labeling vessel architecture (eg. micro-bubble infusion, fluorescein epifluorescence), and can rely on histologic analysis. Should mouse breeding be a challenge, we can focus upon inflammatory perturbation of hysterotomy healing.

**Project Title:** Systematic review and meta-analysis of ketamine therapy for the prevention of postpartum depression

**Resident:** Dayne L. Filer, MD, PhD

**Faculty Mentor:** Jerome J. Federspiel, MD, PhD

**Research Question:** Does ketamine administration during labor decrease the incidence and/or severity of postpartum depression?

**Methods:** Systematic review and meta-analysis of both randomized and retrospective trials evaluating the peripartum use of ketamine and postpartum depression outcomes. The primary outcome will be differences in postpartum depression scores in patients who received ketamine therapy during labor versus those who did not; we will carefully track the specifics of each assessment tool and timing, and may perform secondary analyses based on different tools and timing. We will additionally collect data about any published adverse outcomes. If any themes in measured side effects recur across studies, we will report as secondary measures.

**Progress Made:** We registered the study in PROSPERO, completed the literature search, and have started screening abstracts for the systematic review.

**Anticipated Challenges:** In March 2024, AJOG published an updated meta analysis evaluating ketamine administration and postpartum depression including only randomized control trials. While different slightly in scope, this recent publication will greatly diminish the impact of this work.

**Project Title:** Sexual function after pelvic floor physical therapy among female cancer survivors who have undergone primary pelvic radiation therapy

**Resident:** Jessie Y. Li, MD

**Faculty Mentor:** Laura J. Havrilesky, MD, MHSc

**Research Question:** Among patients who have undergone primary pelvic radiation therapy (RT), how do patient-reported outcomes for sexual function change after pelvic floor physical therapy (PT)?

**Methods:** We will enroll eligible patients who have undergone primary pelvic RT. After providing consent, subjects will complete a baseline PROMIS Sexual Function and Satisfaction Brief Profile and the PROMIS Global Health survey. Subjects will then complete standard-of-care pelvic floor PT consisting of 6-10 sessions. Standard-of-care items will be assessed and reported by the physical therapist, including Marinoff Scale, genital sensation/Q tip test, Reflex testing, PERFECT assessment, dilator assessment, and vaginal length measurement. After completion of pelvic floor PT sessions, subjects will complete another PROMIS survey, as well as an exit survey that will include Likert scale-type questions assessing for adherence and satisfaction with the intervention.

**Progress Made:** The IRB for this project has been approved, and we are now in the process of identifying and enrolling eligible patients.

**Anticipated Challenges:** The primary anticipated challenge is patient recruitment and reaching the desired sample size. Due to the specific patient population needed for this project, there may be challenges with identifying enough eligible patients within the time frame of patient accrual. Additionally, there is likely to be attrition given the longitudinal follow-up required. Furthermore, sexual dysfunction among cancer survivors frequently remains unaddressed during oncologic visits, which also may hinder our ability to recruit patients. Our hope is that rising awareness of survivorship issues will help to foster greater comfort with discussing sexual health issues.

**Project Title:** Standardized education tools to increase trainee competence in caring for patients who have experienced female genital cutting: a prospective cohort study

**Resident:** Alexandra E. Norton, MD, MPH

**Faculty Mentor:** Sarah K. Dotters-Katz, MD, MMHPE

**Research Question:** Female genital cutting (FGC) is estimated to affect over half a million people in the United States. This practice introduces risk of significant long-term physical and psychological sequelae, with particular impact on gynecologic and obstetric health. Despite the growing prevalence of affected patients, providers often report a lack of related formal education, and there has been very limited research into effective education content and modalities. We seek to assess if a combination of didactic and simulation-based education for trainees increases knowledge of FGC and competency in assessing for patients affected by or at risk of experiencing FGC.

**Methods:** This prospective cohort study will recruit medical students, OB/GYN residents and family medicine residents. Participants randomized to the Exposure arm will engage in both a didactic session and an interactive workshop prior to assessment. All participants (both Exposed and Controls) will complete two assessments, a validated FGC knowledge assessment tool and an objective structured clinical examination (OSCE). We will assess difference in knowledge and competency scores between arms. Those in the control arm will have access to the educational materials after the assessments.

**Progress Made:** Working with the simulation center, we developed a structure for OSCE administration and obtained Hammond funding to cover the cost. We are customizing the educational content to best fit the targeted participants and plan to conduct the intervention/assessments this fall.

**Anticipated Challenges:** Recruitment will be the primary challenge, along with logistical coordination for OSCE timing, as targeted participants have many competing interests for their time.

**Project Title:** Early pregnancy anti-oxidant biomarker levels in patients with high allostatic load

**Resident:** Erica J. Odukoya, MD, MPH

**Faculty Mentor:** Jerome J. Federspiel, MD, PhD

**Research Question:** Do patients with high levels of chronic stress based on conventional indicators have higher levels of uric acid in early pregnancy?

**Methods:** We will characterize chronic stress using allostatic load — a scale that assesses the accumulation of stress over the life course using objective parameters. We will perform a prospective observational cohort study in well-described population of high-risk obstetric patients who receive their care in the Duke University Maternal-Fetal Medicine division at Duke Perinatal Clinic. Patients will be prescreened prior to each clinic day to determine group classification (high or low allostatic load) based on the Allostatic Load scoring system. As part of the nurse intake process prescreened patients will be recruited. Enrolled patients will be consented and will add blood draw of uric acid to the patient's initial Obstetric laboratory panel. We anticipate performing logistic/linear regression analysis to investigate the association between chronic inflammatory biomarkers associated with morbidity and allostatic load.

**Progress Made:** Regarding study logistics, I have met with Duke Perinatal Clinic research study personnel to discuss proposed workflow in terms of recruitment and storage. I have met with MFM Fellow Virginia Watkins given that she has completed study recruitment and data collection of a similar structure but significantly larger in scale study at DPC.

**Anticipated Challenges:** The immediate challenge is confirming the final research protocol including personnel percent effort with DPC staff.

**Project Title:** Pain outcomes in the immediate post-partum period after OASIS lacerations: a pre and post analysis after a universal implementation of pudendal nerve block

**Resident:** Jaxon C. Olsen, MD

**Faculty Mentor:** Brenna L. Hughes, MD, MSc

**Research Questions:** Does administration of a long-acting local anesthetic via pudendal nerve block improve pain outcomes in women diagnosed with OASIS lacerations?

**Methods:** This with be a retrospective observational cohort study. Starting in January 2024, Duke Birthing Center began offering pudendal nerve blocks with liposomal bupivacaine as a way to treat pain associated with OASIS lacerations. Using a pre- and post-analysis, pain outcomes will be compared to the group prior to this practice change. In addition to pain outcomes and opioid use, we will assess cost of treatment, rates of urinary retention (assessed by the percent of women requiring bladder catheterization in the post-partum period), and length of hospitalization. Basic maternal demographics will be collected including BMI, race, ethnicity, and age; these factors will be controlled for when assessing outcomes.

**Progress Made:** Duke Birthing Center has implemented this practice change and patients are currently being offered pudendal nerve blocks using liposomal bupivacaine.

**Anticipated Challenges:** The largest anticipated challenge of this project is the timing of implementation of this practice change, specifically, the concern that one year is enough time to build a post-implementation group to compare to pre-implementation group.

**Project Title:** Medicare reimbursement for common obstetric and gynecologic procedures by time and region

**Resident:** Jennifer M. Talbott, MD, MPH

**Faculty Mentor:** Evan R. Myers, MD, MPH

**Research Question:** How have reimbursement rates by the U.S. Centers for Medicare and Medicaid Services (CMS) for common Obstetric and Gynecologic (OBGYN) Procedures changed from 2000 to 2021?

**Methods:** This will be a retrospective, descriptive analysis. Current Procedural Terminology (CPT) will be queried using the Physician Fee Schedule Look-Up Tool from the CMS, and comprehensive reimbursement data for each code will be extracted. Changes in Medicare reimbursement rates will be calculated and averaged for each procedure as both raw percent changes and percent changes adjusted for inflation to 2021 US dollars (USD) based on the consumer price index (CPI). The adjusted R2 value, the compound annual growth rate (CAGR), and both the average annual and total percent change in reimbursement will be calculated based on these adjusted trends for all included procedures. These methods will be adapted from previously published studies examining CMS data using this look-up tool.

**Progress Made:** I have established the list of procedures I would like included in analysis. These will consist of the minimum procedural requirements of OBGYN residents, which reflect the core competencies required of a general practitioner. The next step is data abstraction and analysis.

**Anticipated Challenges:** Although this is a descriptive analysis, temporal trends may not show significant difference. Comparison across procedures may show inconsistent trends. I hypothesize reimbursement rates will not have increased over time for OBGYNs when adjusted for inflation.

**Project Title:** Effect of delta-9-tetrahydrocannabinol (THC) on early placental syncytialization

**Resident:** Lester A. Watch, MD

**Faculty Mentor:** Danny J. Schust, MD

**Research Question:** How does THC exposure affect early placenta development, trophoblast syncytialization, and syncytiotrophoblast (STB) fusion and function in human vs macaque organoid models?

**Methods:** This will be a basic science project where scientists of the Schust lab will culture macaque and human trophoblast organoids and expose them to dilutions of THC. These organoids will be harvested on days 4, 6 and 8, cultured and immunostained for markers of STB formation, such as SDC-1 and BCL-2. The culture supernatants will be collected from those same cultures, frozen and batched for hormonal analysis using ELISA for Human chorionic gonadotropin (hCG) and Human placental lactogen (hPL). These culture supernatants will also be trypsinized, collected as single suspensions and processed through standard flow cytometry to generate dot plots of synctialized cells. Finally, the data will be displayed as means +/- standard deviations. Means will be compared using either Mann-Whitney U-tests or Kruskal-Wallis testing following by Mann-Whitney U-tests with Bonferroni corrections when appropriate. Statistical significance will be defined as $P < 0.05$ or $P < 0.01$, as indicated.

**Progress Made:** The Schust lab have begun the cell culture process and acquisition of THC. Next, we will meet to review research methods and create timeline for remainder of this project, including data collection and analysis.

**Anticipated Challenges:** There are governmental limitations that prolong THC acquisition so ensuring there is ample supply is essential. Furthermore, cellular processing and cell culture can be sensitive and ensuring cautious handling is paramount for adherence to timeline.

# Research Posters

*Please take a moment to view the poster displays of research by current third-year medical students and PhD candidates working with Duke Ob/Gyn faculty members.*

**Student:** Maame Amoako, BS
**Project Title:** Breastfeeding cessation in high-risk obstetric patients
**Mentor:** Sarah K. Dotters-Katz, MD, MMHPE

**Student:** Sage L. Atkins, BS
**Project Title:** Analysis of timely follow up in the evaluation of postmenopausal bleeding
**Mentor:** Laura J. Havrilesky, MD, MHSc

**Student:** Allison C. Chu, MS, BS
**Project Title:** Antenatal depression in high-risk obstetrics: collaborative care as a solution
**Mentor:** Sarah K. Dotters-Katz, MD, MMHPE

**Student:** Melissa Greene, MS
**Project Title:** Using natural language processing to qualitatively assess goals of care conversations for patients with cancer
**Mentor:** Brittany A. Davidson, MD

**Student:** Megan N. Happ, BA
**Project Title:** #VBAC: a content analysis of trending videos on TikTok
**Mentor:** Jonas J. Swartz, MD, MPH

**Student:** Siera R. Lunn, BS
**Project Title:** Exploring attitudes toward pregnancy and their impact on timing of prenatal care initiation
**Mentor:** Sarahn M. Wheeler, MD, MHSc

**Student:** Siera R. Lunn, BS
**Project Title:** Impact of postpartum mood check in patients with and without mental health treatment
**Mentor:** Sarah K. Dotters-Katz, MD, MMHPE

**Student:** Abigail S. Pyne, MS
**Project Title:** Clinical stage I epithelial ovarian cancer: predictors of surgical staging and prescription of adjuvant therapy
**Mentor:** Emma C. Rossi, MD

**Student:** Sydney M. Sheffield, BS
**Project Title:** Disclosure of abortion to healthcare providers among North Carolina gynecology patients
**Mentor:** Jonas J. Swartz, MD, MPH

# THE ANNUAL
# CHARLES B. HAMMOND, MD
# RESEARCH DAY

**Friday, May 3, 2024**

Duke Obstetrics & Gynecology
Duke University School of Medicine