Objectives: Patient selection for primary radical surgery is paramount to avoid the use of adjuvant radiation treatment and its associated adverse effects in cervical cancer. The use of preoperative imaging could help identify those best suited for surgery versus primary radiation; however, no standard of care has been identified. We aim to describe the false negative rate and false positive rate of preoperative imaging at a single institution prior to radical surgery for cervical cancer.

Methods: A retrospective chart review of all patients who underwent radical hysterectomy for early-stage cervical cancer from 1/2010 – 12/2017 at a single tertiary care center was performed. Patient demographics and clinicopathologic information, including imaging, surgery, adjuvant treatment and disease outcomes, were recorded from electronic records. Descriptive statistics were used.

Results: One hundred and nine patients were identified who underwent preoperative imaging. Ninety-four (86%) had no suspicion for metastatic disease, and 15 (14%) had suspicion for metastatic disease on preoperative imaging. Of these 94, 19 (20%) had a false negative study with metastatic disease identified on final surgical pathology with 18 (95%) receiving imaging within 6 weeks of surgery. Regarding imaging modality, 68% (13/19) had PET/CT; 26% (5/19) had an MRI; and one patient had a PET/CT and diagnostic CT. Of the 19 who had false negative imaging, disease was found to be in the pelvic lymph nodes in 11 patients (58%), parametria in 7 (37%), vaginal extension in 3 (16%), and uterine extension in 3 (16%). Sixty-three percent (12/19) underwent conization prior to surgery. Only 1 of these 12 patients (8%) had a tumor >2cm on cone specimen. Only 1 (8%) had positive lympho-vascular space invasion on cone.

Of the 15 with possible metastatic disease on imaging, (60%) had a false positive study with no metastatic disease identified on final surgical pathology.

Conclusions: Preoperative imaging is a commonly utilized tool to help identify cervical cancer patients who are optimal candidates for radical surgery. In this sample, the false negative rate of preoperative imaging was 20%. Further study is needed to explore preoperative testing that may more accurately identify patients who are optimal surgical candidates for cervical cancer treatment.

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Poster #6

Rates of ovarian micrometastasis in cervical adenocarcinoma

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Objectives: Rates of ovarian metastases in patients with early stage cervical adenocarcinoma have been reported to be as high as 5% leading to some practitioners to advocate for oophorectomy (BSO) at time of hysterectomy. It is unclear if visual inspection can be used to determine if a BSO is necessary given that no study has differentiated between gross versus microscopic involvement. Our goal is to examine the rates of micro-metastatic disease in cervical adenocarcinoma.

Methods: Patients with a diagnosis of early stage cervical adenocarcinoma who underwent surgical resection between 2007-2016 at a single institution were identified and patient medical records were retrospectively reviewed. Ovarian micro-metastasis was defined as presence of cancer in clinically negative ovaries without contiguous disease. Patient demographics, pathology, treatment, and follow-up information were collected. Logistic regression was performed to assess for predictors of micro-metastatic disease. Survival analysis was performed using Kaplan Meier method utilizing log rank test to determine significance.

Results: Of 271 cases assessed for eligibility, 132 cases were included. The stage distribution for 1A, 1B and IIA were 25.4%, 72.3% and 2.3%, respectively. Median patient age was 44 (range 25-87), with 75% of patients being age 51 or less, and 10% of patients being 33 years old or younger. Almost half (47.7%) of patients were current or former smokers, average BMI was 26.7 (range 16-45), 7.6% had known HTN, 6% had documented heart disease and 3.8% had DM. The rate of ovarian metastasis was 1.5% (2/132). Of the ovarian metastasis, one of the cases had grossly abnormal ovaries at time of surgery, leaving only one (1/132) identified case of micrometastatic disease to the ovary. The case of micrometastatic disease had associated LVSI, but no stromal or parametrial involvement, and was node negative. Statistical analysis was limited by the few numbers of metastatic cases, but univariate analysis found gross appearance (p=0.015), LVSI (p=0.046) and corpus invasion (p=0.031) to be significantly associated with ovarian metastatic disease. Median overall survival (OS) for patients who underwent oophorectomy was 158 months (range 9-330) with 79.7% of patients alive without evidence of disease at last follow-up. This data was compared to a cohort of 43 patients where ovaries had been conserved. The median OS for this group was not statistically significantly different at 97.5 months (range 12-250) (p= 0.83) with 88.4% alive without evidence of disease.

Conclusions: This is the first report of the rate of micro-metastatic disease involving the ovaries in cervical adenocarcinomas. This rate was found to be very low at <1% and given that the rate of predisposing factors for osteoporosis and heart disease was high, visual inspection can be considered when deciding if a BSO is appropriate at the time of surgery.

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Poster #7

Highlighting disparities among cervical cancer patients receiving brachytherapy – A National Cancer Database study

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Objectives: Cervical cancer outcomes remain disparate among racial and socio-economic groups. Access to radiation therapy, especially brachytherapy, is critical in the treatment of cervical cancer patients. The aim of this study is to determine if racial minorities and those with sub-optimal insurance receive brachytherapy at the same rate as Non-Hispanic White and privately insured counterparts.

Methods: The National Cancer Database, from 2004 to 2015, includes 53,273 cervical cancer patients who received radiation during their treatment. Of these patients, 25,223 have complete data. A univariate analysis using chi-squared was used to determine covariate association with brachytherapy. A multivariable logistic regression model was used to determine the effect of race/ethnicity (Non-Hispanic White, Non-Hispanic Black, Hispanic, Asian, other) and insurance (private, government, uninsured) on rates of brachytherapy.

Results: Compared to Non-Hispanic White patients, Hispanics are significantly less likely to receive brachytherapy (P = 0.029). However, Hispanic and Asian patients receive brachytherapy at similar rates to their white counterparts. Compared to patients with private insurance, those who are uninsured ($P < 0.001$) are less likely to receive brachytherapy.

Conclusions: This study reveals that racial disparities exist for those that receive brachytherapy. Patients that are uninsured or have Medicaid or Medicare insurance also do not receive brachytherapy at the same rate as those with private insurance. These data indicate

that race and insurance status may be important social determinants in cervical cancer treatment. Whether the differences noted in brachytherapy here affect overall cervical cancer mortality or morbidity warrant further studies.

Poster #8
Can preoperative cervical excision pathology predict the need for adjuvant radiation in early-stage cervix cancer?

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Objectives: Appropriate selection of surgical candidates in early-stage cervical cancer is critical given increased morbidity of dual modality treatment. We sought to assess if pathologic characteristics of preoperative cold knife cone [CKC] or loop electrosurgical excision procedure [LEEP] could predict the need for postoperative radiotherapy (RT).

Methods: After IRB approval, patients who underwent radical hysterectomy (RH) for early-stage cervical cancer from 1/2010-12/2017 were identified; demographics and clinicopathologic data, including imaging, surgery, adjuvant treatment and disease outcomes, were retrospectively collected. Our primary outcome was the need for adjuvant RT. The exposure of interest was preoperative evaluation of CKC/LEEP specimens using Sedlis criteria. Descriptive statistics were performed. Fisher's exact test was used to compare groups.

Results: 148 patients underwent RH. Of these, 57 (38.5%) had a preoperative biopsy without excision and 91 underwent cervical excision prior to RH. Of the 57 patients who did not have a CKC/LEEP, 35 (61.5%) needed adjuvant RT as compared to 23/91 patients (25.3%) who underwent CKC/LEEP (p<0.05). Of the 23 patients who had a CKC/LEEP and needed adjuvant RT, 9 patients met 2 of 3 Sedlis criteria. Of those patients meeting 2 of 3 Sedlis criteria on preoperative cervical excision (n=21), 42.9% needed adjuvant RT. There was a higher risk of needing adjuvant RT if patients met 2 of 3 Sedlis criteria on cervical excision specimen (see table 1, p <0.05). Of the patients meeting 0 or 1 Sedlis criteria on excision (n=70), 14 (20%) of patients needed adjuvant RT. Of the 23 patients who needed adjuvant RT after CKC/LEEP and RH, 95.6% (n=22) had positive margins on cervical excision. Of the 70 patients who did not need adjuvant RT after excision and RH, 67.1% (n=47) had positive margins on their cervical excision (p<0.01).

Conclusions: Women who met ≥2 of Sedlis criteria on their excisional biopsy were at more than twice the risk of needing adjuvant radiation as compared to those meeting ≤1 of criteria. Patients who meet 2 of 3 Sedlis criteria on cervical excision for early-stage cervix cancer should be counseled that they are at increased risk for needing RT postoperatively.

Table 1
Patients who underwent CKC/LEEP prior to RH

	Met 2 of 3 Sedlis criteria	Did not meet 2 of 3 Sedlis criteria	Total Patients
CKC/LEEP and no adjuvant RT	12	56	68
CKC/LEEP and adjuvant RT	9	14	23
Total patients	21	70	

Poster #9
Histology matters in developing a framework for explaining racial disparity in cervical cancer survival

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Objectives: The objectives of this study were to determine if histology matters in the racial disparity in survival between non-Hispanic Black (NHB) and non-Hispanic White (NHW) women with cervical cancer and investigate the contributors of the racial disparity in survival in adenocarcinoma (AC) compared with squamous cell carcinoma (SCC).

Methods: Propensity score analysis using inverse probability treatment weighting was applied to NHB and NHW women diagnosed with a single primary stage I-IV AC or SCC of the uterine cervix between 2004 and 2014 in the National Cancer Database to sequentially balance the patients by age, neighborhood income, insurance, comorbidity score, stage, grade and treatment within each histologic subtype. Other races, ethnicities and histologic types were excluded. Hazard ratio (HR) and 95% confidence intervals (CI) for NHB versus NHW women were calculated from weighted Cox modeling and excess relative risk (ERR) of death was expressed as a percent of the individual contribution of each factor.

Results: NHB women with AC were more likely than NHW women to be diagnosed at an older age (mean age was 54 versus 48 years), with advanced stage (38% versus 22%) and with high grade (45% versus 25%), respectively ($P<0.0001$). Racial disparity in survival was evident in both SCC (Fig 1A) and AC (Fig 1B), with a larger disparity in AC histology (interaction $P<0.0001$ indicated $HR_{SCC} \neq HR_{AC}$ for NHB vs NHW women). After sequentially balancing for the seven sets of explanatory variables, the HR (CI) for NHB vs NHW patients dropped from 1.21 (1.16-1.27) to 1.02 (0.98-1.06) in SCC and from 2.46 (2.22-2.73) to 1.06 (0.96-1.17) in AC. The individual contribution to the ERR of death in NHB versus NHW varied between SCC (Fig 1C) and AC (Fig 1D). In SCC the largest contributors to racial disparity in survival were neighborhood income and insurance status explaining 43.9% and 20.7%, respectively. In AC, age, neighborhood income, insurance status and stage explained 40.2%, 17.7%, 11.3% and 16.6% of the racial disparity in survival, respectively.

Conclusions: Racial disparity in survival between NHB and NHW patients with either SCC or AC is largely explained by neighborhood income and insurance status. Age played a dominant role in explaining the survival disparity in AC. Unexplained factors contribute minimally to increased risk of death for NHB women. This finding further supports the case for policy change to expand equitable pay and equal access to health care. The larger racial disparity in survival with AC histology highlights the need for systematic screening methods to improve early detection of AC cervical cancer across all age groups. Identifying the molecular alterations that induce AC histology may also uncover targetable pathways to mitigate racial disparities. Further investigations of racial admixture and social determinants of health in cervical cancer are needed.