Program Addendum

Special Interest Session II: Contemporary Issues in Gynecologic Oncology: An International Focus

Saturday, March 11, 2017

Moderator: Amita Maheshwari, BS, *Tata Memorial Centre, Mumbai, India*

477 - Special Interest Session

Accuracy of functional and morphological magnetic resonance imaging for pelvic, para-aortic and inguinal lymph node metastasis in cervical cancer

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Background/Objectives: Magnetic Resonance (MR) is the standard exam for staging patients with gynecologic cancer. Lymph node involvement is an important prognostic factor. This study aimed to evaluate the accuracy of functional diffusion weighted imaging (DWI) and morphologic at 3T and 1,5T MR for diagnosing metastatic lymph nodes in cervical cancer

Disease/Procedure/Practice Issue: A retrospective study was conducted at Barretos Cancer Hospital and included 25 patients with cervical cancer, who underwent MR examination and pelvic and/or para-aortic lymphadenectomy. Data regarding lymph node image included the size (long and short-axis diameters), morphology (usual, oval, amorphous), appearance (homogeneous, heterogeneous), limits (regular, irregular, imprecise), necrosis (yes, no), apparent diffusion results (ADR) (normal, low), and aspect (suspect, undetermined, normal). Data regarding histopathologic results evaluated which chain was operated (pelvic and/or para-aortic), how many nodes were removed and how many were metastatic in histology analyses. Statistical analyses included the SPSS program (version 21), Kappa, Sensitivity (S), Specificity (E), Positive Predictive Value (VPP) and Negative Predictive Value (VPN)

Outcomes: Among these 25 patients, 5 (5%) had positive lymph nodes, with a total of 17 metastatic lymph nodes. By image, 29 nodes were considered possible metastatic in MR exam. Four patients (16%) were metastatic by MR and histology, 16 (64%) were negative in both evaluations, one(4%) were positive by histology and negative by MR and four(16%) were negative by histology and positive by MR. Ten patients (40%) had pelvic lymphadenectomy, 05 (20%) had pelvic and para-aortic, 03 (12%) had para-aortic, 02 (8%) had inguinal,02 (8%) had sentinel node removal only, 01 (4%) had pelvic, para-aortic and sentinel node removal and 02 (8%) had pelvic and sentinel node removal. It was also reviewed the most common morphological findings related to suspected lymph-nodes, 29 out of 29 (100%) positive lymph-nodes measured more than 1 cm, 24 of 29 (82,76%) had oval aspect, 13 of 29 (44,82%) had low ADR diffusion, 22 of 29 (75,86%) were classified as suspect and 06 of 29 (20,69%) as undetermined (Table1). The S,E,VPP and VPN were 80%, 80%, 50% and 94%, respectively. The kappa test was 0.490, meaning that the two variables have a moderate concordance

Conclusions: The combination of size, morphological aspect and ADR have moderate accuracy to detect metastatic lymph node in patients with cervical cancers

Table 1. Most common findings in positive lymph nodes in RM

RM finding		Number of Lymph-nodes	Percentage (%)
Size	**Bigger than 1 cm**	29	100
	Smaller than 1cm	0	0,00
	Not evaluated	0	0,00
Morphology	**Oval**	24	82,76
	Amorphous	03	10,34
	Normal	01	03,45
	Not evaluated	01	03,45
Diffusion index	**Non habitual**	17	58,63
	Habitual	03	10,34
	Not evaluated	09	31,03
Appearance	**Heterogeneous**	18	62,06
	Homogeneous	10	34,49
	Not evaluated	01	03,45
Limits	**Imprecise**	01	03,45
	Irregular	05	17,24
	Regular	22	75,86
	Not evaluated	01	03,45
Necrosis	**Yes**	05	17,24
	No	18	62,07
	Not evaluated	06	20,69
Diffusion in T2	**Low broadcast**	13	44,82
	Areas of low signal	11	37,93
	Normal signal	04	13,80
	Not evaluated	01	03,45
Aspect	**Suspect**	22	75,86
	Undetermined	06	20,69
	Normal	0	0,00
	Not evaluated	1	03,45
	TOTAL	**29**	**100%**

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Accuracy of functional and morphological magnetic resonance imaging for pelvic, para-aortic and inguinal lymph node metastasis in endometrial cancer

T.D. Soares[a], R.R. Rossini[a], C.E.M.D.C. Andrade[b], G.F. Cintra[c], M.A. Vieira[c] and R. Reis[c]. [a]*Hospital de Câncer de Barretos - Fundação Pio XII, Barretos, Brazil,* [b]*Faculdade de Ciências da Saúde de Barretos Dr. Paulo Prata, Barretos, Brazil,* [c]*Barretos Cancer Hospital, Barretos, Brazil*

Background/Objectives: Magnetic Resonance (MR) is the standard exam for staging patients with gynecologic cancer. Lymph node involvement is one of the most important prognostic factor. This study aimed to evaluate the accuracy of functional diffusion weighted imaging (DWI) and morphologic at 3T and 1,5T MR for diagnosing metastatic lymph nodes in endometrial cancer.

Disease/Procedure/Practice Issue: A retrospective study was conducted at Barretos Cancer Hospital and included 22 patients with endometrial cancers, who underwent MR examination and pelvic and/or para-aortic lymphadenectomy. Data regarding lymph node image included the size (long, short-axis diameters), morphology (usual, oval, amorphous), appearance (homogeneous, heterogeneous), limits (regular, irregular, imprecise), necrosis (yes, no), apparent diffusion results (ADR)

(normal or low), and aspect (suspect, undetermined, normal). Data regarding histopathologic results evaluated which chain was operated (pelvic, para-aortic), how many lymph-nodes were removed and how many were metastatic in histology analyses. Statistical analyses evaluated the SPSS program, Kappa test, Sensitivity (S), Specificity (E), Positive Predictive Value (VPP) and Negative Predictive Value (VPN).

Outcomes: Among these 22 patients, 6 (27.27%) had positive lymph nodes, with a total of 58 metastatic lymph nodes. By image 39 nodes were considered possible metastatic in MR exam. Six patients (27.27%) were metastatic by image and histology, 14 (63.63%) were negative in both evaluations, zero (0%) were positive by histology and negative by MR and two (9.10%) were negative by histology and positive by MR. Six patients (27.27%) had pelvic lymphadenectomy, 13 (59.11%) had pelvic and para-aortic, one (4.54%) had para-aortic, one (4.54%) had inguinal and one (4.54%) had sentinel lymph node removal only. It was also reviewed the most common morphological findings related to suspected lymph-nodes, 30 out of 39 (76.92%) positive lymph-nodes measured more than 1 cm, 21 of 39 (53.85%) had oval aspect, 13 of 39 (33.33%) had low ADR diffusion, 24 of 39 (61.54%) weresuspect and 10 of 39 (25.64%) were undetermined (Table 1). The S,E,VPP and VPN were 100%, 87.50%, 25.00% and 100%, respectively. The kappa test was 0.792, meaning that the two variables have a strongly concordance.

Conclusions: The combination of size, morphological aspect and ADR have high accuracy and can be useful in detecting metastatic lymph node in patients with endometrial cancers.

Table 1. The most common findings in positive lymph nodes in RM.

RM finding		Number of Lymph-nodes	Percentage (%)
Size	**Bigger than 1 cm**	30	76,92
	Smaller than 1cm	05	12,82
	Not evaluated	04	10,26
Morphology	**Oval**	21	53,85
	Amorphous	11	28,20
	Normal	03	07,69
	Not evaluated	04	10,26
Diffusion index	**Non habitual**	24	61,54
	Habitual	03	07,69
	Not evaluated	12	30,77
Appearance	**Heterogeneous**	15	38,46
	Homogeneous	20	51,28
	Not evaluated	04	10,26
Limits	**Imprecise**	02	05,13
	Irregular	11	28,20
	Regular	22	56,41
	Not evaluated	04	10,26
Necrosis	**Yes**	09	23,07
	No	26	66,67
	Not evaluated	04	10,26
Diffusion in T2	**Low broadcast**	13	33,33
	Areas of low signal	13	33,33
	Normal signal	04	10,26

	Not evaluated	09	23,08
Aspect	**Suspect**	24	61,54
	Undetermined	10	25,64
	Normal	01	02,56
	Not evaluated	04	10,26
	TOTAL	**39**	**100%**

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Incremental prognostic significance of preoperative 3-tesla multiparametric MRI findings in predicting pathologic T2b and influencing misdiagnosis of MRI stage at radical hysterectomy in early-stage invasive cervical cancer

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Objectives: The aim of this study was to examine whether pre-operative 3-Tesla multiparametric MRI can add information to optimize the predictability of staging for cervical cancer regarding the known prognostic factors after a radical hysterectomy.

Methods: This retrospective study's cohort enrolled 227 patients with clinically FIGO IA-IIA cervical cancer who underwent 3T multiparameteric MRI investigation followed a radical hysterectomy between January 2007 and December 2015 at a single academic medical center, the Department of Obstetrics and Gynecology. Univariate and multivariate regression analyses were used to assess the clinical predicting factors upstaging on pathologic category T2b at a radical hysterectomy with clinically FIGO IA-IIA as well as the clinical predicting factors on the possibility of a misdiagnosis (under-diagnosis, and over-diagnosis).

Results: By comparison of postoperative histopathological staging (pTNM), the accuracy of MRI prediction of parametrial invasion (PMI) was 82.8%. For all patients, clinical predicting factors regarding increased odds of having pT2b disease was age (adjusted odds ratio [AOR] 1.06, 95% confidence interval [CI] 1.20-1.12, *P* = .0068), MR PMI (AOR, 3.33 95% [CI] 1.33-8.34, *P* = .0103), MR uterine involvement(UI) (AOR, 6.61, 95% [CI] 2.57-16.99, *P* < 0.0001, respectively, in under-diagnosis, these results were histology squamous vs adenocarcinoma and adenosquamous; (AOR 2.13, 95% CI 1.06-4,28, *P* = .00343), and tumor size (AOR 0.59, 95% [CI] 0.47-0.72, *P* < .0001), respectively, in over-diagnosis, these results were tumor size (AOR 1.71, 95% [CI] 1.11-2.62, *P* = .0142, MR PMI(ARO 71.37,95%[8.49-599.73, *P* < .0001], and MR UI (AOR 0.21, 95% [CI] 0.05-7.91, *P* = .0415), respectively.

Conclusions: Tumor size, and extension to the lower uterine segment on T2-weighted images through preoperative 3-Tesla multiparametric MRI should be considered as a valuable coefficient for predicting pathologic T2b. Misdiagnosis of MRI stage, especially under-diagnosis gets influenced by a histology (adenoarcinoma or adenosqumaous carcinoma), and tumor size, while over-diagnosis gets affected by tumor size, MR PMI, and MR UI.

Table 1. Comparison of the distribution of clinical and pathologic characteristics of the 227 women in the study cohort stratified by MRI prediction of organ-confined (T1, T2a) versus locally advanced invasive disease (T2b)

Clinical characteristics	MRI T0 (n=49)	MRI T1b (n=127)	MRI T2a (n=10)	MRI T2b (n=41)	P-value[§]
Clinical characteristics	MRI T0 (n=49)	MRI T1b (n=127)	MRI T2a (n=10)	MRI T2b (n=41)	P-value[§]
Age(y)*	45	48	47	51	0.2602
Parity*	2	2	2	2	0.5974
Operation method					0.3018
Open radical hysterectomy	11	48	2	19	
Laparoscopic radical hysterectomy & Robotic radical hysterectomy	38	78[†]	8	22	
Menopause					0.0825
No	31	71	5	17	
Yes	18	56	5	24	
Cesarean section					0.2750
Yes	3	13	3	7	
No	46	114	7	34	
At least One Normal Delivery History					0.6264
No	5	16	5	7	
Yes	44	111	5	34	
BMI	23.9	23.7	23.5	23.2	0.8172
SCC Ag (ng/ml) *	0.6	1	1.6	2	<.0001
CEA(U/ml) *	1.6	1.9	1.5	2.1	0.1958
CA 125(U/ml) *	7.5	11	22.4	12.2	0.2186
Histology					0.8852
Squamous	31	87	8	31	
Adenocarcinoma	14	30	1	9	
Adeno-squamous	1	5	0	1	
Neuroendocreine	1	1	1	0	
Other	2	4	0	0	
Grade					0.7390
1	21	18	0	6	
2	14	73	5	21	
3	5	26	4	10	
Unknown	9	10	1	4	
Biopsy type					0.8939
Punch biopsy	17	96	8	30	
LEEP	32	31	2	11	
Clinical FIGO Tumor stage(cT)					<0.001
IA	11	0	0	0	
IB1	38	100	4	19	
IB2	0	14	3	14	

IIA1	0	6	2	4	
IIA2	0	7	1	4	
Unknown	0	0	0	0	
RH T category (final pathologic_stage TNM category 1)					<0.001
T1A	11	0	0	0	
T1b1	38	88	6	9	
T1b2	0	22	1	11	
T2a1	0	1	0	1	
T2a2	0	1	1	0	
T2b	0	15	2	20	
Pathologic Tumor size					<0.001
0-≤1	34	18	0	0	
1-≤8	11	21	0	1	
2-≤3	2	40	0	7	
3-≤4	2	20	2	10	
4-≤5	0	15	4	13	
5-≤6	0	12	3	5	
6-≤7	0	1	0	3	
>7	0	0	0	2	
LVSI					<0.001
Yes	2	48	7	29	
No	47	79	3	12	
Pathologic Deep stromal invasion					<.0001
Inner 1/3	41	27	2	0	
Middle 1/3	6	41	3	2	
Outer 1/3	2	59	5	39	
Pathologic Parametrial invasion					<.0001
No	0	113	8	21	
Yes	49	14	2	20	
Pathologic Parametrial invasion laterality					<0.001
Negative	49	113	8	18	
Unilateral	0	7	1	11	
Bilateral	0	7	1	12	
Pathologic Pelvic LN involvement					<0.001
Negative	48	106	6	23	
Positive	1	21	4	18	
Pathologic Para-aortic LN involvement					0.057
Negative	25	92	7	33	
Positive	0	6	1	3	
Not done	24	29	3	5	
Pathological uterine involvement					<.0001
No	48	114	8	21	
Yes	1	13	2	20	
MRI Tumor size					0.0003
≤4	0	95	4	17	
>4	0	32	6	24	

MRI Pelvic LN involvement					<.0001
Negative	49	112	7	28	
Positive	0	9	3	13	
MRI para-aortic LN involvement					1.0000
Negative	49	125	10	41	
Positive	0	2	0	0	
MRI PM involvement laterality					<0.001
Negative	49	127	10	0	
Unilateral	0	0	0	33	
Bilateral	0	0	0	8	
MRI uterine involvement					<0.001
No	49	116	8	22	
Yes	0	11	2	19	
MRI Deep stromal invasion					<0.001
No invasion	49	1	0	0	
Partial invasion	0	76	6	3	
Complete invasion	0	50	4	38	

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Cost-effectiveness of increasing cervical cancer screening coverage in the Middle East: An example from Lebanon

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Background/Objectives: Most cervical cancer (CC) cases in Lebanon are detected at later stages and associated with high mortality. There is no national organized CC screening program so screening is opportunistic and limited to women who can pay out-of-pocket. Therefore, a small percentage of women receive repeated screenings while most are under-or never screened. We evaluated the cost-effectiveness of increasing screening coverage and extending intervals.

Disease/Procedure/Practice Issue: We used an individual-based Monte Carlo model simulating HPV and CC natural history and screening. We calibrated the model to epidemiological data from Lebanon, including CC incidence and HPV type distribution. We evaluated cytology and HPV DNA screening for women aged 25-60 years, varying coverage from 20-70% and frequency from 1-5 years.

Outcomes: At 20% coverage, annual cytologic screening reduced lifetime CC risk by 14% and cost $80,670/year of life saved (YLS), compared to triennial screening, far exceeding Lebanon's gross domestic product (GDP) per capita (I$17,460), a commonly cited cost-effectiveness threshold. By comparison, increasing cytologic screening coverage to 50% and extending screening intervals to 3 and 5 years provided greater CC reduction (21.4 and 26.1%, respectively) at lower costs compared to 20% coverage with annual screening. Screening every 5 years with HPV DNA testing at 50% coverage provided greater CC reductions than cytology at the same frequency (23.4%) and was cost-effective assuming a cost of I$18 per HPV test administered (I$12,210/ YLS); HPV DNA testing every 4 years at 50% coverage was also cost-effective at the same cost per test (I$16,340). Increasing coverage of annual cytology was not found to be cost-effective.

Conclusions: Current practice of repeated cytology in a small percentage of women is inefficient. Increasing coverage to 50% with extended screening intervals provides greater health benefits at a reasonable cost and can more equitably distribute health gains. Novel HPV DNA strategies offer greater CC reductions and may be more cost-effective than cytology.

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Examining cervical cancer screening capacity in Africa
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Background/Objectives: Each year there are 500,000 cervical cancer cases and 230,000 deaths worldwide, and 85% of cases occur in developing countries. Although screening is widely available here in the US, developing countries face unique challenges in providing adequate screening. We created a survey in conjunction with the African Organization for Research and Training in Cancer (AORTIC) to evaluate the cervical cancer capacity in Africa. The survey assessed screening availability across various settings, with the ultimate goal of identifying areas for targeted interventions.

Disease/Procedure/Practice Issue: The survey was emailed to all AORTIC members using the SurveyMonkey website over a period of 3 months, soliciting responses from healthcare workers currently practicing in Africa.

Outcomes: There were 183 responses from healthcare practitioners in 26 African countries. When asked about the availability of cervical cancer screening in their country, 19.9% of responders reported screening was well organized by the government, 33.7% believed it was opportunistic, and 45.8% said screening availability was limited. When examining this question by country healthcare expenditure, responders from countries who spend <5.5% of their GDP on healthcare reported 15.1% was well organized by the government, 32.1% was opportunistic, and 51.9% was limited. For countries spending >5.5% of their GDP on healthcare, the rates of screening availability were 28.3%, 36.7%, and 35% respectively ($P = 0.05$). 78.3% of responders had pap-smear cytology and 56.6% had visual inspection with acetic acid available at their site. However, only 27.1% of responders had access to pap-smear/HPV cotesting and 15.7% had HPV primary testing.

Conclusions: Nearly half of the AORTIC members surveyed reported limited availability of cervical cancer screening in their countries. Screening is more widely available in countries that spend more than 5.5% of their GDP on healthcare. Although more than half of responders had access to pap-smear and visual inspection with acetic acid, access to HPV cotesting and primary testing remains quite limited. Using these data, future interventions can target settings with limited screening availability in attempt to detect cases earlier and lower the morbidity and mortality of cervical cancer in Africa.

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Discrepancies in Brazilian HPV national vaccination coverage
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Background/Objectives: In 2014, a national program for HPV vaccination was launched in Brazil. A quadrivalent vaccine has been offered to girls aged 9 to 14, in 3 doses. States from North, Central and Northeast regions present lower HDI index and higher cervical cancer incidence over the years, when compared to South and Southeast States in the country. The objectives of this analysis are: to analyze the national coverage in this first year; to test if there was a difference when comparing States from South (S) with North (N); and to compare adherence from the first and the second doses of the vaccine.

Disease/Procedure/Practice Issue: This is a transverse analysis including 4,911,725 girls, from the National Program of Immunization, who received at least one dose of HPV vaccine in 2014, and were included in the Brazilian Public Health Care System Database (DATASUS / National Ministry of Health). The statistical analysis is descriptive, and comparisons were performed by means of Mann Whitney, Wilcoxon and Kruskal-Wallis tests.

Outcomes: The national coverage was 99.9%, 58.9% and 0.5%, for the first, second and third doses of the HPV-vaccine ($P < 0.05$), respectively (table 1). N States had significant lower proportions of coverage when comparing to S States, regardless of age ($P < 0.001$). This gap was larger when analyzing the second vaccine dose (18% absolute difference, $P < 0.001$). First dose was very successful in the entire country, but the second dose had a significant lower coverage, in all ages ($P < 0.001$). Interestingly, 12 y.o. girls had a lower coverage than the other age groups, for both first and second doses (Dose 1 with 19%; and Dose 2 with 13% absolute difference, $P < 0.001$).

Conclusions: First year HPV-vaccine national coverage was particularly successful for the first dose (99.9%), but with a significant decrease in the second dose (58.9%). S States (higher HDI and lower cervical cancer incidence) presented better

coverage, regardless of age and dose, when compared to N States. These data support educational initiatives addressing the importance of the complete schedule adherence, mainly in Brazilian N States.

Table 1. Number of girls and HPV vaccine doses coverage according to age in 2014

	Dose 1		Dose 2		Dose 3	
Age	**Number**	***Coverage(%)**	**Number**	***Coverage(%)**	**Number**	***Coverage(%)**
11 y.o.	1761832	103.29	603462	35.38	11412	0.67
12 y.o.	1564057	89.60	995771	57.05	4703	0.27
13 y.o.	1585836	108.55	1022702	70.00	4970	0.34
14 y.o.	15639	1.20	270293	20.72	1835	0.14
TOTAL	4911725	99.99	2892228	58.88	22920	0.47

*Considering the target population

Table 2. Geografic Regions and HPV vaccine coverage in 2014 (p<0,001)

	*Dose 1 Coverage (%)	*Dose 2 Coverage (%)
NORTH	96,83	52,11
NORTHEAST	101,4	59,62
CENTER-WEST	111,4	59,50
SOUTHEASTERN	111,9	77,40
SOUTH	104,1	73,98

*Considering the target population

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Using HPV DNA co-testing to assess the efficacy of cervical cancer screening and triage with visual inspection under the single visit 'screen-and-treat' approach

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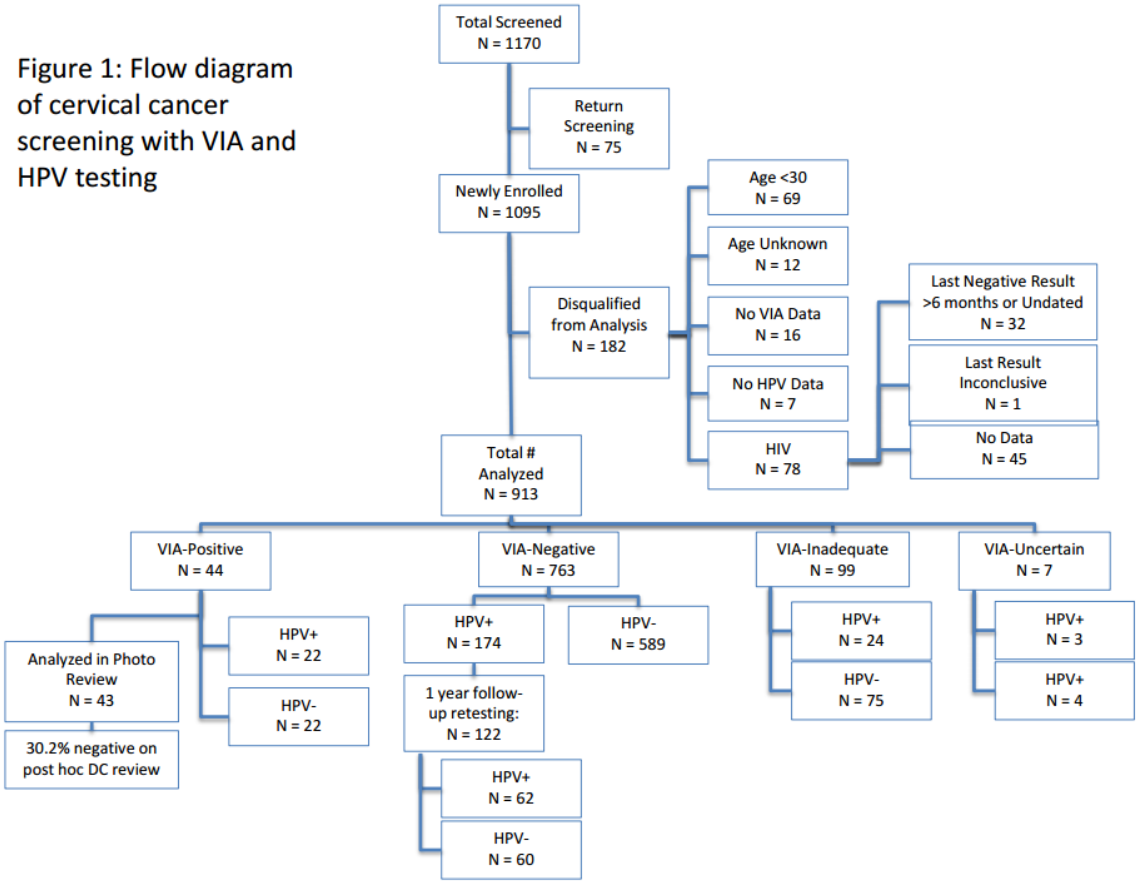
Background/Objectives: Cervical cancer screening by visual inspection with acetic acid is routinely used in resource poor settings, but produces inconsistent results. We assessed the feasibility of screening with VIA enhanced by digital cervicography (VIA-DC) and co-testing with HPV DNA testing by PCR to improve diagnostic accuracy and treatment and to assess consistency of the initial VIA-DC interpretation and post hoc cervicograph review.

Disease/Procedure/Practice Issue: We screened 913 previously unscreened women, aged >= 30, of known HIV status with VIA-DC and tested clinician collected cervical specimens for high-risk HPV genotypes. According to World Health Organization guidelines, all VIA-DC positive women were offered same day cryotherapy, cold coagulation, biopsy or referral for care. A post hoc review of 300 cervicographs blinded to initial interpretations was performed, including 218 HPV or VIA-DC-positives and a random sample of 82 negative for both tests.

Outcomes: A total of 1170 women were screened, with 913 meeting selection criteria for analysis (Fig. 1). Of eligible women, 41.0% were HIV positive, and VIA-DC results were: 4.8% positive, 83.6% negative, 10.8% inadequate, and 0.8% uncertain. Overall HPV prevalence was 24.4% and varied by VIA-DC results (50.0% among VIA-DC positive, 22.8% among negative, 24.2% among inadequate, and 42.8% among uncertain). While half of the 44 women who were VIA-DC positive did not have high-risk HPV, only 22 (3.2%) of the 684 HPV negative women were VIA-DC positive. Of the 44 women initially VIA-DC positive and eligible for either cryotherapy or LEEP, 37.8% of initial interpretations were concordant on cervicograph review, with 31.4% reinterpreted as negative, 20.9% positive but different treatment recommended, 14.0% inadequate, and 4.7% uncertain.

Conclusions: Our pilot program identified limitations of using VIA-DC alone for screening and triage. HPV DNA co-testing with PCR may improve screening accuracy, but cannot provide same day results, because it requires 90 samples per three hour run. Since post hoc cervicograph results varied considerably from initial VIA-DC interpretation, primary screening with self-collected HPV DNA, followed by VIA-DC of HPV positives on a second visit might improve accuracy and reduce over- or under-treatment.

Figure 1: Flow diagram of cervical cancer screening with VIA and HPV testing



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Opportunity lost: Scratching the surface on the impact of suboptimal HPV vaccination in the deep south

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Background/Objectives: The HPV vaccine received FDA approval in June 2006. Unfortunately, uptake in the general population (~60%) has not been robust over the last decade. This is especially true in the Deep South. In Alabama, vaccine uptake is abysmal (30%) and the incidence rate of cervix cancer is among the highest in the nation (8.9 per 100,000 women). Given a decade of availability, we conducted a retrospective cohort study to determine the potential impact that suboptimal effective vaccination strategy has on cervix cancer rates in southern Alabama.

Disease/Procedure/Practice Issue: Following IRB approval, utilizing ICD-9 & 10 data, we identified a cohort of women under age 40 diagnosed with cervical cancer at a single institution over the last 5 years. The goal of this study is to identify the number of invasive cancer cases that were eligible for HPV vaccination in 2006 and hence potentially preventable in a high-incidence population.

Outcomes: Utilizing 5 years of ICD-9 & 10 data, we identified 464 cervix cancer patients treated at a single institution. One hundred thirty seven women (30%) were under age 40 at diagnosis. Following exclusion of pre-invasive disease, incomplete treatment records, and wrong disease site, 78 women with invasive disease under age 40 were identified. The median age of this cohort was 33 years, the majority of cases were squamous cell carcinoma (75%, n=59), and 25% (n=20) had stage IB2 disease. The majority of our cohort was Caucasian (n=48, 65%) and 27% (n=20) African American. Nearly 50% of women (n=38) underwent hysterectomy (simple or radical) and 40% (n=31) received concurrent chemotherapy and radiation. Within our cohort, based on age at diagnosis, 70% (n=55) were eligible to receive the HPV vaccine based on the 2006 criteria. At present, 92% (n=71) of our cohort has survived their diagnosis with a median of 14 months of follow up.

Conclusions: Our data represents a simple, but telling observation. A large proportion of our cohort represents women who were candidates for the HPV vaccine in 2006. Identification and further analysis of these women will better detail the medical, reproductive and economic opportunity lost secondary to suboptimal vaccination education and utilization strategies. Further analysis of this cohort is ongoing and we plan to utilize our findings to direct planned prospective efforts to design protocols to improve vaccine uptake in south Alabama.

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Incidence and costs of cervical intraepithelial neoplasia in the Korean population
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Background/Objectives: All citizens of Korea are members of the National Health Insurance Plan, and although there is no National Immunization Program (*NIP*) for HPV vaccine, a national health examination program for prevention is being carried out for those who are 30 years of age or older. In this study, we identify differences in cervical intraepithelial neoplasia incidence and its medical costs by age and region.

Disease/Procedure/Practice Issue: We searched 5 years' worth of data on cervical cancer, high grade cervical intraepithelial neoplasia (HG-CIN) and low grade intraepithelial neoplasia (LG-CIN), from 2010 through 2014, using the Standardized Disease Classification Code and the Standardized Medical Treatment Code from the database of the Health Insurance Review and Assessment Service (HIRA).

Outcomes: The 2014 crude incidence rates for cervical cancer, HG-CIN, and LG-CIN were 28.4, 39.8, and 425.4, respectively. Thus, the crude incident rates of cervical cancer and HG-CIN are decreasing, but that of LG-CIN is significantly increasing ($P < 0.001$).

The peak ages of incidence were 70-75 years old, 30-34 years old, and 25-29 years old for cervical cancer, HG-CIN, and LG-CIN, respectively; LG-CIN showed an increasing trend in all age groups. HG-CIN showed a significantly increasing trend in individuals 30-39 years of age. The treatment of cervical cancer requires $3,342 per year, whereas treatment of HG-CIN and LG-CIN requires $467and $83 per year, respectively. Although the frequency of CIN-related visits to doctors is increasing, the cost per visit has been decreasing, particularly with LG-CIN

Conclusions: The incidence rate of HG-CIN and cervical cancer is increasing among the younger generation (≥30 years old) and in specific region of Korea. These findings suggest that different strategies will be required for prevention of cervical cancer by region, age.

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486 - Special Interest Session
Improving treatment of cervical lesions detected through visual screening in Cameroon, West Africa
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Background/Objectives: While visual methods for screening and treating cervical lesions are widely used, information on treatment is limited. In 2012, only 6% of women with cryotherapy (cryo)-eligible lesions received same-day treatment and only 1/3 had received cryo 12 months after screening at Banso Baptist Hospital (BBH). In 2013, same day treatment rates for cryo-eligible lesions improved to 52% through patient and provider education, better follow up, and having the women pay later for the cost of treatment. We aimed to evaluate treatment rates for patients, who screened positive at BBH July-December 2015.

Disease/Procedure/Practice Issue: Trained nurses screened women aged 25-65 at BBH and out reach clinics with digital cervicography of the acetic acid- and Lugol's iodine-stained cervix and treated cervical precancers with cryo or loop electrical excision procedure (LEEP) per World Health Organization criteria.

Outcomes: Of the 1436 eligible women who were screened, 92 (6.4%) screened positive, 65 had cryo-eligible lesions, 15 had LEEP-eligible lesions, and 12 had lesions suspicious for cancer. The same day treatment rate was 78.5% for cryo-eligible

lesions and 6.7% for LEEP-eligible lesions and 100% of lesions suspicious for cancer were biopsied. At 12 months, treatment rates increased to 90.8% for cryo-eligible lesions and to 53.0% for LEEP-eligible lesions. Of the 12 biopsies of lesions suspicious for cancer, 10 (83.3%) were confirmed as invasive cervical cancer.

Conclusions: Same day treatment of cryo-eligible lesions has increased dramatically since 2012. However, since only 53% of LEEP-eligible lesions were treated, further investigation of barriers to LEEP treatment is needed.

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487 - Special Interest Session

Implementation of a single-visit breast care program in Zambia

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Background/Objectives: System level barriers to breast cancer care in low-income countries with high breast cancer mortality rates, like Zambia, lead to late stage presentation and high mortality rates. To overcome these barriers we designed and implemented a model that compresses the breast cancer care pathway – breast self-awareness, psychosocial counseling, clinical breast examination, breast ultrasound, ultrasound-guided biopsy, cytologic analysis of biopsy specimens and surgical treatment into a single visit – "One Stop Shop."

Disease/Procedure/Practice Issue: In collaboration with the Zambian Ministry of Health and support of the Susan G. Komen Breast Cancer Foundation, we facilitated the development of breast cancer detection and treatment capacity in Zambia through on-site training of local healthcare providers, led by international breast oncology experts. Afterwards, a breast cancer detection camp of one-week duration was implemented in a rural area of the country, during which multiple steps in the breast cancer care pathway were offered in a single-visit format.

Outcomes: Four hundred seventy-five (475) women were evaluated during the camp. Mean age of participants was 34.5 (± 13.0). The majority of women had more than one pregnancy (81.9%), breast-fed (78.5%), reported hormone use (54.1%), and had no family history of breast cancer (96.4%). Abnormalities were detected on clinical breast examination in 33 women of which 27 required ultrasound. Lesions were confirmed in 17 and evaluated using US-guided core needle biopsy (12) or fine-needle aspiration (5). On-site imprint cytology was performed on all 17 specimens and later confirmed by histology. Two breast cancers were detected, one early and one late stage, and referred for treatment. Three women with benign lesions underwent same-day surgery after histologic confirmation.

Conclusions: The "One-Stop Shop" model has the potential to improve the efficiency of breast care in low-resource environments.

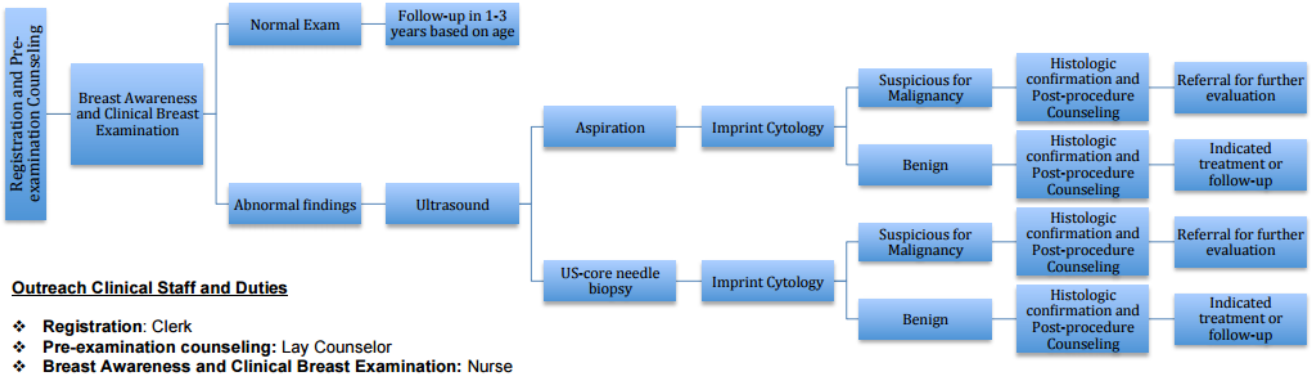

Figure 1. Outreach Flow Diagram

488 - Special Interest Session

Educational attainment and response bias: A unique barrier when studying predictors of HPV in Liberia

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Background/Objectives: Human Papillomavirus (HPV) is one of the most common sexually transmitted infections (STI), and a well-established cause of cervical cancer. Within Liberia, a country with finite resources, the majority of women go without any form of cervical cancer screening. In this analysis, we explored important predictors of HPV among Liberian women while attempting to correct for non-response bias due to high stigmatization surrounding the age of one's first sexual encounter.

Disease/Procedure/Practice Issue: The data for this ancillary analysis came from a cervical cancer screening program conducted between 2013 and 2014 in Monrovia, Liberia. Results are currently available for 670 women. The principle outcome was HPV. Predictors of interest were age, oral contraceptive use, marital status, educational attainment, employment status, and number of children. Our analysis consisted of a sub-sample (n=514, 77%) of the 670 women who had complete information on all predictors of interest, except age at first sex. Only 90% (n=465) of the sub-sample reported age at first sex. To correct for potential non-response bias, we first conducted a probit regression analysis to predict the proclivity to report age at first sex in the larger sub-sample of 514 women. A function of this proclivity was then incorporated in a second probit model in the smaller subsample of 465 women.

Outcomes: Among the larger sub-sample (n=514), those with higher education were more likely to report age at first sex than those without education ($P < 0.001$). In the smaller sub-sample (n=465), those with and without HPV differed with respect to educational attainment ($P = 0.001$), employment ($P = 0.002$) and marital status ($P = 0.024$). The multivariate model showed marginally significant evidence of non-response bias. This resulted solely from multicollinearity arising from the dual impact of education on choosing to report age at first sex and one's risk for HPV.

Conclusions: While educational attainment may be a major contributor to HPV in Liberia, it is also linked to whether individuals respond to stigmatized questions. If unresolved, global health researchers could be left with incorrect estimates of the magnitude of the true underlying contributors to HPV in this vulnerable population, ultimately halting the identification of important mechanistic targets for intervention.

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489 - Special Interest Session

Cervical cancer screening in rural South Africa among HIV-infected migrant farm workers and sex workers: A mixed methods program evaluation

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Background/Objectives: In 2014 a "see and treat" cervical cancer-screening program was implemented at a local HIV clinic in Limpopo, South Africa. Pap smears, although routinely done, were of poor quality, results were often lost, and there was lack of follow up and delayed treatment for abnormal results. The purpose of this evaluation was to determine the quality and sustainability of the implemented program. A mixed-methods program analysis was conducted at 18-months post implementation.

Disease/Procedure/Practice Issue: Data collection techniques included in-depth interviews of staff and patients, observation of healthcare workers delivering screening, and review of charts and patient logs.

Outcomes: Twenty in-depth interviews revealed improved cervical cancer screening understanding and awareness and privacy concerns and negative perceptions of medical care as barriers to screening (Table 1). Informal observations revealed continued clinical competence among healthcare workers; nurses were able to correctly perform the procedure and triage patients appropriately for treatment without assistance. Review of charts demonstrated positive correlation between VIA and Pap smear results [r= .321, n=82, $P = .003$; r= .463, n=183, $P = .000$] in 2016 and 2015 respectively. In evaluating loss to attrition (Table 2), about half of the first cohort of patients were lost to follow up, 54.8% of VIA+ patients and 61% of VIA- patients. Of those patients who received treatment, necessitating additional screening, 60% were lost to follow up. VIAs and

Pap smears were offered on an ongoing basis and month over month change for overlapping 4 months of programming between 2015 and 2016 showed a 4.4% negative change in number of Pap smears and a 57% negative change in VIAs.

Conclusions: Our evaluation reveals successful integration of "See and Treat" into a clinic in rural South Africa and increased awareness of cervical cancer among health workers and participants. Quality of the program was maintained and patients were treated on site with out additional referrals for treatment. Program sustainability was challenging to assess as many patients were lost to follow up, given the migrant and transient population attending this clinic. Acceptance by health workers and patients alike is vital for the long-term impact on cervical cancer incidence in this region.

Table 1. Results from 20 qualitative interviews

Understanding	Role	Quote
Awareness	**Patient**	"The most important thing is that if you go for cervical cancer and then you're still on the first stage, early stage, you will get help. Yea, That's the only thing she say it's very important to get it on early stage before it spread."
	Patient	"I just want to know if when they check me the Pap smear, I just want to make sure I don't have the cervical cancer. So it's easier for me if I can find it earlier then they can clear it."
	Patient	"Her understanding is that they are checking if there is the cancer of cervix and then if it's there, how far has the cancer cells."
	Patient	"[laughing]. Because I don't want to die, while I don't know what is happening."
	Patient	"Helpful to find something hidden. Pap smear – you won't know until you get screening. It's about cancer. If you have it or are just starting to have it"
	Patient	"It helps when you developing that cancer of the cervix they will find it earlier before it spread."
Barriers		
Negative Perceptions of Medical Care	**Nurse**	"Patients don't ask questions to doctors, have fear about the explanation"
	Patient	"Stressed, don't know what's going on. Don't know what to say."
	Patient	"Since some of the people they understand about the cervix cancer. But the others they can go to the clinic and do Pap smear and if they refer them. […] They go to hospital and waiting for doctor. And the doctor give them, book them, give them a date to come back to doing something, some of the people they say, I'm going home I don't want to go there because maybe they will cut me something, so they go home. Instead of going to the doctor doing something for them. "
Confidentiality & privacy	**Nurse**	"About 10-20% refuse Pap smear because they are too nervous or concerned with privacy. Some have fear and don't want to ask questions. They don't want to be taught, even at meetings or churches, [they say] 'I would rather die than be uncomfortable.'"
	Nurse	"Largest challenge – patients don't want be seen. Older women didn't want young nurses to see her. Not comfortable with the position and being seen"

Table 2. Loss to Attrition

	T1	T2	T3
	N=403	N=114	N=403
VIA			
Yes	403 (100%)	13 (11%)	87 (21.6%)
VIA Positive	124 (30.8%)	4 (3.5%)	7 (8.0%)
Cryotherapy	114 (92%)	-	-
VIA Negative	279 (69.2%)	9 (7.9%)	80 (92%)
Ineligible	0 (0%)	1 (.9%)	
No	0 (0%)	33 (29%)	79 (19.6%)
Loss to Follow Up	-	68 (60%)	237 (58.8%)
Pap Smear			
Yes	183 (45.4%)	30 (26.3%)	96 (23.8%)
Pap Positive	49 (12.2%)	11 (36.7%)	14 (14.6%)
Pap Negative	134 (33.3%)	19 (63.3%)	77 (80.0%)
No	199 (49.4%)	21 (18.4%)	57 (14.1%)
Loss To Follow Up	21 (5.2%)	63 (55.3%)	248 (61.5%)

Note: Time 1 (T1) is program implementation, Time 2 (T2) is 6 month follow up for those who received cryotherapy at T1, Time 3 (T3) is 1 year follow up for all those who were screened at T1

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490 - Special Interest Session

The impact of HIV infection on cervical cancer survival in Ugandan women

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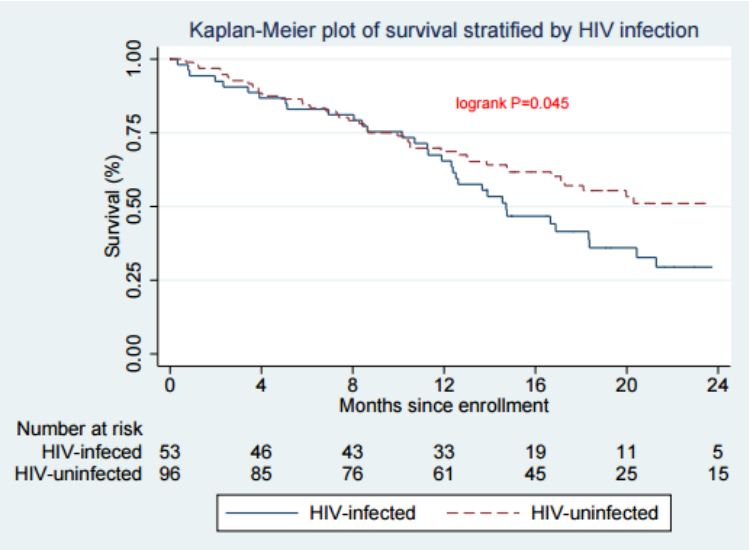
Background/Objectives: To understand the impact of HIV infection on overall survival (OS) in Ugandan women diagnosed with cervical cancer.

Disease/Procedure/Practice Issue: A prospective cohort study of women diagnosed with cervical cancer between 2013 and 2015 at the Uganda Cancer Institute. Upon enrollment, medical history, blood draw, and tumor tissue were obtained for each participant (pts). The association of HIV infection, age, FIGO stage, tumor histology, tumor grade, baseline CD4 count and baseline hemoglobin (Hb) with OS was evaluated using univariable and multivariable Cox proportional hazards models.

Outcomes: 53 HIV-infected and 96 HIV-uninfected pts were enrolled. The majority of both groups had squamous cell and moderate to poorly differentiated tumors. Median age at diagnosis was 44 for HIV-infected and 54 for HIV-uninfected pts. Among HIV-infected pts 68% had early stage (I-II) compared to 65% of HIV-uninfected pts. 79% of HIV-infected pts were receiving antiretroviral therapy. Median baseline CD4 count was 390 cells/mm^3 and median Hb was 10.5 g/dL for pts with HIV. Median CD4 count was 926 cells/mm^{3}and median Hb was 12.0 g/dL for pts without HIV. There were 35 deaths among HIV-infected and 45 among HIV-uninfected pts. HIV-infected pts had shorter unadjusted median OS compared to HIV-uninfected pts (14.7 vs 24.3 months, hazard ratio (HR) 1.56, 95% CI 1.003-2.431, P = 0.048). On univariable analysis, younger age, later stage, lower CD4 count and lower Hb were associated with shorter OS. After adjusting for age, stage, histology, grade,

baseline CD4 count and baseline Hb, HIV infection was not significantly associated with OS (HR 0.96, 95% CI 0.42-2.21, *P* = 0.93). Only stage (*P* = 0.01) and age (*P* = 0.02) remained significantly associated with OS in multivariable analysis.

Conclusions: Despite similar stage, histology, and grade distribution between HIV-infected and uninfected cervical cancer patients in this prospective cohort study, there is a marked difference in unadjusted OS, potentially attributable in part to differences in baseline CD4 count and Hb. Only stage and age were associated with OS in a multivariable model, but small cohort size may have reduced power to detect other associations. These findings motivate larger and more detailed studies of the natural history of cervical cancer in sub-Saharan Africa.



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491 - Special Interest Session
Screening for endometrial cancer should be considered in special population
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Background/Objectives:

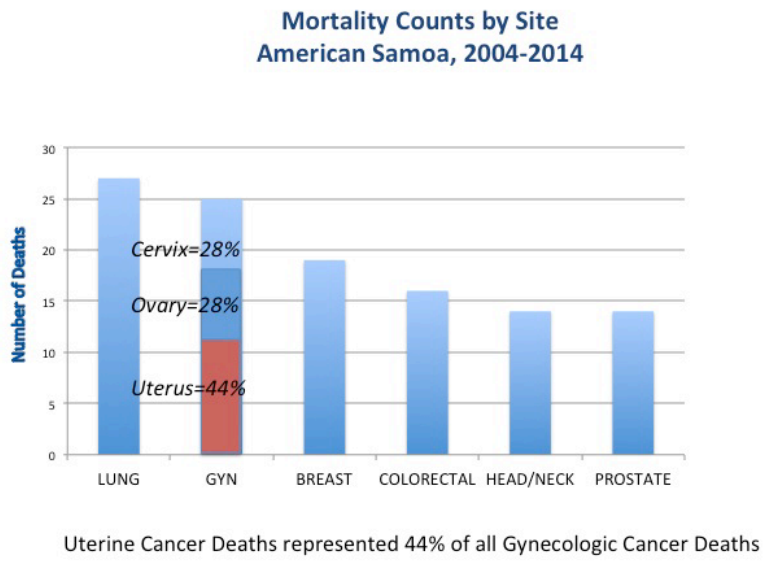
Non-communicable disease (NCD) cancer risk factors are increasingly common throughout the world. Consequently, population cancer control needs and practices may no longer be optimally aligned. We sought to assess a vanguard of contemporary cancer risks vs traditionally screened cancers with American Samoa (AS) as a demonstration population.

Disease/Procedure/Practice Issue: Public access de-identified data was used to describe population cancer characteristics over several time periods.

Outcomes: According to 2010 census, there were 27,349 women living on AS. From 2004-14, 258 new cancers (9.4/10,000 women/year) were diagnosed including uterine (36%), breast (37.6%), cervix (6.6%), ovary (5.1%), and others (14.7%). Compared to year 2000 data, the incidence of uterine cancer increased 78.9% to 3.4 cases/10,000 women years while breast cancer increased 52.2% to 3.5 cases/10,000 women years. Compared to USA mainland reported high quality cancer incidence data, breast cancer on AS was 0.31x and ovarian 0.55x less than that on the mainland while uterine was 2x and cervical 1.4x greater. In the most recent 23 months for which data is available from hospital pathology records, there were 31 uterine cancers diagnosed from 284 endometrial biopsies sampled for abnormal bleeding (PPV 31/284=10.9%). Among uterine cancers limited to those with available data (n=20); the median age was 54.5 with 25% <50 yrs old; median BMI was 40.9 with 95% >30; 35% were grade 3. Also during the most recent 23 months, endometrial cancer was 2.4x more likely to be diagnosed than breast cancer, 3.9x more likely than colon cancer, 7.6x more than cervical cancer and 10.3x more than ovarian. Gyn cancers (uterine, ovarian, cervix) were the leading cause of cancer death among women after lung.

Conclusions: Using limited data sources, the recent and trending AS cancer profile appears to have important differences from that of traditional US mainland experiences. Mainland cancer characteristics may be changing similarly based on evolving NCD rates throughout the world. Cancer control programs should evaluate the inclusion of population based screening

for endometrial cancer according to their population specifics. This is an early report that may be reflecting impending significant changes in cancer cases. Due to methodologic limitations, additional research must be performed to confirm our observations.



Uterine Cancer Deaths represented 44% of all Gynecologic Cancer Deaths

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492 - Special Interest Session

Breast cancer population "screening" using a repurposed WWW based personal risk assessment tool instead of age based screening

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Background/Objectives: Breast cancer screening is an important part of cancer prevention and control programs. Unfortunately developing communities do not have the needed equipment, technicians or infrastructure to implement best practices. We report an alternative www based model and its potential impact on breast cancer in a representative under resourced population (Kosrae, Federal Micronesia).

Disease/Procedure/Practice Issue: Population based modeling using the unadjusted www based Asian American Breast Cancer Study (AABCS) personalized risk assessment tool (dceg.cancer.gov/tools/risk-assessment) not intended for population based screening.

Outcomes: Based on US census data, there were 3827 women at risk for breast cancer in 2000 on Kosrae with approximately 3 breast cancers diagnosed each year. Using age-based mammogram screening of all eligible women at risk (ages >50), 869 women would have been referred for image-based screening. CMS maximum allowable charges would yield a total expenditure for this triage of $73,369 (869 x $84 for the CMS non-facility limiting charge CPT 77057) or approximately $24,456 per breast cancer case detected (assuming all cases would have been detected by imaging). Alternatively, assuming universal access to www and no cost per AABCS screening, a AABCS cut off rate of 10% for referring for diagnostic mammogram, based on a corresponding 5 year cumulative risk of developing breast cancer, additional image based diagnosis would cost approximately $1126 (8.69 x $129 CMS maximum allowable charges for diagnostic mammogram CPT 76091). Additional assumptions e.g. a false positive rate of 10% and a positive predictive value of screening mammogram as low as 20% would increase the cost of age based mammogram screening.

Conclusions: Modifying the use of the AABCS web based individualized risk assessment tool for population based “screening” can refer any predetermined number of high-risk women, at a knowable cost per cancer case detected. By adjusting the cut-off percentage for referral, communities can determine the optimal balance between cost and disease outcomes reflecting their unique values. Actual implementation of this strategy should proceed after a practice dataset from the target population is used to adjust assumptions and cut-offs. Thereafter a demonstration project may be warranted.

493 - Special Interest Session

A comprehensive assessment of breast and cervical cancer control infrastructure in Zambia

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Background/Objectives: By 2030 cancer will kill one million Africans each year. Women will bear the heaviest burden, as cancers of the breast and cervix are the most common malignancies and causes of cancer-related death in the African region. Implementing and expanding existing services for the early detection and treatment of these "priority" cancers are of utmost importance. National-level data that maps the current status of women's cancer control services is needed to inform strategies for capacity-building.

Disease/Procedure/Practice Issue: Using mixed-methods we assessed currently available services for breast and cervical cancer early detection and treatment in Zambia. The evaluation was conducted at all provincial hospitals in the country, the national referral hospital, and the national center for cancer treatment. These facilities were selected because they have been identified in the Zambian National Cancer Control Strategic Plan as the highest priority facilities for expansion of cancer control services.

Outcomes: A system for cervical cancer prevention using visual inspection with acetic acid (VIA) and ablation/excision of precancerous lesions has been established at the provincial level in Zambia. Mammography, clinical breast examination, diagnostic ultrasound and breast biopsy capacity exist at the provincial level, albeit on a much smaller scale. Breast wedge resections and mastectomy can be performed in provinces where general surgeons are located; breast conserving and reconstructive surgery are not available. Invasive cancers are generally referred to the University Teaching Hospital in Lusaka, where cancer surgical services, radiation, chemotherapy and hormonal therapy are available. Pathology services nationwide are woefully inadequate.

Conclusions: The assessment revealed a critical need for centrally coordinated, but decentralized, comprehensive service platforms for cervical and breast cancer control; mid- and high-level healthcare providers who can provide advanced diagnostic and therapeutic services; pathology services; and innovative financing.

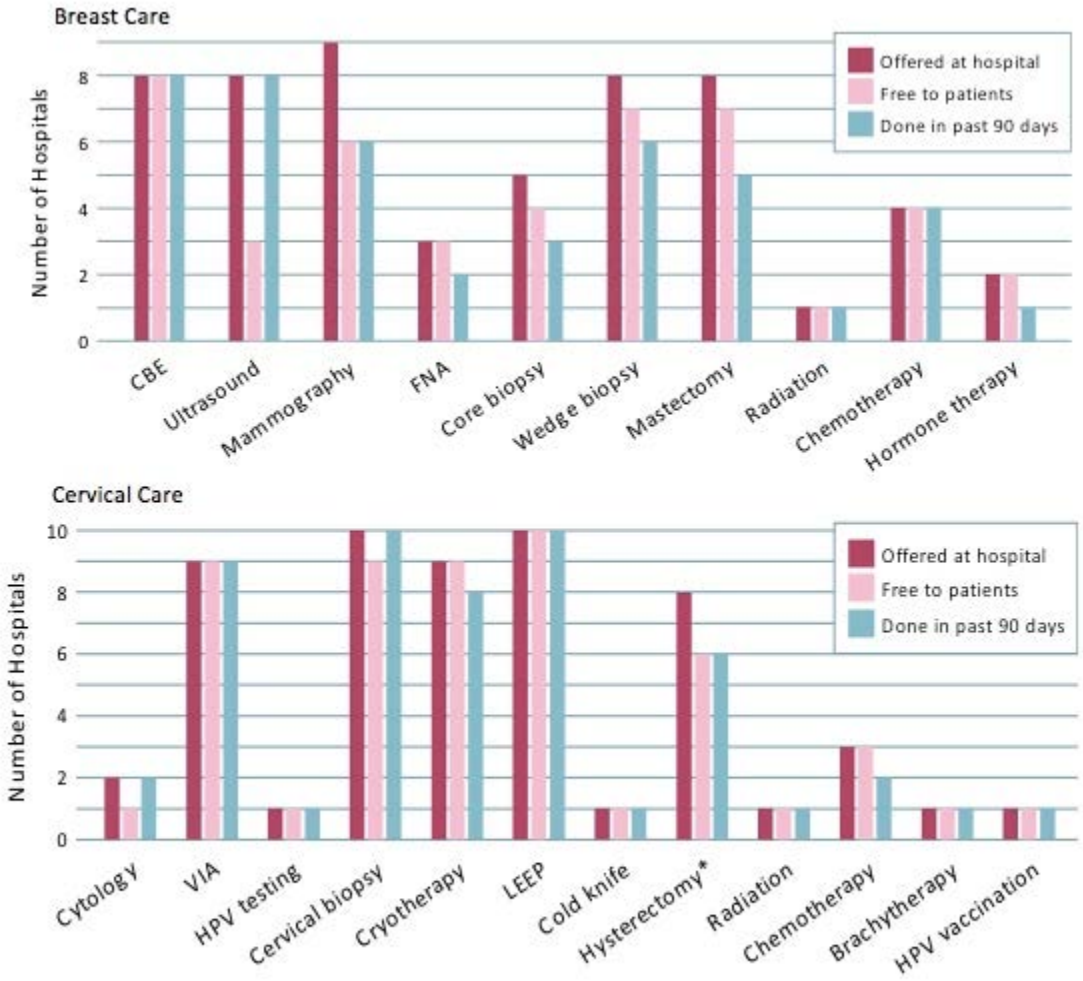

Figure 1. Available Breast and Cervical Cancer Services in Zambia

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494 - Special Interest Session

Uptake and outcome of multi-gene panel testing in women with breast, ovarian or uterine cancer counselled at a cancer genetics clinic in Singapore

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Objectives: To study the genetic testing uptake and outcome of multi-gene panel testing in women with breast, ovarian and uterine cancer, since its introduction at our genetics clinic in April 2014.

Methods: We reviewed the characteristics, genetic test motivations, uptake, and test results of women with breast, ovarian or uterine cancer offered multi-gene testing at our cancer genetics clinic from July 2014 to August 2016. Testing comprises sequencing and deletion/duplication analysis of 11 to 49 genes including *BRCA1/2*, mismatch repair, and other cancer predisposition genes.

Results: 308 patients with primary breast (n=205), ovarian (n=85) or uterine cancer (n=18) were counselled, and 51.3% underwent testing. Primary suspected diagnosis was hereditary breast-ovarian, Lynch, Li-Fraumeni, and Cowden syndrome in 81.6%, 15.2%, 1.9% and 1.3% respectively. Test uptake was significantly higher in ovarian than breast and uterine cancer patients (69.4% vs 44.9% vs 38.9%, $P = 0.001$). There were no differences in ethnicity ($P = 0.07$), risk category ($P = 0.13$) or age at cancer diagnosis ($P = 0.83$) between patients counselled and tested. Main motivation for testing for breast, ovarian and uterine cancer patients was to plan screening and preventive surgery (38.0%), for treatment options (59.3%) and for knowledge (42.9%), respectively. 23/92 (25.0%), 16/59 (27.1%) and 3/7 (42.9%) of breast, ovarian and uterine cancer patients tested had deleterious mutations. 13/23 (57%) breast cancer mutation carriers had *BRCA1* (5) and *BRCA2* (8)

mutations, 10/23 (43%) had mutations in other genes (*TP53* [3], *BRIP1* [1], *CHEK2* [1], *FANCC* [1], *MLH1* [1], *PALB2* [1] and *RAD50* [1]). One *BRCA2* mutation carrier had an incidental *RET* pathogenic mutation. 12/16 (75%) ovarian cancer mutation carriers had *BRCA1* (8) and *BRCA2* (4) mutations, 4/16 (25%) had mutations in other ovarian cancer predisposition genes (*BRIP1*, *MLH1*, *MSH2* and *RAD51C*). All 3 uterine cancer mutation carriers had mismatch repair gene mutations (*MSH1*, *MSH2* and *MSH6*).

Conclusions: Almost 50% breast cancer and 25% ovarian cancer mutation carriers diagnosed from multi-gene testing carried mutations in cancer predisposition genes other than *BRCA1/2* and mismatch repair genes, highlighting the relevance of adopting multi-gene testing in the clinic.

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495 - Special Interest Session

Parametrial involvement in early stage cervical cancer: A Brazilian experience

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Background/Objectives: Cervical cancer is a high prevalence cancer mainly in developing countries. Currently the surgical procedure of choice for invasive cervical cancer has been the Wertheim-Meigs (WM) surgery, but would this be the ideal treatment? This study aims to identify women with early-stage cervical cancer who may benefit from conserving surgery.

Disease/Procedure/Practice Issue: We retrospectively reviewed the medical records of 82 pacients who underwent surgycal treatment (WM and Traquelectomy) for invasive cervical cancer between 1999 and 2014 in HMU SBC hospital. These patients were evaluated for histologic type, tumor size, and involvement of other structures. Of these, 14 were excluded: undergoing conization and not evoluated for tumor size.

Outcomes: Of the 68 patients analyzed, 61 (89.7 %) underwent WM surgery and only 7 patients (10.3%) underwent trachelectomy surgery. 86.7 % of the cases were of squamous cell carcinoma. In relation to tumor size, 79% of them were smaller than 2 cm, and 21% were higher than 2 cm. 31% had at least one kind of invasion (vascular, parametrial, lymph node and vaginal).These patients were analyzed for tumor size to cog define the existence of a risk group.

Conclusions: As the rate of parametrial involvement in women with early stage cervical cancer is low, conservative surgery could become the standard of care for certain women, especialy those with tumor size < 1 cm.

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496 - Special Interest Session

Prognostic significance of endomyometrial and parametrial infiltration with positive surgical margin in lymph node-negative FIGO stage IB-iia cervical cancer treated with radical hysterectomy

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Background/Objectives: The aim of this study was to evaluate clinicopathologic factors possibly influencing extra-pelvic metastasis and survival in patients with lymph node-negative FIGO stage IB-IIA cervical cancer treated with abdominal/laparoscopic/robotic radical hysterectomy (ARH/LRH/RRH) with retroperitoneal lymphadenectomy.

Disease/Procedure/Practice Issue: We retrospectively reviewed clinicopathologic data of 293 patients with FIGO stage IB-IIA cervical cancer treated with RH with retroperitonal lymphadenectomy between February 2000 and July 2016. We categorized the LRH/RRH groups into LRH-vaginal colpotomy (VC) and LRH/RRH-intracorporeal colpotomy (IC). Several clinicopathologic factors including surgical and colpotomic methods, surgical resection margin, and parametrial/endomyometrial infiltration were selected. Univariate and multivariate Cox proportional hazard regression models were applied to analyze prognostic factors.

Outcomes: The median follow-up time was 58 months (range, 6 to 202 months). In multivariate analysis, LRH/RRH-IC (OR, 4.535; [95% CI, 1.099-18.715]; $P = 0.037$), endomyometrial infiltration (OR, 13.036; [95% CI, 2.801-60.660]; $P = 0.001$), and parametrial infiltration with positive surgical margin (OR, 30.132; [95% CI, 2.550-356.060]; $P = 0.007$) were significantly related to five-year disease-specific survival. Five patients (13.9%) who received LRH/RRH-IC showed distant lymph node and extra-pelvic peritoneal metastasis including omentum, liver surface, and splenic hilum. Three patients (50.0%) with positive

parametrial margin and five patients (26.3%) with endomyometrial infiltration showed extra-pelvic metastasis including distant lymph node and lung.

Conclusions: The optimization and standardization of LRH/RRH are expected to improve the survival outcome. The status of endomyometrial and parametrial infiltration can help guide physicians with decisions regarding the use of systemic therapy in lymph node-negative FIGO stage IB-IIA cervical cancer patients.

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497 - Special Interest Session

Prognostic model for disease-free survival, lymphatic and/or hematogenous recurrence in patients with early stage cervical cancer treated with radical hysterectomy: A Korean Gynecologic Oncology Group study

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Background/Objectives: To develop a model to predict 5-year disease-free survival (DFS), lymphatic and/or hematogenous recurrence, in early stage cervical cancer treated with radical hysterectomy, which can be used to select low-risk patients potentially eligible for less radical surgery

Disease/Procedure/Practice Issue: We retrospectively analyzed a multi-institutional cohort of early stage cervical cancer patients treated between 2000 and 2008. According to the order of data submission, data from four institutions were allocated to a model development cohort (n=1041), and data from the remaining four institutions were allocated to an external validation cohort (n=971). Patient information including body mass index, pretreatment complete blood count, glucose levels and clinical outcome was modeled using Cox proportional hazards regression analysis to predict 5-year DFS. The models were validated by bootstrap-corrected, relatively unbiased estimates of discrimination and calibration.

Outcomes: Multivariable analysis identified prognostic factors including histology, International Federation of Gynecology and Obstetrics stage, depth of invasion, pelvic and/or paraaortic node status, parametrial involvement, platelet count, and hemoglobin level. Model for 5-yr DFS, lymphatic recurrence, and hematogenous recurrence showed good discrimination and calibration, with a bootstrap-corrected concordance indices of 0.70, 0.69, and 0.73, respectively, and were well calibrated. Also, the validation set showed good discrimination with a bootstrapadjusted concordance index of 0.72, 0.70 and 0.74, respectively.

Conclusions: We have developed a robust model to predict 5-yr DFS, lymphatic and/or hematogenous recurrence in patients with early stage cervical cancer. Further, we discussed how the low-risk patients selected from the model could facilitate clinical trials of less radical surgery to reduce complication of surgery.

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498 - Special Interest Session

Clinical significance and prognostic value of femoral lymph node metastasis in stage III vulvar carcinoma

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Background/Objectives: To determine the clinical significance and prognostic value of femoral lymph node metastasis (FLNM) in patients with International Federation of Gynecology and Obstetrics (FIGO) 2009 stage III vulvar carcinoma.

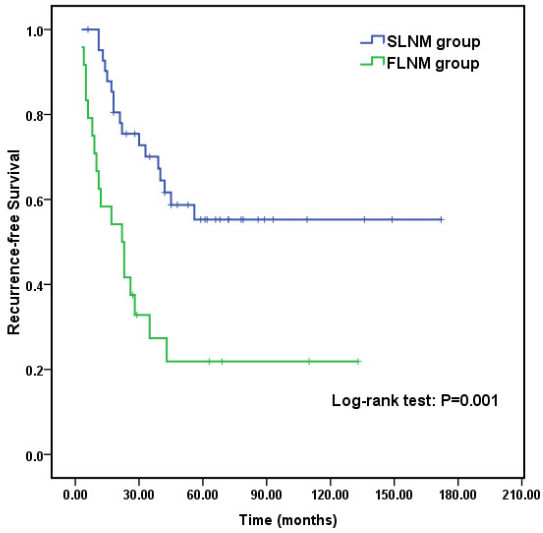
Disease/Procedure/Practice Issue: The medical records of patients with vulvar carcinoma who underwent inguinofemoral lymphadenectomy between 1990 and 2013 were retrospectively reviewed.

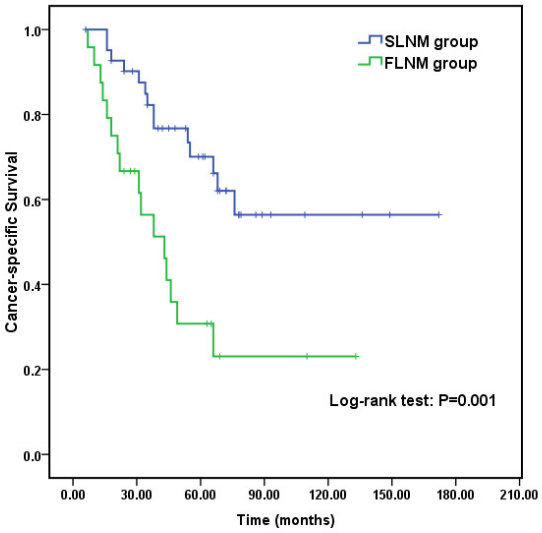
Outcomes: Of 66 patients with stage III vulvar carcinoma, 42 had superficial lymph node metastasis (SLNM) only and 24 had FLNM (20 with SLNM and 4 without SLNM). Significantly higher rates of extracapsular invasion ($P = 0.008$), multiple nodal metastasis ($P = 0.042$), and advanced FIGO substage ($P = 0.026$) as well as a larger tumor diameter (≥4 cm, $P = 0.023$) and greater depth of invasion (≥5 mm, $P = 0.020$) were observed among patients with FLNM compared to those with SLNM only. After a median follow-up of 46 months (range, 6–172 months), 35 patients experienced relapse and 30 died from disease. The 5-year cancer-specific survival (CSS) rates were 70.1% and 30.8% for patients with SLNM only and FLNM, respectively ($P =$

0.001). In multivariate analysis, only FLNM was found to be an independent risk factor for reduced recurrence-free survival (RFS) and CSS among patients with stage III vulvar cancer (hazard ratio [HR]=2.277, P=0.037 for RFS; HR=2.360, *P* = 0.042 for CSS). When the FLNM cases were merged into stage IIIC, significant differences emerged in RFS (*P* = 0.002) and CSS (*P* = 0.004) among the re-divided FIGO substages (Fig.1).

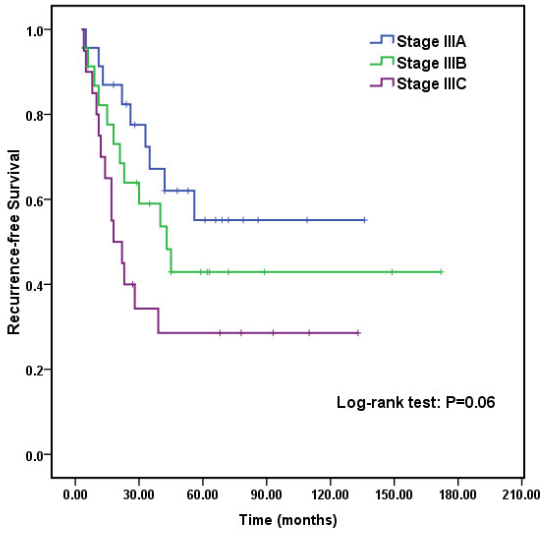
Conclusions: FLNM represented an unfavorable status of node metastasis with a worse prognosis compared to that of SLNM alone, and this should be considered in a future FIGO staging system for vulvar cancer.

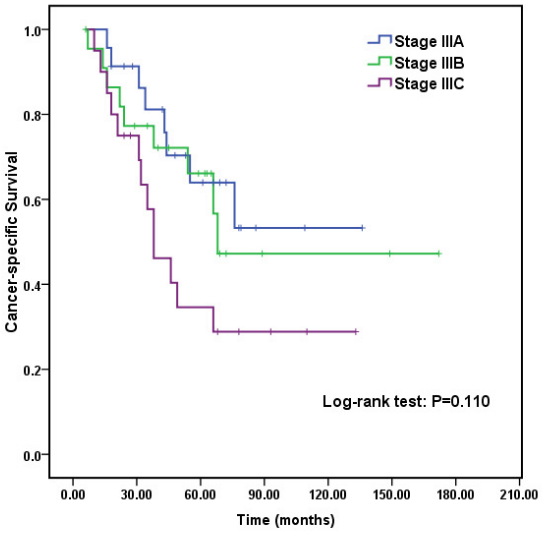
A. Survival curves for RFS and CSS in the SLNM and FLNM groups.



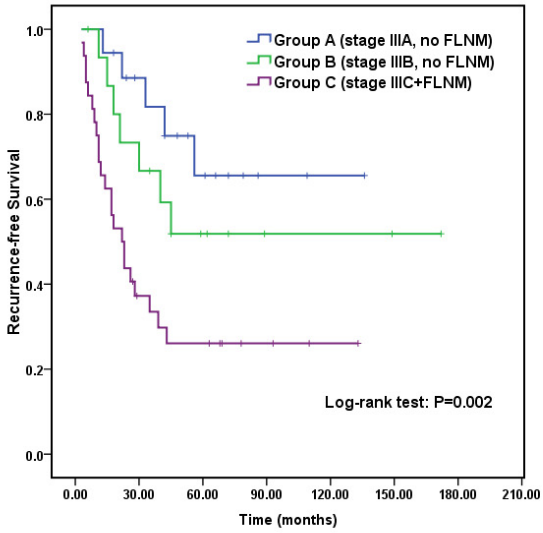


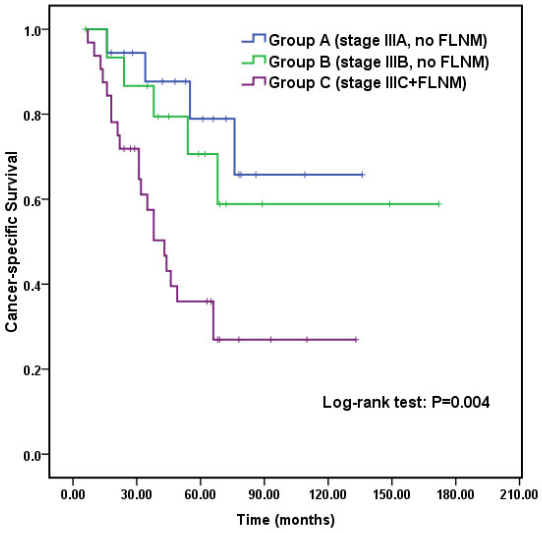
B. Survival curves for RFS and CSS in FIGO stages IIIA, IIIB, and IIIC.





C. Survival curves for RFS and CSS in the re-divided groups A, B, and C.





499 - Special Interest Session

Impact of parametrectomy in the indication of adjuvant treatment in early-stage cervical cancer

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Background/Objectives: Women with early stage cervical cancer are traditionally treated with radical hysterectomy and bilateral lymphadenectomy. Parametrectomy has been associated with increased surgical morbidity and long term urinary, intestinal and sexual disorders. Previous studies showed correlation between parametrial and lymph node involvement, suggesting that selected patients could omit parametrectomy and maintain the indication of adjuvant treatment solely on lymph node status. The objective of this study was to estimate the incidence of parametrial involvement in radical hysterectomy specimens in women with early-stage cervical cancer and to evaluate the impact of parametrectomy in indicating adjuvant treatment.

Disease/Procedure/Practice Issue: A retrospective study was conducted in patients who underwent radical hysterectomy and pelvic lymphadenectomy for early stage cervical cancer (stages IA1 with lymphovascular space invasion (LVSI), IA2 and IB1) at a Brazilian cancer hospital from 2009 to 2016. We evaluated FIGO STAGE, pre-operative magnetic resonance image (MRI) and final histology. Patients who had paremetrial involvement on MRI were excluded.

Outcomes: One hundred three patients were evaluated. The FIGO stage was IA1 with LVSI in 4 (3.8%), IA2 in 21 (20.3%) and IB1 in 78 (75.7%) patients. The histology was squamous in 64 (62.1%), adenocarcinoma in 36 (34.9%), adenosquamous in one (0.9%) and other histologies in 2 (1.9%) patients. Four patients (3.8%) had parametrial involvement. All of them had LVSI and squamous histology, of these, two patients had lymph node micro metastasis and one had risk factors based on Sedlis criteria which indicated adjuvant radiation. (Table 1).

Conclusions: The parametrectomy influenced the indication for adjuvant treatment in only one patient (0.9%) in our series. The other three patients with parametrial involvement had other risk factors which indicated adjuvant treatment.

Table 1 . Pathologic risk criterias to determine postoperative radiotherapy in early stage cervical cancer in the patients with parametrial involvement

Patients	LVSI	Tumor size (cm)	Stromal invasion	Status of pelvic lymph nodes	Margins	Type of parametrial involvement
1	present	0,5	superficial	negative	free	positive parametrial lymph node
2	present	1,2	deep	micrometastases in right and left sentinel lymph node	free	direct microscopic extension
3	present	4	deep	micrometastases in right and left sentinel lymph node	free	vascular emboli
4	present	4,2	deep	negative	free	direct microscopic extension

500 - Special Interest Session

Cervical cancer in a sub-optimally screened cohort: A population-based epidemiologic study of 133,771 women in Brazil

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Background/Objectives: Cervical cancer (CC) represents an important public health challenge in low- and middle-income countries (LMICs), where it continues to present at high incidences and advanced stages of disease. Our objective was to report the epidemiology, clinical characteristics, and treatment outcomes of CC in a sub-optimally screened population in Brazil, with the goal of informing future clinical management and local policy decisions regarding this high-burden women's cancer.

Disease/Procedure/Practice Issue: Epidemiologic and clinical data of CC patients treated between 2000 and 2015 were obtained from the Brazilian Hospital Cancer Register databases. To describe our results, summary odds ratios and chi-square tests were estimated.

Outcomes: Of 133,771 CC patients, mean age was 52.4, with 4.4% of patients younger than 30 and 22.6% older than 65 years. 97.11% had less than 8 years of schooling and 61.3% were described as non-white. 82.1% presented with squamous cell carcinoma, but a 30.43% increase in adenocarcinoma was observed over the study period, from 11.5% in 2000-2004 to 14.6% in 2010-2014. 79.76% of patients presented with at least stage II disease, and 6% with stage IV disease. Time from diagnosis to first treatment exceeded 30 days for 78.4% of patients and exceeded 90 days for 36.4% of patients. Death after the first treatment occurred in 15.5% of the cohort.

Conclusions: Despite the promise of recent HPV vaccination rollout in Brazil, its full impact will take decades to occur, and these data argue for continued efforts to improve access to CC screening and treatment to reduce lives lost from this preventable cancer in the meantime. These results also suggest that the current government guideline to stop CC screening at 65 years in Brazil and many other LMICs results in nearly one-fourth of cases being missed, and it should be revisited.

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501 - Special Interest Session

Current demographics of gynecologic cancers in Brazil

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Background/Objectives: Little is known, or has been previously published, regarding the epidemiology of gynecologic cancer (GC) in Brazil. Every two years the Brazilian National Cancer Institute releases incidences, but no clinical data, on cervical (CC), endometrial (EC) and ovarian cancer (OC). This report emanating from data not previously released from the Brazilian National Cancer Institute describes the demographic and clinical details of women in Brazil affected with GC between 2000 and 2015.

Disease/Procedure/Practice Issue: Data from patients treated with a diagnosis of one out of the five most common gynecologic cancers, CC, EC, OC, vulvar (VvC) or vaginal (VgC), were obtained from the Brazilian Hospital Cancer Registry databases. Summary odds ratios and chi-square tests were estimated.

Outcomes: 193,647 women with gynecologic cancer were included, 133,751 (69.37%) had CC, 36,645 (18.95%) EC, 14,299 (7.4%) OC, 6,036 (3.14%) VvC, and 2,193 (1.14%) VgC. During the study period, CC was the most common gynecologic cancer in all regions of Brazil. The mean age at diagnosis was 52.4 years and 82.1% had squamous cell carcinoma histology. Time from diagnoses to first treatment exceeded 30 days in 78.4% of CC patients. With regards to OC, the mean age at presentation was 54.9 years. The most common histology was serous-papillary carcinoma (50.3%). However, mucinous histology was diagnosed in 22.5% of the patients. 54% were treated within less than 30 days of diagnosis. Women with EC had similar demographics compared to other large multi-institutional studies, the mean age at diagnosis was 62.9 years, 51.49% had stage I disease, and 84.8% had type I tumors. VvC patients median age was 66.4 years, most patients (55.9) presented with stage III

or IV at diagnosis. VgC patients' median age was 60.9 years and 79.1% presented with stage II or more at diagnosis. Time to start treatment was more than 30 days for approximately 75% of VvC and VgC patients.

Conclusions: This is the first report describing the demographics of GC in Brazil. CC is the most common, followed by EC. Most patients with these malignancies in Brazil were diagnosed at more advanced stages compared to international data with more than 70% of CC, EC, Vv and Vg cancer patients having their first treatment more than 30 days from diagnosis.

Table 1: Most relevant demographics for major gynecologic cancers in Brazilian women.

	Cervix	Endometrial	Ovarian	Vulvar	Vagina
Mean Age	**52.4**	**62.9**	**54.9**	**66.4**	**60.9**
Caucasian vs non-Caucasian	**38.7 vs 61.3%**	**58 vs 42%**	**53.4 vs 46.6%**	**52,6 vs 47.4%**	**50.2 vs 49.8%**
Less than 8 years of schooling	**97.11 x 2.89%**	**91.57 x 8.43%**	**89.24 x 10.76%**	**97.39 x 2.61%**	**94.29 x 5.71%**
Marital status at diagnosis: (married* x non married #)	**47.77 x 52.22%**	**47.87 x 52.12%**	**49.50 x 50.49%**	**38,26 x 61.73%**	**43.56 x 56.43%**
Most common histology	**SCC (82.1%); Adeno 12.9% AS 1.1%**	**Type I 84.8% CCS 4,1% SPC 2,1 % CCC 1.6 %**	**SPC 50.3%, MC 22.5% EC 11.9% CCC 4.5%**	**SCC 86.8%**	**SCC 73.7%; Adeno 18.3%**
Stage at diagnosis	**I :20.24 vs 79.76% stage II-IV**	**I: 51.49 vs 48.50% stage II-IV**	**I-II 37.43 vs 62.56% stage III-IV**	**I-II 44.09% vs 55.90% stage III-IV**	**I 20.88% vs 79.11% stage II-IV**
Time to first treatment >30 days	**78.4%**	**77.5%**	**45.3%**	**74.5**	**74.8%**

SCC (Squamous Cell Carcinoma); SPC (Serous-Papillary Carcinoma); CCS (Carcinossarcoma); CCC (Clear Cell carcinoma); EC (Endometrioid Carcinoma); Adeno (Adenocarcinoma); AS (Adenosquamous Carcinoma); MC (Mucinous Carcinoma). (*)Married or living with a partner. (#)Single, divorced or widow

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502 - Special Interest Session

New perspectives and limitations for access to oncologic treatments in Brazil public health care system (SUS): A focus on female cancers

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Background/Objectives: Brazil has the largest universal public health care system (SUS). More than 200 millions people, and expectations of ~30,000 new gyn cancers every year, only 1/3 of those has private insurance. The Ministry of Health established a federal committee (CONITEC) to rule the technology incorporation based on health technology assessment (HTS), and organize national therapeutics guidelines evidence based. This aims to depict the CONITEC workflow, to analyze CONITEC's recommendations for breast and gynecologic cancers since 2012, and to correlate applications' variables to probability of technology incorporation.

Disease/Procedure/Practice Issue: All relevant information was draw from CONITEC website. All recommendations were tabled, any of them related to breast, ovarian, endometrial, or cervical cancers were reviewed in details. Correlation to approval was tested by Pearson-test, variables: pharma/owner vs government/others, curative vs palliative, medication vs others.

Outcomes: CONITEC is composed by plenary committee and executive secretariat, the process flowchart (attached) lasts 180 days, plus 180 days for SUS makes it available to public. The health secretary has power to veto. Delays and discrepancies

were identified, eg. approving intervention of limited benefit like CA125 follow up and denying trastuzumab for metastatic breast cancer Her2+ve. No characteristics analyzed correlated to probability of approval.

Conclusions: CONITEC is a first step in standardizing the incorporation of technology. However, there are limitations in their reports, recommendations, and workflow. It is only demand-driven, and it is very limited regarding female cancers.

Table 1.

Summary of CONITEC Analysis	
Total applications	516
New medications incorporation	338
New procedures incorporation	107
New products or devices	71
Applications approved for incorporating	178 (34,5%)
Female Cancer Analysis	
Breast cancer	Trastuzumab (neo)adjuvante Her2+ve (approved) Trastuzumab metastatic Her2+ve (denied) Sentinel lymph node dissection (approved) Everolimus metastatic ER+ve Her2-ve (denied) Endocrine therapy neoadjuvant ER+ve (approved - coded) Screening mamograms beyond 50-69y.o (denied) Intraoperative radiation therapy (denied) Pertuzumab plus trastuzumab metastatic Her2+ve (in process)
Ovarian cancer	CA125 follow-up (approved) Bevacizumab any setting (denied - guideline)
Endometrial cancer	None
Cervical cancer	Cervical excision type 2 (approved) Bevacizumab metastatic (in process)

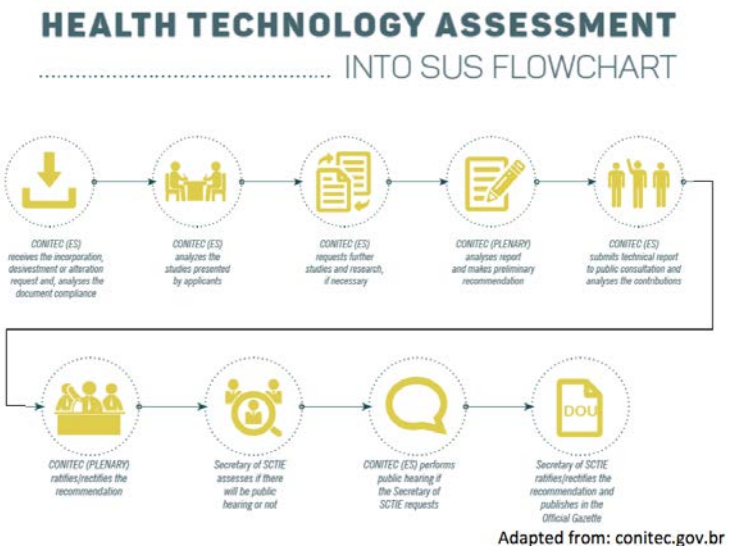

Fig. 1.

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503 - Special Interest Session
Gynecologic oncologists' experience in, and barriers to, participation in global health delivery
M.D.S. Lightfoot, K.M. Esselen, M.J. Haviland, C.S. Awtrey, J.L. Dalrymple, M.R. Hacker and F.W. Liu. *Beth Israel Deaconess Medical Center, Boston, MA, USA*

Background/Objectives: Cancer is a leading cause of mortality in low- and middle-income countries. Sub-specialty providers, such as gynecologic oncologists, who practice in high-income countries can help reduce this burden through global health delivery. The objective of this cross-sectional study was to assess gynecologic oncologists' global health experience and perceived barriers to participation in global health. In December 2016, we sent a survey to gynecologic oncology fellows and attending physicians who are members of the Society of Gynecologic Oncology.

Disease/Procedure/Practice Issue: Treatment of gynecologic cancers globally.

Outcomes: The survey was completed by 206 gynecologic oncologists, yielding a 13.4% response rate. The majority of participants were attending physicians (81.1%), born in the United States (79.6%), and ≥40 years old (61.2%). Half (49.3%) reported participating in global health during their career. Among those who did not participate in global health, the most common reasons were inability to get time off (36.6%), family responsibilities (28.7%), lack of support from home institution (24.8%), and lack of funding (22.8%). Among those who participated in global health, 61 (62.2%) did so as attendings, 26 (26.5%) as fellows, and 43 (43.9%) as residents. The majority (88.5%) of those who participated in global health did so with a focus on direct patient care. Entities through which respondents participated in global health were home institutions (69.2% fellows, 44.3% attendings), multilateral organizations (26.9%, 32.8%), and host country hospitals (23.1%, 47.5%). Respondents who participated in global health cited an inability to get time off (55.1%), lack of funding (54.1%), lack of clinical coverage while away (45.9%), and family responsibilities (43.9%) as the main barriers to participating in global health. When asked what resources might increase participation in global health among residents/fellows and attending physicians, the most common responses were additional elective time, increased funding, and a formal global health course provided by the home institution (Fig. 1).

Conclusions: Participation of gynecologic oncologists in global health delivery is essential to address the global burden of disease, and may be facilitated through increased elective time, funding, clinical coverage, and formal global health training.

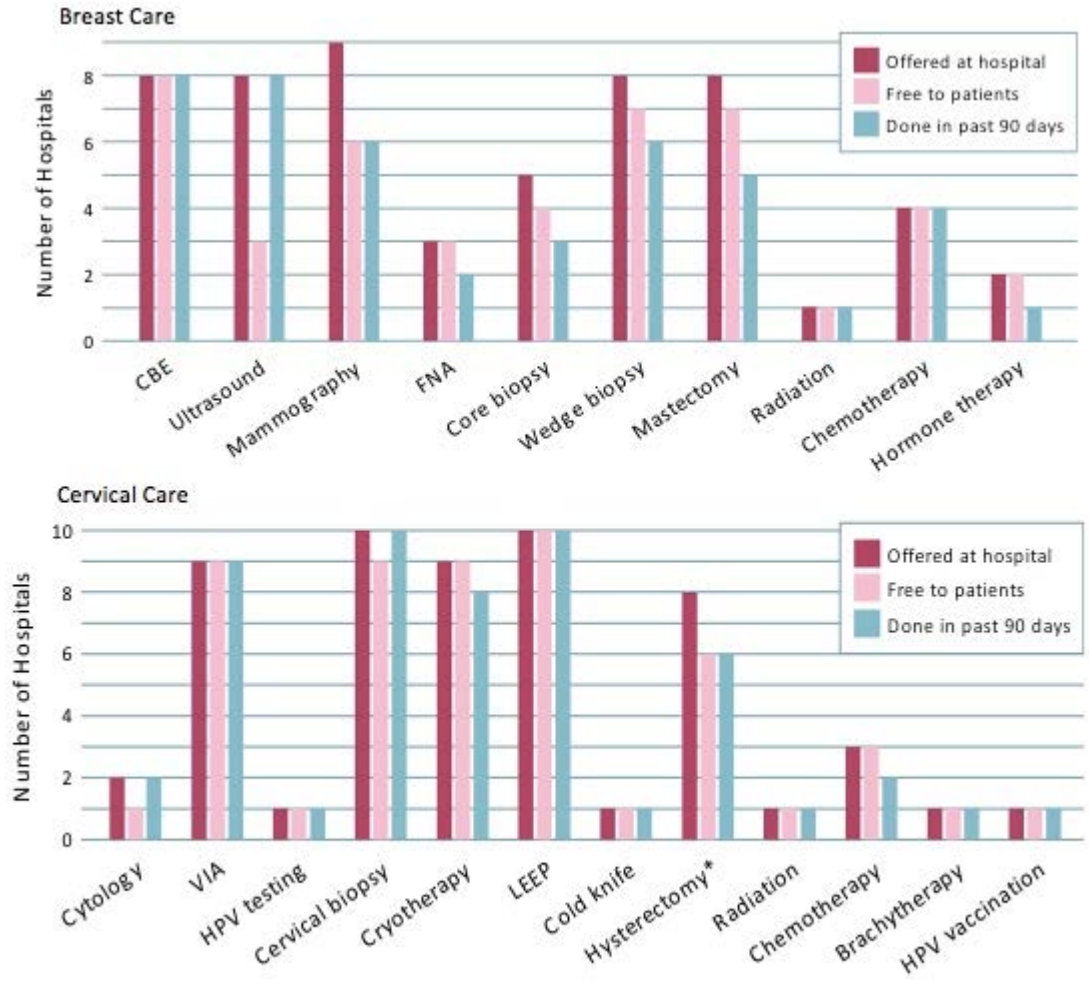

Figure 1. Available Breast and Cervical Cancer Services in Zambia

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504 - Special Interest Session

Clinical outcomes in Asian patients (pts) with germline *BRCA1/2*-mutation associated advanced (stage III-IV) ovarian, primary peritoneal or fallopian tube carcinoma (gBMOPFC): Experience from an Asian cancer centre

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Background/Objectives: Improved prognosis and response rates to platinum-based chemotherapy are hallmarks of gBMOPFC. These clinical features are attributed to homologous recombination (HR) mediated DNA repair defects (HRD) resulting in impaired ability of tumour cells to repair double strand breaks leading to cell death. Unfortunately, there is limited published data on the prognosis and response rates to platinum chemotherapy in Asian pts with gBMOPFC. Here we report on the frequency and clinical outcomes of BMOPFC from an Asian cancer centre

Disease/Procedure/Practice Issue: From 2014 – 2016, data was prospectively collected on pts with OPFCs referred to the cancer genetics clinic. Germline HRD related gene mutations were determined by next generation sequencing and deletion/duplication analysis. Progression free survival (PFS) and response rate (RR) to subsequent lines of chemotherapy in gBMOPFC patients were assessed

Outcomes: Eighty-seven Asian women with OPFCs underwent genetic testing, of which 50 (59%) pts had advanced disease (stage III/IV) with available clinical outcome data. A germline pathogenic mutation in the HR pathway was observed in 36%

(18/50) of pts, of which 56% (10/18) were *BRCA1*, 33% (6/18) were *BRCA2*, 5.5% (1/18) were *RAD51C*, and 5.5% (1/18) were *BRIP1*mutant. Of the 32 advanced stage non-gBMOPFC pts, 31% (10/32) harboured a variant of unknown significance (VUS) in the HRD pathway. One pt had a *BRCA1* variant initially classified as VUS but subsequently reclassified as a pathogenic mutation. All pts received platinum based chemotherapy as initial treatment. Median PFS for gBMOPFC compared to non-gBMOPFC pts following 1st line treatment was 18 vs 16 mths; $P \leq 0.55$. *BRCA1 g*BMOPFC pts had a median PFS of 15 mths vs 21 mths for *BRCA2* gBMOPFC*;* $P \leq 0.77$. Only 17% of pts with HRD related mutations recurred within 6mths of completing initial platinum-based chemotherapy compared with 44% of pts with non-HRD related mutations ($P = 0.067$). Following disease relapse in gBMOPFC pts, 2nd line and 3rd line RR to further platinum therapy was 67% 6/9) and 56% (5/9) respectively.

Conclusions: *BRCA1/2* mutations are common in Asian pts. Asian pts with HRD mutations are less likely to relapse with platinum resistant disease than non-HRD pts. The lack of difference in PFS between the BMOPFC and non-BMOPFC women in our series may be due to small sample size, but the high prevalence of potentially clinically relevant VUS's in our non- BMOFC pts and possible somatic HR mutations may also be a confounding factor

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505 - Special Interest Session

Very long-term survival among epithelial ovarian cancer BRCA1/2 mutation carriers: The national Israeli study of ovarian cancer

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Background/Objectives: Most studies nowadays agree upon an overall advantage in survival for ovarian cancer patients carrying the germ line *BRCA* mutations compared to non-carriers. During 1994-99 a nonselective group of all patients diagnosed with ovarian cancer all over Israel were collected. To compare 5, 10 and 15 years survival between invasive epithelial ovarian cancer patients with and without *BRCA1/2* germ line mutation**.**

Disease/Procedure/Practice Issue: The analysis was based on 779 Jewish patients (229 carriers to one of the three Ashkenazi Jewish founder mutations in *BRCA1* (185delAG; 5382insC) and *BRCA2* (6174delT) and 550 non- carriers). Clinical characteristics were abstracted from the patients' medical records and vital status was updated through the National Population Registry up to November 2015. The Kaplan-Meier method, log-rank tests, and stepwise Cox regression model were used for survival analyses.

Outcomes: By the end of the follow-up period, (range 1-20 years), 629 (80.7%) deaths occurred. While much higher survival were observed during the first 5 years from diagnosis among carriers compared to non-carriers (46.7% vs. 36.2%, $P = 0.0004$), similar survival were seen at 15 years (22% in both groups). Controlling for age at diagnosis, staging and being of Ashkenazi origin, the hazard ratio of survival of carriers versus non-carriers was 0.69 (95%CI 0.55-0.85) in the first 5 years. For women who survived 5 and 10 years, the HRs in 5 additional years were 1.14 (95%CI 0.76-1.69) and 0.83 (95%CI 0.46-1.40), respectively.

Conclusions: These results support recent publications suggesting that the advantage in survival seen among *BRCA1/2* survivors during the first 5 years decreases over time. To the best of our knowledge, our cohort is the first to describe a 15 years follow-up of ovarian cancer patients with the BRCA mutations. Clinically, this may have implications for follow-up and therapy especially of new agents that are particularly effective in BRCA carriers.

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506 - Special Interest Session

Correlation between vaginal reference length and vaginal dose reporting in 2 ethnically different population – is there a difference?

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Background/Objectives: Vaginal toxicity is an under-investigated area but clinical important domain as it may impede sexual function. One proposed novel strategy for vaginal dose reporting is to use fixed referenced point doses along the vagina length. The aim of this study is to quantify the difference in vaginal reference length (VRL) between 2 ethnically different population cohorts and to determine any differences between VRL and vaginal dose reporting.

Disease/Procedure/Practice Issue: Patients with cervical cancer undergoing external beam radiotherapy 50.4Gy in 28 fractions followed by 3 channel brachytherapy followed by planning CT or MRI imaging at planning were eligible for the study. VRL was defined from tip of the cervical os as marked by the superior part of the central tandem flange to the level of the Posterior–Inferior Border of Symphysis (PIBS). An anatomical vaginal reference point was defined at the level of the Posterior–Inferior Border of Symphysis (PIBS) from 2 cm to + 3cm (mid/introitus vagina). Patients from our institution were compared to published data from a major European institution.

Outcomes: Sixty-two patients treated from 2013 to 2015 formed the study cohort. The mean VRL was 5.0±0.9. Mean reported vaginal doses from PIBS -2,-1.0,+1,+2,+3 were 21.6±16.0,41.1±11.4, 51.1±6.9,60.0±7.8,75.7±16.1,123.5 ±64.8. When compared to the Westerveld data, there was a significant difference in VRL as well as all reported vaginal doses from PIBS -2 to +3, with the greatest difference at the PIBS+3 vaginal point.

Conclusions: There is a statistical difference between Caucasian and Asian VRL with Caucasian population having a longer VRL leading to a significantly lower reported vaginal doses with the greatest differences at PIB+3. Determining a clinically meaningful upper vaginal level for reporting could be the subject of further research.

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507 - Special Interest Session
CT based brachytherapy planning in locally advanced cervical cancer: a study of toxicity outcomes
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Background/Objectives: To report late rectal and bladder toxicity outcomes of a computed tomography (CT)-based image guided brachytherapy(IGBT) technique for treatment of cervical cancer.

Disease/Procedure/Practice Issue: Between 2008-2014, 95 women with FIGO stage IB to IVA cervical carcinoma treated with concurrent chemotherapy and external beam radiation therapy (EBRT) 50.4Gy in 28 fractions followed by planned prescription dose of 7Gy x 4 fractions of high-dose-rate (HDR) IGBT was retrospectively reviewed. A brachytherapy applicator consisting of a tandem and ovoids without any interstitial needles was used. At each implantation, all patients had a urinary catheter in situ and received bowel enema before undergoing planning CT-simulation. Volumes were contoured as per GEC-ESTRO guidelines and doese were recorded. Toxicities were recorded on follow-up.

Outcomes: The median follow-up time was 29 months (range: 6-76). The 3-year cumulative incidences of local, locoregional and distant relapse free survival were 94.8% (SD ± 14.8), 87.4% (SD± 15.5) and 76.8% (SD±15.3) respectively. The 3-year overall survival was 69.7% and the 3 year relapse free survival was 72.6% (SD ± 18.1). (Fig. 1.) Twenty-two patients (23%) had Grade 2 proctitis and 10 patients (11%) had Grade 3 proctitis. This occurred more than 6 months post treatment. Six patients experienced radiation colitis which necessitated laser coagulation and 3 patients required transfusion for low haemoglobin levels. One patient had fecal incontinence and another with stage IVA cervical cancer who had undergone concurrent chemotherapy and radiation therapy continued to have radiation proctitis diarrhoea post procedure and required admission for intravenous fluids. Four patients (4%) had Grade 2 cystitis and 2 patients (2%) had Grade 3 cystitis. No patients had Grade 4 toxicities. There were 3 patients who developed recto-vaginal fistulae and one of these patients also developed a vesico-vaginal fistula. This was found to be due to tumour recurrence.

Conclusions: This study reports the excellent results of CT-based image-guided brachytherapy for local control and overall survival. Implementation of an interstitial IGBT program using the EMBRACE protocol may help to decrease late toxicity.

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508 - Special Interest Session
Dose-dense paclitaxel and carboplatin for ovarian carcinoma among Korean population: Single institution experience
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Background/Objectives: After JGOG 3016 trial, several studies have been done to evaluate the effectiveness of dose-dense paclitaxel and carboplatin among advanced ovarian carcinoma. We undertook this study to investigate the chemotherapy-induced toxicity and quality of life during chemotherapy comparing dose-dense paclitaxel and carboplatin (dd-TC) with conventional paclitaxel and carboplatin(c-TC) among a Korean population.

Disease/Procedure/Practice Issue: A retrospective review of ovarian cancer patients who were treated in Department of Obstetrics and Gynecology, Samsung Changwon Hospital, by a single surgeon was done. Patients with ovarian cancer who received six cycles of either c-TC and dd-TC (carboplatin AUC 6 mg/mL per min on day 1 and paclitaxel 80 mg/m^2 on days 1, 8, and 15) were found. We survey of patient's QoL by using the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire C30 (EORTC QLQ-C30) version 3.0 and its ovarian-specific module QLQ-OV28. We check Clinical information was extracted from the medical record.

Outcomes: Total patients were 17. Of these, 8 patients were c-TC group and 9 were dd-TC group. There were two refusal cases during chemotherapy not related with chemotherapy associated toxicity. The dd-TC regimen was associated with a higher frequency of gastrointestinal toxicity than the c-TC regimen. But other chemo induced toxicity or patient's QoL are not statistically significantly different between two treatment arms.

Conclusions: It shows that chemotherapy-induced toxicity and quality of life in the dd-TC regimen achieved comparable tolerability and quality of life to the c-TC regimen. Continuous long term and large scale study is needed in the future.

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509 - Special Interest Session

Prediction model using HE4 and CA125 in differentiating between benign and malignant adnexal tumor of Korean women according to menopausal status

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Background/Objectives: The aim of this prospective multicenter study was to explore optimal cut-off levels and the best method to discriminate ovarian cancer from benign ovarian lesion using CA125 and HE4 in Korean women.

Disease/Procedure/Practice Issue: 649 patients satisfied the inclusion criteria, 327 patients with histologically confirmed EOC and 322 patients diagnosed with benign lesions. The manufacturer's suggested cut-off levels and optimal cut-off levels derived from study population for CA125, HE4 and the risk of ovarian malignancy algorithm (ROMA) were used. In addition, we used simple dual marker method (DualM), which regarded patients as positive when either CA125 or HE4 was higher than the cut-off. The performance of the DualM and ROMA compared to that of CA125 alone in differentiating between benign and malignant adnexal tumors according to menopausal status.

Outcomes: In premenopausal (PreMP) patients, ROMA showed the most balanced diagnostic values among CA125, DualM, and ROMA. The sensitivity of CA125, Dual M and ROMA was 0.747, 0.787 and 0.707 (CA125 *vs* Dual M; $P = 0.250$, CA125 vs ROMA; $P = 0.549$), respectively, while the specificity of CA125, Dual M and ROMA was 0.787, 0.775 and 0.926 (CA125 vs Dual M; $P = 0.250$, CA125 vs ROMA; $P < .001$), using the suggested cut-offs. The optimal cut-offs did not make a difference in discriminating performance comparing suggested cut-offs in PreMP patients. In postmenopausal (PostMP) patients, the sensitivity with the suggested cut-offs of CA125, DualM, and ROMA was 0.821, 0.881, and 0.829, respectively (CA125 vs Dual M; $P < 0.001$, CA125 vs ROMA; $P = 0.774$). The specificity of CA125, DualM, and ROMA was 0.949, 0.897, and 0.974, respectively (CA125 vs Dual M; $P = 0.125$, CA125 vs ROMA; $P = 0.500$). With optimal cut-offs, the sensitivity of CA125, DualM, and ROMA was 0.853, 0.905, 0.853, respectively (CA125 vs Dual M; $P < 0.001$, CA125 vs ROMA; $P = 1.0$), while the specificity was 0.949, 0.885, 0.974 (CA125 vs Dual M; $P = 0.063$, CA125 vs ROMA; $P = 0.5$). ROMA was not significantly different than CA125 in either sensitivity or specificity.

Conclusions: The combination of HE4 and CA125 performed better than CA125 alone in discriminating EOC from benign ovarian pathology. HE4 in addition to CA125 increased specificity in PreMP patients using ROMA and increased sensitivity in PostMP patients using DualM in differentiating EOC from benign tumors. The method of DualM needs external validation in future studies.

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510 - Special Interest Session

ALDH-high signature enriched ovarian clear cell carcinoma correlates with advanced disease, poor patient outcomes, and unique immune profiles

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Background/Objectives: Ovarian clear cell carcinoma (OCCC) is the second most common histotype of epithelial ovarian cancer in Asian countries including Singapore. OCCC is associated with poorer prognosis and resistance to chemotherapy compared to other histotypes. We investigated the gene expression profiling of OCCC and explored the molecular pathways that were associated with clinical prognosis. Furthermore, we investigated the immune signature in OCCC tissue samples to provide mechanistic insight of the biology.

Disease/Procedure/Practice Issue: A subset of OCCC samples (N=135) from an in-house ovarian cancer microarray gene expression database, CSIOVDB, was analyzed by consensus clustering. Pathway analysis of the differentially expressed genes was performed. An independent cohort of fresh frozen OCCC samples (n=23) were profiled by gene expression microarray for validation. Their corresponding formalin-fixed paraffin-embedded (FFPE) tissues were profiled with nCounter PanCancer Immune Profiling Panel.

Outcomes: Consensus clustering revealed two distinct OCCC subgroups. One subgroup is highly enriched in genes related to extracellular matrix (ECM), immunity/inflammatory response, immunoglobulin, and major histocompatibility complex (MHC). This subgroup is also hallmarked by the upregulation of ALDH1A1 and ALDH1A3 gene expression. The ALDH-low subgroup is enriched in genes related to extracellular exosome, glycoprotein, cell adhesion, nucleosome, and DNA replication. The ALDH-high subgroup is significantly associated with advanced stage of disease (Stage III&IV, P = 3.9E-6), more heterogeneous molecular subtype distribution (Stem-B vs non-Stem-B, P = 2.2E-26), and poorer disease-free survival (ALDH-high vs ALDH-low, HR=4.513, P = 0.0188). Immune profiling further confirmed that the ALDH-high subgroup showed distinct expression pattern of immune-related genes.

Conclusions: ALDH-high signature might be utilized to predict clinical outcomes or therapeutic responses of OCCC.

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511 - Special Interest Session

Early tumor shrinkage as a prognostic factor in patients with advanced ovarian cancer receiving neoadjuvant chemotherapy

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Objectives: Early tumor shrinkage (ETS), defined as 10-20% decrease in the sum of the longest diameters of target lesions after a short period of chemotherapy, appears to be a prognostic factor for overall survival (OS) and progression-free survival (PFS) in some types of cancer, and it might be a surrogate end-point for trials in those cancers. However, ETS has not been well studied in patients with epithelia ovarian cancer (EOC). The aim of this study was to explore prognostic values of ETS in patients with EOC.

Methods: Prognostic significance of the various clinicopathological factors including ETS were retrospectively analyzed in 115 patients with stage III/IV ovarian, fallopian tube, and primary peritoneal carcinoma, who received neoadjuvant chemotherapy in the center between April 2007 and March 2015. Tumor response was assessed, which was measured according to the response evaluation criteria in solid tumors between 5 to 9 weeks from initiation of first-line chemotherapy.

Results: In 115 EOC patients, the median follow-up was 29 months, 76 patients received interval debulking surgery, and 60 died. Median PFS and OS were 17 and 44 months, respectively. Univariate Cox regression analysis showed that ETS ≥ 10% was a significant prognostic factor for PFS (HR= 0.26, P = 0.0008) and OS (HR=0.20, P = 0.0006). Kaplan-Meier survival curves also demonstrated prolonged PFS and OS in patients who achieved ETS.

Conclusions: ETS ≥ 10% was a significant prognostic factor for both PFS and OS, and might be a surrogate end-point for future clinical trials in advanced EOC.

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512 - Special Interest Session

Clinicopathologic factors associated with prolonged disease free survival in long term survivors of advanced epithelial ovarian cancer

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Objectives: The aim of this study was to analyze clinicopathologic factors of long term survivors who have not experienced recurrence after primary treatment in advanced epithelial ovarian cancer (AEOC).

Methods: We retrospectively reviewed medical records of 164 patients with FIGO stage III or IV EOC from 2001 to 2011. All patients underwent primary debulking surgery (PDS) or interval debulking surgery (IDS) after 3 cycles of neoadjuvant chemotherapy (NAC). Patients who survived 5 years or more were identified and divided into two groups according to recurrence after primary treatment. Clinicopathologic data including demographic factors, implementation of NAC, operative findings, surgical outcomes, tumor histology and disease-free survival (DFS) were evaluated between the two groups.

Results: A total of 58 patients (35.8%) survived more than 5 years and the median overall survival time was 95 months (61-199). Twenty-five patients (43%) survived more than 8 years and 15 patients (25.8%) survived more than 10 years after an average follow-up period of 102 months. Fifty-seven patients (98.3%) had residual disease (RD) less than 1cm. Three patients (5.2%) were identified to have stage IV disease. Of 58 patients, 32 (53.2%) experienced disease recurrence after primary treatment. Patients who had disease recurrence were more likely to have upper abdominal disease (UAD) (50% vs. 23.1%, P = 0.036*)* or peritoneal carcinomatosis (PC) (53.1% vs. 26.9%, P = 0.044) at the time of initial surgery. The median DFS of the recurrence group were 23 months compared to 89 months of the non-recurrence group. Even with severe disease burden, the overall survival of patients with UAD or PC was comparable (100.4 mos vs. 96.9 mos; P = 0.348) with those without UAD or PC after optimal debulking surgery.

Conclusions: Optimal debulking surgery is critical for long term survival in AEOC. Existence of UAD or PC at the time of primary surgery was significantly associated with decreasing DFS. However, if optimal residual disease is accomplished, long term survival can be achieved even with UAD or PC.

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513 - Special Interest Session

Role of paroxetine in the management of hot flashes in gynaecological cancer survivors: Results of the first randomized single-center controlled trial

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Objectives: To examine the effects of paroxetine supplementation on hot flashes and sleep in gynecological cancer survivors.

Methods: In a randomized, double-blind, placebo-controlled study, postmenopausal women with a prior history of stage 0-III gynecological cancer who had completed active cancer treatment (including hormonal therapy) were randomly assigned 1:1 to either 7.5 mg oral paroxetine or placebo daily for 16 weeks. Sleep and hot flashes were assessed at baseline, week 4 and week 16.

Results: Eighty women (91%) completed the study. We found a statistically significant difference in weekly reductions in VMS frequency and severity for paroxetine 7.5 mg than for placebo on week 4 and 16. Regarding sleep characteristics, the analysis of data through week 16 reported a statistically significant reduction in the number of nighttime awakenings attributed to VMS among participants receiving paroxetine than among participants receiving placebo on baseline and weeks. The duration of sleep per night increased significantly more among participants receiving paroxetine than among those receiving placebo at all post baseline time points. No significant differences in sleep-onset latency were noted between the two treatment arms during the course of the study. Paroxetine was well-tolerated with a high level of compliance. In our cohort of patients, no serious adverse events have been reported.

Conclusions: This is the first randomized placebo-controlled study in gynecological cancer survivors that demonstrates that paroxetine significantly reduces hot flashes in weekly frequency and severity and the number of nighttime awakenings attributed to vasomotor symptoms, increasing sleep duration.

514 - Special Interest Session

The accuracy of sentinel node mapping algorithm in cervical cancer

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Objectives: Evaluate the sensitivity and negative predictive value (NPV) of sentinel node (SLN) procedure in cervical cancer using only blue dye, and test the SLN algorithm proposed by Memorial Sloan Kettering Cancer Center (MSKCC).

Methods: The study included 57 patients who met the FIGO staging criteria from IA2 to IB2, treated at AC Camargo Cancer Center from May 2014 to July 2016. The patients underwent SLN mapping with patent blue dye. Following the SLN procedure, a radical hysterectomy or trachelectomy that included parametrectomy and systematic bilateral pelvic lymphadenectomy was performed. The SLNs were examined by immunohistochemistry when the hematoxylin-eosin was negative.

Results: The median age was 43 years (range, 25-76). Median SLN count was 2 (range, 1-8) and median total lymph node (LN) count 23 (range, 6-81). Forty-seven (82.5%) patients had at least 1 SLN detected. Bilateral pelvic detection was found in 29 (50.9%) cases, and 18 (31.6%) had unilateral pelvic detection. We found overall metastatic LN in 13/57 (22.8%) patients and in 10/47 (21.3%) of patients with SLN detected. There were 9 in 10 patients with LN metastasis with a positive SLN, with an overall sensitivity of 90% and NPV of 97.4%. From the 76 sides mapped, SLN was able to predict LN involvement in 75 (98.6%) hemi-pelvises. Two patients had bilateral positive LNS. A total of 12 hemi-pelvises had LN metastasis, and in 11 the SLN was involved, resulting in a sensitivity of 91.7%, NPV of 98.4%, and FN of 8.3%. In 3 (6.4%) cases the SLN was positive only after immunohistochemistry (2 micrometastasis and 1 ITC).

Conclusions: We found that SLN procedure is a safe and accurate technique that increases metastatic nodal detection rates by 6.4% after IHC. We found better performance of the SLN procedure when analyzing per side, however we still had one false positive even applying the MSKCC's algorithm.

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515 - Special Interest Session

Germline mutations in patients with epithelial ovarian cancer using multi-gene panel sequencing in Korea

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Objectives: Next-generation sequencing (NGS) allows for simultaneous sequencing of multiple cancer susceptibility genes and may be more efficient and less expensive than sequential testing. We assessed the frequency of germline mutations among individuals with epithelial ovarian cancer (EOC) who received multigene panel test using NGS.

Methods: Patients with EOC (n=43) with/without family history of breast or ovarian cancer were recruited consecutively, from March 2016 to June 2016. Germline DNA was sequenced with a 35-gene NGS panel to identify mutations. Cross validation with direct sequencing was done, when genetic alteration was detected by the panel testing.

Results: Thirteen patients (30.2%) were identified to have pathogenic or likely pathogenic mutations in 6 genes, in *BRCA1* (n=6), *BRCA2* (n=3), *CHEK2* (n=1), *BRIP1* (n=1), *POLE* (n=1), and *RAD51C* (n=1). Among the 18 patients with family history of cancer, 8 patients (44.4%) revealed to have pathogenic or likely pathogenic mutations, and 3 patients had mutations other than *BRCA1/2*, such as *CHECK2*, *POLE*, and *RAD51C*. Eighteen patients (41.9%) were identified to carry variants of uncertain significance (VOUS) gene alterations. Lynch syndrome-related gene *VOUS* was identified in 5 individuals.

Conclusions: Among sequential patients with ovarian cancer, 30.2% were found to have germline mutations in a gene that predisposes women to breast or ovarian cancer, using the panel. NGS substantially improved the detection rates of a wide spectrum of mutations in ovarian cancer patients, than does *BRCA1/2* testing alone.

516 - Special Interest Session

Molecular signature for lymph node metastasis predict survival in epithelial ovarian cancer

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Background/Objectives: Identifying the molecular signature for lymph node metastasis (LNM) can be a critical step for prognostication in epithelial ovarian cancer (EOC). We aimed to develop molecular classifier that can predict LMN and survival of EOC patients.

Disease/Procedure/Practice Issue: We analyzed microRNA (miRNA), messenger RNA (mRNA), methylated DNA expression profiles in data from The Cancer Genome Atlas (TCGA). To identify the molecular signatures for LNM, we performed analyses of differentially expressed genes followed by logistic regression for LNM. The performance of classifier predicting LNM were validated by receiver operating characteristics (ROC) analysis, logistic regression, linear discriminant analysis (LDA), and support vector machine (SVM). We assessed the independent prognostic role of the classifier using random survival forest model and pathway deregulation score (Pathifier algorithm: www.weizmann.ac.il/pathifier).

Outcomes: We identified 19 mRNAs, 18 methylated DNAs, and 7 miRNAs that predicted LMN and used them to create a prognostic models. The risk score calculated using the model was well correlated with the status of LNM, which is validated in the ROC analysis (AUC of 0.95, 0.86, and 0.77, respectively). For predicting LNM, logistic regression, LDA and SVM algorithm showed high C-index which were similar between 3 molecular signatures. Using random survival forest model, we found that incorporating molecular data with clinical variable (LNM) yields improved prediction of survival. Pathway deregulation score using the identified signatures enabled us to classify patients into a high-risk group and a low-risk group, which resulted in statistically significant survival difference in DNA methylation and miRNA profiles.

Conclusions: The molecular signature based on LNM provides improved prognostic stratification for EOC patients. The signatures warrant further investigation for the development of a clinical-grade prognostic assay.

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518 - Special Interest Session

Evaluating modalities of physician learning and access to specialized oncology training across Africa

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Background/Objectives: Instituting effective cancer control is a significant challenge even for developed nations, one that becomes more daunting for countries with limited resources where cancer control is often a lower priority. Physician training is imperative to effective cancer care, though physicians in developing nations have fewer opportunities to train, particularly in specialized fields such as gynecologic oncology. We created a survey in conjunction with the African Organization for Research and Training in Cancer (AORTIC) to evaluate the oncological capacity in Africa. The survey assessed the modes of practitioner training in multiple areas of oncology, with the ultimate goal of identifying areas for targeted interventions.

Disease/Procedure/Practice Issue: The survey was emailed to all AORTIC members using the SurveyMonkey website over a period of 3 months, and solicited responses from healthcare workers currently practicing in Africa.

Outcomes: There were 183 responses from healthcare practitioners in 26 African countries, 113 of whom were physicians. Of those, there were 18 medical doctors, 27 surgeons, 31 clinical oncologists, 12 gynecologic oncologists, 25 pathologists and 12 palliative care specialists. 77.4% of responders reported their hospital offered residency training, while only 46.5% and 34.6% said their country offered specialized training in Clinical Oncology and Gynecologic Oncology respectively. When asked how surgeons at their hospital learn techniques and improve skills, responders said 73.5% learn from colleagues, 64.9% learn from surgical seminars abroad, and 58.9% learn from visiting surgeons. When asked where they learned to deliver radiation or chemotherapy, 61.2% of responders said international conferences or training abroad, 57.5% said residency, 23.8% self-taught, and 22.4% said physicians visiting internationally.

Conclusions: Access to specialized oncology training across Africa remains limited; more than half of responders said their country did not have training programs for Clinical or Gynecologic Oncology. A significant number of surgeons learn skills from surgical seminars abroad and visiting surgeons. Physicians reported learning to deliver chemotherapy and radiation most commonly from international conferences and training abroad.

519 - Special Interest Session

Implementation and quality assurance of training institutions for gynecologic oncologists in Japan

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Objectives: The Japan Society of Gynecologic Oncology (JSGO) initiated a nation-wide training system for the education and certification for gynecologic oncologists in 2005 with reference to the SGO educational system. Here, the JSGO examined the quality of the training institutions using the survey based on the Uterine Cervical Cancer Registry in the Japan Society of Obstetrics and Gynecology (JSOG).

Methods: 119 institutions were accredited for gynecologic oncology training program in 2006 upon meeting the following criteria: 1) >40 gynecologic malignancies per year, 2) at least one board-certified gynecologic oncologist, 3) availability for board-certified radiation oncologist and pathologist, 4) organized tumor board, 5) training opportunity for intestinal and urological surgery, 6) availability of multidisciplinary resource, 7) organized institutional review board, 8) performance of clinical trials, 9) JSOG-accredited hospital and tumor registry, and 10) publication of an annual report. By utilizing the JSOG nation-wide registry for cervical cancer (2006-2009), tumor characteristics, treatment patterns, and survival outcomes of women with stage IB1-IVB cervical cancer were compared based on the JSGO accrediting status.

Results: A total of 15,835 eligible women were identified: 12,122 (76.6%) cases for JSGO-accredited institutions and 3,713 (23.4%) cases for non-accredited institutions. A multivariate analysis showed that the following factors were independently associated with mortality: age, stage, histology type, and treatment pattern. Moreover, women who received treatment at the JSGO-accredited institutions had a significantly decreased mortality risk compared to non-accredited institutions: (adjusted-hazard ratio [HR] 0.851, 95% confidence interval [CI] 0.793-0.914). Similar findings were seen among subset of women who received surgery alone (adjusted-HR 0.564, 95%CI 0.403-0.789) and among women who received radiotherapy (adjusted-HR 0.864, 95%CI 0.784-0.952) on multivariate analysis.

Conclusions: Successful implementation of gynecologic oncology accrediting institution was associated with improved survival outcome of women with cervical cancer in Japan.

Table 1. Cox regression analysis (Cervical cancer patients who received surgery alone).

		HR	95% CI		*P* value
			lower	upper	
Age		1.019	1.007	1.032	.002
JSGO-accredited institutions	no (N=857)	1 (reference)			
	yes (N=2856)	.564	.403	.789	.001
TNM-T	T1	1 (reference)			
	T2	3.142	2.154	4.582	.000
TNM-N	N0	1 (reference)			
	N1	4.256	2.606	6.952	.000
TNM-M	M0	1 (reference)			
	MA (PAN+)	3.157	.997	9.996	.051
Histology	scc	1 (reference)			
	adeno	1.827	1.302	2.563	.000
	others	6.535	3.829	11.153	.000

Disclosure Information

In order to assure the highest quality CME/CE programming, SGO requires those who have the opportunity to affect the content of an educational activity to disclose financial relationship(s) with corporate interest(s).This condition must be met prior to participating in the CME/CE activity.All conflicts of interest will be resolved prior to the start of the activity, per the SGO Conflict of Interest Resolution Policy.

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Honoraria/Reimbursement: up to date, inc

Leslie Ciancibello, Other
Speakers' Bureau(s): Siemens Healthcare

Robert Coleman, MD
Grant: AstraZeneca
Honoraria/Reimbursement: AstraZeneca
Grant: Clovis
Grant: Abbvie
Grant: Roche/Genentech
Grant: Merck
Grant: Janssen
Honoraria/Reimbursement: janssen
Grant: Gradalis

Nicoletta Colombo, MD
Board Membership: Astra Zeneca
Honoraria/Reimbursement: Astra Zeneca
Speakers' Bureau(s): Astra Zeneca

Board Membership: Roche
Honoraria/Reimbursement: Roche
Speakers' Bureau(s): Roche
Board Membership: Pharmamar
Honoraria/Reimbursement: Pharmamar
Speakers' Bureau(s): Pharmamar
Board Membership: Clovis
Board Membership:

Suzanne Conzen, MD
Consulting: Arno Therapeutics
Co-inventor on licensed patent: Corcept Therapeutics

Larry Copeland, MD
Consulting: Clovis
Honoraria/Reimbursement: Clovis
Honoraria/Reimbursement: Advaxis
Consulting: Advaxis
Stockholder/Shareholder: Merck & Company
Stockholder/Shareholder: Lilly Eli & Company
Stockholder/Shareholder: Cardinal Health, Inc
Consulting: Tesaro
DMC: Tesaro
Consulting: Janssen

Larry Copeland, MD
Consulting: Clovis
Honoraria/Reimbursement: Clovis
Consulting: Advaxis
Honoraria/Reimbursement: Advaxis
Stockholder/Shareholder: Merck & Company
Stockholder/Shareholder: Lilly Eli & Company
Stockholder/Shareholder: Cardinal Health, Inc
Consulting: Tesaro
DMC: Tesaro
Consulting: Janssen

Emily Dalton, CGC
Employee: Ambry Genetics

Vanessa Dalton, MD
Consulting: Bayer

Giuseppe Del Priore, MD
Author: UpToDate
I, both individually and with IU, have patents related to uterine cancers either issued or pending: Indiana University
Chief Medical Officer: Tyme

Amit Deshpande, PhD
Employee: Jounce Therapeutics

Michael Diamond, MD
Board Membership: Advanced Reproductive Care
Stockholder/Shareholder: Advanced Reproductive Care
Grant: AbbVie
Honoraria/Reimbursement: AbbVie
Grant: Bayer
Consulting: ZSX Medical
Consulting: Actamax
Honoraria/Reimbursement: Actamax
Consulting: Temple Pharmaceutical
Consulting: Seikagaku

Don Dizon, MD
Editor: UpToDate
Consulting: Pfizer
Consulting: Fuji Bio

Linda Duska, MD
Honoraria/Reimbursement: Genentech

Julia Elvin, MD, PhD
Stockholder/Shareholder: Foundation Medicine

Ryan Emerson, PhD
Stockholder/Shareholder: Adaptive Biotechnologies
Full-time employment: Adaptive Biotechnologies

Ramez Eskander, MD
Consulting: Astrazeneca
Speakers' Bureau(s): Astrazeneca
Consulting: Genentech
Speakers' Bureau(s): Genentech

Janet Espirito, PharmD
Stockholder/Shareholder: McKesson

David Fabrizio, PhD
Stockholder/Shareholder: Foundation Medicine
Employee: Foundation Medicine

Ancilla Fernandes, PhD
Employee: AstraZeneca

Stephen Fiascone, MD
Wife is employee of EMR company: AllScripts

Gini Fleming, MD
Supply of drug for IIT: corecept

Fergal Fleming, MD
Author royalty: UpTodate

Melissa Frey, MD
Ambry Genetics provided germline genetic testing for participants in this study who did not have insurance that could cover the cost of testing: Ambry Genetics

Michael Frumovitz, MD, MPH
Consulting: Novadaq
Honoraria/Reimbursement: Novadaq

Keiichi Fujiwara, MD, PhD
Grant: Pfizer
Consulting: Pfizer
Grant: Astra Zeneca
Consulting: Astra Zeneca
Grant: Chugai
Consulting: Chugai
Grant: MSD
Consulting: MSD
Honoraria/Reimbursement: Zeria Pharma
Grant: Zeria Pharma
Consulting: Zeria Pharma
Speakers' Bureau(s): Nippon Kayaku
Grant: Ono pharma
Consulting: Ono pharma
Grant: Esai

Stephanie Gaillard, MD, PhD
Consulting: Genentech
Consulting: Pfizer
Honoraria/Reimbursement: Pfizer
Consulting: Merck

Melissa Geller, MD
Consulting: Voluntis

Robert Giuntoli, MD
Consulting: Abcodia, Inc.

Bill Given, PhD
Consulting: Michigan State University

Sacha Gnjatic, PhD
Consulting: B4CC
Consulting: Neon Therapeutics|
Grant: Janssen R&D
Grant: Immune Design
Honoraria/Reimbursement: BMS

Barbara Goff, MD
Employment: Lilly- spouse

Radhika Gogoi, MD, PhD
Stockholder/Shareholder: Medtronic

Antonio Gonzalez, MD
Consulting: ROCHE
Speakers' Bureau(s): ROCHE
Consulting: ASTRA ZENECA
Speakers' Bureau(s): ASTRA ZENECA
Consulting: PHARMAMAR
Speakers' Bureau(s): PHARMAMAR

Annekathryn Goodman, MD
UptoDate royalties: UptoDate

Heidi Gorringe, MS
Employee: Myriad Genetic Laboratories, Inc.

Walter Gotlieb, MD, PhD
Grant: Astra Zeneca
Honoraria/Reimbursement: Astra Zeneca
Speakers' Bureau(s): Astra Zeneca
Honoraria/Reimbursement: Roche

Camille Gunderson, MD
Advisory Board: Clovis

Saketh Guntupalli, MD
Consulting: Genentech

Divya Gupta, MD
Consulting: Genentech, Fujirebio Inc

Lisa Guzzardi, RN
Founder/ moderator: BRCA Advanced 101 & 102 Facebook Journal Club

Heather Hampel, MS
Board Membership: Invitae Genetics
Grant: Myriad Genetics

Kosei Hasegawa, MD, PhD
Consulting: Eisai
Grant: Eisai
Honoraria/Reimbursement: Yakult Honsha
Grant: ImmunoGen
Grant: Daiichi Sankyo
Grant: OncoTherapy Science
Honoraria/Reimbursement: Ono
Honoraria/Reimbursement: Taiho

Laura Havrilesky, MD
Spouse is an employee of Bioventus: Bioventus

Thomas Herzog, MD
Consulting: J & J
Consulting: Roche
Consulting: AstraZeneca
Consulting: Clovis
Consulting: Tesaro
Consulting: Caris

Heather Hirsch, PhD
Scientist employee: Jounce Therapeutics

M. Holcomb, MD
Honoraria/Reimbursement: Fujirebio Diagnostic, Inc
Surgical proctor: Intuitive Surgical, Inc

Neil Horowitz, MD
Funded clinical trial: TRACON

Carolyn Horton, CGC
full time paid employee: Ambry Genetics

Eric Huang, MD, PhD
Consulting: Allergan

Warner Huh, MD
Consulting: THEVAX
Consulting: INCELLDX
Consulting: LICOR
Consulting: Advaxis
Educational Courses: INTUITIVE

Robert Ilaria, MD
Stockholder/Shareholder: Eli Lilly and Company
Employment: Eli Lilly and Company

Michelle Jackson, CGC
employee: Ambry Genetics

David Jackson, MD
Stockholder/Shareholder: Molecular Health
Employee: Molecular Health

Amir Jazaeri, MD
Honoraria/Reimbursement: Genentech
Research support: Astrazeneca
Honoraria/Reimbursement: EMD Serono

Elizabeth Jewell, MD
Speakers' Bureau(s): Covidien

Robin Jones, BS, MD
Consulting: Lilly
Consulting: Eisai
Consulting: Merck
Consulting: Pharmamar
Consulting: Immunedesign
Consulting: Adaptimmune
Consulting: Immudulon
Consulting: Daichii
Consulting: Blueprint
Consulting: Pfizer

Dorina Kallogjeri, MD, MPH
Consulting: Potentia Systems
Stockholder/Shareholder: Potentia Systems

Noriyuki Kasahara, MD
Consulting: Tocagen Inc.
Stockholder/Shareholder: Tocagen Inc.

Scott Kaufmann, MD, PhD
Grant: Eli Lilly

Sarah Kerr, MD
Grant: Abbott Molecular, Inc., Des Plaines, IL, USA

Alok Khorana, MD
Consulting: Janssen
Consulting: Leo Pharma
Consulting: Sanofi
Consulting: Halozyme

DeLeslie Kiser, NP, MSN
Speakers' Bureau(s): Astra Zeneca

Masha Kocherginsky, PhD
US8710035 B2 - "Methods and compositions related to glucocorticoid receptor antagonists and breast cancer ": Patent Royalties

W. Kraus, PhD
Consulting: Ribon Therapeutics, Inc.
Honoraria/Reimbursement: Ribon Therapeutics, Inc.
Stockholder/Shareholder: Ribon Therapeutics, Inc.
Founder: Ribon Therapeutics, Inc.

Thomas Krivak, MD
Consulting: Clovis
Speakers' Bureau(s): Astra Zenenca
Honoraria/Reimbursement: Genentech

Nadia La Scala, PA-C
Stockholder/Shareholder: Exact Sciences

Holly LaDuca, MS
Full time paid employee: Ambry Genetics

Charles Leath, MD
Grant: Celsion
Honoraria/Reimbursement: Celsion
Grant: Novartis
Honoraria/Reimbursement: Genentech/Roche
Grant: Astra Zeneca
Grant: Plexikkon

Jonathan Ledermann, MD
Consulting: AstraZeneca
Honoraria/Reimbursement: AstraZeneca
Honoraria/Reimbursement: Pfizer
Honoraria/Reimbursement: Roche
Honoraria/Reimbursement: Clovis Oncology

Soo Chin Lee, MBBS
Grant: Eisai
Grant: Taiho
Honoraria/Reimbursement: Roche
Honoraria/Reimbursement: Pfizer
Honoraria/Reimbursement: Astra Zeneca

Mario Leitao, MD
Ad hoc speaker: Intuitive Surgical

Shashikant Lele, MD
Consulting: Genentech, Abbott

Jason Levy, MD
Consulting: Medtroni
Speakers' Bureau(s): Medtroni

Lenard Lichtenberger, PhD
Stockholder/Shareholder: PLx Pharma Inc.

Kevin Lin, PhD
Stockholder/Shareholder: Clovis Oncology

Stacy Lindau, MD
Stockholder/Shareholder: NowPow, LLC
Founder, co-owner, Chief Innovation Officer: NowPow, LLC

Michael Linden, MD
Modest reimbursement for travel to a workshop at which I am a presenter (BMS, noted above): Bristol Myers Squib

Gregory Longmore, MD
Consulting: Rottapharm

Philip Low, PhD
Board Membership: On Target Laboratories
Grant: On Target Laboratories
Stockholder/Shareholder: On Target Laboratories

Anthony Magliocco, MD
Honoraria/Reimbursement: illumine
Travel Support: illumine
Consulting: Biotheranostics
Grant: Biotheranostics
Consulting: Diacarta
Travel Support: Diacarta
Travel support: Definiens

Sven Mahner, MD
Consulting: AstraZeneca
Grant: AstraZeneca
Honoraria/Reimbursement: AstraZeneca
Consulting: Clovis
Honoraria/Reimbursement: Clovis
Grant: PharmaMar
Honoraria/Reimbursement: PharmaMar
Consulting: MEDAC
Grant: MEDAC
Honoraria/Reimbursement: MEDAC
Consulting: Roche
Grant: Roche
Honoraria/Reimbursement: Roche

Bryan Mak, BS
Employee: Ambry Genetics

Liza Makowski, PhD
Spouse- Founder: GeneCentric, Inc.

Lara Maloney, BA
Stockholder/Shareholder: Clovis Oncology

Susan Manley, CGC, MBA, MS
Employee: Myriad Genetic Laboratories, Inc.

Robert Mannel, MD
Advisory Board meeting: Tesaro
Advisory Board Meeting: Clovis

David Markovitz, MD
Consulting: Dynavax

Lainie Martin, MD
Honoraria/Reimbursement: ImmunoGen, Inc

Daniela Matei, MD
Consulting: Genentech
Consulting: Astex Inc
Consulting: Clovis
Consulting: Anydyn

Koji Matsuo, MD, PhD
Honoraria/Reimbursement: Chugai

Ursula Matulonis, MD
Consulting: Immunogen
Consulting: astrazeneca
Consulting: Merck
Consulting: Clovis
Consulting: Genentech Roche
Consulting: Eli Lilly

Greg Mayes
Board Membership: Advaxis
Stockholder/Shareholder: Advaxis
Employee: Advaxis

Clair McClung, MD
Spouse is an employee and stock holder: pMD

Rachel McFarland, BS
Full-time employee: Ambry Genetics

Jacob McGee, MD
Speakers' Bureau(s): Astra Zeneca
Drug Advisory Board: Astra Zeneca

Michael McHale, MD
Speakers' Bureau(s): ethicon

Iain McNeish, PhD, MD
Consulting: Clovis Oncology
Consulting: Astra Zeneca

Iain McNeish, PhD, MD
Consulting: Clovis Oncology
Consulting: Astra Zeneca

Geralyn Messerlian, PhD
Grant: Fujirebio

Larissa Meyer, MD
Research funding: AstraZeneca

Jeffrey Miller, MD
Scientific Advisory Board: Celgene
Consulting: Fate Therapeutics
Grant: Fate Therapeutics
Consulting: Oxis Biotech
Grant: Oxis Biotech

David Miller, Other
Consulting: Clovis
Honoraria/Reimbursement: Clovis
Consulting: Genentech
Honoraria/Reimbursement: Genentech
Speakers' Bureau(s): Genentech
Consulting: Insys
Honoraria/Reimbursement: Insys
Consulting: Vermillion
Grant: Vermillion
Honoraria/Reimbursement: Vermillion
Consulting: Janssen
Grant: Janssen
Honoraria/Reimbur

M. Miller, BS
Consulting: Fujirebio Diagnostics, Inc.

David Miller, Other
Honoraria/Reimbursement: Clovis
Consulting: Clovis
Speakers' Bureau(s): Genentech
Honoraria/Reimbursement: Genentech
Consulting: Genentech
Honoraria/Reimbursement: Insys
Consulting: Insys
Consulting: Vermillion
Grant: Vermillion
Honoraria/Reimbursement: Vermillion
Consulting: Janssen
Grant: Janssen
Honoraria/Reimbur

Susan Modesitt, MD
Grant given to my institution for the use of my CME talk: Myriad

Bradley Monk, MD
Consulting: Amgen
Grant: Amgen
Consulting: Genentech
Grant: Genentech
Speakers' Bureau(s): Genentech
Grant: Eli Lilly
Grant: Array
Consulting: TESARO, Inc.
Grant: TESARO, Inc.
Grant: Morphotek
Grant: Janssen/Johnson & Johnson
Speakers' Bureau(s): Janssen/Johnson & Johnson

Consulting: Roche
Speakers' Bureau(s): Roche

Kathleen Moore, MD
Consulting: Astra Zeneca
Consulting: Clovis
Consulting: Immunogen
Consulting: VBL therapeutics
Consulting: Tesaro
Consulting: Genentech/Roche

Richard Moore, MD
Consulting: Fujirebio Diagnostics
Grant: Fujirebio Diagnostics
Honoraria/Reimbursement: Fujirebio Diagnostics
Consulting: Roche Diagnostics
Honoraria/Reimbursement: Roche Diagnostics
Grant: Angle plc.

Daniel Morgan, MD
Salary support: Michigan Surgical Quality Collaborative
Honoraria/Reimbursement: UpToDate

Carolyn Muller, MD
Travel for investigator meeting for GOG Partners trial including another immunotherapy agent: Pfizer

David Mutch, MD
Speakers' Bureau(s): Astra Zeneca

Evan Myers, MD, MPH
Consulting: Merck & Co

Goutham Narla, MD
Consulting: Dual Therapeutics
Grant: Dual Therapeutics
Honoraria/Reimbursement: Dual Therapeutics
Stockholder/Shareholder: Dual Therapeutics

R. Wendel Naumann, MD
Consulting: Clovis
Consulting: Astra Zeneca
Consulting: Janssen

R. Wendel Naumann, MD
Consulting: Clovis
Consulting: Astra Zeneca
Consulting: Janssen

Wilberto Nieves, MD
Speakers' Bureau(s): Caris Life Sciences

Andrew Nixon, PhD
Grant: Tracon Pharma
Grant: Amgen
Grant: Novartis
Grant: Incyte
Grant: MedPacto, Inc.
Grant: Seattle Genetics
Grant: Genentech/Roche

David Nolte, PhD
Consulting: Animated Dynamics, Inc.
Stockholder/Shareholder: Animated Dynamics, Inc.

Katherine O'Hanlan, MD
Consulting: BD
Speakers' Bureau(s): Baxter
Honoraria/Reimbursement: Medtronic

David O'Malley, MD
Honoraria/Reimbursement: Clovis
Honoraria/Reimbursement: Genentech/Roche
Honoraria/Reimbursement: Janssen
Honoraria/Reimbursement: Amgen
Steering Committee: Amgen
Honoraria/Reimbursement: Novocure
Honoraria/Reimbursement: Tesaro

Ray Osborne, MD
Stockholder/Shareholder: Pfizer
Stockholder/Shareholder: Genentech

Tony Panzarella, MSc
Consulting: Celgene Canada

Nickolas Papadapoulos, PhD
Stockholder/Shareholder: PapGene Inc
Stockholder/Shareholder: PGDx Inc

Antonios Papanicolau-Sengos, MD, MS
I am assistant director in this company: OmniSeq LLC

Manish Patel, MD
Honoraria/Reimbursement: Medivation, Gilead, Taiho, Genentech
Speakers' Bureau(s): Medivation, Gilead, Taiho, Genentech

Joseph Pearson, MD
Consulting: Intuitive surgical

Richard Penson, MD, MRCP
Consulting: Genentech

Scientific Advisory Boards: Genentech
Consulting: Astrazeneca
Honoraria/Reimbursement: Astrazeneca
Scientific Advisory Boards / Research funding: Astrazeneca

George Peoples, MD
Consulting: Galena Biopharma
Patent rights: Galena Biopharma

Raymond Perez, MD
Consulting: Pharmaceutical Research Associates, Inc. (PRA)
Grant: Eli Lilly
Grant: Bristol-Myers Squibb
Grant: Dompé Farmaceutici
Grant: Novartis
Grant: Millennium
Grant: Agensys
Grant: Immunogen
Grant: TetraLogic Pharmaceuticals
Grant: Altor BioScience
Grant: Incyte
Grant: Onyx
Grant: MedImmune
Grant: Genentech/R

Patrick Peterson, PhD
Employee: Eli Lilly and Company

Paul Pharoah, PhD
Expert testimony: Shook, Hardy and Bacon LLP

Sandro Pignata, MD, PhD
Board Membership: AZ
Consulting: AZ
Honoraria/Reimbursement: AZ

Andrés Poveda, MD
Board Membership: ROCHE
Speakers' Bureau(s): ROCHE
Board Membership: ASTRA ZENECA
Speakers' Bureau(s): ASTRA ZENECA
Board Membership: PHARMAMAR
Speakers' Bureau(s): PHARMAMAR

Matthew Powell, MD
Consulting: AstraZeneca
Honoraria/Reimbursement: AstraZeneca
Speakers' Bureau(s): AstraZeneca
Consulting: Roche/Genetech
Honoraria/Reimbursement: Roche/Genetech
Speakers' Bureau(s): Roche/Genetech

Eric Pujade-Lauraine, MD
Board Membership: Roche
Honoraria/Reimbursement: Roche
Speakers' Bureau(s): Roche
Board Membership: Astra Zeneca
Honoraria/Reimbursement: Astra Zeneca

Troy Randall, PhD
Consulting: Orphagen

Leslie Randall, MD
Consulting: Astra Zeneca
Grant: OnTarget Laboratories
Honoraria/Reimbursement: OnTarget Laboratories
Consulting: Clovis
Grant: Genentech
Grant: Array BioPharma
Grant: Arno Therapeutics

Lisa Rezende, PhD
Spouse is an employee: Ventana Medical Systems

Reitan Ribeiro, MD
Speakers' Bureau(s): Johnson & Johnson

David Riedel, MD
Clinical trial PI: Merck
Grant: Gilead
Educational grant PI: Gilead

B.J. Rimel, MD
Advisory Board Participant: AstraZeneca
Advisory Board Participant, internal education speaker: Genetech

Lillian Rinker, MD
Stockholder/Shareholder: Amgen
Honoraria/Reimbursement: CVS Healthcare Corp
Stockholder/Shareholder: Anthem Inc.
Stockholder/Shareholder: Bristol Meyers Squibb
Stockholder/Shareholder: Glaxo Smith Kline
Stockholder/Shareholder: Johnson & Johnson
Stockholder/Shareholder: Proctor & Gamble
Stockholder/Shareholder: Thermo Fisher

Gabrielle Rocque, MD
Grant: Medacape
Grant: Pack Health
Grant: Carevive
Grant: Genentech

Joanna Roder, PhD
Employee, Stock options: Biodesix

Heinrich Roder, PhD
Stockholder/Shareholder: Biodesix

Lindsey Rolfe, MBChB
Employee: Clovis Oncology

Lynda Roman, MD
Consulting: Astex Phamaceuticals

Rodrigo Ruiz-Soto, MD
Stockholder/Shareholder: ImmunoGen, Inc.
Employment: ImmunoGen, Inc.

Meredith Rumble, PhD
Grant: Merck

Rachel Ruskin, MD
Consulting: Axogen
Grant: Axogen
Speakers' Bureau(s): Axogen
Stockholder/Shareholder: AppMedicine
Stockholder/Shareholder: Minna Life
Board Membership: Mozart Medical
Stockholder/Shareholder: Mozart Medical
Stockholder/Shareholder: Puracath
Board Membership: SuperRenal
Stockholder/Shareholder: SuperRenal
Consulting: Vas

Jennifer Saam, PhD, LCGC
Employee: Myriad Genetic Laboratories, Inc.

Cheryl Saenz, MD
Honoraria/Reimbursement: Merck
Honoraria/Reimbursement: Genentech

Sunil Sahai, MD
Honoraria/Reimbursement: UpToDate.com
Perioperative Medicine Chapter: UpToDate.com

Ritu Salani, MD, MBA
Advisory Board: Astra Zeneca, Clovis

Susana San Roman, MS
Employee: Myriad Genetics

Sriram Sathyanarayanan, PhD
Employee: Jounce Therapeutics

Matthew Schlumbrecht, MD
Speakers' Bureau(s): Ambry Genetics

Alexandra Sebastianelli, MD
Honoraria/Reimbursement: MedTronic
Speakers' Bureau(s): Roche

Alexandra Sebastianelli, MD
Honoraria/Reimbursement: MedTronic
Speakers' Bureau(s): Roche

Angeles Secord, MD
Grant: Tesaro
Consulting: Astra Zeneca
Grant: Astra Zeneca
Grant: Bristol Myers Squibb
Grant: Amgen
Consulting: Genentech
Grant: Genentech
Grant: Boerhinger Ingelheim,
Consulting: Astex Pharmaceuticals, Inc.,
Grant: Astex Pharmaceuticals, Inc.,
Grant: AbbVie
Consulting: Janssen
Consulting: Clovis

Leigha Senter, CGC
Consulting: Clovis Oncology
Consulting: MyGeneCounsel

Muhieddine Seoud, MD
Honoraria/Reimbursement: Roche
Speakers' Bureau(s): Roche

Shelly Seward, MD
Speakers' Bureau(s): Astra Zeneca
Speakers' Bureau(s): Genentech

Ashwin Shahir, MD
employee: Eli Lilly and Co.

Qiuling Shi, PhD
Consulting: Amgen Inc.

Amy Skubitz, PhD
Consulting: Bayer

Brian Slomovitz, MD
Consulting: Clovis
Consulting: Advaxis
Consulting: Jansen
Consulting: Vermllion

William Small, MD
Grant: Zeiss

Speakers' Bureau(s): Zeiss
Advisory Board: Varian

William Small, MD
Grant: Zeiss
Speakers' Bureau(s): Zeiss
Advisory Board: Varian

Alexandra Snyder Charen, MD
Grant: BMS
Honoraria/Reimbursement: BMS
Consulting: SmartAnalyst
Honoraria/Reimbursement: Syndax

Pamela Soliman, MD, MPH
Grant: Novatis

Anil Sood, MD
Scientific Advisory Board: Kiyatec
Consulting: M-Trap

Julie Sosa, MD
Member, Data Monitoring Committee, Medullary Thyroid Cancer Consortium Registry: NovoNordisk, Astra Zeneca, GlaxoSmithKline, Eli Lilly

Arni Steingrimsson, MSc
Employee stock option: Biodesix Inc

Charlotte Sun, DrPH, MPH
Collaborator on AZ-sponsored projects: AstraZeneca

James Sun, PhD
Stockholder/Shareholder: Foundation Medicine

David SP Tan, Other
Honoraria/Reimbursement: Astra Zeneca
Honoraria/Reimbursement: Roche
Honoraria/Reimbursement: Merck
Grant: Karyopharm Therapeutics

Deanna Teoh, MD
Grant: Acelity
This grant is for a study that is unrelated to the abstract that is being submitted: Acelity

Krishnansu Tewari, MD
Speakers' Bureau(s): Roche/Genentech
Participation in an advisory board: ADVAXIS
Participation in an advisory board: Clovis
Grant: Astra Zeneca
Speakers' Bureau(s): Astra Zeneca
Consulting: Clovis
Grant: Clovis
Speakers' Bureau(s): Clovis
Speakers' Bureau(s): Merck
Grant: Pfizer
Grant: Abbie
Grant: Genmab
Grant: Tesaro

Premal Thaker, MD
Consulting: Celsion
Grant: Merck

Premal Thaker, MD
Consulting: Celsion
Grant: Merck

Premal Thaker, MD
Consulting: Celsion
Grant: Merck

Premal Thaker, MD
Consulting: Celsion
Grant: Merck

Premal Thaker, MD
Consulting: Celsion
Grant: Merck

Premal Thaker, MD
Consulting: Celsion
Grant: Merck

Premal Thaker, MD
Consulting: Celsion
Grant: Merck

Premal Thaker, MD
Consulting: Celsion
Grant: Merck

Premal Thaker, MD
Consulting: Celsion
Grant: Merck

Premal Thaker, MD
Consulting: Celsion
Grant: Merck

Todd Tillmanns, MD, FACOG
Speakers' Bureau(s): Astra Zeneca
Stockholder/Shareholder: ISRG
ISRG: ISRG

Anna Tinker, MD
Grant: AstrzZeneca

Audrey Tsunoda, PhD
Honoraria/Reimbursement: Roche

John Turek, PhD
Board Membership: Animated Dynamics, Inc.
Consulting: Animated Dynamics, Inc
Stockholder/Shareholder: Animated Dynamics, Inc.

Fidel Valea, MD
Speakers' Bureau(s): Covidien (Medtronic)

Brian Van Tine, MD, PhD
Consulting: Eli Lilly
Consulting: Novartis
Honoraria/Reimbursement: Novartis
Speakers' Bureau(s): Novartis
Consulting: Jansen
Honoraria/Reimbursement: Jansen
Speakers' Bureau(s): Jansen
Honoraria/Reimbursement: Caris
Speakers' Bureau(s): Caris
Consulting: Merck Serano
Honoraria/Reimbursement: Merck Serano

Jennifer Veneris, MD, PhD
Spouse is employee of Abbott Laboratories: Abbott

Sara Vesely, PhD
Consulting: Ablynx

Marissa Vignali, PhD
Stockholder/Shareholder: Adaptive Biotechnologies
Employee: Adaptive Biotechnologies

Bert Vogelstein, MD
Board Membership: PapGene
Consulting: PapGene
Stockholder/Shareholder: PapGene
Founder: PapGene
Consulting: Sysmex
Board Membership: PGDx
Consulting: PGDx
Stockholder/Shareholder: PGDx
Founder: PGDx
Consulting: Morphotek

Christine Walsh, MD
Research Funding: Merck
Advisory Board: Clovis Oncology

Robert Wenham, MD, MS
Honoraria/Reimbursement: Genentech
Speakers' Bureau(s): Genentech
Speakers' Bureau(s): Jaansen
Grant: Merck

Lari Wenzel, PhD
Consulting: Immunogen

Shannon Westin, MD
Grant: Novartis
Consulting: AstraZeneca
Grant: AstraZeneca
Grant: Critical Outcomes Technologies, Inc
Consulting: Roche/Genentech
Consulting: Medivation
Consulting: Vermillion

Samuel Wickline, MD
Stockholder/Shareholder: Trasir Therpeutics

Thomas Wilson, PhD
Board Membership: Trajectory Healthcare, LLC
Stockholder/Shareholder: Trajectory Healthcare, LLC
Consulting: McKesson

Kenton Wride, MS
Stockholder/Shareholder: Clovis Oncology

Jason Wright, MD
Consulting: Tesaro

Ilker Yalcin, PhD
Employee (2/2016 - Present): TESARO Inc.
Employee (5/2011 - 1/2016): Synta Pharmaceuticals

Eddy Yang, PhD, MD
Consulting: Nanostring
Honoraria/Reimbursement: Nanostring

Amal Yussuf, BS
Full time paid employee: Ambry Genetics

Tong Zi, PhD
Employee: Jounce Therapeutics

Addendum Edits

Room Changes:
Saturday, March 11, 2017
Gynecologic Cancer InterGroup GCIG: The Success of International Collaboration in Clinical Trials – now in National Harbor 2/3
SGO Dinner Symposium: Genetic Counseling in Gynecologic Oncology: What Advanced Practitioners Need to Know – now in National Harbor 4/5
Tuesday, March 14, 2017
Education Forum X: Palliative and End of Life Care is now in Maryland Ballroom BD

Exhibit Hall Additions:

Merck Oncology, Booth 530
Merck (known as MSD outside the US and Canada) is a global health care leader working to help the world be well. Through our prescription medicines, vaccines, biologic therapies, and animal health products, we work to deliver innovative health solutions and are committed to increasing access to health care.

Speaker substitutions:

In the Late Breaking Abstract Session, *A prospective phase 2 trial of the listeria-based HPV immunotherpay axalimogene filolisbac (AXAL) in second and third-line metastatic cervical cancer: An NRG Oncology Group trial* will be presented by Charles A. Leath, III, MD

Abstract #439 - *Distance to care is associated with lower health care maintenance and survival in patients with gynecologic malignancies* will be presented by Nadim Bou Zgheib, MD

Abstract #231 - *Macrometastases in the pelvic lymph nodes as predictors of multiple pelvic and para-aortic node involvement in endometrial cancer* will be presented by Jvan Casarin, MD

Abstract #356 - *Postoperative complications and survivorship trends following ovarian cancer surgery in New York State* will be presented by Sarah Temkin, MD

Abstract #483 - *Using HPV DNA co-testing to assess the efficacy of cervical cancer screening and triage with visual inspection under the single visit 'screen-and-treat' approach* will be presented by Leslie Bradford, MD