Purpose or Objective
Adjuvant radiotherapy for breast cancer treatment has been long shown to reduce the risk of recurrence, but also results in incidental exposure of organs at risk (OAR) such as the heart and lungs. Several studies have reported on cardiac toxicity, showing an increase in the rate of ischemic heart disease after radiotherapy for left-sided breast cancer; and meta-analyses of women treated with breast radiotherapy have shown an increased risk of primary lung cancer, which is even more appreciable in the smoking population. Other potential lung complications from breast radiotherapy include pneumonitis and subsequent fibrosis, the risk of which further increases with the addition of chemotherapy. In this retrospective dosimetric study, we report on the cardiac and lung doses from over 400 breast cancer patients treated with radiotherapy at our centre, with the long-term goal of correlating dose to toxicity.
Material and Methods
412 breast cancer patients treated with 50Gy in 25 fractions or 42.56Gy in 16 fractions were identified retrospectively. Cohorts were stratified based on the radiation technique including (i) 2-field tangential beam arrangement (n=256) (ii) 3- and 4-field techniques with standard tangents (n=92) and (iii) 4-field technique with wide tangents (n=64) to include the internal mammary chain (IMC), which was further stratified between treatment of right (n=34) and left-sided disease (n=30). Of the latter, patients simulated in free-breathing (n=8) and those simulated with a modified deep inspiration breath-hold technique (mDIBH) (n=22) were analysed separately. Standardized contouring based on the RTOG breast cancer atlas, in combination with standard field based planning was used. Dosimetric heart parameters evaluated included mean heart dose (MHD) and V(50%). Metrics for the combined lung volumes included V5Gy, V20Gy and Mean Lung Dose (MLD). ANOVA was also used to compare the dose between the techniques for statistical significance.
Results
Dosimetric parameters for heart and lung are reported in table 1 for the different techniques, with the differences shown to be statistically significant. Breast cancer patients treated with radiotherapy which included regional nodal irradiation increased dose to both heart and lungs. mDIBH significantly reduced the dose to the heart as compared to the free-breathing technique.

HEART		Radiotherapy Technique	Standard Tangents (Left and Right)	3,4-Field Standard Tangents (left and Right)	4-Field Wide Tangents (Right side)	4-Field Wide Tangents (Left side, mDIBH)	4-Field Wide Tangents (Left side, free breathing)	One-Way ANOVA
Dosimetric Parameter	V(50%) %	Mean	0.12	0.48	0.28	0.91	2.8	p<<0.001
		Range	0-3.11	0-5.08	0-2.77	0-8.44	0.06-9.55	
	MHD (cGy)	Mean	106.6	161.9	160.8	243.2	335.3	p<<0.001
		Range	2-350.2	2.9-398.9	8.2-264.2	149.6-373.7	185.8-648	

LUNGS (combined)		Radiotherapy Technique	Standard Tangents (Left and Right)	3,4-Field Standard Tangents (left and Right)	4-Field Wide Tangents (Right and Left)	One-Way ANOVA
Dosimetric Parameter	V20Gy (%)	Mean	5.47	13.54	17.04	p<<0.001
		Range	0.03-12.63	6.4-24.64	7.59-28.12	
	V5Gy (%)	Mean	10.66	22.94	26.05	p<<0.001
		Range	1.67-22.06	14.91-34.17	14.96-36.6	
	MLD (cGy)	Mean	298.87	697.76	853.34	p<<0.001
		Range	69.3-638.7	401.8-1193.8	421.0-1367.8	

Conclusion
Standardized contouring and planning facilitates a meaningful dosimetric evaluation of OAR dose associated with breast radiotherapy, which in future studies can be correlated with toxicity. In an era where the benefits of breast radiotherapy well outweigh the risks in the majority of patients, it is important to consider the potential long-term effects of breast cancer radiotherapy from a survivorship lens.

EP-1325 Personalized Medicine in breast cancer: a nomogram from prognostic score to deescalate radiotherapy

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Purpose or Objective
OncotypeDX can enhance prediction of breast cancer recurrence (BRC), guiding adjuvant treatment options. Many studies showed a low local relapse for Recurrence Score (RS) < 18 and probably in these patients would be possible to deescalate adjuvant radiotherapy (RT). However, the opportunity to access this test is not always possible. The aim of this study is to investigate the correlation between classical immunohistochemistry (IHC) and RS in order to offer to clinicians a Decision Supporting System to be validated for deescalating RT
Material and Methods
All patients who for ER+ HER2- breast cancer underwent Oncotype between 2014 and 2018 were retrospectively included in the study. The data selected for analysis were: age, menopausal status, pT, pN, PVI, IHC, RS and ER, PgR and HER2 expressed on Oncotype analysis. IHC was performed with standardized semi-quantitative method. Multivariable logistic regression analyses were applied to ascertain the associations between all these parameters and RS
Results
The study comprised 407 patients who underwent Oncotype. Mean age was 53.7 (31-80) and 222 pts (54.55%) were > 50 years old. Oncotype results showed: 67 pts (16.5%) between 0-10, 173 pts between 11 and 18 (42.5%), 133 pts between 19 and 30 (32.7%), and 34 pts > 30 (8.3%). At the logistic regression analysis, RS score was significantly associated with ER (p=0.004), PgR (p<0.0001), and Ki67% (p<0.0001). Above pts with Oncotype ≤18 (0-18), a linear regression showed a model with AUC 0.814 (sensitivity 75%; specificity 75%) (Figure 1). Ten-cross fold validation of the model presented a mean AUC of 0,80 (0.7-0.9). A nomogram was generated for further prospective evaluation, predicting RS score < 18 for internal IHC prognostic factor (Figure 2).
Conclusion
Prognostic factors present a good correlation with RS score in pts with RS ≤ 18 in our series. A nomogram for physician that enhance a good cost/effectiveness clinical practice need to be tested prospectively for deescalating adjuvant RT

EP-1326 Assessment of rigorous dosimetry guidelines for a multi-institutional, phase II APBI clinical trial
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Purpose or Objective
To compare the clinically achieved dosimetry of ACCEL trial with the trial's rigorous *dosimetry guidelines* in context with phase III multi-institutional accelerated partial breast irradiation (APBI) trials. These *dosimetry guidelines* were significantly stricter than *dosimetry constraints* formally imposed by trial protocol.
Material and Methods
The ACCEL trial (https://clinicaltrials.gov/NCT02681107) is a Canadian, multi-institutional, phase II prospective