breast cancer , but increases in colorectal cancer. Lung cancer shows a decrease in radical TCR, but an increase in palliative completion rate. Across all three sites the radiotherapy access rates decrease in the elderly.

Lung (n=557)	Treatment Completion		Local Access Rate
Age band	Palliative	Radical	
0-49	100%	75%	40%
50-59	95%	100%	69%
60-69	91%	84%	63%
70-79	90%	89%	45%
80+	97%	81%	18%
Breast (n=1175)	Treatment Completion		Local Access Rate
Age band	Palliative	Radical	
0-49	95%	88%	93%
50-59	98%	82%	93%
60-69	93%	76%	84%
70-79	91%	80%	66%
80+	86%	85%	33%
Colorectal (n=262)	Treatment Completion		Local Access Rate
Age band	Palliative	Radical	
0-49	70%	82%	38%
50-59	93%	67%	28%
60-69	80%	76%	21%
70-79	83%	83%	20%
80+	100%	85%	9%

Table 1. Treatment completion rates, separated by treatment intent, and local access rate for lung, breast and colorectal cancer.

Conclusion
Our analysis confirms that access rates for radiotherapy decline with advancing age. However, in the case of breast and colorectal cancer the elderly are more likely to complete their scheduled treatment than their younger counterparts. The effect is reversed in lung-cancer, likely due to higher co-morbidity rates in the elderly. These comparisons indicate that there is value in combining local usage statistics and cancer registry data to investigate the appropriateness of radiotherapy utilisation in across different disease sites in this age group.

Poster: Clinical track: Health services research / health economics

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PO-0858 Case/Budget Impact Analysis of Intraoperative breast cancer radiotherapy in the German health care
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Purpose or Objective
To inform reimbursement policy a case number and a budget impact analysis was carried out. The statistics in the statutory system and the billing behavior of the medical institutions were evaluted as well as the financial implications for the health care spending when using the low energy intraoperative radiotherapy (IORT) for breast cancer treatment. The IORT (as a definitive dose or as a boost) reduces or eliminates the need for several radiation center visits and minimizes radiation exposure to healthy tissue and organs.
Material and Methods

The analysis was based on the case-related hospital statistics of the Federal Statistical Office (Destatis) for the years 2008 to 2016. An incidence-based budget impact model in MS Excel was developed over a five-year time horizon employing the German health care system perspective. Epidemiologic data were used to quantify the proportion of patients diagnosed with early breast cancer in Germany. Diagnosis Related Group (DRG) based IORT base case cost was varied in a reasonable range for the sensitivity analysis.
Results
The introduction of the specific low kV IORT OP key 8-52.d showed relevant changes in coding behavior in 2013 and a shift of 960 cases in favor of OPS 8-52.d took place. The OP key 8-52.d was applied in 2013-15 1,341, 1,282 and 1,125 times. Thus in the German statutory system over the years 2008 – 2015 10,000 breast cancer patients have been treated with low kV IORT. According to the Budget Impact Analysis 10 Million Euros have been saved to the public system from 2008-2015 with the application of IORT. With the progressive introduction of IORT the total annual cost of treatment for early breast cancer patients in Germany gradually decline from 244 Million Euros in the first year to 189 Million Euros in the fifth year. Therefore, the introduction of IORT in phasic manner could save 241 Million Euros over the next five years. In the alternative scenario, where all applicable patients are treated with IORT from now, the annual cost saving for the payer would be 78 Million Euros and would save 389 Million Euros.
Conclusion
IORT (boost and single treatment) is clearly the cost saving treatment strategy for patients with early-stage breast cancer. The impact of IORT treatment decision extends beyond these model results as the implementation of this shorter radiation course could improve quality of life by sparing patients from the longer course of conventional radiotherapy, improve compliance, prevent unnecessary mastectomies and save valuable health care resources.

PO-0859 Project S32: decision support system for lung cancer patients
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Purpose or Objective
A decision support system (DSS) has been proposed to predict survival and apply knowledge from routine care data rather than solely relying on clinical guidelines in lung cancer (LC) patients.
Material and Methods
To implement the technological architecture of this DSS, we integrated a set of open source tools which allowed us to register information during daily clinical practice through electronic health records and use this information to automatically execute different Data Mining analyses. It is based on the XGBoost and Generalized Linear Models algorithms applying a 10-fold cross validation to explore its potential for predicting survival from a heterogeneous dataset. Prospective multicenter data from 543 consecutive LC patients that

were seen in consultation in the radiation oncology departments from January 2013 to July 2017 were available to enable the development of the prediction model. There were 229 (42%) alive patients and 314 deaths at the time of the study. The data set had more than 400 items but only a proportion of them (including, among others, age, gender, histology, performance status, stage, and treatment approach) with discriminatory ability according the algorithms were used. Different time´s periods (pre-treatment, treatment) were assessed for prediction. Additionally, a subset of patients with a minimum follow-up of 18 months for alive patients was also assessed. Area under the receiver-operating characteristics curve (AUC) measured performance. The results were compared with the AUC obtained using the basic items included in the guidelines (pretreatment data [stage, histology] and treatment data [radiotherapy, surgery, and systemic therapy]).

Results
Our pertinent findings (Table 1) can be summarized as follows. First, we found that the AUC for predicting survival were significantly (P<0.05) higher using the DSS compared with conventional guidelines in all cases. For instance, using the guidelines, the AUC for predicting survival in all lung cancer patients in the pretreatment setting was 0.64 while the predictive power of the DSS enhanced the AUC up to 0.80 (P=0.0009). Second, we found that there were not significant AUC differences among the time period evaluated (i.e. pre-treatment vs treatment vs all data for all LC patients; P=0.11). Finally, we found that the AUC (0.80) for predicting survival in all LC patients regardless the follow-up was significantly higher than the AUC (0.74) for patients with a minimum follow-up of 18 months for alive patients only in the pretreatment setting (P=0.0004).

Data	Predictive model for mortality							
	Using data mining				Using guidelines			
	Lung cancer patients							
	All patients (N=543)		Patients with a minimum follow-up of 18 months for alive patients (N=451)		All patients (N=543)		Patients with a minimum follow-up of 18 months for alive patients (N=451)	
	N*	AUC	N*	AUC	N**	AUC	N**	AUC
Using pre-treatment data	20	0.80	6	0.74	2	0.64	2	0.64
Using only treatment data	9	0.78	10	0.61	3	0.57	3	0.61
Using all data	35	0.86	34	0.82	5	0.58	5	0.58
	Non-small cell lung cancer							
	(N=405)		(N=343)		(N=405)		(N=343)	
Using pre-treatment data	20	0.79	20	0.72	2	0.56	2	0.60
Using only treatment data	24	0.70	25	0.73	3	0.55	3	0.60
Using all data	17	0.81	32	0.79	5	0.53	5	0.57
	Small cell lung cancer							
	(N=138)		(N=108)		(N=138)		(N=108)	
Using pre-treatment data	19	0.81	20	0.76	2	0.61	2	0.70
Using only treatment data	22	0.78	23	0.88	3	0.60	3	0.69
Using all data	33	0.90	34	0.95	5	0.54	5	0.57

*Number of variables with discriminatory ability according the algorithms
*Number of variables according guidelines

Conclusion
Our DSS successfully handled a high number of heterogeneous variables, demonstrating potential for enhancing prediction of survival. The DSS could assist physicians in formulating an evidence-based management advice in patients with LC. This DSS might be used in a clinic as an objective guide to individualize treatment, and discussions with patients, according to prognosis.

Poster: Clinical track: Other

PO-0860 Learning radiation oncology in Europe: results of the ESTRO multidisciplinary survey
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Purpose or Objective
Education and training in the radiation oncology (RO) field may have a high grade of variability across different European countries, even despite the publication and implementation of the European Society ESTRO core curricula back in 2011. The purpose of this current study was to provide a glimpse into the different European education systems regarding RO, to consequently report on perceived quality of training and education and to possibly understand specific needs and requests.

Material and Methods
An online survey comprising 30 open questions was send out to RO professionals aged below 40, employing e-mail and social media platforms. Clinicians, radiobiologists, physicists and radiation therapists (RTTs) were invited to provide a feedback with respect to (1) demographics data, (2) duration, (3) organization, (4) content and (5) quality and potential improvements of national education programs.

Results
A total of 463 questionnaires were received from respondents working in 34 different European countries. All disciplines were represented (45% clinicians (n=210), 29% physicists (n=135), 24% RTTs (n=108) and 2% radiobiologists (n=10). Male and female participants were well-balanced for each speciality, except for radiobiologists (80% males). Median age was 31.5 years old (range 21 – 40). A consistent range of the duration of the National RO education programs was observed: median = 9 years (range: 3-15). In half of the surveyed countries the European Credit Transfer System (ECTS) that facilitates mobility for trainees has been implemented. Participants declared that only a minority of countries have implemented the ESTRO Core Curriculum (n=5). Overall, three quarters of participants indicated that the quality of their national education programs was satisfactory (Fig 1,2).