recurring tumors (actuarial 5-yr 44% vs 0% p<0.05). Four cases of mandibular osteoradionecrosis were seen (cumulative dose range 106-128 Gy). Fifty-three patients received a cumulative dose of 100 Gy or higher. The actuarial 5-year mandibular necrosis rate in this group was 26%.

Conclusion: Re-irradiation in the head and neck region for a recurrent or second primary malignancy is associated with LRC-rates of 40%. Results in patients re-irradiated post-recurrent or second primary malignancy is associated with late toxicity. The most important limitation for re-irradiation is late toxicity, which can be limited with current IMRT techniques.

EP-1100
External validation of a mixture NTCP model of radiation-induced hypothyroidism (HT)
M.F. Roenjøm1, C. Brink2, S. Bentzen3, L. Hegedüs1, J. Overgaard1, J. Petersen1, H. Prindahl1, J. Johansen1
1Odense University Hospital, Department of Oncology, Odense, Denmark
2Odense University Hospital, Laboratory of Radiation Physics, Odense, Denmark
3Division of Biostatistics and Bioinformatics- University of Maryland Greenebaum Cancer Center and, Department of Epidemiology and Public Health- University of Maryland School of Medicine, Baltimore, USA
4Odense University Hospital, Department of Endocrinology and Metabolism, Odense, Denmark
5Aarhus University Hospital, Department of Experimental Clinical Oncology, Aarhus, Denmark
6Aarhus University Hospital, Department of Medical Physics, Aarhus, Denmark
7Aarhus University Hospital, Department of Oncology, Aarhus, Denmark
8Division of Biostatistics and Bioinformatics- University of Maryland Greenebaum Cancer Center and, Department of Epidemiology and Public Health- University of Maryland School of Medicine, Baltimore, USA

Purpose or Objective: We have previously developed a mixture NTCP model for radiation-induced HT in a cohort of patients with head and neck cancer treated at the Department of Oncology, Odense University Hospital (OUH), Denmark. The model was validated in an independent cohort of patients treated at the Department of Oncology, Aarhus University Hospital (AUH). One plasma TSH assessment after RT was used in the external validation cohort and the latency time function of the model could therefore not be validated. The aim of this study was to validate the latency function by including repeated thyrotropin (TSH) measurements and a longer follow-up in the validation cohort.

Material and Methods: Initially, 198 patients were included in the validation cohort. From July 2012–October 2014 further TSH measurements were collected in 171/198 patients, increasing the median follow-up from 22 to 38 months after RT. The endpoint, HT, was defined as TSH>4.0 mU/l. Data were analyzed using a mixture model taking both thyroid volume (Vthyroid) and dose (Dmean) into account. From the repeated bio samples, latency was estimated and both the latency time function and NTCP models in AUH were compared to OUH. Validation was performed using a calibration plot of binned groups of patients showing the clinically observed outcome in the validation cohort compared with the predicted outcome from the original NTCP model.

Results: With the additional follow-up, 40 patients (20%) developed HT (19 after one TSH assessment). Dmean and Vthyroid were still significant risk factors for HT, OR=1.1 (1.06-1.19) and OR=0.85 (0.74-0.93), respectively. The cumulative events showed that 94% (59-100%) of the events would develop within the first five years after RT in the validation cohort, in line with the original cohort’s 97% (85-100%). Mean thyroid volumes were 17.4 (OUH) and 17.3 (AUH) cm³, and tolerance estimates around this level showed TD25 =38 Gy and 34 Gy, respectively, at 15 cm³ and 48 Gy and 42Gy, respectively, at 20 cm³. The calibration plot (Fig. 1) showed good agreement between the observed incidences of HT in the validation group versus the predicted probability of HT from the original model. Thus, the NTCP model has external validity in the cohort with multiple blood tests.

Conclusion: Increasing thyroid dose and a decreasing thyroid volume were confirmed as significant risk factors for radiation-induced HT, which likely develops within the first five years after RT. The calibration plot shows that the original NTCP model has external validity, supporting that risk estimates from the NTCP model may be used to support clinical treatment planning decisions relating to development of hypothyroidism after RT to the neck area.

EP-1101
Knowledge of HNC risk factors and symptoms - a survey among 1903 young Polish respondents
E. Sierka1, A. Krentowska1, A. Skoneczny1, A. Strzałka1, W. Pietruszewszka2, M.Z. Wojtukiewicz2, E. Sierko1
1Medical University of Białystok, Students’ Scientific Association in the Department of Oncology, Białystok, Poland
2Medical University of Lodz, Student’s Scientific Association in the Department of Otolaryngology and Laryngological Oncology, Lodz, Poland
3Medical University of Lodz, Department of Otolaryngology and Laryngological Oncology, Lodz, Poland
4Medical University of Białystok, Department of Oncology, Białystok, Poland

Purpose or Objective: Head and neck cancer (HNC) is the sixth most common type of cancer in Europe. Its early symptoms are usually non-specific and easy to miss, which in many patients lead to late presentation and diagnosis. Main risk factors of HNC include alcohol consumption and smoking. Both of them are usually present in young people, thus health education in this group is of great importance. The aim of the study was to assess the level of HNC awareness among young population in Poland.

Material and Methods: An anonymous online survey about HNC was conducted among 1903 people in the age of 18-35 years, mainly students of high schools and universities. The closed-ended questions concerned HNC risk factors, symptoms and prognosis. Participation in the study was voluntary.

Results: 85% of respondents had heard about HNC. The main source of information was the Internet (57%). Seventy-eight percent of participants associated smoking with HNC development, but alcohol consumption was mentioned by less than a half, and human papillomavirus (HPV) infection by approximately ¼ of them. The main risk factors mentioned by students of non-medical schools included smoking (66%), stress (33%), and excessive sunbathing (32%). One fourth of the respondents (38% when excluding medical students) were unaware of any HNC early symptoms. The symptoms mentioned most often included chronic hoarseness (55%), lump in the neck (52%), and chronic sore throat (51%). Over ¼ of medical students and half of other respondents were aware that early diagnosis is associated with a great chance
of cure. In contrast to that, if they noticed the symptoms in themselves, as much as 5% of medical students and 9% of students of other schools would seek medical advice only when they made everyday functioning impossible.

Conclusion: The level of HNC cancer knowledge among young population is alarmingly low. A large number of students of non-medical schools and universities are unaware of its risk factors and early symptoms. This group would benefit from increasing the number of educational campaigns, which would lead to earlier presentation, diagnosis and treatment of HNC.

EP-1102
Parotid toxicity in head and neck cancer patients treated with IMRT
G. Mantello1, G. Capezzali1, F. Cucchiarelli1, L. Vicenzi1, M. Giacometti2, M. Valent1, S. Maggi1, M. Cardinaii
1Azienda Ospedaliero Universitaria Ospedali Riuniti, Radiotherapy Department, Ancona, Italy
2Azienda Ospedaliero Universitaria Ospedali Riuniti, Physics Department, Ancona, Italy

Purpose or Objective: The aim of this study was to evaluate the parotid glands toxicity and its relationship with the dose in a cohort of head and neck cancer patients treated with IMRT.

Material and Methods: 78 patients out of 110 treated in our department between January 2011 and October 2015 were included in the analysis. Criteria to select patients were: at least 6 months follow up, the omolateral parotid (OP) close to the high (HR) and / or intermediate (IR) risk CTY. Characteristics of the studied patients population are shown in Table1. The GTV, whenever present, CTY HR (regions at high risk of microscopic disease), CTY IR (regions at intermediate risk) and CTY LR (regions at low risk) were contoured on each slice. The targets were expanded 1.5 mm to obtain the PTVs. The prescribed dose was 66-70 Gy (2.1-2.3 Gy /fr) to PTV LR, 59.4 - 66 Gy (1.8 - 2 Gy /fr) to PTV IR; 56.1 Gy (1.7 Gy /fr) to PTV LR. IMRT with Simultaneous Integrated Boost (SIB) technique was used (41patients were treated with Tomotherapy and 36 with VARIAN 21EX). The OP and the CP were contoured; PTV SV1 OP and SV2 CP were defined as overlapping volumes of PTVs and glands. Priority was given to OP when OP was partially included. The dose limit (Dmean) was <= 25 Gy to the whole contralateral gland (if not close to GTV N) and < 24 Gy to the volume of CP not included in the PTV (external CP). Salivary gland toxicity was assessed weekly, during RT, and at 3,6,9,12,18,24 months after RT and was graded using the RTOG toxicity scale.

Table 1. Patient and tumor characteristics (n=78). Values are number (percentage).

<table>
<thead>
<tr>
<th>Age (years) (mean range)</th>
<th>52 (39-62)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
</tr>
<tr>
<td>15 (10.2%)</td>
<td>63 (79.8%)</td>
</tr>
<tr>
<td>Tumor site</td>
<td>Nasopharynx</td>
</tr>
<tr>
<td>8 (10.2%)</td>
<td>20 (33.3%)</td>
</tr>
<tr>
<td>Adjuvant Chemotherapy</td>
<td>Yes</td>
</tr>
<tr>
<td>8 (7.7%)</td>
<td>72 (92.3%)</td>
</tr>
<tr>
<td>Concurrent Chemotherapy</td>
<td>Yes</td>
</tr>
<tr>
<td>37 (47.4%)</td>
<td>41 (52.6%)</td>
</tr>
<tr>
<td>PreRadiotherapy surgery</td>
<td>Yes</td>
</tr>
<tr>
<td>50 (64.1%)</td>
<td>28 (35.9%)</td>
</tr>
<tr>
<td>Stage (TNM staging system)</td>
<td>I-L</td>
</tr>
<tr>
<td>20 (25.6%)</td>
<td>58 (74.4%)</td>
</tr>
</tbody>
</table>

Results: The dose delivered to the PTVs was 67.9 Gy (range 66-70) 2.02 Gy /fr (1.9 -2.2) to PTV HR, 62.3 Gy (range 58-66) 1.86 Gy /fr (1.7-2) to PTV IR, 55.9 Gy (range 51-60) 1.68 Gy /fr (1.65-2) to PTV LR. The mean dose was 41.56 Gy (range 17.8 - 66.8) to OP and 24.9 Gy (range 4.7-39.7) to CP; the external CP received 21.7 Gy mean dose. 36 (46.1%) patients experienced mouth dryness, thickened saliva and altered taste (31 G1 and 5 G2) during RT. At a median follow up of 24 months (range 6-56.2) 19 cases with xerostomia were experienced mouth dryness, thickened saliva and altered taste (31 G1 and 5 G2) during RT. At a median follow up of 24 months (range 6-56.2) 19 cases with xerostomia were observed.

Conclusion: In our experience 25 Gy mean dose to the whole contra-lateral parotid, with <24 Gy mean dose to the external CP, even with sacrifice of the OP, allowed our patients to maintain an adequate salivation. 24% of cases experienced G1 and G2 xerostomia. No G3 toxicity was observed.

EP-1103
Review of thyroid ablation rates with RAI based on I131 uptake in differentiated thyroid carcinoma
M. Keys1, C. Faul1, O. Boychek1
1St. Lukes Radiation Oncology Network, Radiation Oncology, Dublin 6, Ireland

Purpose or Objective: Recent studies show that low activity (1.1GBq) of RAI is as effective as high activity (3.7GBq) in treating those with low-intermediate-risk differentiated thyroid cancer (DTC). The purpose of our study was to retrospectively review post-operative I131 uptake and ablation rates in those with DTC.

Material and Methods: Data was obtained from St. Luke’s Radiation Oncology Network (SLRON) patient registry. Selection criteria included histologically proven DTC; post-thyroidectomy; pre and post RAI ablation scan and RAI ablation in SLRON. There were 68 cases of DTC treated with RAI identified between 2005-2007 that were suitable for analysis and met criteria and follow up of >5 years

Results: Of the cases analysed 73% were female and 27% male with a mean age of 44 years. The predominant histological subtype was papillary (73%), followed by follicular (22%). Most had early stage disease; Stage I (65%), Stage II (22%), Stage III (13%), 39 cases were pN0 and 29 had pH1 disease. Regarding surgery performed 39 patients had a complete excision CE, 22 had residual disease and there was no information for 7 cases. Thirty seven (37) cases had microscopically positive margins, 26 were negative and it was unknown in 5. Pre RAI ablation, Post op. RAI (I131) uptake in these patients was an average of 3.6 % in pH1 disease and 5.1% in those with pH0 disease. The max uptake was 28%. The extent of the surgery tended to influence the trend of uptake. There was a trend to a higher mean uptake in those who didn’t have a CE with an uptake of 0.1-17%, and mean of 6.3%. Patients that had a CE had an uptake of 0-28%, and mean of 3.9%. In the SLRON there was no standard protocol for RAI dosage at the time the patients were treated. The mean and range of doses of RAI administered was looked at based on pre-ablation uptake scans. Group 1 had a pre-ablation uptake of <4% and group 2 >4%. For group 1 the mean dose was 3.9GBq with a range 2.2-7.4GBq, and group 2 had a mean of 3.7GBq with a range of 2.8-7.4GBq. Post-ablative RAI131 scans showed an average of 0.07% uptake with the majority of patients (33) having <0.1% uptake. At the time of analysis 23 patients remained disease free, 10 had metastases (M1) and 2 had died from metastatic disease.

Conclusion: In those that received RAI ablation, high ablation rates >90% were shown despite variability in post-op. I131 uptake and dose of RAI administered. There didn’t appear to be an association between those with recurrent or metastatic disease and their pre-ablation uptake rates, it was more associated with original stage.

EP-1104
Role of perfusion CT in evaluation of tumour response after radiochemotherapy in HNB cancer
P. Ferrazza1, P. Cecoza1, F. Pancrazzi2, D. Delisib1, L. Fatigante1, A. Cristaudo1, L. Faggioni2, F. Orlandi1, F. Matteucci1, S. Ursino1
1Azienda Ospedaliero Universitaria Pisana, Department of Radiation Oncology, Pisa, Italy
2Azienda Ospedaliero Universitaria Pisana, Department of Diagnostic and Interventional Radiology, Pisa, Italy

Results: The dose delivered to the PTVs was 67.9 Gy (range 66-70) 2.02 Gy /fr (1.9 -2.2) to PTV HR, 62.3 Gy (range 58-66) 1.86 Gy /fr (1.7-2) to PTV IR, 55.9 Gy (range 51-60) 1.68 Gy /fr (1.65-2) to PTV LR. The mean dose was 41.56 Gy (range 17.8 - 66.8) to OP and 24.9 Gy (range 4.7-39.7) to CP; the external CP received 21.7 Gy mean dose. 36 (46.1%) patients experienced mouth dryness, thickened saliva and altered taste (31 G1 and 5 G2) during RT. At a median follow up of 24 months (range 6-56.2) 19 cases with xerostomia were recorded, 15 (19%) G1 and 4 (5,1%) G2. No G3 was observed. The symptom was recorded on an average of 8 months (range 6-15) after RT. Only 13/36 patients with acute salivary problems experienced late xerostomia.

Conclusion: In our experience 25 Gy mean dose to the whole contra-lateral parotid, with <24 Gy mean dose to the external CP, even with sacrifice of the OP, allowed our patients to maintain an adequate salivation. 24% of cases experienced G1 and G2 xerostomia. No G3 toxicity was observed.