factors, family history plays an important role in this population too. Gene mutation assessment is mandatory for this subgroup. Early detection may be the key to achieve a better survival rate, as well as considering LC always as a possible diagnosis in younger and symptomatic patients. **Keywords:** young patients, lung cancer

P07.04
Primary Lung Cancers in Patients With Head and Neck Cancer: Experience of a French Institution

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Introduction: Head and neck cancers, and lung cancers are frequent, and have a bad prognosis. In the literature, studies have analysed the relationship between these cancers. **Methods:** The aim of this study was to analyse the epidemiology of head and neck cancers, and the association with lung cancer. This study included retrospectively, all patients with head and neck cancer, and lung cancer between 2002 and 2016, in a French Institution (Institut de Cancérologie de Lorraine). All data were analysed with the SAS system, with mean, and percentages. **Results:** This study included 46 patients with head and neck cancer. Most of the patients were male, and had a tobacco, and alcohol consumption. Twenty-one patients had synchronous cancers (45,6%), and 25 had metachronous cancers (54,4%). Twenty-five lung cancers were diagnosed. Most of the secondary primary lung cancers were early, and local advanced stages. The median time before death was 41.9 months (3.7-328.2), the time before recurrence of lung cancer was 10.1 months (1.8-26.2), and the time before recurrence of head and neck cancer was 18.9 months (7.1-48.3).

	Head and neck cancers	Lung cancers
Localisation Buccal Oropharynx Larynx Hypopharynx Ethmoidal Other	12 (29.1%) 18 (39.1%) 9 (19.6%) 5 (10.9%) 1 (2.2%) 1 (2.2%)	-
Histological type Squamous cell Adenocarcinoma Small cell carcinoma	45 (97.8%) 1 (2.2%) -	23 (50%) 19 (41.3%) 4 (8.7%)
TNM stage I II III IVA IVB	7 (15.6%) ç (17.8%) 5 (11.1%) 23 (49%) 2 (4.4%)	17 (36.9%) 8 (17.4%) 10 (21.7%) 11 (23.9%) -
Treatment Surgery Chemo-radiation Radiation Chemotherapy Other or palliative care Surgery followed by adjuvant treatments	9 (20%) 9 (20%) 5 (11.1%) 7 (15.6%) 1 (2.2%) 14 (31.1%)	21 (45.6%) 3 (6.5%) 3 (6.5%) 16 (34.8%) 3 (6.5%) -

Conclusion: The diagnosis of secondary primary lung cancer in patients with head and neck cancers is frequent. Clinicians have to be aware of the risk of second primary lung cancer in head and neck cancers, in order to adapt their follow-up. **Keywords:** Head and neck cancer, diagnosis, lung cancer

P08 HEALTH SERVICES RESEARCH/HEALTH ECONOMICS - FACTORS AFFECTING CLINICAL OUTCOMES

P08.01
Building Personalized Follow-Up Care Through AI by Bringing the Lung Cancer Patient, Data Scientist and Oncologist Together

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Introduction: Survival rates of lung cancer patients were rather poor until recent decades, when screening protocols, diagnostic techniques improvement and novel therapeutic options were developed. This leads to a new challenge: to increase lung cancer patients' post-treatment quality of life (QoL) and well-being. We here report on a first integration of an NLP framework for the analysis and integration of comprehensive eElectronic Health Records, genomic data, open data sources, wearable devices and QoL questionnaires, in order to determine the factors that predict poor health status and design personalized interventions that will improve the patient's QoL. **Methods:** Patients diagnosed and treated at the Medical Oncology Department at Puerta de Hierro University Hospital were included. Eligible patients were aged >18 years old, were diagnosed with non-small cell lung cancer (all stages), and had an ECOG 0-1. Artificial Intelligence (AI) and Knowledge Discovery (KD) techniques were used to integrate heterogeneous datasets, and synthesize complex relationships within these large data sets. **Results:** A total 2052 patients were included in the study. 251.730 documents from EHR were analyzed (240.851 notes and 10.879 reports) and images from patients have been included. A total of 124 patients wore the wearable device "Kronowise 3.0" (Kronohealth SL, Spain) and QoL questionnaires were also obtained from every patient. From every patient monitoring, more than 1.000.000 data records are being analyzed, and more than 130 indicators are obtained by using expert knowledge. These heterogeneous data sources are analyzed and integrated into an interactive user interface (Figure 1). This dashboard will allow clinicians to obtain immediate and personalized information of each patient and will elaborate models based on statistical relational learning and explainable AI techniques to predict patient-specific risk of developing complications and toxicities secondary to their cancer treatments. These models will help clinicians to make evidence-based treatment and post-treatment decisions in a way that it is not possible with any existing approach.

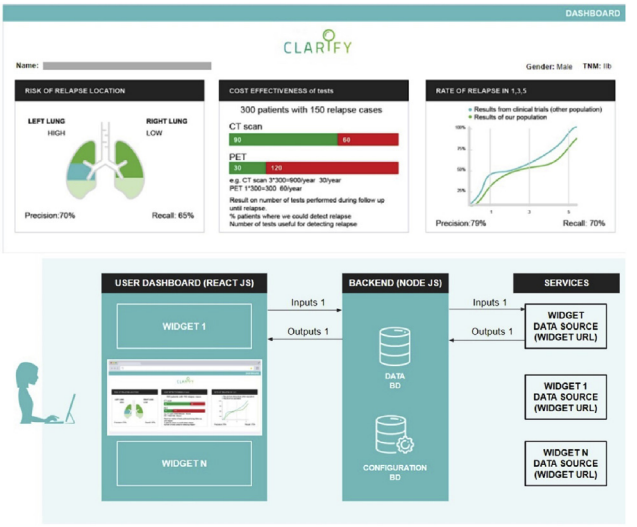

Figure 1. Project CLARIFY dashboard

Conclusion: By using AI techniques we will be able to exploit large amounts of clinical information integrated into an interactive user that

will facilitate the early discovery of risk factors that may deteriorate a lung cancer patient's condition during and after treatment. It will also allow us to examine the effect of multidisciplinary interventions in order to personalize their follow-up by better assessment of their needs and eventually improve their quality of life, wellbeing, and outcome. This work was supported by the EU H2020 program, under grant agreement Nº 875160 (Project CLARIFY). **Keywords:** Artificial Intelligence, personalized follow-up care, knowledge discovery

P08.02
Lorlatinib in First Line Treatment of Patients With ALK-Positive NSCLC: A Network Meta-Analysis

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Introduction: Lorlatinib, a third-generation tyrosine kinase inhibitor (TKI), showed a 72% reduction in risk of progression/death (HR 0.28: 95% CI, 0.19 to 0.41; $p<0.0001$) versus crizotinib in the Phase 3 CROWN study (NCT03052608). The study included previously untreated patients with anaplastic lymphoma kinase-positive (ALK+), advanced non-small-cell lung cancer. To understand the relative effects of lorlatinib compared to other treatments of interest not investigated in CROWN, we conducted a network meta-analysis (NMAs). **Methods:** We used comparator evidence, identified from a systematic literature review, to form a connected network of studies including the ALK TKIs lorlatinib (CROWN), alectinib (ALEX, ALESIA, J-ALEX), brigatinib (ALTA-1L), ceritinib (ASCEND-4, ASCEND-8), crizotinib (CROWN, ALEX, ALESIA, J-ALEX, ALTA-1L, PROFILE 1014, PROFILE 1029, eXalt3), ensartinib (eXalt3) and chemotherapy (ASCEND-4, PROFILE 1014, PROFILE 1029). The primary outcome for the analysis was progression-free survival (PFS) by independent radiologic review (IRR). Secondary outcomes (to be presented) included intracranial time to progression, objective response rate, adverse events, and overall survival. We used Bayesian, fixed and random-effects proportional hazards NMAs to derive estimates of the relative treatment effect (hazard ratios [HR]) of lorlatinib compared to the other treatments. **Results:** Fixed-effects models are presented due to the small evidence base and as these provided the best fitting models, based on DIC value. The results for PFS by IRR including all studies ranged from HR (95% credible interval) = 0.12 (0.08 to 0.19) for lorlatinib compared to chemotherapy; to 0.82 (0.36 to 1.85) for lorlatinib compared to alectinib (300 mg) [Table]. A sensitivity analysis was performed which removed studies that were solely based in Asian countries (J-ALEX, ALESIA, PROFILE1029) as this was believed to be a source of heterogeneity. The results for the analysis including only global studies ranged from 0.13 (0.08 to 0.20) for lorlatinib compared to chemotherapy; to 0.57 (0.34 to 0.95) for lorlatinib compared to brigatinib. Further sensitivity analyses using the investigator definition of PFS did not alter the conclusions of the NMA. **Conclusion:** For PFS, lorlatinib reduced the hazard of progression or death compared to all other treatments based on analyses conducted using all studies when comparing to all studies. This NMA suggest that lorlatinib is an effective first line treatment for ALK+ NSCLC patients when compared to other next-generation ALK TKIs. **Keywords:** Lorlatinib, Network meta-analysis, ALK-positive NSCLC

Treatment comparison Lorlatinib vs:	Studies	PFS HR (95% CrI)
Alectinib (600 mg)	ALEX, ALESIA*	0.61 (0.38 to 0.99)
Alectinib (300 mg)	J-ALEX*	0.82 (0.36 to 1.85)
Brigatinib	ALTA-1L	0.57 (0.34 to 0.95)
Ceritinib (750 mg)	ASCEND-4, ASCEND-8	0.22 (0.13 to 0.37)
Ceritinib (450 mg)	ASCEND-8	0.31 (0.15 to 0.66)
Ceritinib (600 mg)	ASCEND-8	0.25 (0.12 to 0.54)
Crizotinib	CROWN, ALEX, ALESIA*, J-ALEX*, ALTA-1L, ASCEND-4, ASCEND-8, PROFILE 1014, PROFILE 1029*, eXalt3	0.28 (0.19 to 0.41)
Ensartinib	eXalt3	0.55 (0.32 to 0.93)
Chemotherapy	ASCEND-4, PROFILE 1014, PROFILE 1029*	0.12 (0.08 to 0.19)

Key: CrI, credible interval; HR hazard ratio; PFS, progression-free survival
Notes: *Study in Asian population only

P08.03
Cost-Effectiveness of Pembrolizumab With or Without Chemotherapy for Stage IV Non-Squamous NSCLC with High PD-L1 in Switzerland

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Introduction: Until recently, chemotherapy was the only treatment option for metastatic non-squamous non-small cell lung cancer (NSCLC) without targetable mutations. The introduction of immunotherapies changed the prognosis for patients suffering from this disease. Pembrolizumab can be given as monotherapy or in combination with chemotherapy. So far, it was unclear, if and which of these treatment options is cost-effective for patients with a high programmed death ligand 1 (PD-L1) expression. **Methods:** We conducted a cost-effectiveness analysis for Switzerland, comparing pembrolizumab with and without chemotherapy and chemotherapy alone using a Markov model with a time horizon of 10 years. We used data from the KN-024 and KN-189 registration trials and the available follow-up data. Costs were assessed from a Swiss health care perspective and include further treatment lines as well as best-supportive care. **Results:** Pembrolizumab monotherapy in comparison to chemotherapy lead to a gain of 0.83 quality-adjusted life years (QALYs) and generates incremental costs of 56,585 CHF per year, resulting in an incremental cost-effectiveness ratio (ICER) of 68,580 CHF/QALY. Pembrolizumab in combination with chemotherapy resulted in a gain of 0.17 QALYs and generated incremental costs of 81,085 CHF as compared to pembrolizumab alone, resulting in an ICER of 475,299 CHF/QALY. **Conclusion:** While pembrolizumab monotherapy is cost-effective from a Swiss perspective, the combination therapy with pembrolizumab and chemotherapy is not. **Keywords:** cost-effectiveness, Pembrolizumab, NSCLC

P08.04
Comparative Clinical Outcomes Between EGFR Exon20ins and Wildtype NSCLC Treated with Immune Checkpoint Inhibitors

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Introduction: Mutation of the epidermal growth factor receptor (EGFR) is a major oncogenic driver in non-small cell lung cancer (NSCLC), and up to 12% of all EGFR-mutant NSCLCs harbor Exon 20 insertion mutations (Exon20ins). The insensitivity of Exon20ins to EGFR tyrosine kinase inhibitors has been well documented, but the activity of immune checkpoint