Basiccs in Lung cancer

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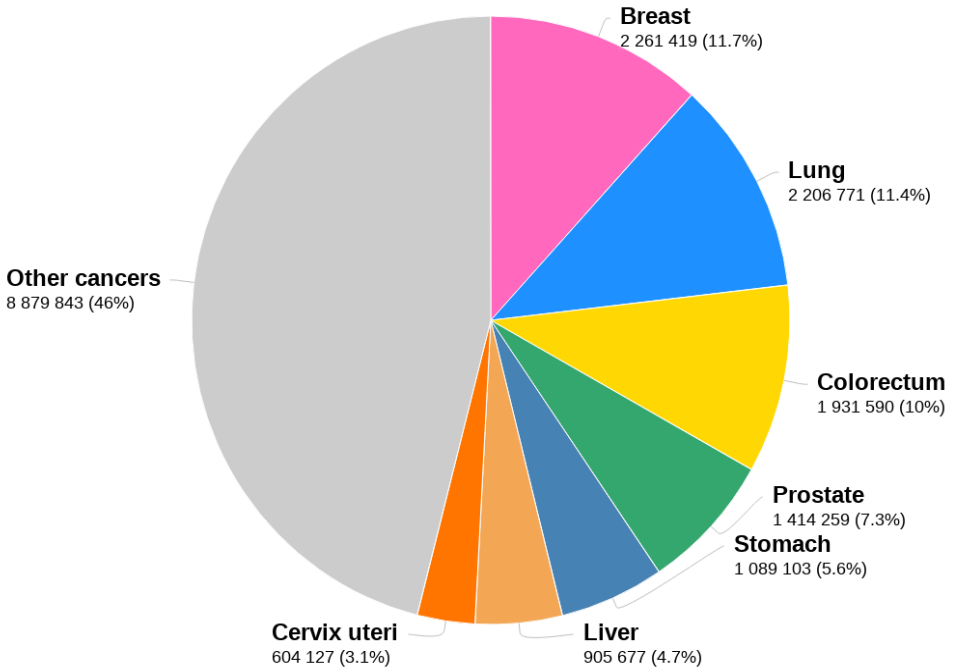
Incidence and mortality of Lung cancer worldwide

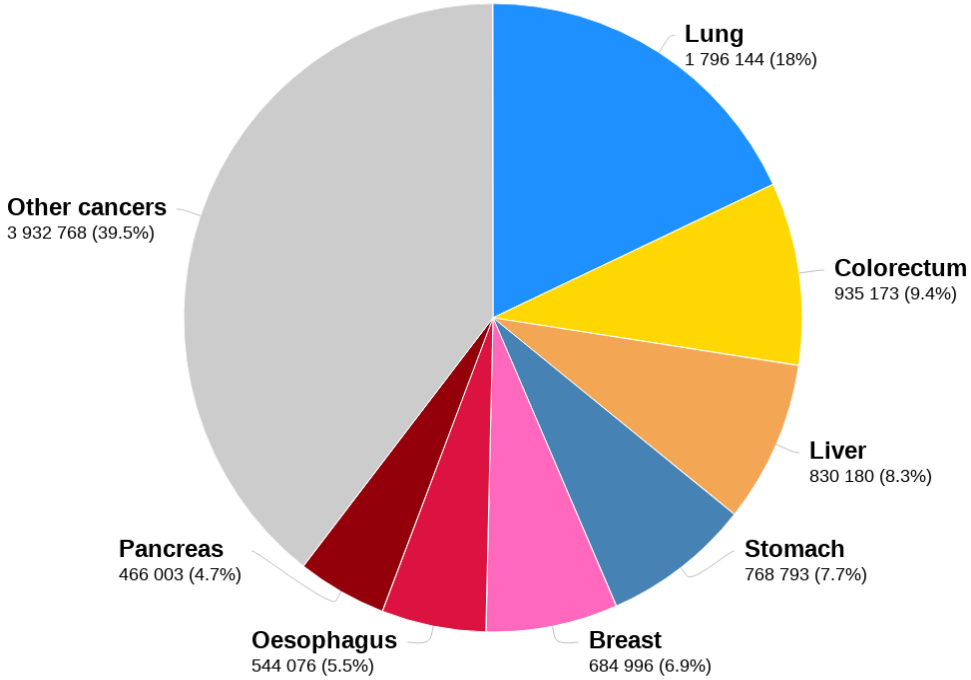
Source: GLOBOCAN 2020

Estimated number of new cases in 2020, World, both sexes, all ages



Total : 19 292 789

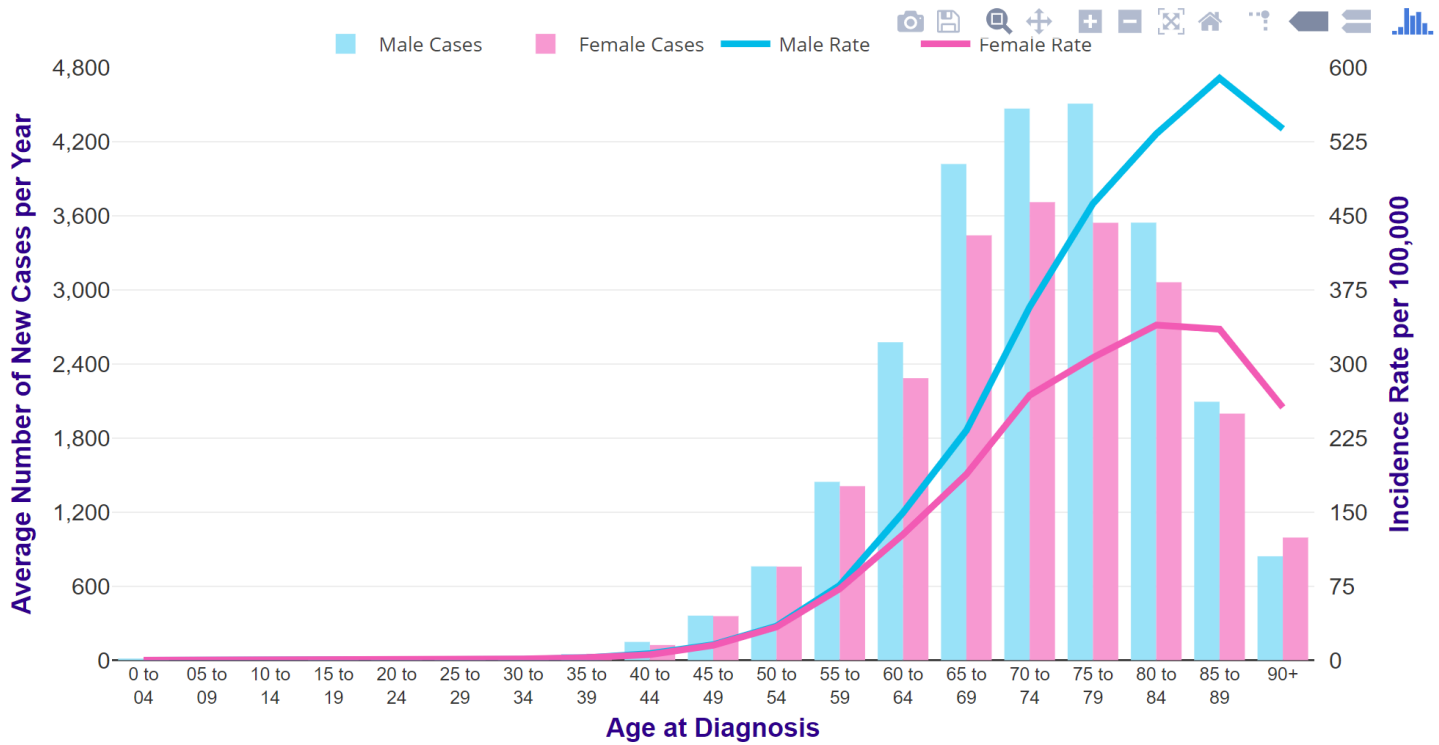
Estimated number of deaths in 2020, World, both sexes, all ages



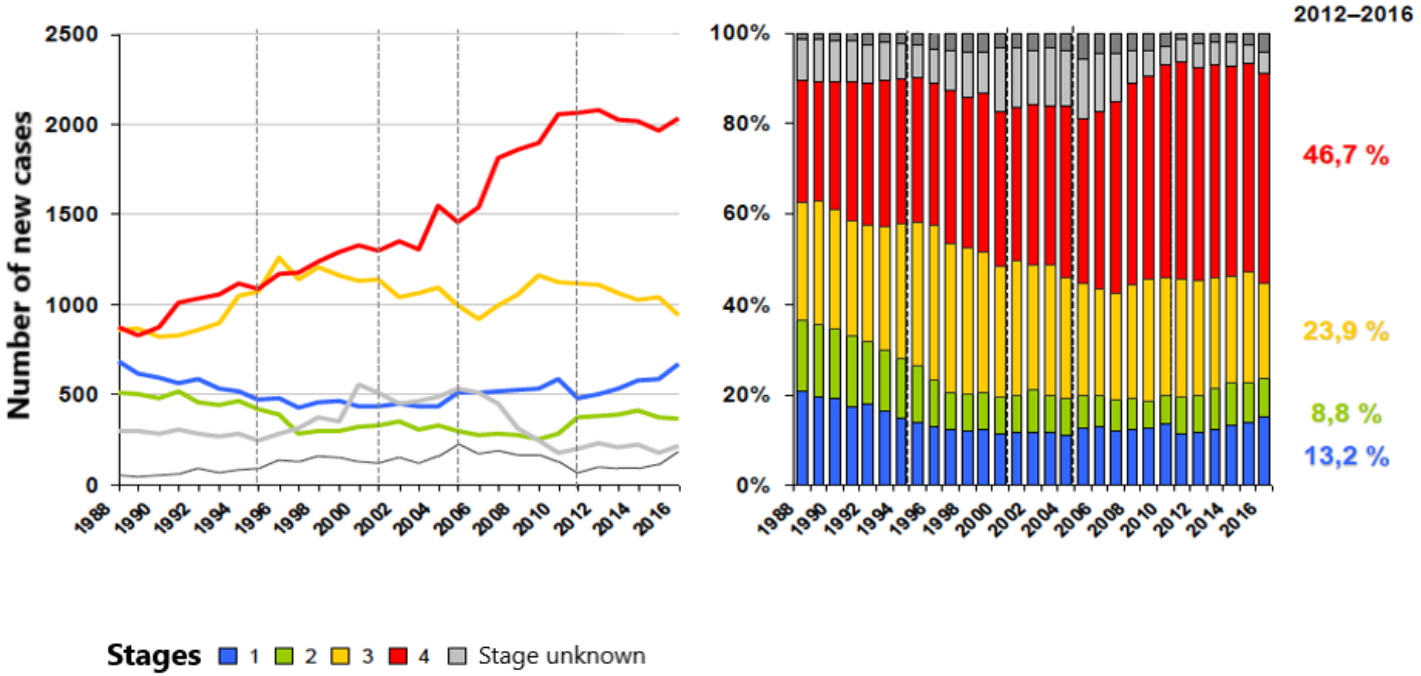
Total : 9 958 133

Age distributions 2014-2018

Lung Cancer (C33-C34), Average Number of New Cases per Year and Age-Specific Incidence Rates per 100,000 Population, UK, 2013-2015



NSCLC is still mostly diagnosed in advanced stage



Lung cancer Epidemiology

Leading cause of cancer mortality

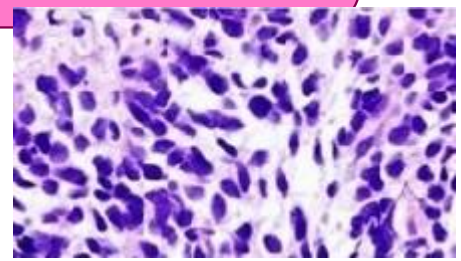
5-year survival rate in patients with LC 20%

90% of all lung cancers are caused by smoking

Histopathological types of lung cancer

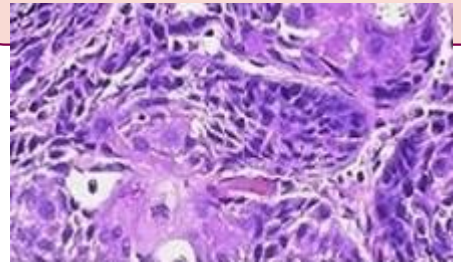
Lung cancer

Small cell lung cancer (SCLC) 15%

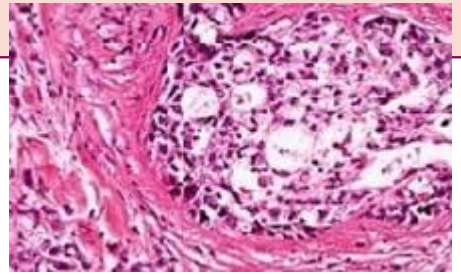


Non-small cell lung cancer (NSCLC) 85%

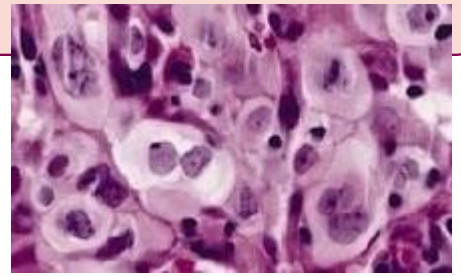
Squamous cell carcinoma 35%



Adenocarcinoma 45%



Large cell carcinoma 15%



Others 15%

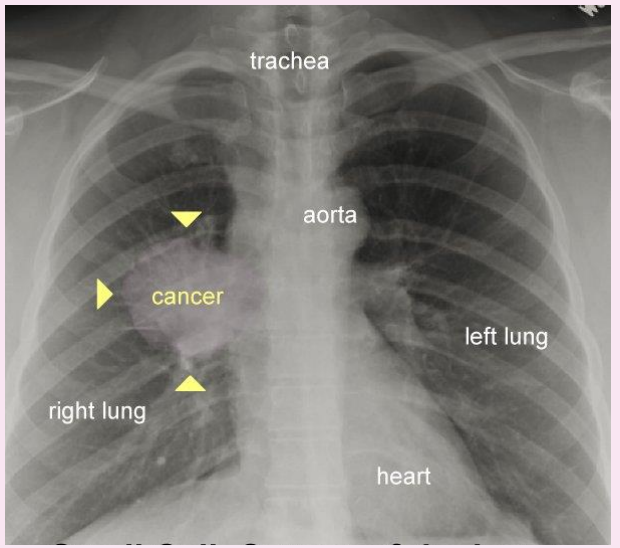
- mixed (adenosquamous)
- sarcomatoid carcinoma

How is lung cancer diagnosed?

Imaging tests

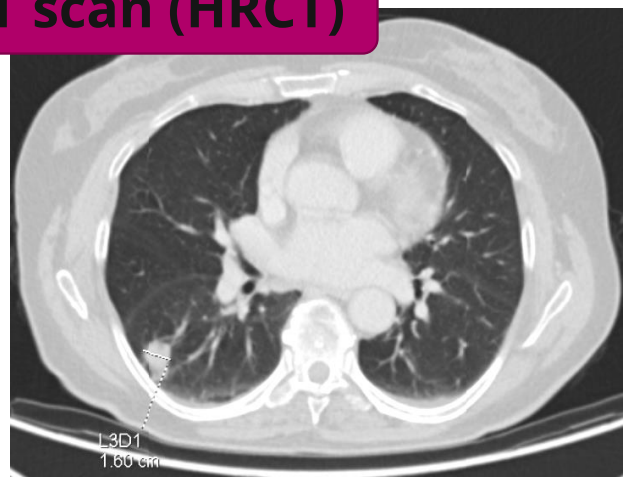
Chest X-ray

Adenocarcinoma of upper right lobe, pleural infiltration, massive pleural effusion



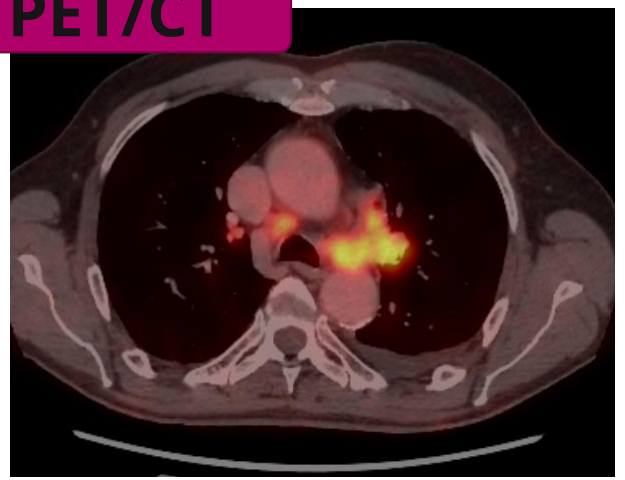
Small cell lung cancer of right lung

CT scan (HRCT)



Lung cancer of the right lung. Patient underwent surgery.

PET/CT

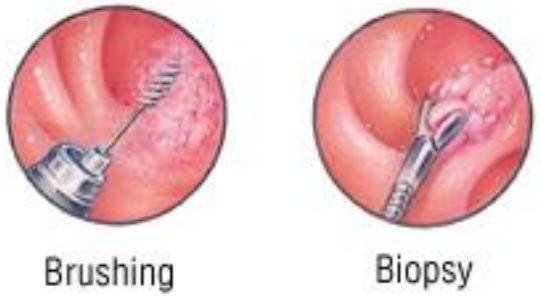


Adenocarcinoma of left hilum. Pathological mediastinal lymph nodes

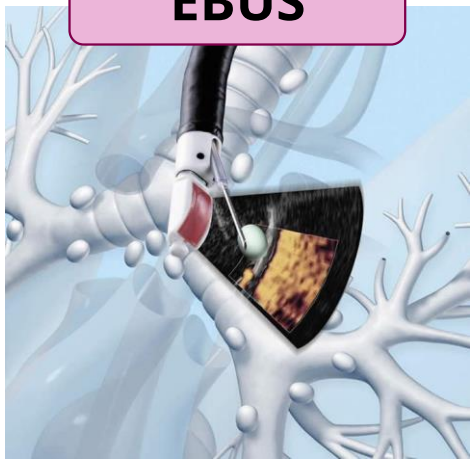
Tissue collection for histology analysis and molecular testing

- **Bronchoscopy**
  - Description of tumor macroscopic morphology
  - Biopsy from intraluminal tumours
- **Endobronchial ultrasound (EBUS)**
  - biopsy through bronchial wall under ultrasound control
- **Percutaneous biopsy under CT control**
  - fine needle biopsy
- **Surgery**
  - Endoscopic surgery
    - mediastinoscopy
    - video-assisted thoracoscopic surgery (VATS)
  - Open thoracotomy

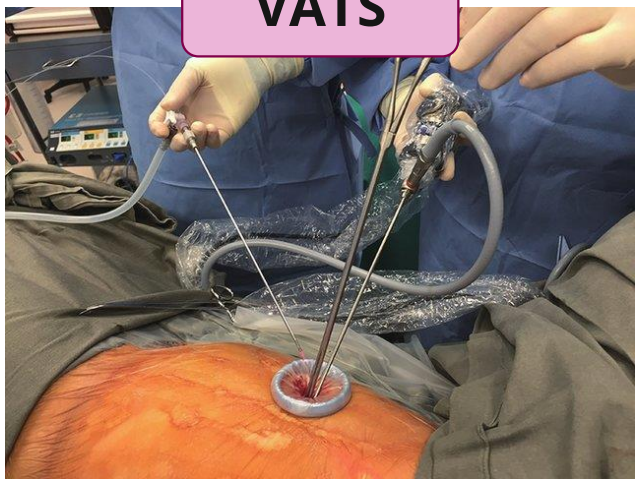
Bronchoscopy



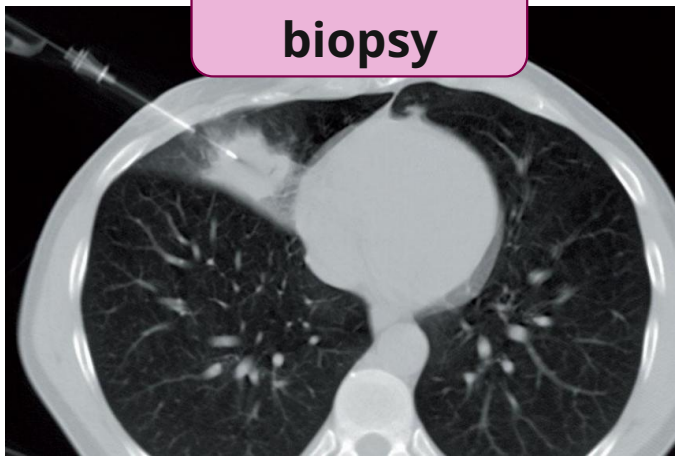
EBUS



VATS



Fine needle biopsy

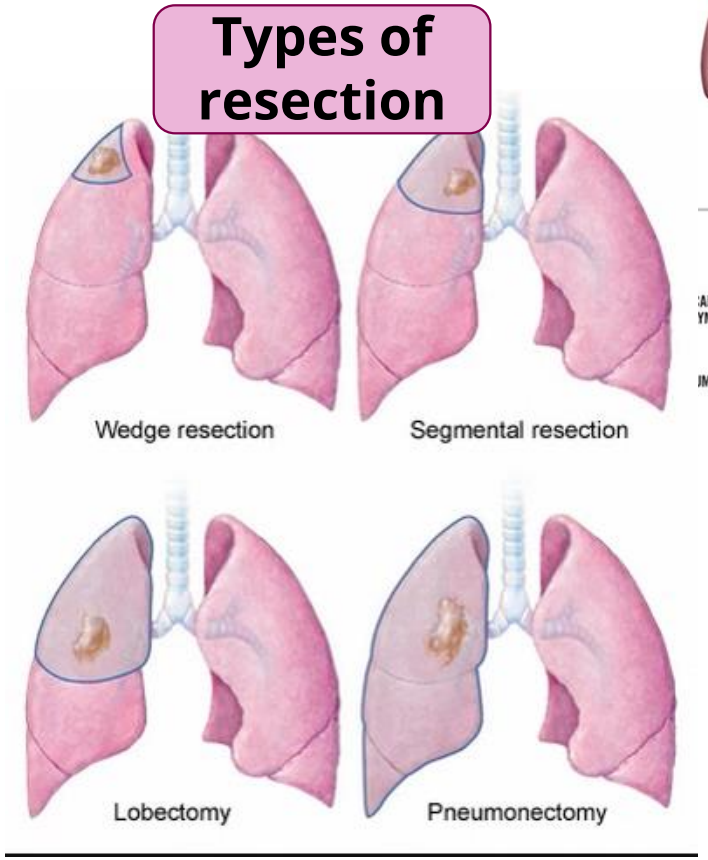


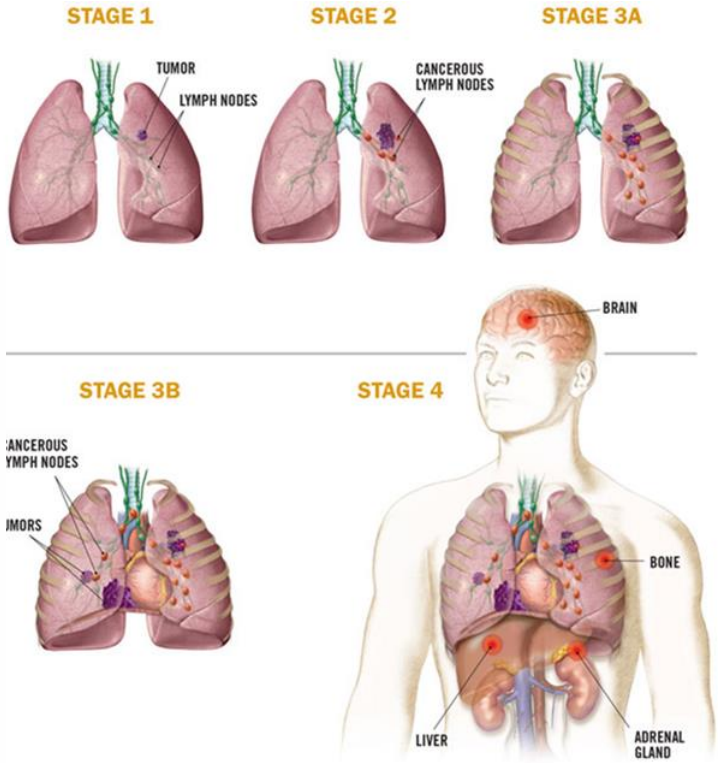
Non – small cell lung cancer (NSCLC) - treatment

Treatment according to clinical stage

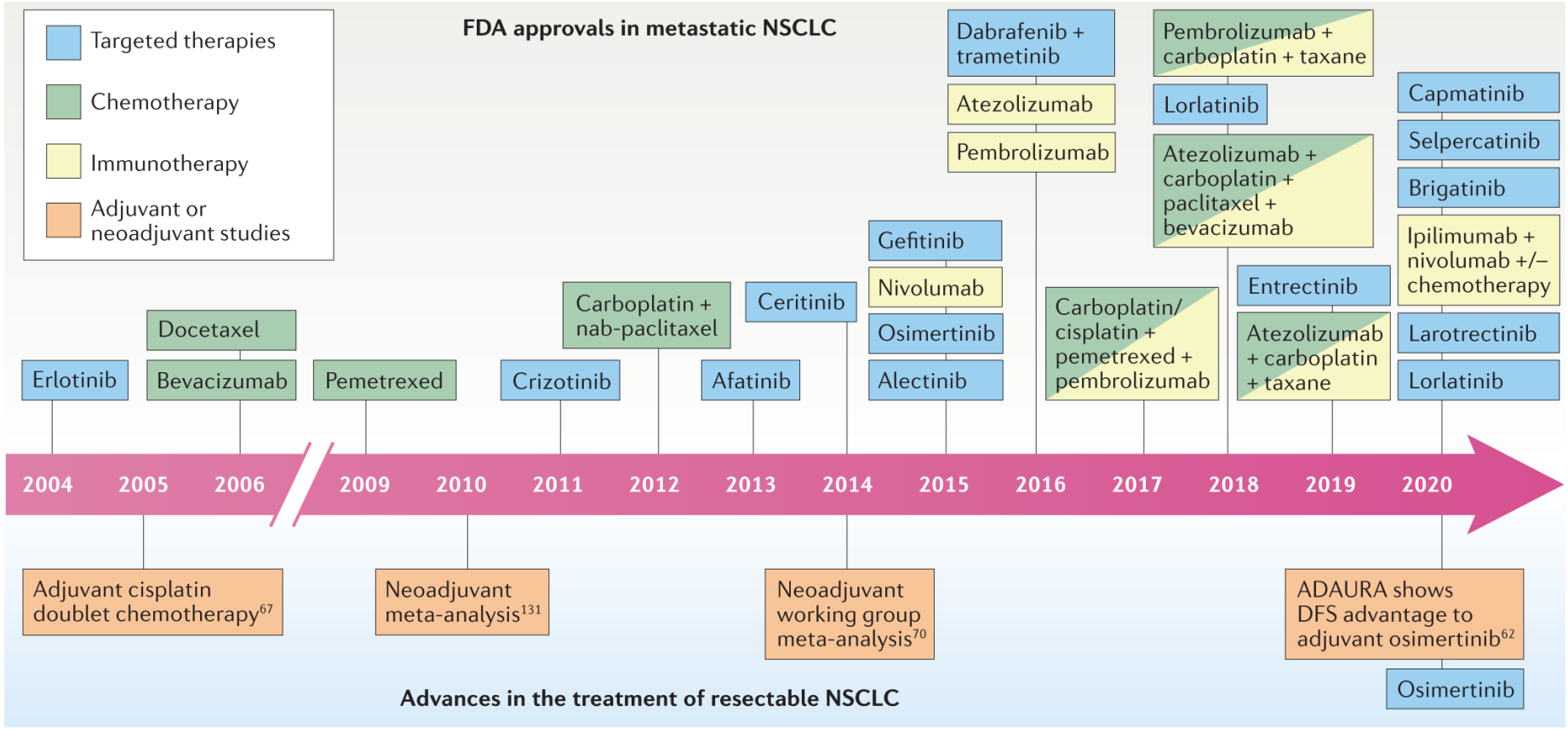
- **Stage I–IIIA:** local + systemic treatment
  - **Surgery**
    - Video-assisted thoracoscopic surgery (VATS)
    - Open thoracotomy
  - **Adjuvant chemotherapy** (from stage IB)
  - **Radiotherapy+/-chemotherapy**
    - when surgery is not indicated

- **Stage IIIB–IV** – systemic treatment
  - **Chemotherapy**
  - **Tyrosine kinase inhibitors**
  - **Immunotherapy**
  - **Radiotherapy**
    - definitive radiotherapy in IIIB stage
    - palliative radiotherapy on metastatic lesion

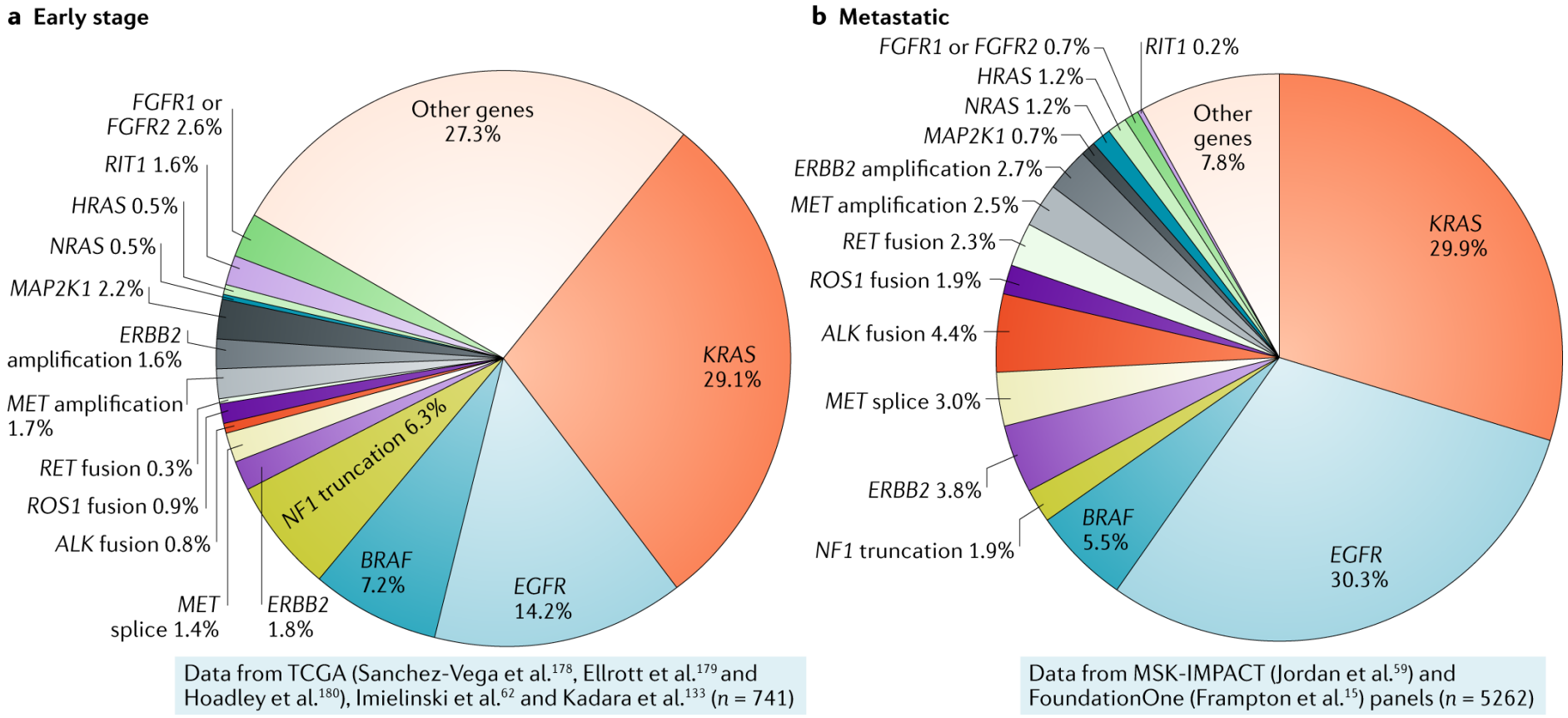




Evolution of systemic treatment of NSCLC



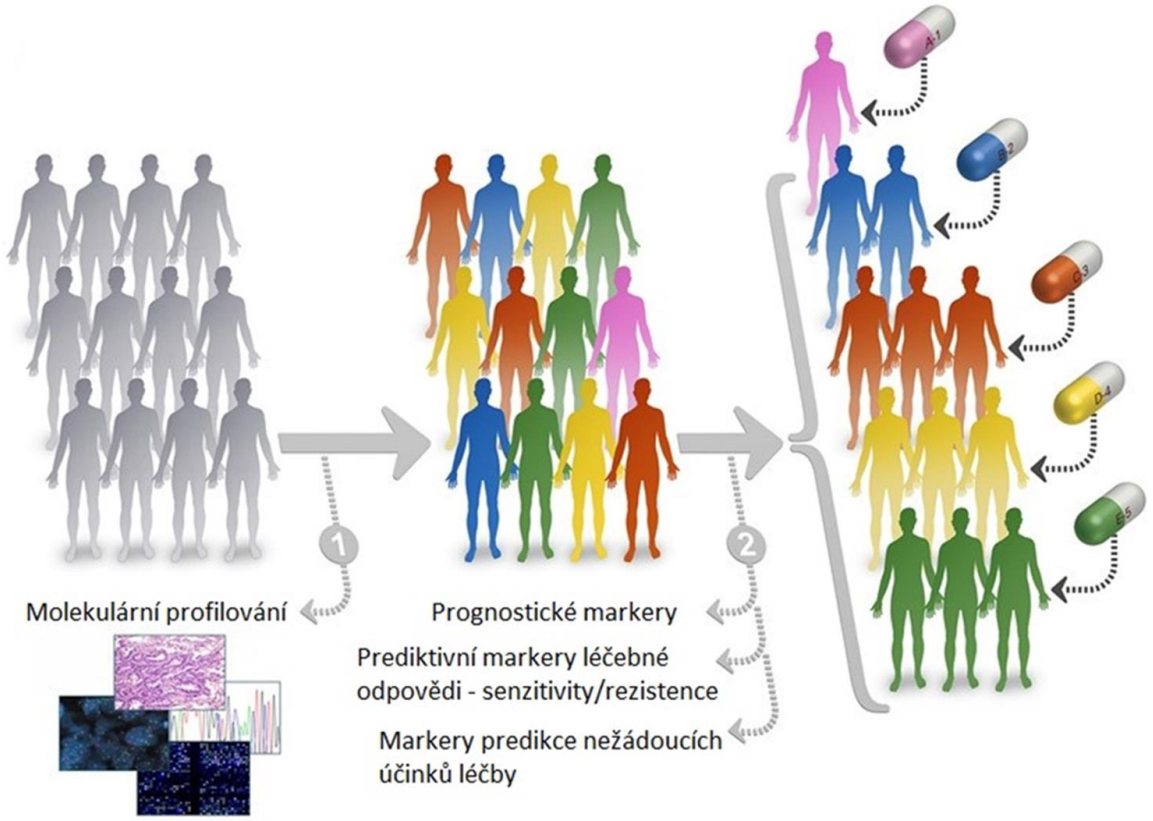
The oncogenic driver of lung adenocarcinoma



Data from TCGA (Sanchez-Vega et al.[178], Ellrott et al.[179] and Hoadley et al.[180]), Imielinski et al.[62] and Kadara et al.[133] (*n* = 741)

Data from MSK-IMPACT (Jordan et al.[59]) and FoundationOne (Frampton et al.[15]) panels (*n* = 5262)

Personalised medicine

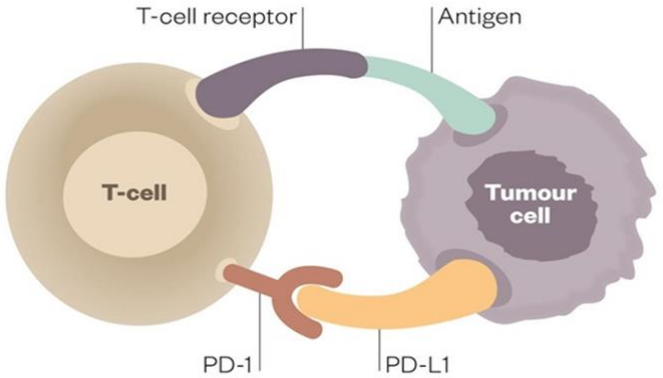


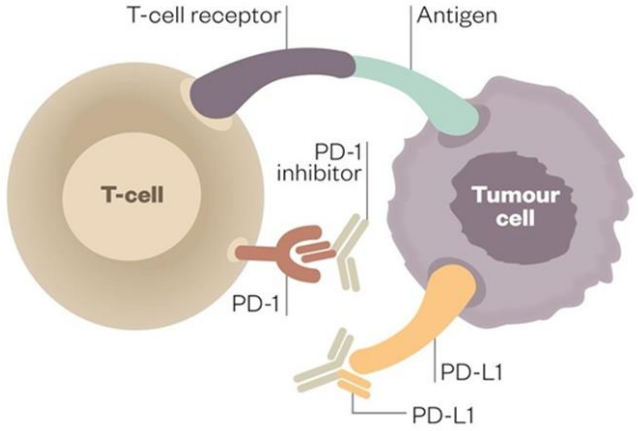
Systemic treatment - basics

- **For metastatic stage**
- **Immunotherapy** alone or in combination with chemotherapy
  - Tumors without driver mutations
  - According to PD-L1 expresion
- **Targeted therapy** in patients with driver mutations
  - EGFR, ALK, ROS1 or more according to NGS testing
- **Chemotherapy** – alone or in combinations with immunotherapy
  - Platinum-based chemotherapy (Cisplatin, carboplatin)

Immunotherapy – checkpoint inhibitors

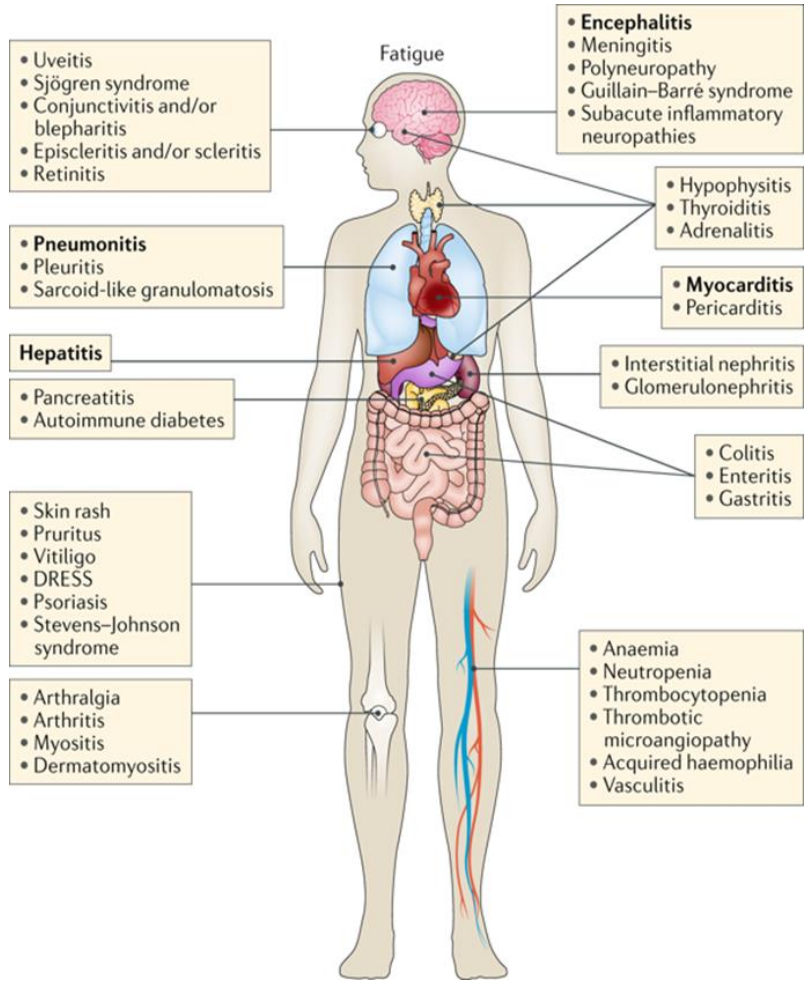
- **Immune checkpoints**
  - key regulators of the immune system
  - stimulation of checkpoints can diminish the immune response to an immunologic stimulus
- **Inhibition of PD-1/PDL-1**
  - restores T- lymphocytes antitumor immunity
- **Anti PD-1/PDL-1 antibodies**
  - anti PD-1 monoclonal antibody
    - pembrolizumab, nivolumab
      - – standard treatment in Czech republic
    - durvalumab
  - anti PDL-1 monoclonal antibody
    - atezolizumab/avelumab





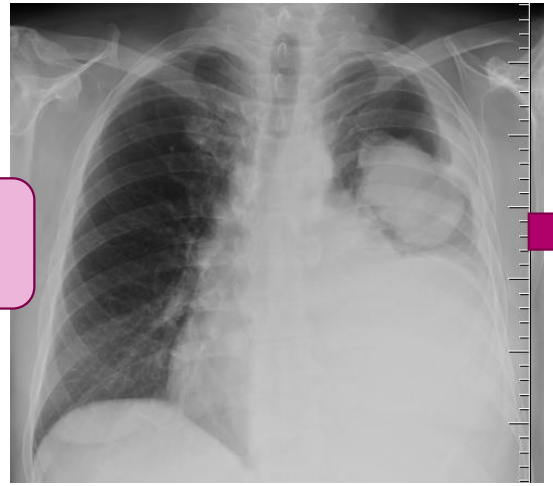
Immunotherapy – checkpoint inhibitors

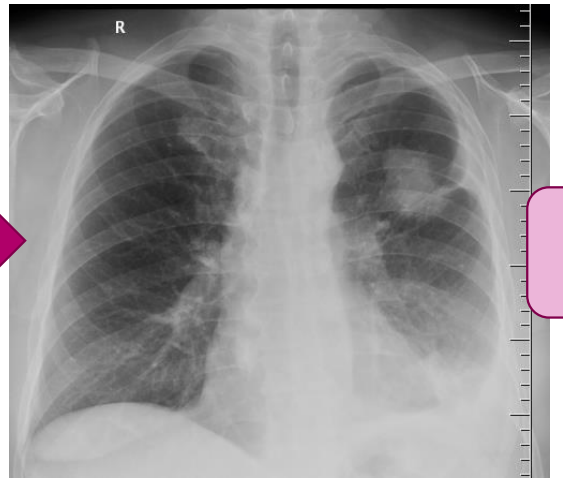
- **Benefits**
  - New unique mechanism of action
  - Great therapeutic potential
- **Pitfalls**
  - Does not work in every cancer and every patient
    - predictive biomarkers are needed
  - Immune-related adverse effects
    - similar to autoimmune diseases
    - can affect any organ



Miraculous improvement with target therapy

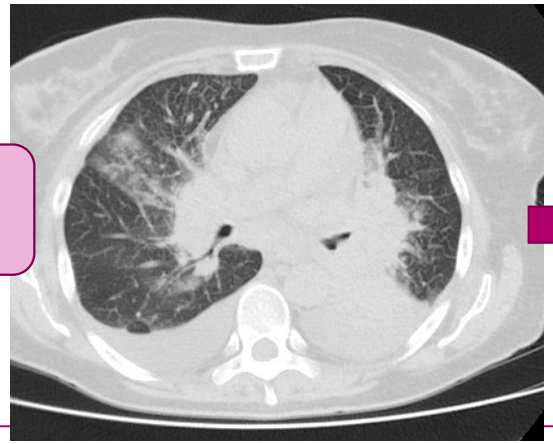
Before treatment





After 6 weeks of EGFR TKI

Before treatment



After 4 weeks of ALK TKI

Thank you for your attention!