

ANNUAL COSTS OF BEST SUPPORTIVE CARE FOR PATIENTS WITH ADVANCED NON-SMALL-CELL LUNG CANCER (NSCLC) IN GERMANY

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Objectives

Patients with advanced non-small-cell lung cancer (NSCLC) for whom antineoplastics are not suitable are usually treated individually with best supportive care (BSC). This research aims to estimate annual costs of BSC for these patients from the perspective of the Statutory Health Insurance (SHI) in Germany.

Methods

Quantification of treatment costs

Recommended measures for BSC were identified from the German development stage 3 (S3) guideline for lung cancer (1). The costs of these measures were estimated based on publicly available official data in Germany.

As costs of BSC may vary considerably by patient the maximum possible costs were estimated. Costs for outpatient drug therapy were calculated standardized for a one-year time horizon on the basis of the costs per defined daily dose (DDD) (2). Inpatient costs were taken into account to display the upper cost limit of radiotherapy and interventional procedures. The costs of other recommended measures were estimated as described in Table 2.

Results

The identified recommended measures are displayed in Table 1. The annual costs of these measures are as follows (Table 2):

- drug therapy from €116.80 to €2,023.88
- radiotherapy €2,390.00 and €5,888.51, respectively (depending on regime)
- interventional procedures €5,447.63
- rehabilitation €3,660.20
- three further measures (psychotherapy, physical therapy, therapy with oxygen) from €756.60 to €2,194.25

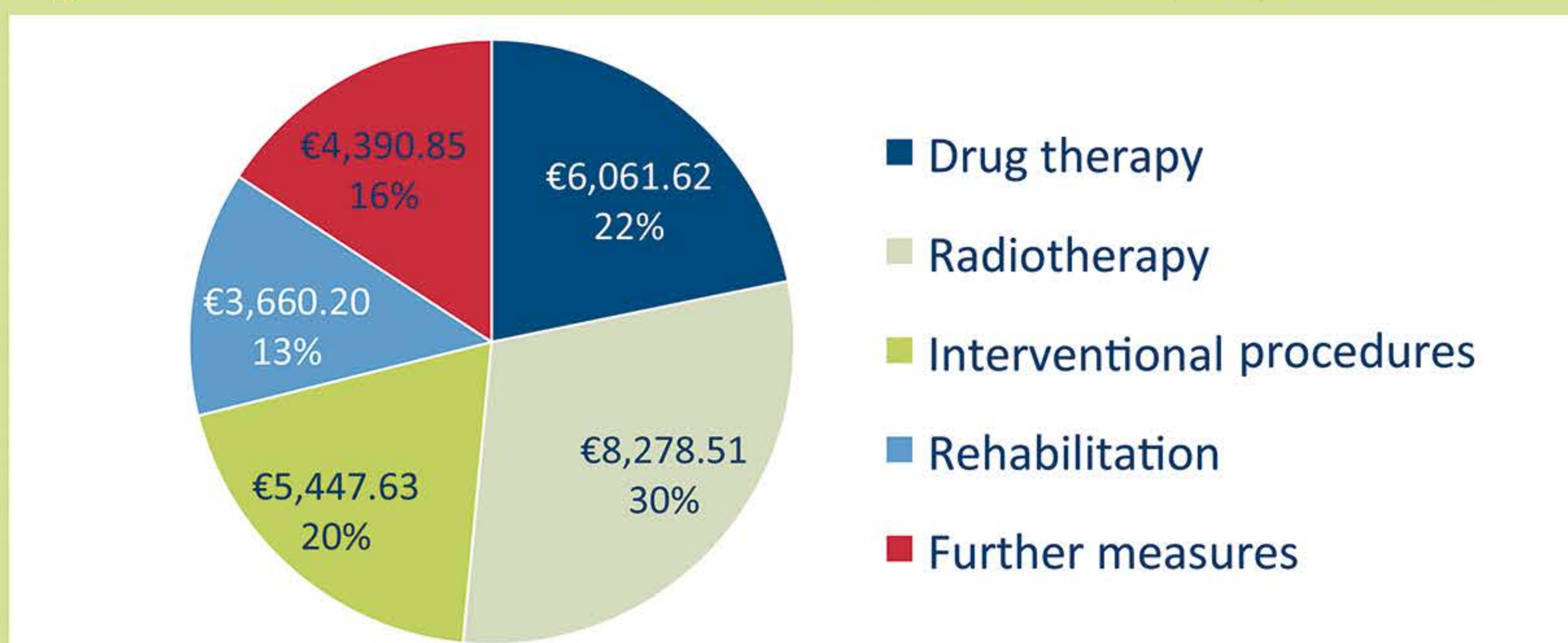
Summing up the costs of these measures, costs for radiotherapy are highest (Figure 1) and the upper limit of annual costs is €27,838.81. These costs do not include costs for inpatient palliative care or treatment in the terminal phase (approx. €400 per day) (3).

Conclusions

As BSC is provided individually to patients, the annual costs of BSC in Germany for patients with advanced NSCLC lay within a wide range from €0 (less likely) to €27,838.81. These costs are comparable to the annual costs for BSC in Germany of €27,864 estimated by Schmidt et al., 2014 (4).

In order to estimate the costs of BSC more precisely, further research regarding the frequency of each recommended measure for BSC in Germany is needed.

Figure 1: Distribution of maximum annual costs of BSC per patient



Acknowledgements

The authors thank Bristol-Myers Squibb GmbH & Co. KGaA, Germany for funding the study.

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Table 1: Recommended measures for BSC based on German S3 guideline for lung cancer

| Measure | Symptom/Complication |
|--|--|
| Drug therapy | |
| Non-opioid analgesics | Pain |
| Opioids | Dyspnea, pain |
| Corticosteroids | Dyspnea, symptomatic brain metastases and spinal cord compression, nausea and vomiting, loss of appetite |
| Bronchodilators | Dyspnea |
| Benzodiazepines | Anxiety and panic attacks, dyspnea |
| Antidepressants | Depression, anxiety, pain |
| Laxatives | Obstipation (especially within opioid treatment) |
| Bisphosphonates or denosumab | Bone metastases, hypercalcemia |
| Levodropropizine or dihydrocodeine | Cough |
| Metoclopramide | Nausea and vomiting |
| Anticonvulsants | Seizure as a result of brain metastases |
| Radiotherapy | |
| Palliative radiotherapy | Tracheobronchial tumor obstruction, bone metastases, brain metastases, spinal cord compression |
| Radionuclide therapy | Multiple painful bone metastases |
| Interventional Procedures | |
| Palliative surgery | Pulmonary abscess, exulceration, pleurodesis, creation of pericardial window, spinal cord decompression, stabilising spinal cord operation, tumor endoprothetics, stabilization of tubular bones, PEG-tube, pleural long-term catheter |
| Rehabilitation | |
| Rehabilitation | after chemotherapy and operation, with extensive functional deficits |
| Further measures | |
| Psychotherapy/ psycho-oncological care | Psychological stress, depression, anxiety, dyspnea, coping |
| Physical therapy | Dyspnea, restricted quality of life |
| Oxygen therapy | Dyspnea with proof of hypoxemia |

Based on S3 guideline (1)

Table 2: Costs for recommended BSC measures

| Measure | Costs per DDD/ day/session/ measure | Costs per year/ total costs | Comment | Source |
|--|-------------------------------------|-----------------------------|---|--------|
| Drug therapy (outpatient costs) | | | | |
| Non-opioid analgesics | 1.38 € | 503.70 € | | (2) |
| Opioids | 5.54 € | 2,023.88 € | By numbers of prescription weighted DDD-costs for morphine, buprenorphine, fentanyl, oxycodone and hydromorphone | |
| Corticosteroids | 0.44 € | 160.60 € | Costs for dexamethasone | |
| Bronchodilators | 1.77 € | 646.05 € | Costs for anticholinergics | |
| Benzodiazepines | 0.63 € | 229.95 € | Costs for tranquilizers | |
| Antidepressants | 0.32 € | 116.80 € | Costs for selective serotonin-reuptake-inhibitors, the most common antidepressants | |
| Laxatives | 0.76 € | 277.40 € | | |
| Bisphosphonates or denosumab | 1.51 € | 550.12 € | By numbers of prescription weighted DDD-costs for bisphosphonates and denosumab | |
| Levodropropizine or dihydrocodeine | 2.62 € | 954.52 € | By numbers of prescription weighted DDD-costs for levodropropizine and dihydrocodeine | |
| Metoclopramide | 0.88 € | 321.20 € | | |
| Anticonvulsants | 0.76 € | 277.40 € | Costs of valproic acid | |
| Radiotherapy | | | | |
| Palliative radiotherapy | 5,888.51 € | 5,888.51 € | By number of cases weighted costs for E03Z, E08B and E08C | (5) |
| Radionuclide therapy | 2,390.00 € | 2,390.00 € | Costs for an inpatient radionuclide therapy (E03Z) | |
| Interventional procedures | | | | |
| Palliative surgery | 5,447.63 € | 5,447.63 € | By number of cases weighted costs for E05A, E05B, E71A, E71B, E73A and E73B | (5) |
| Rehabilitation | | | | |
| Rehabilitation | 126.21 € | 3,660.20 € | Average costs for inpatient rehabilitation (nonspecific indication) | (6) |
| Further measures | | | | |
| Psychotherapy/ psycho-oncological care | 87.77 € | 2,194.25 € | Calculated for depth-psychology oriented psychotherapy (short term therapy, individual treatment) (EBM code 35200) and the maximum amount of 25 sessions | (7) |
| Physiotherapy | 63.05 € | 756.60 € | Calculated for the maximum number of 12 treatments (massage, respiratory exercises and inhalation; position code X0106, 20702 und X1801) | (8) |
| Oxygen therapy | 1,440.00 € | 1,440.00 € | 12 monthly care lump sums (Technique: 14.00.24.0507 and oxygen: 14.00.99.1987) according to healthcare aids agreement for oxygen therapy (Hilfsmittelvereinbarung zur Sauerstofftherapie) | (9) |
| Sum | | 27,838.81 € | | |

DDD = Defined daily dose; EBM = Doctor's fee scale (Einheitlicher Bewertungsmaßstab)