



RESEARCH ARTICLE

The Quest for Affordable Monoclonal Antibodies and Targeted Therapy in Lung Cancer

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ABSTRACT

Costs of anticancer drugs are generally and rightly labeled expensive. Many nations across the globe have limited resources and could hardly afford the basic necessary medications. The United States (US) government in 2022 allocated 17.3% of the gross domestic product (GDP) on health care. A \$28,176.6 trillion dollars was spent in 2024 on health care, with a significant portion covering drug costs. Insulin price was reduced to \$35 with plans to limit other medications costs.

Main Text:

Drug value ^(1,2) is simply defined as its worth in monetary fund. Pharma determines the prices of newly discovered drugs at or around confirmation of positive outcomes. Admittedly, drug prices are variable and negotiable. Few medical journals tackle such a sensitive subject. Pembrolizumab (Pembro) was the 1st- immune checkpoint inhibitor (ICI) approved in advanced/metastatic non-small cell lung cancer (a/d-NSCLC) ⁽³⁻⁵⁾. The annual US price was set at US \$190,400. Outcomes are dependent on a minimal 50% program death receptor-1 (PD-1) with no epidermal growth factor receptor (EGFR) or anaplastic lymphoma kinase (ALK) genomic alterations. Other ICIs soon followed including Nivolumab, Atezolizumab, Durvalumab and Cemiplimab. Prices were intentionally set close for competitive reasons. Drug costs was dependent on the number of purchases and duration of treatment ⁽⁶⁾.

The median annual cost of 5-MABs was \$163,640. In a/d-NSCLC, the 2-year \$327,280 cost was justified. However, the 3rd-year \$490,920 cost was excessive and unnecessary due to lack of further improvement in overall survival (3-5,6). For cost comparison, the incidence of lung cancer and Alzheimer disease increases with age. The estimated annual cost of MAB in Alzheimer treatment is \$30,000. The lung cancer incidence was 226,035 cases in 2022, presumably higher than Alzheimer . The median

annual cost of 5-targeted therapy (TT) was \$204,000. Osimertinib is the 1st and prototype of the class. It binds to the EGFR receptors and is widely used as neo-adjuvant, adjuvant and in a/d-NSCLC ^(7,8). At present, treatment of 1,000 patients in the US or Europe by all TT for 5 years would be unaffordable at \$1,020,000,000. Sadly, previous attempts to tackle the problem of prolonged TT costs have failed. The financial burden of prolonged TT administration was clearly identified ^(9,10).

Application of caps to limit costs has received poor reception ^(11,12). Access to financial assistance programs and their impact on the overall spending on oral anticancer medications has been recently described ⁽¹³⁾. The Canadian health system demonstrated the rapid rising costs of cancer medicines ⁽¹⁴⁾. Affordable cancer drugs are worthy goals to pursue and attain in addition to safe and effective drugs ⁽¹⁵⁾. The high costs of 3-year MAB and the prolonged TT with no limit on duration in a/d-NSCLC prompted a novel proposal ⁽¹⁶⁾ of reducing the financial toxicity of prolonged therapy in a/d-NSCLC. The 1st 3 years of TT use would be fully paid at the regular annual price of \$204,000 to compensate pharma for their large and successful investment. Starting the 4th year and throughout treatment, a 50% reduction could be applied at a net \$114,800 price, resulting in a saving of another \$114,800 year.

Table

Costs	1 st to 3 rd year	4 th year	4,5,6 years	4-10 years
Current Annual Costs	\$204,000	\$204,000	\$812,000	\$1,428,000
Proposed 50% cost reduction starting the 4 th year	\$204,000	\$102,000	\$406,000	\$714,000

The proposed approach does not need any clinical study for approval. All it needs is one pharma takes the initiative cutting its drug cost and others will follow. Cost matters ⁽¹⁷⁾ and clinical investigators need to think twice before using combinations of 2-3 traded name drugs. The correlation between the number of purchases with costs

should include not only lung cancer but also all other malignancies, diseases, down to the price of milk and bread. Wise stewardship calls on pharma, oncologists, patients and governments to consider drug costs and duration of treatment.

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