



RESEARCH ARTICLE

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## The Financial Burden of Breast Cancer Treatment; Drug Cost Reduction Proposal

Helmy M Guirgis\*

University of California, Irvine, California, USA.

### ABSTRACT

Drug cost is a touchy subject, rarely addressed in medical journals. Breast cancer treatment is lengthy, tedious and expensive. Costs of anti-cancer drug are relatively higher in the United States (US) than Europe. The present US government plans to reduce drug costs.

**Our Aims:** 1- Test drug cost reduction in US over 12.5% - 75% range 2- Choose 37.5% cost reduction as appropriate measure for patients, consumers, pharma and government.

**Results:** Generic chemo \$1,500, trastuzumab for HER2-positive cancer, depending on usage and cancer type; the total \$86,955 cost was reduced to \$32,608 with %37.5 reduction. Pertuzumab reduced from \$99,000 to \$37,125, trastuzumab deruxtecan (T-DXd) \$159,600 to \$59,850. It was estimated that if 300,000 US females develop breast cancer at \$100,000 drug cost, the total treatment would currently climb to \$30,000,000,000 (30 billion), reduced to \$15 billion at 50% cost reduction and \$11,250 billion at 37.5%. A 50%-75% reduction was considered too harmful for pharma to bear and 25% too little and too late.

**Conclusion:** In US the proposed drug cost reduction by 37.5% would secure patients affordability, ensure pharma continued innovations and reduce costs down to European levels.

### ARTICLE HISTORY

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### KEYWORDS

Breast cancer, Drugs, Cancer.

### Abbreviations

ADC: Antibody drug conjugate, a/m-NSCLC: advanced/metastatic non-small-cell lung cancer, ICI: Immune check point inhibitors, US: United States.

### Introduction

Lung cancer is the leading cause of cancer death for both men and women. Drug costs on lung cancer treatment have been previously reported [1,2]. Breast cancer remains the most common cancer among women in the world. In the United States (US) an estimated 316,950 women will be diagnosed with invasive breast cancer and 59,080 with ductal carcinoma in situ (DCIS) in 2025. In general, the average risk of a woman developing breast cancer in her lifetime is about 13% or 1 in 8. High drug costs represent a serious threat to successful treatment outcome. The uninsured and low-to middle income patients are more prone to high deleterious cost consequences.

### Our Aim

Test a range between 12.5% - 75% drug cost reduction in the US 2- Decide on 37.5% as appropriate middle-road to patients, pharma and government.

All the drugs analyzed have been approved in the US, Canada, Great Britain and the European nations.

### Results

Using the US current drug costs system, it was estimated that if 300,000 US females develop breast cancer at \$100,000 drug cost, the total treatment bill would currently climb to \$30,000,000,000 (30 billion) and reduced to \$15 at 50% cost reduction and \$11,250 billion at 37.5%.

The table outlined the costs of generic chemo and commonly used drugs and combinations for breast treatment.

In comparison the median of 5 immune check point inhibitors (ICI) in advanced/metastatic non-small cell lung cancer was 164. The median of 5 targeted therapy was \$211,000.

T-DXd\*, or trastuzumab deruxtecan, is an antibody-drug conjugate (ADC) targeting the HER2 protein, directly delivering a chemotherapy drug. It is approved in metastatic breast, gastric, colorectal and non-small cell lung cancers.

### Discussion

Anti-cancer drugs are generally and rightly so, considered expensive in the US. Cost matters, counts [3] and could sabotage the number of purchasers and purchases. To be fair to the pharmaceutical companies, it takes years, patience and above all strong finance backing for a pre-conceptual

**Contact:** Helmy M Guirgis, University of California, Irvine, California, USA.

## Drug Treatment and Costs

Drugs	Indications	Annual cost	75% Cost Reduction	50% Reduction	25% Reduction	12.5% Reduction
Generic chemo	Commonly used	\$1,000 -2,000	none	none	none	
Trastuzumab	HER2 +ve, as adjuvant and in metastatic breast	<i>Depending on usage and indications</i> \$86,950	\$65,213	\$43,475	\$217,375	\$108,688
Pertuzumab	Initial 840 mg dose, 420 mg thereafter	\$99,000	\$74,250	\$49,500	\$24,750	\$12,375
Trastuzumab + Pertuzumab	Combo	\$185,950	\$139,463	\$92,975	\$46,488	\$23,244
T-DXd	5 mg/kg q 3 weeks	\$159,600	\$119,700	\$79,800	\$39,900	\$19,950
T-DXd + Pertuzumab	5 mg/kg q 3 weeks + Pertuzumab	\$258,600	\$193,950	\$129,300	\$64,650	\$32,325
Tucatinib 300mg bid	300mg po bid	\$222,000	\$165,500	\$111,000	\$55,500	\$27,750
Pertuzumab + Tucatinib	Pertuzumab +Tucatinib	\$321,000	\$240,750	\$160,500	\$80,250	\$40,125

creation of a new drug, with no guarantee for success. Artificial Intelligence and 3-D photography will ultimately speed up drug synthesis and lower synthesis costs.

Value and cost effectiveness [4,5] are determined upon drug approval and have been thoroughly examined prior to marketing. Cost is seldom discussed separately. The bispecific ivonescimab was the only drug with cost not assigned by the company but separately evaluated [6-8].

Generic drugs are generally cheap. Approved drugs are expensive, and a combination of 2 approved drugs is much more costly than one single agent. T-DXd + Pertuzumab is the added high cost of both. So is the cost of Pertuzumab + Tucatinib. Drug costs are also proportional to the number of purchases [9]. In general, anti-cancer drugs are expensive necessitating cap application [10]. The growing and burdensome financial toxicity of anticancer drugs are being felt throughout the world [11,12]. Costs of the overall total cancer care keep multiplying [13]. Admittedly, drug costs are not fixed but largely negotiable [14] depending on the amount purchased and the buyer.

In view of the relatively higher costs of brand name-drugs in the US more than in Europe, a 50% cost reduction was preferred and proposed over 25% or 75%. A 25% was considered too little and too late and 75% cost reduction was too high for pharma to bear. Certain allowances might be considered for Veteran Administration hospitals, and patients with limited income.

It is the aim of every patient and oncologist to prolong the quality and quantity of life and if possible, achieve cure. Affordable, effective and safe breast cancer treatment is certainly worth the cost. Cure, regardless of cost should always be the goal.

In summary, over 25%-75% range, a 37.5% drug cost reduction was considered a reasonable goal for consumers. Pharma would also benefit from the anticipated wider utilization.

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