

Pharmacoeconomics and Cancer: Medical Issue of Economists or Governments?

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Keywords: Pharmacoeconomics; Cancer; Economists; Cost-effectiveness.

Editorial Note

Pharmacoeconomics is a field of study that evaluates the cost and value of healthcare interventions, particularly pharmaceuticals. It involves the use of economic principles and techniques to assess the clinical and economic outcomes of drug therapy, including the costs and benefits of different treatment options.

The main goal of pharmacoeconomics is to provide decision-makers with the information they need to make informed choices about healthcare interventions, such as whether to approve a new drug for use in a healthcare system or which treatment options to include in a formulary.

Pharmacoeconomic analyses can be conducted from various perspectives, including those of patients, healthcare providers, payers (such as insurance companies or governments), and society as a whole. They can also take into account various factors such as efficacy, safety, quality of life, and productivity. Overall, pharmacoeconomics plays an important role in optimizing the use of healthcare resources and improving patient outcomes while controlling costs. Pharmacoeconomics is a multidisciplinary field that involves input from various stakeholders, including doctors, economists, policymakers, patients, and healthcare payers [1,2].

Doctors, economists, or politicians?

Doctors play a crucial role in pharmacoeconomics by prescribing medications and making treatment decisions

that affect patient outcomes and costs. They also provide important clinical data that is used in pharmacoeconomic evaluations.

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Received Date: 05-02-2023

Accepted Date: 05-11-2023

Published Date: 05-20-2023

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Economists play a significant role in pharmacoeconomics by applying economic principles and analytical tools to assess the costs and benefits of healthcare interventions. They help to evaluate the efficiency and effectiveness of drug therapy and identify the most cost-effective treatment options.

The government also plays an important role in pharmacoeconomics by regulating the pharmaceutical industry, funding healthcare programs, and making decisions about drug reimbursement and formulary management. Government agencies may conduct pharmacoeconomic evaluations to determine whether a new drug should be approved for use in a healthcare system or whether it should be covered by public insurance.

Overall, pharmacoeconomics is a collaborative effort that involves input from multiple stakeholders to ensure that healthcare resources are used efficiently and that patients receive the best possible care.

The relationship between pharmacoeconomics and oncology is very important, as cancer treatment is often associated with high costs and complex decision-making [3,4].

Pharmacoeconomics and cost-effectiveness

Pharmacoeconomics plays a crucial role in evaluating the cost-effectiveness of oncology treatments and helping to determine which therapies provide the best value for patients and healthcare payers. With the high cost of many oncology treatments, pharmacoeconomic evaluations can help to ensure that patients receive the best possible

care while controlling costs and maximizing healthcare resources.

In oncology, pharmacoeconomic evaluations can help to assess the cost-effectiveness of different treatment options, such as chemotherapy, radiation therapy, targeted therapies, and immunotherapies. They can also help to evaluate the cost-effectiveness of supportive care interventions, such as pain management, symptom control, and palliative care.

Pharmacoeconomic evaluations in oncology take into account not only the cost of treatment but also the benefits, such as improvements in quality of life, disease control, and survival. By providing a comprehensive assessment of the costs and benefits of different treatment options, pharmacoeconomics can help oncologists and patients make informed decisions about cancer treatment [5].

Financial toxicity

Financial toxicity is a term used to describe the financial burden and stress experienced by patients and their families as a result of cancer treatment. It can be caused by the high cost of cancer medications, as well as the indirect costs associated with treatment, such as lost income and transportation expenses.

Pharmacoeconomic evaluations in oncology can help to mitigate financial toxicity by identifying the most cost-effective treatments that provide the best value for patients and healthcare payers. By considering the cost-effectiveness of different treatment options, pharmacoeconomics can help to reduce the financial burden of cancer care while

ensuring that patients receive the best possible treatment.

Additionally, pharmacoeconomic evaluations can help to inform reimbursement decisions and formulary management policies, which can have a significant impact on the cost of cancer treatment for patients. By taking into account the financial impact of different reimbursement and formulary decisions, pharmacoeconomics can help to reduce financial toxicity and ensure that patients have access to the most effective and affordable treatments.

Pharmacoeconomics has an important role to play in reducing financial toxicity and ensuring that cancer patients receive the best possible care without experiencing undue financial stress [6-8].

Do all countries have access to state-of-the-art treatments?

Access to expensive medicines is a major challenge for middle- and low-income countries, which often have limited healthcare budgets and a high burden of disease. However, there are several strategies that can be used to improve access to these medicines:

1. Negotiation of lower prices: Middle- and low-income countries can negotiate with pharmaceutical companies to obtain lower prices for expensive medicines. This can be done through pooled procurement initiatives, such as the Pan American Health Organization's Strategic Fund, which allows countries to purchase

medicines at lower prices by negotiating as a group.

2. Licensing and technology transfer: Middle- and low-income countries can also explore licensing and technology transfer agreements to produce generic versions of expensive medicines. This can help to reduce the cost of medicines and improve access for patients.
3. Donations and philanthropy: Donations and philanthropic initiatives can provide access to expensive medicines in low-income countries. For example, the Medicines Patent Pool, a United Nations-backed organization, works with pharmaceutical companies to license their patents and make HIV, hepatitis C, and tuberculosis medicines available at reduced prices in low-income countries.
4. International aid and funding: International aid and funding can also be used to support access to expensive medicines in middle- and low-income countries. Organizations such as the Global Fund to Fight AIDS, Tuberculosis and Malaria and Gavi, and the Vaccine Alliance, provide funding for medicines and vaccines in low-income countries.

Improving access to expensive medicines in middle- and low-income countries requires a combination of strategies, including negotiation, licensing and technology transfer, philanthropy, and international aid and funding. By working together and implementing these strategies, it is possible to ensure that all patients, regardless of where

they live, have access to the medicines they need to live healthy and productive lives [9,10].

Cancer as a public health problem

The number of patients diagnosed with cancer and the number who undergo cancer treatment varies by country and region. According to the latest available global statistics from the World Health Organization (WHO), there were an estimated 19.3 million new cancer cases and 10 million cancer-related deaths worldwide in 2020.

In terms of cancer treatment, it is estimated that around half of all cancer patients worldwide receive some form of treatment. Treatment options may include surgery, radiation therapy, chemotherapy, immunotherapy, targeted therapy, and/or hormonal therapy, depending on the type and stage of cancer.

However, the availability and use of cancer treatment can vary widely depending on factors such as the country's healthcare system, access to cancer care, and affordability of treatment. In low-income countries, for example, access to cancer treatment may be limited due to a lack of healthcare resources, infrastructure, and funding.

It is important to note that these figures are estimates and may not capture the full extent of cancer diagnosis and treatment globally, as not all countries have comprehensive cancer registries and reporting systems[11].

Not having access to the best available treatment can be a major challenge for many cancer patients, especially in low- and middle-income countries where healthcare resources are often limited. However, there are several strategies that can be used to improve access to the best available treatment:

1. **Increased investment in healthcare:** Governments can increase investment in healthcare systems to improve access to cancer treatment. This can include investing in infrastructure, training healthcare workers, and expanding access to medicines and medical technologies.
2. **International collaborations:** International collaborations between healthcare providers, research institutions, and advocacy organizations can help to improve access to the best available cancer treatment. These collaborations can facilitate knowledge-sharing, technology transfer, and the development of innovative solutions to improve cancer care.
3. **Affordable drug pricing:** Governments and healthcare systems can negotiate with pharmaceutical companies to reduce the price of cancer medications, making them more affordable and accessible to patients.
4. **Patient education and support:** Patient education and support programs can help to ensure that patients are aware of their treatment options and can access the best available care. These programs can also provide emotional support to

patients and their families throughout the cancer treatment journey.

5. **Clinical trial participation:** Participation in clinical trials can provide access to cutting-edge cancer treatments that may not yet be widely available. Encouraging patient participation in clinical trials can help to expand access to the best available treatment options.

Access to the best available cancer treatment requires a multi-faceted approach that involves investment in healthcare, international collaborations, affordable drug pricing, patient education and support, and clinical trial participation. By working together and implementing these strategies, it is possible to improve cancer care and ensure that all patients have access to the best available treatment options [12,13].

The average cost of treatments for the four most common tumors

The cost of advanced breast cancer treatment can vary widely depending on a number of factors, including the type and stage of breast cancer, the treatment options chosen, the healthcare system in which the treatment is delivered, and the location of the patient. Therefore, it is difficult to give a precise average cost for advanced breast cancer treatment.

However, advanced breast cancer treatment typically involves a combination of chemotherapy, targeted therapy, hormonal therapy, radiation therapy, and/or surgery. The cost of these treatments can range from several thousand to hundreds of thousands of

dollars, depending on the specifics of the treatment plan and the country or region in which the treatment is received.

For example, in the United States, the cost of advanced breast cancer treatment can range from around \$10,000 to \$100,000 or more per year, depending on the type and stage of breast cancer and the specific treatment regimen. In some cases, patients may also incur additional costs, such as for imaging tests, hospitalizations, or supportive care.

It is worth noting that the cost of advanced breast cancer treatment can be a significant financial burden for patients and their families, particularly in countries with high out-of-pocket healthcare costs or limited insurance coverage. This financial burden is often referred to as "financial toxicity" and can have a negative impact on a patient's quality of life and treatment outcomes.

Like advanced breast cancer, the cost of advanced lung cancer treatment can vary widely depending on a number of factors. The type and stage of lung cancer, the treatment options chosen, the healthcare system in which the treatment is delivered, and the location of the patient can all affect the cost of treatment [14,15].

Advanced lung cancer treatment typically involves a combination of chemotherapy, targeted therapy, radiation therapy, and/or surgery. The cost of these treatments can range from several thousand to hundreds of thousands of dollars, depending on the specifics of the treatment plan and the country or region in which the treatment is received. In the United States, the cost of

advanced lung cancer treatment can range from around \$10,000 to \$100,000 or more per year, depending on the type and stage of lung cancer and the specific treatment regimen. Like with advanced breast cancer treatment, patients may also incur additional costs such as imaging tests, hospitalizations, or supportive care.

It is worth noting that the financial burden of advanced lung cancer treatment can also be significant, and the concept of "financial toxicity" applies here as well. Patients and their families may face difficulties in paying for treatment, and this can have a negative impact on their quality of life and treatment outcomes. It is important for healthcare systems to consider the financial impact of cancer treatment and to work to make treatment accessible and affordable for all patients [16].

The cost of treating advanced colorectal cancer can also vary widely depending on a number of factors. Like with advanced breast and lung cancer, the specific treatment regimen chosen, the healthcare system in which the treatment is delivered, and the location of the patient can all affect the cost of treatment.

Treatment for advanced colorectal cancer typically involves a combination of surgery, chemotherapy, targeted therapy, and/or radiation therapy. The cost of these treatments can range from several thousand to hundreds of thousands of dollars, depending on the specifics of the treatment plan and the country or region in which the treatment is received. The financial burden of advanced colorectal cancer treatment can

also be significant, and the concept of "financial toxicity" applies here as well. Patients and their families may face difficulties in paying for treatment, and this can have a negative impact on their quality of life and treatment outcomes. Therefore, it is important for healthcare systems to consider the financial impact of cancer treatment and to work to make treatment accessible and affordable for all patients.

The cost of treating advanced prostate cancer can also vary widely depending on a number of factors. Like with advanced breast, lung, and colorectal cancer, the specific treatment regimen chosen, the healthcare system in which the treatment is delivered, and the location of the patient can all affect the cost of treatment.

Treatment for advanced prostate cancer typically involves a combination of surgery, radiation therapy, chemotherapy, hormonal therapy, and/or immunotherapy. The cost of these treatments can range from several thousand to hundreds of thousands of dollars, depending on the specifics of the treatment plan and the country or region in which the treatment is received.

The financial burden of advanced prostate cancer treatment can also be significant, and the concept of "financial toxicity" applies here as well. Patients and their families may face difficulties in paying for treatment, and this can have a negative impact on their quality of life and treatment outcomes. Therefore, it is important for healthcare systems to consider the financial impact of cancer treatment and to work to make treatment accessible and affordable for all patients [17].

Cost-effectiveness analysis (CEA) or a cost-utility analysis (CUA)

The cost-effectiveness ratio is a measure used to compare the costs of a healthcare intervention (such as a treatment or a screening program) with its benefits or outcomes (such as improved health or quality of life).

To study the cost-effectiveness ratio, researchers typically conduct a cost-effectiveness analysis (CEA) or a cost-utility analysis (CUA). In a CEA, the costs and effects of different healthcare interventions are compared in terms of a common measure, such as the cost per life year gained or the cost per quality-adjusted life year (QALY) gained. In a CUA, the effects are measured in terms of QALYs, which are a way of measuring both the length and quality of life.

To conduct a cost-effectiveness analysis or cost-utility analysis, researchers collect data on the costs of the intervention, such as the cost of the treatment itself, the cost of any additional tests or procedures, and the cost of managing any side effects or complications. They also collect data on the outcomes of the intervention, such as the improvement in health or quality of life.

The costs and outcomes are then compared with those of alternative interventions or with the costs and outcomes of no intervention at all. This allows researchers to calculate the cost-effectiveness ratio of each intervention, which is the ratio of the incremental cost of the intervention to the incremental benefit (in terms of life years gained or QALYs gained) compared to the next best alternative.

By studying the cost-effectiveness ratio of different healthcare interventions, researchers can help decision-makers (such as healthcare providers, insurers, or policymakers) to make more informed decisions about which interventions to prioritize, based on their relative costs and the field of pharmacoeconomics is constantly evolving, and there are several trends that are shaping its future [18].

Here are some of the key areas where pharmacoeconomics is likely to develop in the coming years:

1. **Personalized medicine:** As our understanding of genetics and disease continues to grow, there is a growing interest in personalized medicine, which tailors treatments to an individual's unique genetic makeup. Pharmacoeconomics will need to adapt to this trend by developing new methods for evaluating the cost-effectiveness of personalized treatments.
2. **Real-world evidence:** In recent years, there has been a shift towards using real-world evidence (RWE) to evaluate the effectiveness and safety of treatments. RWE includes data from sources such as electronic health records, claims databases, and patient registries. Pharmacoeconomics will need to incorporate RWE into its evaluations to provide a more comprehensive view of the costs and benefits of treatments.
3. **Digital health:** The use of digital health technologies such as telemedicine, mobile health apps, and

wearables is rapidly growing. These technologies have the potential to improve patient outcomes and reduce healthcare costs, but they also present new challenges for pharmacoeconomic evaluation.

4. Value-based healthcare: There is increasing interest in value-based healthcare, which seeks to maximize patient outcomes while minimizing costs. Pharmacoeconomics will play a key role in the development of value-based healthcare models by providing

evidence-based assessments of the value of different treatments [19,20].

Conclusion

Overall, the future of pharmacoeconomics is likely to be shaped by these and other trends that reflect the changing landscape of healthcare. By staying up-to-date with these developments, pharmacoeconomists can continue to provide valuable insights into the costs and benefits of treatments, and help to inform healthcare decisions [21].

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Hunis A | Volume 1; Issue 2 (2023) | Mapsci-JCRTP-1(2)-010 | Editorial Note

Citation: Hunis A. Pharmacoeconomics and Cancer. Medical Issue, of Economists or Governments? *J Cancer Res Treat Prev*. 2023;1(2):119-127.

DOI: [https://doi.org/10.37191/Mapsci-JCRTP-1\(2\)-010](https://doi.org/10.37191/Mapsci-JCRTP-1(2)-010)

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