

Burden of Cancer an Analysis of Costs Disparities and Strategic Imperatives

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Abstract

Cancer represents one of the most formidable public health challenges of the 21st century, imposing a profound and escalating burden on individuals, families, healthcare systems, and national economies. This report provides a comprehensive analysis of the multifaceted economic impact of malignant disease, synthesizing extensive data to quantify its scale, deconstruct its core components, and illuminate the stark disparities in its distribution. A landmark modeling study projects that the global macroeconomic cost of 29 major cancers will reach an astonishing **\$25.2 trillion** (in constant 2017 international dollars) between 2020 and 2050, a figure equivalent to a persistent 0.55% annual tax on the world's Gross Domestic Product (GDP). This immense financial toll is not an abstract calculation but a tangible drag on global prosperity, driven by a complex interplay of direct healthcare expenditures, the escalating price of innovative therapies, and vast societal losses in productivity. The analysis reveals that this burden is highly concentrated, with five cancer types—tracheal, bronchus, and lung; colorectal; breast; liver; and leukemia—accounting for nearly half of the total global economic cost. The financial impact is also distributed with profound inequity. High-income countries (HICs) face the largest absolute costs, driven by expensive treatments and high labor valuations, with North America, Europe, and East Asia shouldering over 85% of the global burden. Conversely, low- and middle-income countries (LMICs), where approximately 75% of cancer deaths occur, face a crisis of access and a devastating human toll, with productivity losses from premature mortality crippling developing economies.

Keywords: Cancer, Global Impacts, Cost, Disparities, Strategic Imperatives

1. Introduction

1.1. The Staggering Scale of Cancer's Global Economic Footprint

Deconstructing this global figure reveals several critical drivers. Direct medical costs are highest in the final year of life, often exceeding \$100,000 per patient in the United States, but it is the exponential rise in the cost of novel therapeutics that presents the most acute challenge to healthcare sustainability. Immunotherapies and cell-based treatments, while clinically transformative, carry price tags that can exceed \$1 million per patient for a full course of care, creating a paradox where medical innovation strains the very systems designed to deliver it. Beyond the formal healthcare system, the report quantifies the immense and often-uncounted societal costs. Productivity losses from premature death and

disability frequently exceed all direct treatment costs combined, representing a significant loss of human capital and a direct impediment to economic growth. Furthermore, a vast, hidden "care economy" exists, in which families—disproportionately women—provide trillions of dollars in uncompensated informal care, effectively subsidizing national health systems while bearing immense personal financial and emotional burdens. This is compounded by the phenomenon of "financial toxicity," which pushes patients into debt, savings depletion, and even bankruptcy to afford care.

Finally, the report examines how medical progress itself is reshaping the economic landscape. As treatments improve, more people are living longer as cancer survivors, transforming many cancers into

chronic conditions. This medical triumph creates a new, long-term economic profile characterized by years of continuing care, management of late effects, and persistent financial hardship, for which current health and social systems are inadequately prepared. In response to this complex and unsustainable trajectory, this report concludes with a series of strategic imperatives. A sustainable path forward requires a fundamental reorientation of global cancer control around three core pillars: (1) aggressive investment in prevention as the most effective economic strategy, targeting known risk factors like tobacco and HPV; (2) systemic reforms to pharmaceutical pricing to align cost with clinical value and ensure affordability; and (3) robust policies to mitigate financial toxicity and formally support the critical role of patients and their informal caregivers. Addressing the economic burden of cancer is not merely a healthcare issue; it is an imperative for global economic development, equity, and human well-being. Cancer stands as a paramount global challenge, extending its impact far beyond the clinical realm to inflict a profound and growing strain on the world's economic stability and developmental potential. The financial consequences of the disease are of such a magnitude that they must be understood not merely as healthcare expenditures but as a significant macroeconomic force shaping the prosperity of nations. Recent comprehensive modeling has brought the scale of this challenge into sharp focus, providing a sobering forecast of

the economic burden that lies ahead.

A pivotal study published in *JAMA Oncology* estimates that the cumulative global economic cost of 29 of the most prevalent cancers will amount to **\$25.2 trillion** between the years 2020 and 2050, calculated in constant 2017 international dollars. This figure represents a loss of economic output that is difficult to contextualize through conventional health metrics. To frame its macroeconomic significance, this projected cost is equivalent to imposing an annual tax of **0.55% on the total global GDP** for three decades. Such a persistent drag on the global economy underscores that cancer is a critical issue for ministries of finance and economic planning, not just ministries of health. The analysis, which incorporates not only treatment costs but also the broader effects on labor supply and capital investment, confirms that the economic toll of cancer is a fundamental threat to sustainable development worldwide.

This enormous global burden is not distributed evenly across the spectrum of malignant diseases. A remarkably small number of cancer types are responsible for a disproportionately large share of the total economic cost. The analysis reveals that nearly half of the projected \$25.2 trillion burden is attributable to just five cancer categories, highlighting specific areas where targeted interventions could yield the greatest economic and public health benefits.

Cancer Type	Projected Economic Cost (International Dollars)	Percentage of Total Global Burden
Tracheal, Bronchus, and Lung (TBL) Cancer	\$3.9 trillion	15.4%
Colorectal Cancer	\$2.75 trillion	10.9%
Breast Cancer	\$1.94 trillion	7.7%
Liver Cancer	\$1.64 trillion	6.5%
Leukemia	\$1.59 trillion	6.3%

Source: Chen S, et al. JAMA Oncology. 2023.

Table 1: Global Economic Burden of Top 5 Cancers (2020-2050)

The dominance of these five cancers, as detailed in Table 1, provides a critical roadmap for global health policy. Tracheal, bronchus, and lung (TBL) cancer alone accounts for \$3.9 trillion, or 15.4% of the total burden, making it the single most economically devastating malignancy worldwide. This concentration of cost immediately focuses attention on the underlying drivers of these specific diseases.

The immense economic burden detailed here is not an unavoidable fate or a simple reflection of biological chance. Rather, it serves as a powerful financial proxy for deeply entrenched public health challenges and persistent policy gaps. The data shows that the cancers imposing the highest economic costs are precisely those most strongly linked to known, modifiable risk factors. For instance, TBL cancer, the costliest malignancy, is overwhelmingly caused by tobacco use, the leading preventable cause of cancer globally. Therefore, the \$3.9 trillion economic toll of lung cancer can be largely reframed as the direct, quantifiable economic price of global tobacco consumption and the failure to fully implement

effective control measures.

Similarly, other high-cost cancers like colorectal, breast, and liver cancer have strong ties to preventable risk factors. Unhealthy diets, harmful alcohol use, physical inactivity, and obesity are major contributors to colorectal and breast cancers, while chronic infections with hepatitis B and C viruses are the primary drivers of liver cancer in many parts of the world. This direct line from preventable exposure to staggering economic cost transforms the entire understanding of the problem. The economic burden is not simply a matter of treatment affordability; it is a direct financial manifestation of failures in primary and secondary prevention. This realization provides a compelling economic rationale for prioritizing public health interventions, as investments in prevention are not just health expenditures but are, in fact, fundamental strategies for long-term economic preservation.

Section 1: Deconstructing the \$25 Trillion Burden: A Multi-Dimensional Cost Analysis

The projected \$25.2 trillion global economic burden of cancer is a composite figure, reflecting a complex and interlocking array of costs that extend from the hospital bedside to the factory floor and the family home. To formulate effective strategies to mitigate this burden, it is essential to dissect this aggregate number into its constituent parts. The total economic impact of cancer can be broadly categorized into four key domains: direct healthcare expenditures, the rapidly escalating costs of oncological therapeutics, the profound societal toll of lost productivity, and the often-uncounted "hidden economies" of informal caregiving and patient financial hardship. Each of these dimensions contributes uniquely to the overall burden and presents distinct challenges for policymakers, health systems, and societies.

1.2. Direct Healthcare Expenditures: The Costs of Care Delivery

Direct healthcare expenditures represent the most visible component of cancer's economic impact, encompassing all costs billed by the formal healthcare system for the diagnosis, treatment, and management of the disease. These costs are substantial, with national cancer-related medical expenditures in the United States alone estimated at **\$208.9 billion in 2020**. This figure includes a wide array of services, such as hospitalizations, outpatient clinic visits, physician and supplier services, diagnostic imaging, laboratory tests, and prescription drugs administered in clinical settings.

A critical feature of these direct costs is their dramatic variation across the patient's journey. Cancer care is not a monolithic expense; rather, its financial intensity is highly dependent on the phase of treatment. Analysis of U.S. Medicare data provides a robust model for understanding this temporal distribution, revealing three distinct cost phases :

1. **The Initial Phase:** This period, covering the first 12 months after diagnosis, is characterized by intensive diagnostic workups, major surgical procedures, and primary courses of radiation or chemotherapy. The concentration of these high-cost interventions results in substantial initial expenditures, with average per-patient medical service costs estimated at **\$43,516**.
2. **The Continuing Phase:** For patients who enter remission or live with stable disease, this phase represents the long-term management of cancer, often referred to as survivorship. Costs during this period are significantly lower on an annual basis, covering routine monitoring, follow-up appointments, and the management of long-term treatment side effects. The average annualized medical service cost in this phase is estimated at **\$5,518**.
3. **The End-of-Life Phase:** The final 12 months of life for patients who succumb to their disease represent the most expensive period of cancer care. This phase is often marked by repeated

hospitalizations, intensive care unit stays, complex palliative interventions, and the use of aggressive last-line therapies. Consequently, costs escalate dramatically, with average per-patient medical service expenditures reaching **\$109,727**.

This end-of-life cost burden also varies significantly depending on the type of cancer. For example, in the final year of life, average medical costs can range from a lower bound of \$71,300 for prostate cancer to an extreme high of **\$239,400 for acute myeloid leukemia (AML)**, reflecting differences in disease biology and the intensity of available treatments. This phase-dependent cost structure highlights the immense financial pressures placed on health systems during the most acute periods of a patient's illness, particularly at the end of life.

1.3. The Engine of Escalation: The Economics of Oncological Therapeutics

Within the landscape of direct healthcare costs, no single component has grown more rapidly or presents a greater challenge to the sustainability of global health systems than oncological pharmaceuticals. The last two decades have witnessed a revolution in cancer treatment, with the advent of targeted therapies and immunotherapies that have transformed patient outcomes. However, this clinical progress has been accompanied by an exponential escalation in drug prices, making therapeutics the primary engine of rising cancer care costs.

The trend is unambiguous and alarming. In 2012, 11 of the 12 cancer drugs approved by the U.S. Food and Drug Administration (FDA) were priced at over \$100,000 for a year of treatment. A decade later, this figure had become the norm rather than the exception. Newly approved cancer drugs in 2022 carried an average annual price of **\$283,000**, representing a staggering 53% increase from the 2017 average of \$185,620. This hyperinflation in drug pricing far outpaces general inflation and the growth of other healthcare costs, placing unprecedented strain on payers and patients alike.

The price of these innovative therapies can be astronomical. A course of immunotherapy, such as Pembrolizumab (Keytruda), can cost approximately **\$191,000 annually**. Targeted therapies, which are often taken for extended periods, can cost tens of thousands of dollars per month. For example, a three-year course of adjuvant Osimertinib for non-small cell lung cancer (NSCLC) is estimated to cost over **\$550,000** per patient. The most advanced treatments, such as Chimeric Antigen Receptor T-cell (CAR-T) therapy, represent a new frontier in both clinical efficacy and cost. While the list price for a one-time infusion is around \$373,000, real-world data reveals that the total cost of care—including hospitalization, management of severe side effects, and follow-up—averages over **\$700,000** and can readily exceed **\$1 million** per patient. The potential system-wide impact is immense; one analysis estimated that the cost to treat a single year's cohort of eligible patients with new adjuvant therapies for just a few types of thoracic malignancies could surpass **\$30 billion**. The factors driving these high prices are complex and contentious. While the

pharmaceutical industry often cites the high cost of research and development (R&D), which can exceed \$1 billion per approved drug, several other market and policy factors are at play. In key markets like the United States, legislative frameworks prevent large public payers such as Medicare from negotiating drug prices directly with manufacturers, removing a critical cost-containment mechanism present in many other countries. Furthermore, the patent system grants each new drug a period of market exclusivity. For its specific approved indication, a new drug often functions as a monopoly with no direct competitors, allowing manufacturers to set high launch prices without significant market resistance. Compounding this is a lack of value-based pricing, where the cost of a drug is often not directly tied to its relative effectiveness or the magnitude of clinical benefit it provides over existing, less expensive alternatives.

This dynamic creates a profound paradox of innovation. The very scientific advancements that are leading to longer survival and better quality of life for patients are simultaneously the primary drivers of unsustainable cost growth. This places health systems, insurers, and governments in an increasingly untenable position, forcing difficult decisions about which treatments to cover and for whom. Without systemic policy interventions that better align the price of innovation with its value and the ability of societies to pay, access to the most effective cancer treatments will inevitably become more restricted, thereby deepening health inequities and potentially rationing care based on affordability rather than clinical need.

1.4. The Societal Toll: Quantifying the Impact of Lost Productivity

The economic burden of cancer extends far beyond the direct costs captured in healthcare budgets. A vast and arguably more significant component of the total economic toll is the indirect cost of lost productivity. These costs represent the value of economic output lost to society when individuals are unable to work due to cancer-related illness, disability, or premature death. For many nations, particularly those with lower incomes, these indirect costs are the dominant feature of cancer's economic impact, often exceeding all direct medical expenditures combined. The standard methodology for quantifying these losses is the "human capital" approach. This economic model estimates the present value of lifetime earnings that are forgone when an individual dies prematurely or is forced to leave the workforce. The calculation accounts for a person's age, sex, life expectancy, probability of employment, and projected wage growth, thereby providing a monetary valuation of the human potential lost to the disease. This approach effectively measures the drain on a nation's human capital, a critical resource for economic growth and innovation.

The magnitude of these productivity losses is substantial. In the United States, the aggregate loss in productivity from cancer survivors aged 18-64 is estimated to exceed **\$26 billion** annually. This figure is composed of losses from employment disability (\$19 billion), missed workdays (\$4 billion), and lost household productivity (\$3 billion). On an individual level, a newly

diagnosed cancer survivor in the workforce loses an average of **\$4,694** in productivity annually, while longer-term survivors face ongoing annual losses of **\$3,593**. The impact is particularly severe for patients diagnosed with advanced disease. A study found that employees with metastatic cancer missed an average of **106 days from work in the first year** following their diagnosis, compared to 46 days for those with non-metastatic cancer. This difference in absenteeism translated into an additional indirect cost to employers of up to **\$22,283 per patient** in that first year alone.

These figures demonstrate that cancer's economic impact functions as a significant brake on national economic activity. The macroeconomic models used to derive the \$25.2 trillion global burden explicitly account for how cancer shrinks the labor supply and diverts household savings away from productive investments and into treatment costs. When a person of working age is diagnosed with cancer, the economic consequences ripple outwards. The individual loses income, the employer loses a productive worker, the government loses tax revenue, and the national economy loses a unit of its human capital. The Organisation for Economic Co-operation and Development (OECD) estimates that across its member countries, cancer reduces total workforce output by an estimated **€163 billion per year**.

This reframes the entire discourse around cancer control. It is not simply a matter of managing healthcare spending; it is a core component of economic development strategy. From this perspective, investments in cancer prevention, early detection, and effective treatments that enable patients to remain in or return to the workforce are not merely costs to be contained. They are strategic investments in preserving a nation's most valuable economic asset—its people—and in securing its long-term economic prosperity and resilience.

1.5. The Hidden Economies of Cancer: Informal Caregiving and Patient Financial Toxicity

The formal accounting of healthcare expenditures and productivity losses, while immense, fails to capture the full economic burden of cancer. A significant portion of the cost is offloaded from the formal system onto the shoulders of patients and their families, creating a hidden economic ecosystem that is both essential and unsustainable. This hidden burden manifests in two primary forms: the uncompensated labor of informal caregivers and the severe financial hardship experienced by patients, a phenomenon known as "financial toxicity."

Informal caregivers—typically family members or friends—are the unpaid workforce of the cancer care system. They provide essential support, from transportation and medication management to personal care and emotional support, allowing patients to be cared for in their homes and communities. The economic value of this unpaid labor is staggering. In the United States, the societal value of informal caregiving across all diseases is estimated to be over **\$470 billion annually**. Specific to cancer, one study from 2022 quantified the annual cost of informal cancer care in its region at **\$3.6 billion**, with caregivers providing an average of **28.6 hours**

of care per week—the equivalent of a demanding part-time job. From a societal perspective, this informal care is often the single largest cost component of cancer care. One economic analysis of palliative care found that informal care accounted for **82% to 88% of the total daily cost**, dwarfing the costs of formal medical services.

While essential, this reliance on informal care comes at a significant personal cost to caregivers, who often face loss of employment, reduced income, and depletion of their own savings to provide care. The burden is also deeply gendered, with women disproportionately taking on these unpaid caregiving roles, often at the expense of their own careers and financial security. Simultaneously, patients themselves bear a heavy and direct financial burden. The term "financial toxicity" has emerged to describe the devastating impact of cancer costs on patients' financial well-being, even for those with health insurance. In the U.S., direct costs borne by patients, including out-of-pocket payments for services and drugs as well as the value of time spent seeking care, are estimated at **\$21.1 billion per year**. This financial strain manifests in numerous ways: patients are forced to deplete their savings, take on substantial medical debt, sell assets, and in some cases, file for bankruptcy. The consequences can be devastating, forcing families to choose between paying for cancer treatment and affording basic necessities like food and housing. This financial pressure can directly harm health outcomes, as a significant number of patients report delaying or forgoing recommended care, including prescription drugs, due to an inability to pay.

The existence of these two hidden economies reveals a fundamental truth about the current model of cancer care financing. The formal healthcare system is heavily subsidized by a vast, unacknowledged, and gendered "care economy" that extracts immense, uncompensated value from families. At the same time, the system offloads a significant portion of its costs directly onto patients, often pushing them to the brink of financial ruin. This model is fundamentally unsustainable. A true and complete accounting of cancer's economic cost must incorporate these hidden burdens, and any viable long-term policy solution must address the financial protection of both patients and their caregivers as a central priority. Without such measures, the system will continue to function by leveraging the financial and emotional depletion of the very people it is meant to serve.

Section 2: A World of Disparities: The Uneven Distribution of Cancer's Economic Toll

The global economic burden of cancer, while universally significant, is not experienced uniformly. Its weight falls with profound inequity, creating a world of disparities where the financial and health consequences of a cancer diagnosis are largely

determined by geography and socioeconomic status. Where a person lives—both the country they call home and the community within that country—is a primary determinant of their access to care, their chances of survival, and the severity of the economic hardship they and their family will endure. This section explores these deep-seated disparities, examining the divide between nations, the regional variation in cancer's economic drivers, and the inequities that persist within national borders.

2. The Great Divide: Regional and National Economic Disparities

The global cancer burden presents a tale of two fundamentally different crises, sharply divided along lines of national income. While high-income countries (HICs) bear the largest share of the absolute economic cost, low- and middle-income countries (LMICs) suffer a disproportionately severe human toll and a more socially disruptive relative economic burden. HICs are the epicenter of global cancer spending. The regions of North America, Europe, and East Asia, despite representing a minority of the world's population, are projected to account for a staggering **85.5% of the total global economic cost** of cancer between 2020 and 2050. The two largest economies, the United States and China, will shoulder nearly half of the entire global burden, with projected costs of **\$5.3 trillion** and **\$6.1 trillion**, respectively. This concentration of cost is reflected in the per capita figures; the economic burden per person in North America is estimated at **\$14,065**, compared to just \$241 in Sub-Saharan Africa. This massive financial burden in HICs is driven by two main factors: the high cost of advanced medical treatments and the high economic value assigned to lost productivity in developed economies with higher wage structures. The primary challenge in these nations is one of *affordability*—how to manage unsustainable growth in healthcare spending while ensuring continued access to innovative but costly care.

In stark contrast, LMICs face a crisis of *access*. Although approximately **75% of all cancer deaths worldwide occur in LMICs**, these nations account for only about half of the total economic cost. This paradoxical discrepancy does not signal a lesser problem; rather, it reflects a tragic reality. The lower economic cost is a direct consequence of limited access to care, lower wages that reduce the calculated value of lost productivity, and health systems that are ill-equipped to provide comprehensive cancer services. Comprehensive cancer treatment is reportedly available in over 90% of HICs, but in **less than 15% of low-income countries**. This "care gap" leads to diagnoses at later stages, limited treatment options, and consequently, much higher mortality rates. For LMICs, the economic burden is primarily driven by massive losses in human capital due to premature death, which is devastating to the social fabric and long-term development prospects of these nations.

Country/Region	Absolute Economic Burden (International Dollars)	Burden as % of GDP	Per Capita Cost (International Dollars)
China	\$6.1 trillion	~0.6%	-
United States	\$5.3 trillion	~0.8%	\$14,065 (North America)
India	\$1.4 trillion	-	-
North America	-	0.83%	\$14,065
Europe & Central Asia	-	0.63%	-
High-Income Countries	~\$12.6 trillion (50% of total)	0.72%	-
Low-Income Countries	-	0.26%	\$241 (Sub-Saharan Africa)
<i>Source: Chen S, et al. JAMA Oncology. 2023; Aptitude Health; Cancer Atlas</i>			

Table 2: Comparative Analysis of Cancer's Economic Burden by Region and Income Level (2020-2050)

As Table 2 illustrates, the nature of the economic challenge differs profoundly across the globe. While HICs grapple with the high price of medical progress, LMICs are struggling with the fundamental absence of life-saving infrastructure and care, leading to a far greater loss of life for every dollar of calculated economic burden.

2.1. Regional Profiles of High-Impact Cancers

The economic landscape of cancer is not only divided by income but also shaped by diverse regional patterns of disease. The specific type of cancer that imposes the largest macroeconomic cost varies significantly from one part of the world to another, creating a geographic mosaic of distinct public health challenges. This variation is not random; it is a direct reflection of local and regional differences in exposure to environmental and lifestyle risk factors, as well as the capacity of local health systems to prevent and treat specific diseases. An analysis of the most economically damaging cancer in each country reveals these distinct regional profiles :

- In the majority of developed nations, including the United States, China, and much of Europe, tracheal, bronchus, and lung (TBL) cancer imposes the greatest economic burden. This is a direct legacy of historical and ongoing high rates of tobacco consumption in these regions.
- In countries such as India and Pakistan, the highest economic losses are attributed to lip and oral cancers, a pattern strongly linked to the widespread use of smokeless tobacco products and betel quid, which are major local risk factors.
- In parts of Southeast Asia and Africa, such as Thailand, Egypt, and Mongolia, liver cancer is the dominant economic burden. This correlates directly with the high prevalence of chronic infections with the hepatitis B and C viruses, which are the primary causes of hepatocellular carcinoma in these populations.
- In several South American nations, including Colombia, Bolivia, and Peru, stomach cancer accounts for the largest economic cost, a trend associated with regional dietary patterns

and high rates of infection with the bacterium *Helicobacter pylori*.

This geographic variation provides a powerful analytical lens. The economic burden of cancer acts as a highly specific fingerprint, revealing the most pressing local risk factors and health system failures in a given region. The financial data, therefore, does more than just quantify a problem; it provides a clear and compelling justification for tailoring public health strategies to local realities. For example, the immense economic cost of lung cancer in HICs provides a powerful economic argument for strengthening tobacco control, while the high cost of liver cancer in Egypt underscores the economic imperative of investing in hepatitis screening and treatment programs.

This evidence strongly suggests that a one-size-fits-all global cancer strategy is destined to be economically inefficient and clinically suboptimal. To achieve the greatest return on investment—both in terms of lives saved and economic costs averted—resources must be strategically allocated to tackle the specific cancers that impose the highest burden in each region. This requires a nuanced approach that prioritizes localized prevention, targeted screening programs, and health system strengthening tailored to the unique epidemiological and economic profile of each country and community.

2.2. Inequities Within Borders: The Burden on Vulnerable Populations

Just as the economic burden of cancer is unevenly distributed among nations, it is also marked by deep inequities within national borders. National averages often mask profound disparities where the financial and health consequences of cancer fall most heavily on the most vulnerable and marginalized populations. Socioeconomic status, race, ethnicity, and geographic location are powerful predictors of cancer outcomes and the severity of its economic impact.

In the United States, a clear socioeconomic gradient exists in the cancer burden. Residents of the nation's poorest counties experience cancer death rates that are approximately **20% higher** than those living in the most affluent counties. This disparity is

driven by a confluence of factors, including higher exposure to risk factors, lower rates of screening and early detection, and barriers to accessing high-quality care. The economic consequences follow the same pattern. Individuals and families with limited incomes face significantly more financial hardship from a cancer diagnosis. They are more likely to be uninsured or underinsured, forcing them to bear a larger share of costs out-of-pocket relative to their income. This financial strain has cascading effects; these populations are more likely to delay or forgo necessary medical care due to cost, and they report higher rates of food insecurity as they are forced to divert funds from basic necessities to pay for medical bills.

Racial and ethnic disparities further compound these inequities. In the U.S., specific minority groups bear a disproportionate burden from certain cancers. For example, non-Hispanic Black women are more likely to die from breast cancer than non-Hispanic white women, and non-Hispanic Black men experience higher rates of and mortality from prostate cancer. These health disparities have a direct and measurable economic cost. A 2018 analysis calculated that the total economic cost of health disparities in the U.S. was **\$451 billion** for that year alone, with cancer being a major contributing factor. This figure represents a massive loss of economic potential and underscores the financial imperative of achieving health equity. The burden of cancer is not just a matter of biology; it is a reflection of systemic social and economic inequalities that create barriers to health and prosperity for the most disadvantaged communities.

Section 3: The Paradox of Progress: How Improved Survival Rates Reshape the Economic Landscape

The narrative of modern oncology is one of remarkable progress. Advances in diagnostics, surgery, radiation, and particularly systemic therapies have transformed the prognosis for many types of cancer, leading to a substantial and growing population of cancer survivors. This is a monumental medical achievement, a testament to decades of scientific research and clinical innovation. However, this success has created a critical and often overlooked consequence: it is fundamentally altering the nature, timeline, and structure of cancer's economic burden. The very progress that saves lives is creating a new set of long-term economic challenges for which current health and financial systems are largely unprepared. Historically, the economic impact of many cancers was concentrated in two acute phases: the initial period of diagnosis and primary treatment, and the end-of-life phase for those with fatal disease. The period in between, for those who survived, was often viewed as a return to normalcy. Today, this model is increasingly obsolete. As treatments become more effective, they are converting what were often acute, terminal illnesses into manageable, chronic conditions. This has led to a dramatic increase in the number of people living with and beyond cancer, shifting the economic center of gravity away from the acute phases and toward a long, sustained "continuing care" or survivorship phase. While the annualized costs during this phase are lower than during initial treatment, they are paid out over many years, and in some cases, for the rest of a survivor's life, leading to

a substantial cumulative cost.

This growing population of survivors faces a unique and persistent set of financial challenges long after their active treatment has concluded. First, they consistently have higher annual out-of-pocket medical costs for follow-up care, monitoring, and prescription drugs compared to individuals without a cancer history. Second, many survivors carry a significant burden of medical debt incurred during their intensive initial treatment, a financial liability that can affect their economic well-being for decades. Third, survivorship is often accompanied by the need to manage long-term side effects of treatment, such as cardiotoxicity, neuropathy, or cognitive changes, which can require ongoing medical care and generate new costs. Finally, many survivors experience diminished earning potential. The physical and psychological sequelae of cancer and its treatment can lead to reduced work hours, difficulty maintaining previous job performance, or forced early retirement, resulting in a long-term reduction in household income and wealth accumulation.

This emerging reality presents a systemic challenge. The success of modern oncology is effectively creating a new chronic disease population with a distinct and long-term economic profile. However, our health, insurance, and social support systems are still largely designed around an outdated model of acute, episodic care. Health systems are often not structured to provide the integrated, long-term, multidisciplinary care that survivors need. Financial and insurance models, which focus on annual deductibles and out-of-pocket maximums, often fail to account for the cumulative financial toxicity that unfolds over a decade or more of survivorship. Social safety nets may not be equipped to handle the long-term employment challenges faced by this growing population. This creates a fundamental mismatch between the evolving needs of cancer patients and the design of the systems meant to support them. The very triumph of cancer treatment—longer survival—is exposing the inadequacies of a system that has not yet adapted to this new reality. Addressing this paradox requires a strategic shift in thinking. Policymakers, healthcare providers, and insurers must move from an acute cancer care paradigm to a chronic cancer survivorship model. This involves redesigning care pathways to be more integrated and long-term, reforming insurance benefit designs to provide better protection against long-tail financial risk, and strengthening social and employment support systems to address the unique challenges faced by the growing population of cancer survivors. Failure to adapt will mean that the medical victories of today will translate into the chronic economic hardships of tomorrow.

Section 4: Charting a Sustainable Path Forward: Policy and Strategic Recommendations

The projected \$25.2 trillion economic burden of cancer represents a clear and unsustainable trajectory for global health and economic development. The current model, characterized by escalating treatment costs, profound inequities, and a heavy reliance on the hidden subsidies of family caregiving and patient financial hardship, is on a collision course with the fiscal realities of

nations worldwide. Averting this crisis requires a concerted and strategic global effort to reorient cancer control. The findings of this report point to three critical pillars for action: prioritizing prevention as a primary economic strategy, reforming the systems of pharmaceutical valuation and pricing, and implementing robust policies to protect patients and their families from financial devastation.

2.3. Investing in Prevention as a Primary Economic Strategy

The most powerful and cost-effective lever for reducing the long-term economic burden of cancer is to prevent the disease from occurring in the first place. The evidence is unequivocal: approximately **40% of all cancer cases are preventable** through interventions that target known lifestyle and environmental risk factors. Viewing prevention not as a peripheral public health activity but as a core economic strategy is essential for charting a sustainable path forward. The economic case for prevention is most compelling when examining the cancers that drive the highest costs. As established, tracheal, bronchus, and lung (TBL) cancer is the single most economically damaging malignancy, projected to cost the world \$3.9 trillion. Given that tobacco use is the primary cause, aggressive and comprehensive tobacco control policies offer the highest possible return on investment in the fight against cancer. Policies such as increased tobacco taxation, comprehensive smoke-free laws, and well-funded cessation programs can dramatically reduce the incidence of lung cancer and, in doing so, avert trillions of dollars in future economic losses. Similarly, vaccination against the human papillomavirus (HPV) is a highly effective intervention that can prevent the vast majority of cervical cancers and a significant proportion of other malignancies, including head and neck and anal cancers. Scaling up HPV vaccination programs globally is a profoundly cost-effective strategy that not only saves lives but also prevents substantial healthcare costs and increases long-term workforce productivity. Beyond these two high-impact areas, broader public health policies aimed at tackling harmful alcohol use, promoting healthy diets and physical activity, and reducing exposure to air pollution can further curb the rising tide of cancer and its associated economic costs. For policymakers, the message is clear: every dollar invested in evidence-based cancer prevention today will yield many more in saved healthcare expenditures and preserved economic productivity tomorrow.

2.4. Reforming Pharmaceutical Value, Pricing, and Access

While prevention is the first line of defense, effective and affordable treatment remains a cornerstone of cancer control. However, as this report has detailed, the current model of pharmaceutical pricing is the primary engine of unsustainable cost escalation in HICs and a major barrier to access in LMICs. Systemic reforms are urgently needed to ensure that the price of innovation is aligned with its clinical value and that life-saving medicines are accessible to all who need them.

A critical first step is the implementation of **value-based pricing** frameworks. Under such a system, the price of a new cancer drug would be explicitly linked to its demonstrated clinical benefit relative to the existing standard of care. Drugs that offer

breakthrough survival advantages or substantial improvements in quality of life would command higher prices than those that provide only marginal or incremental benefits. This would create powerful incentives for manufacturers to focus R&D on truly transformative innovations and would help rationalize spending across the healthcare system.

To make value-based pricing effective, major public payers must have the authority to negotiate prices directly with manufacturers. In markets like the United States, where such negotiation is currently restricted, legislative changes are needed to empower entities like Medicare to leverage their purchasing power to secure fair and reasonable prices for cancer drugs. This is a standard practice in most other HICs and is a proven mechanism for controlling pharmaceutical expenditures.

Finally, policies must be enacted to foster a competitive market for off-patent drugs. This includes streamlining the regulatory pathways for the approval of lower-cost generic drugs and biosimilars and implementing policies that encourage their rapid uptake by physicians and health systems. A robust competitive market for older medicines is essential for creating the fiscal headroom needed to pay for new, on-patent innovations. Together, these reforms can help tame the hyperinflation in drug costs and move toward a system where groundbreaking cancer treatments are both innovative and affordable.

2.5. Mitigating Financial Toxicity and Supporting Patients and Caregivers

A healthcare system that pushes its patients into financial ruin is a failing system. The phenomenon of financial toxicity and the immense uncompensated burden placed on informal caregivers are not acceptable side effects of cancer care; they are signs of a system that has lost sight of its fundamental purpose. Protecting patients and their families from the devastating financial consequences of a cancer diagnosis must become a central goal of health policy. The most direct way to mitigate financial toxicity is to strengthen health coverage. This involves expanding access to comprehensive health insurance that includes a robust package of cancer benefits and, crucially, incorporates **caps on annual out-of-pocket spending**. These caps are a critical safety net that can prevent a medical crisis from becoming a financial catastrophe for families.

Beyond insurance design, health systems must proactively address the financial challenges of their patients. Screening for financial hardship should become a routine and integrated part of the cancer care pathway, just like screening for pain or depression. From the point of diagnosis, patients identified as being at risk of financial distress should be connected with financial navigators, social workers, and other resources that can help them manage costs and access available support programs. Finally, it is time to formally recognize and support the indispensable economic contribution of informal caregivers. Their unpaid labor is a massive subsidy to the formal healthcare system, and policies must be developed to alleviate their burden. This could include the provision of direct financial support through caregiver allowances, the expansion of

paid family and medical leave policies to cover cancer caregiving, and the funding of respite care services that provide caregivers with temporary relief from their demanding responsibilities. Acknowledging and supporting this hidden workforce is not only a matter of fairness and compassion; it is a necessary step toward building a more resilient and sustainable system of long-term cancer care.

3. Conclusions

The projected \$25.2 trillion economic cost of cancer is more than a statistic; it is a stark warning of a looming global crisis that threatens health, economic stability, and human development on an unprecedented scale. The current trajectory—defined by hyper-inflating treatment costs, deep-seated inequities between and within nations, and a fundamental reliance on the unsustainable and hidden burdens borne by patients and their families—is untenable. Continuing on this path will lead to a future where access to the best cancer care is increasingly rationed, health disparities are further entrenched, and the economic prosperity of nations is eroded by the ever-growing cost of disease. However, this future is not inevitable. The findings of this report illuminate a path toward a more sustainable and equitable approach to global cancer control. The analysis demonstrates that the economic burden of cancer is not a random force of nature but a direct consequence of specific, addressable factors: failures in prevention, misalignments in the pharmaceutical market, and systemic neglect of the financial well-being of patients and caregivers. This understanding provides a clear mandate for action.

A sustainable path forward must be built upon a strategic reorientation around the three core pillars identified in this report. First, we must elevate **prevention** to its rightful place as the most powerful and efficient economic tool in the fight against cancer. Aggressive, evidence-based investments in tobacco control, HPV vaccination, and the promotion of healthy lifestyles are not costs but are, in fact, the most secure investments we can make in our future health and economic resilience. Second, we must undertake **systemic reform of pharmaceutical pricing** to ensure that the cost of innovation is aligned with its clinical value and that life-saving treatments are affordable and accessible to all. This requires a commitment to value-based pricing, empowered price negotiation, and robust market competition. Third, we must build a system of cancer care with a renewed focus on **protecting patients and their families from financial devastation**. This means strengthening health coverage, integrating financial support into the core of clinical care, and formally recognizing and supporting the critical role of informal caregivers. Addressing the economic challenge of cancer is a complex and formidable task that will require political will, international cooperation, and a shared commitment to the principles of equity and sustainability. The human and economic stakes are too high for inaction. By embracing a strategy rooted in prevention, value, and patient protection, the global community can transform the fight against cancer from an unsustainable cost burden into a shared investment in a healthier and more prosperous future for all.

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