

The Political Dysfunction Tax

A Forensic Audit of Global Governance Efficiency

Mike P. Sinn

Institute for Accelerated Medicine

m@warondisease.org | ORCID: 0009-0006-0212-1094

Online version: <https://political-dysfunction-tax.warondisease.org>

Abstract

Governance dysfunction suppresses roughly \$101T (95% CI: \$83.3T-\$191T) in recoverable value each year. Under this paper’s 20-year transition model, the Treaty-Only Path reaches 16.5x (95% CI: 5.17x-64.9x) the Earth baseline (\$3.11 quadrillion (95% CI: \$974T-\$12.2 quadrillion)), while the full Optimal-Governance Path reaches 56.7x (95% CI: 19.3x-304x) the Earth baseline, raises average income to \$1.16M (95% CI: \$395K-\$6.22M) versus \$20.5K on the status-quo path, and reaches \$10.7 quadrillion (95% CI: \$3.64 quadrillion-\$57.2 quadrillion) in total output. This paper is the project’s canonical derivation of that ceiling from an explicit waste ledger, opportunity ledger, and source-linked parameter model. [Incentive Alignment Bonds](#) are presented as the adoption mechanism, and full formulas, uncertainty ranges, and sensitivity outputs appear in [Methodology, Parameters, and Calculations](#).

Table of contents

| | | |
|----------|--|-----------|
| 1 | What This Costs You | 2 |
| 1.1 | Interactive Projection | 3 |
| 2 | Canonical Ceiling Scenario | 3 |
| 3 | Introduction: The Mechanism Design of Civilizational Stagnation | 4 |
| 4 | Part 1: The Waste Ledger (The “Burned Capital”) | 6 |
| 4.1 | Military Overspend: The Cost of Hegemony vs. Security | 7 |
| 4.1.1 | The Strategic Delta: Dominance vs. Denial | 8 |
| 4.1.2 | The Compounded Economic Loss | 10 |
| 4.2 | Administrative Bloat and the Friction Economy | 12 |
| 4.2.1 | The Healthcare Administration Tax | 13 |
| 4.2.2 | The Compliance Tax of Complexity | 15 |
| 4.2.3 | Corporate Welfare and Rent-Seeking | 17 |
| 4.3 | Incarceration & Prohibition: The Economics of Human Caging | 19 |
| 4.3.1 | The Direct Fiscal Cost | 20 |
| 4.3.2 | The Destruction of Human Capital | 21 |
| 5 | Part 2: The Opportunity Ledger (The “Buried Multipliers”) | 23 |

| | | |
|-----------|--|-----------|
| 5.1 | The Health Multiplier: The Trillion-Dollar Graveyard | 24 |
| 5.1.1 | The Efficiency Shift: From RCTs to PCTs | 25 |
| 5.1.2 | Valuing the “Lost Years” | 27 |
| 5.2 | The Human Capital Multiplier: Unleashing Cognitive Stock | 28 |
| 5.2.1 | The Lead Anchor | 28 |
| 5.2.2 | The Migration Arbitrage (“Trillion Dollar Bills”) | 30 |
| 6 | Part 3: The Calculation (<i>E</i>) | 30 |
| 6.1 | The Variables | 30 |
| 6.2 | The Efficiency Score | 31 |
| 7 | Comparative Balance Sheet: Status Quo vs. Optimocracy | 31 |
| 8 | Analysis and Second-Order Insights | 32 |
| 8.1 | The “Parable of the Broken Window” on Steroids | 32 |
| 8.2 | The “Buried” Health Multiplier is the Critical Failure | 33 |
| 8.3 | Security Theater vs. Solvency | 34 |
| 9 | Conclusion | 35 |
| 10 | See Also | 35 |

Version note. This document is an archival snapshot. Latest interactive version: <https://political-dysfunction-tax.warondisease.org>. Citable DOI: <https://doi.org/10.5281/zenodo.18603840>.

1 What This Costs You

Governance inefficiency is not an abstraction. It has a price, and you are paying it.

This paper documents \$101T (95% CI: \$83.3T-\$191T) in annual global opportunity costs from governance dysfunction (derived in Parts 1 and 2 below). Distributed across 8 billion of people (95% CI: 7.8 billion of people-8.2 billion of people) people, the **Political Dysfunction Tax** costs \$12.6K (95% CI: \$10.6K-\$23.4K) per person per year, or \$50.5K (95% CI: \$42.6K-\$93.7K) per household of four.

But the annual figure is only the static loss. The deeper cost is compound: the dysfunction tax doesn’t just reduce current output, it suppresses the growth rate itself. Delayed cures mean sicker, less productive workers. Migration restrictions prevent talent from reaching high-productivity environments. Regulatory friction slows R&D spillover. Each of these is a brake on compound growth, not a one-time deduction.

Under current governance, global GDP per capita grows at approximately 2.5% annually from a base of \$14.4K (95% CI: \$14.1K-\$14.7K). This 2.5% rate was itself achieved *while paying the dysfunction tax*. Removing the tax does not merely shift the level upward; it removes structural constraints on growth. The 20-year transition path used in this paper models three direct compounding channels: spending reallocation with R&D spillover, accelerated disease cures, and non-health dysfunction-capital reallocation to higher-value uses.

The per-person 20-year implications under the same model base:

| Scenario | Assumed Growth | Starting Per Capita | Year-20 Average Income |
|--|--|-----------------------------------|---|
| Status quo (Earth baseline) | 2.5% for 20 years | \$14.4K (95% CI: \$14.1K-\$14.7K) | \$20.5K |
| Treaty-only path | 17.9% (95% CI: 11.3%-26.3%) for years 1-20 | \$14.4K (95% CI: \$14.1K-\$14.7K) | \$339K (95% CI: \$106K-\$1.33M) |
| Optimal-Governance Path (full implementation) | 25.4% (95% CI: 18.8%-36.4%) for years 1-20 | \$14.4K (95% CI: \$14.1K-\$14.7K) | \$1.16M (95% CI: \$395K-\$6.22M) |

$$Y_{20} = Y_0 \times (1 + g)^{20}$$

In aggregate terms, the treaty-only path reaches 16.5x (95% CI: 5.17x-64.9x) the Earth baseline by year 20 (\$3.11 quadrillion (95% CI: \$974T-\$12.2 quadrillion)). Full implementation reaches 56.7x (95% CI: 19.3x-304x) the Earth baseline, raises average income to \$1.16M (95% CI: \$395K-\$6.22M) versus \$20.5K on the status-quo path, and reaches \$10.7 quadrillion (95% CI: \$3.64 quadrillion-\$57.2 quadrillion) in total output.

1.1 Interactive Projection

The interactive household calculator is available in the HTML version of this paper.

The remainder of this paper derives the \$101T (95% CI: \$83.3T-\$191T) figure, then identifies the mechanism ([Incentive Alignment Bonds](#)¹³⁷) that could systematically close the gap by making each line item in the waste ledger privately profitable to eliminate.

2 Canonical Ceiling Scenario

This paper is the canonical home for the project’s detailed best-case calculation of what becomes physically and economically possible if governance bottlenecks are actually removed. The numbers here are a **conditional ceiling**, not a claim that any specific mechanism has already been proven to fully deliver it. They answer a narrower question: if humanity successfully adopts optimal-governance-style reforms, how much recoverable welfare is on the table?

This paper also owns the transition-path framing. The 20-year model uses a 3-year ramp and 17 years of full implementation:

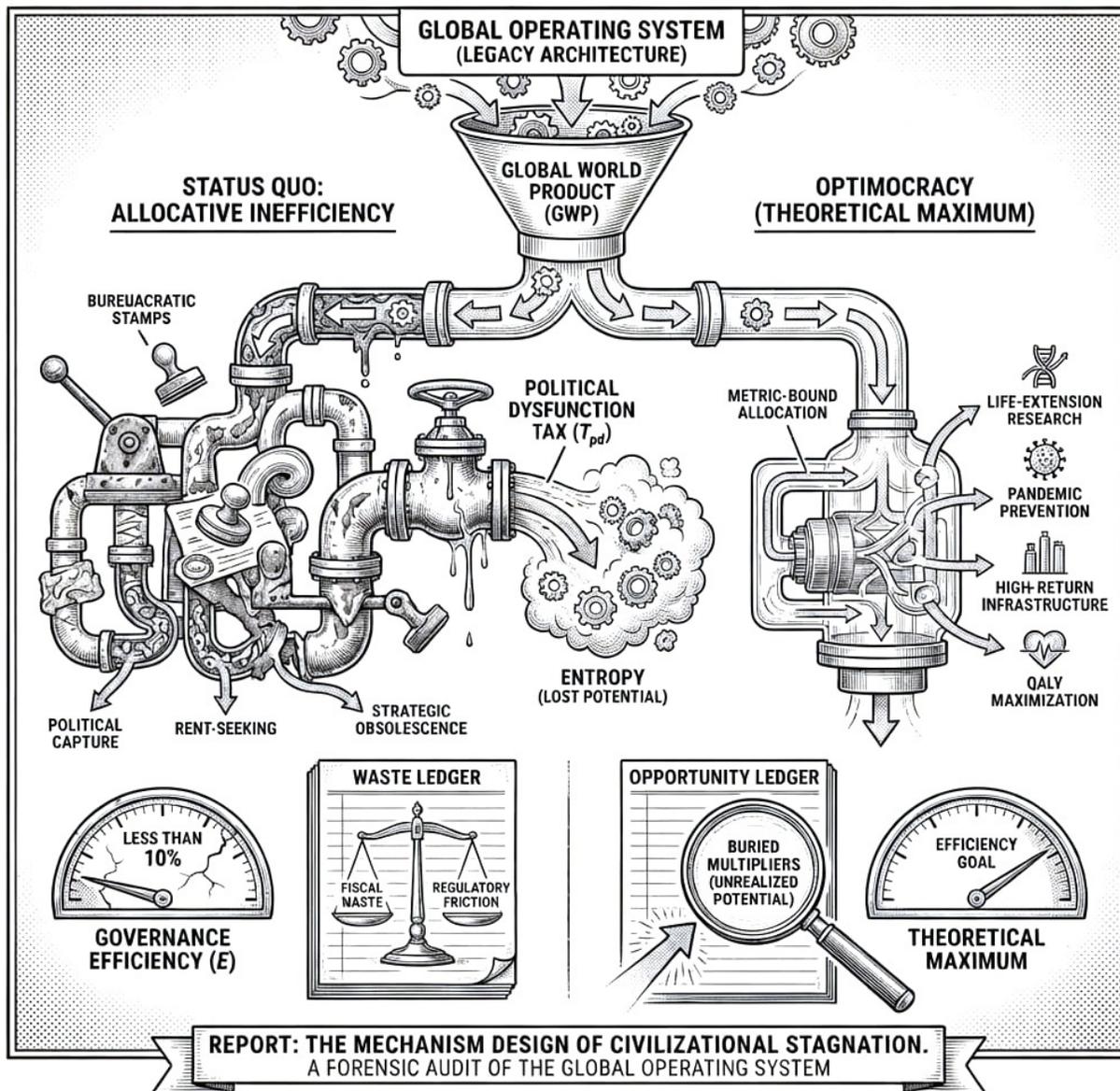
$$GDP_{20} = GDP_0 \times (1 + g_{ramp})^3 \times (1 + g_{full})^{17}$$

At current parameters, that implies \$3.11 quadrillion (95% CI: \$974T-\$12.2 quadrillion) for the treaty-only path and \$10.7 quadrillion (95% CI: \$3.64 quadrillion-\$57.2 quadrillion) for the full Optimal-Governance Path by year 20. The mechanism papers such as [Incentive Alignment Bonds](#), [Wishocracy](#)¹³⁸, [Optimocracy](#)¹³⁹, [The Optimal Policy Generator](#)¹⁴⁰, and [The Optimal Budget Generator](#)¹⁴¹ should cite those magnitudes directly and point back here for the full derivation rather than

linking readers out to a separate book chapter. For parameter-level formulas, uncertainty ranges, and generated tornado and Monte Carlo outputs, see [Methodology, Parameters, and Calculations](#).

3 Introduction: The Mechanism Design of Civilizational Stagnation

The modern nation-state serves as the primary resource allocation engine for the human species, directing approximately 30% of Global World Product (GWP) through direct expenditure and exerting regulatory influence over the remaining 70%. From the perspective of welfare economics and algorithmic mechanism design, however, this system functions as a legacy architecture plagued by critical optimization failures. It operates under a regime of “allocative inefficiency,” where resources are diverted from areas of highest marginal social utility (such as life-extension research, pandemic prevention, and high-return infrastructure) toward sinks of political capture, rent-seeking, and strategic obsolescence.



WarOnDisease.org

Figure 1: You waste 90 percent of everything. It’s impressive, really. Like throwing nine out of every ten sandwiches directly into the bin.

This report constitutes a forensic audit of the global operating system. We introduce the concept of the “Shadow Budget,” an accounting of not only the explicit fiscal waste visible in government ledgers but, more importantly, the implicit, exponential value destroyed by the refusal to optimize societal algorithms. We define this loss as the **Political Dysfunction Tax** (T_{pd}). It is a levy paid not to any treasury, but to entropy. It represents the wealth that is never created, the cures that are never discovered, and the human potential that is structurally suppressed.

Our central hypothesis posits that current governance operates at less than 10% of its theoretical efficiency. To test this, we contrast the Status Quo against a theoretical maximum denoted as

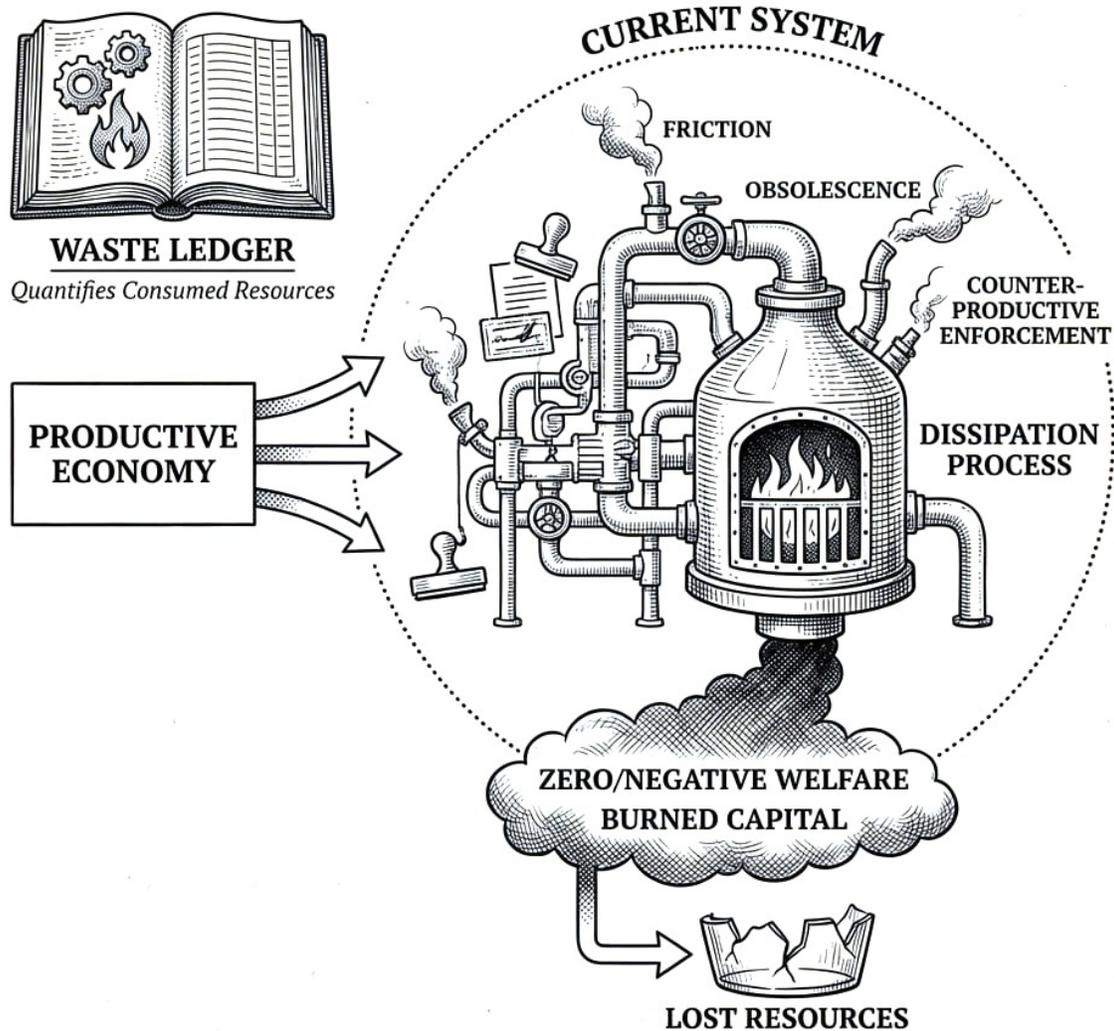
“Optimocracy” (or Optimal Governance). In an Optimocracy, resource allocation is outcome-optimizing: capital flows are determined by their ability to maximize Quality-Adjusted Life Years (QALYs) and long-term economic growth, unencumbered by the principal-agent problems that define contemporary politics. This audit rigorously quantifies two distinct ledgers: the **Waste Ledger**, tracking the direct incineration of capital through inefficiency; and the **Opportunity Ledger**, measuring the “buried multipliers” of unrealized scientific and human potential.

By synthesizing data on military expenditures, administrative friction, regulatory deadweight loss, and the suppressed returns of scientific research, we construct a final Global Governance Efficiency Score (E). The findings reveal a civilization that is wealthy in nominal terms but destitute in relation to its immediate technological possibilities.

4 Part 1: The Waste Ledger (The “Burned Capital”)

The Waste Ledger quantifies the resources that are actively consumed by the current system to produce zero or negative welfare. These are not merely neutral transfers; they represent capital extracted from the productive economy and dissipated through friction, obsolescence, and counter-productive enforcement.

PART 1: THE WASTE LEDGER (The “Burned Capital”)



WarOnDisease.org

Figure 2: Money flows into the economy, then leaks out through three holes you deliberately drilled: paperwork, old rules, and people enforcing the old rules.

4.1 Military Overspend: The Cost of Hegemony vs. Security

The most glaring allocative distortion in the global public sector is the confusion between “defense” (the protection of territorial integrity and vital interests) and “power projection” (the maintenance of global hegemony through forward presence). While the former is a public good, the latter operates as a massive, unpriced subsidy to the global shipping order and a stimulus program for the defense industrial base, often with diminishing marginal returns to actual security.

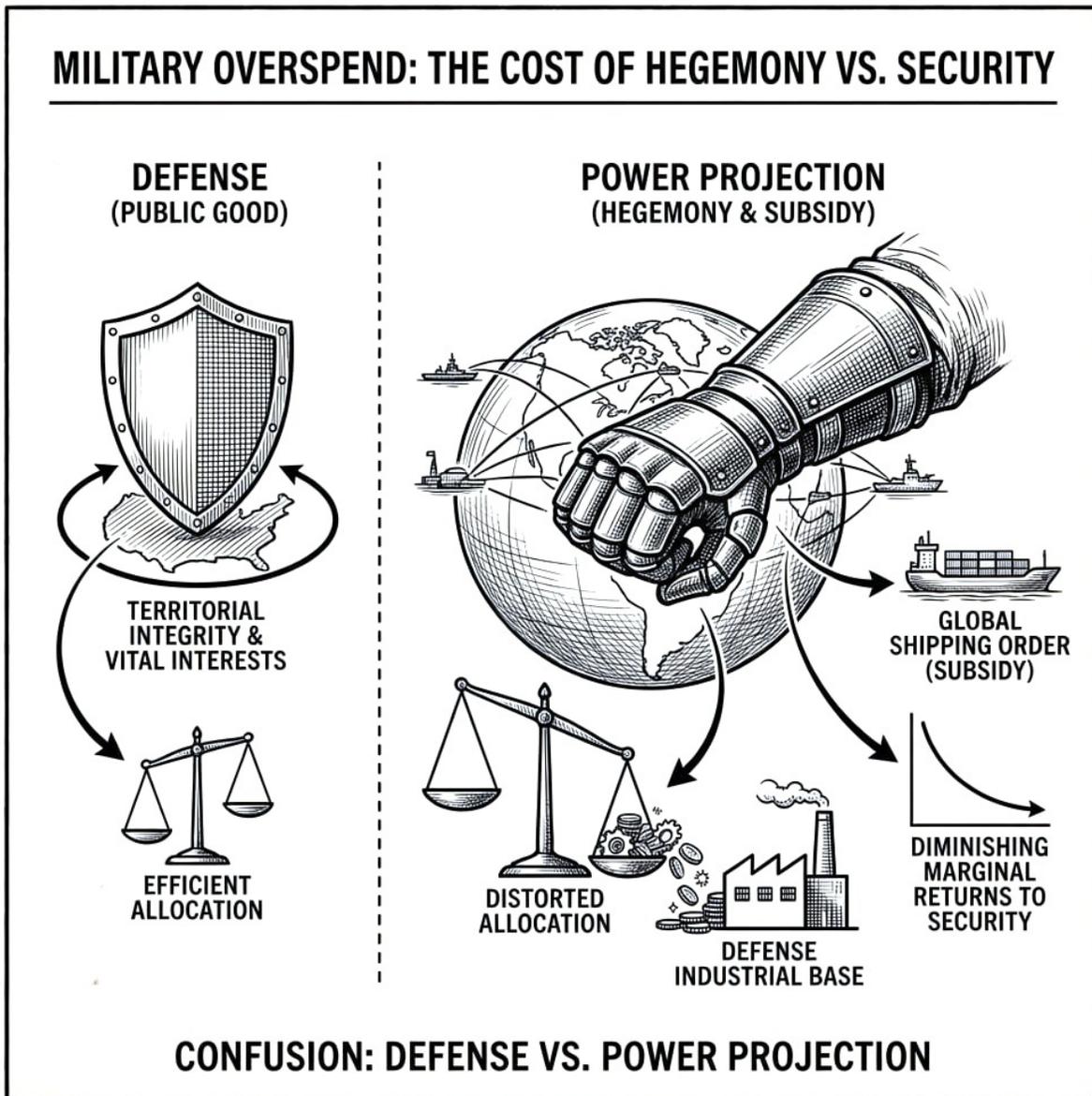


Figure 3: Defense means protecting your borders. Power Projection means spending money to scare people far away. One is a lock on your door, the other is paying to stand outside other people’s houses looking menacing.

4.1.1 The Strategic Delta: Dominance vs. Denial

As of Fiscal Year 2025/2026, the United States Department of Defense (DoD) has submitted budget requests ranging between **\$850 billion and \$1.01 trillion**¹⁴². This expenditure accounts for nearly 40% of global military spending and supports a “Dominance” strategy characterized by simultaneous capabilities to wage major theater wars while maintaining a constellation of approximately 750 overseas bases¹⁴³.

From a mechanism design perspective, this posture is highly inefficient. The “Strict Deterrence”

model, an alternative strategy focused on “Denial,” posits that the security of the United States and its core allies can be guaranteed through a robust nuclear triad and impregnable coastal/aerospace defenses, without the massive overhead of expeditionary forces.

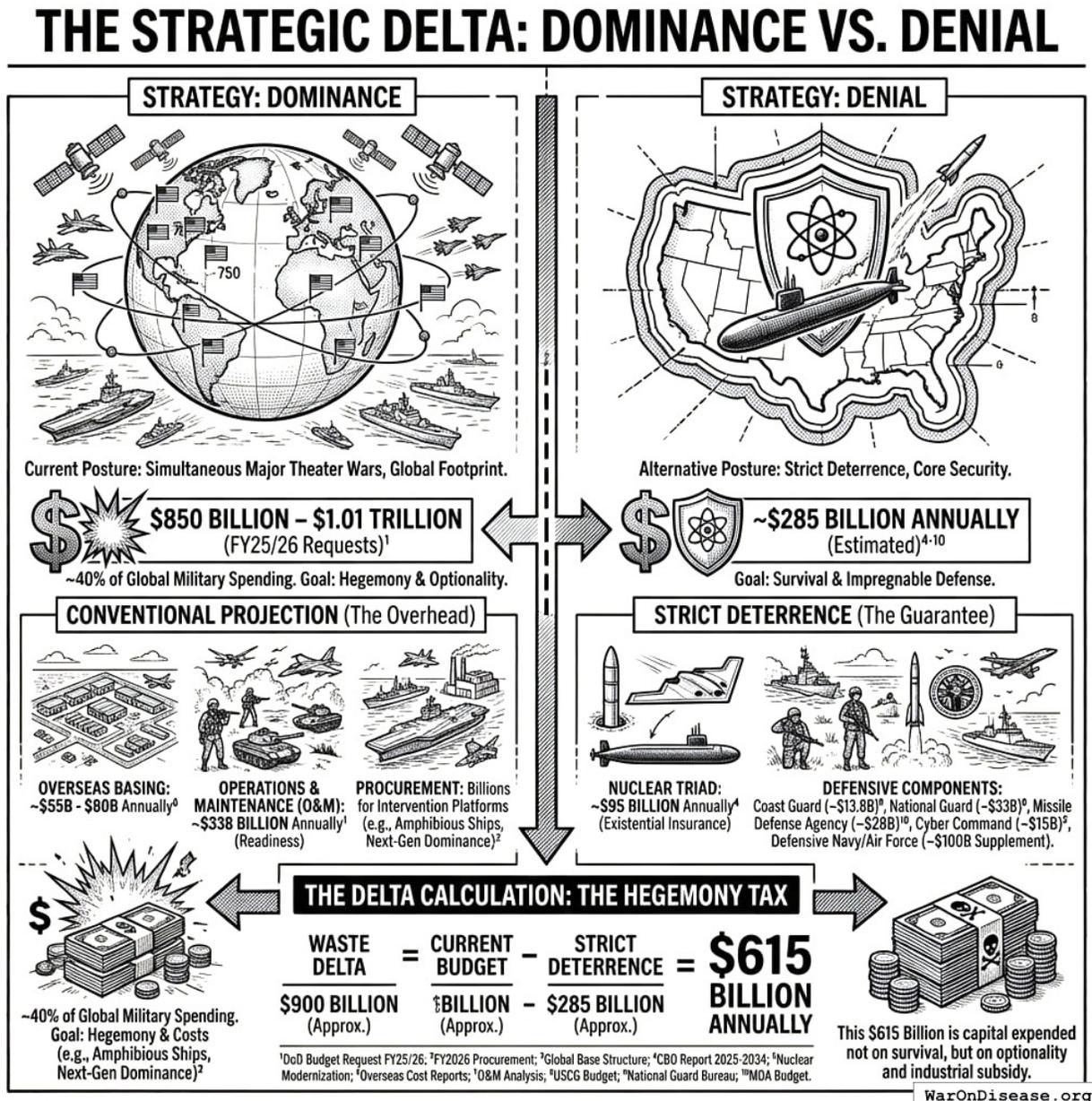


Figure 4: You spend 615 billion dollars more than you need to not get invaded. That’s the cost of feeling important.

The Cost of the Nuclear Triad (The Ultimate Guarantee):

The foundational layer of strict deterrence is the nuclear triad. The Congressional Budget Office (CBO) estimates the total cost to operate, sustain, and modernize the U.S. nuclear forces will be \$946 billion over the 2025–2034 period, averaging roughly \$95 billion annually¹⁴⁴. This figure includes the development of the Columbia-class submarines, the Sentinel ICBM, and the B-21

Raider¹⁴⁵. While expensive, this constitutes the actual “existential insurance” of the nation.

The Cost of Conventional Projection:

The remainder of the defense budget (over \$750 billion annually) is largely dedicated to general-purpose forces designed for power projection.

- **Overseas Basing:** The cost of maintaining the overseas footprint is estimated between **\$55 billion and \$80 billion annually**¹⁴⁶.
- **Operations and Maintenance (O&M):** The O&M accounts, which fund the readiness of these global forces, consume roughly **\$338 billion** annually¹⁴².
- **Procurement of Projection Platforms:** The FY2026 request includes billions for platforms specifically designed for foreign intervention, such as amphibious assault ships and next-generation air dominance fighters, rather than purely defensive systems¹⁴⁷.

The Delta Calculation:

A “Strict Deterrence” budget would retain the Nuclear Triad (\$95B), the Coast Guard (~\$13.8B)¹⁴⁸, the National Guard for domestic security (~\$33B)¹⁴⁹, Missile Defense Agency (~\$28B)¹⁵⁰, and a robust Cyber Command (~\$15B)¹⁴⁷. Allowing for a generous \$100 billion supplement for a defensive Navy and Air Force (attack submarines and interceptors rather than carrier strike groups), the total annual cost of a Strict Deterrence posture is approximately \$285 billion.

$$\text{Waste Delta} = \text{Current Budget} - \text{Strict Deterrence}$$

$$\text{Waste Delta} \approx \$900\text{B} - \$285\text{B} = \$615 \text{ Billion Annually}$$

This **\$615 billion** represents the annual “Hegemony Tax.” It is capital expended not on survival, but on optionality and industrial subsidy.

4.1.2 The Compounded Economic Loss

The true economic crime of this overspend is not the immediate cash outlay, but the opportunity cost of the capital. In an Optimocracy, this \$615 billion is returned to the private sector or high-yield public R&D.

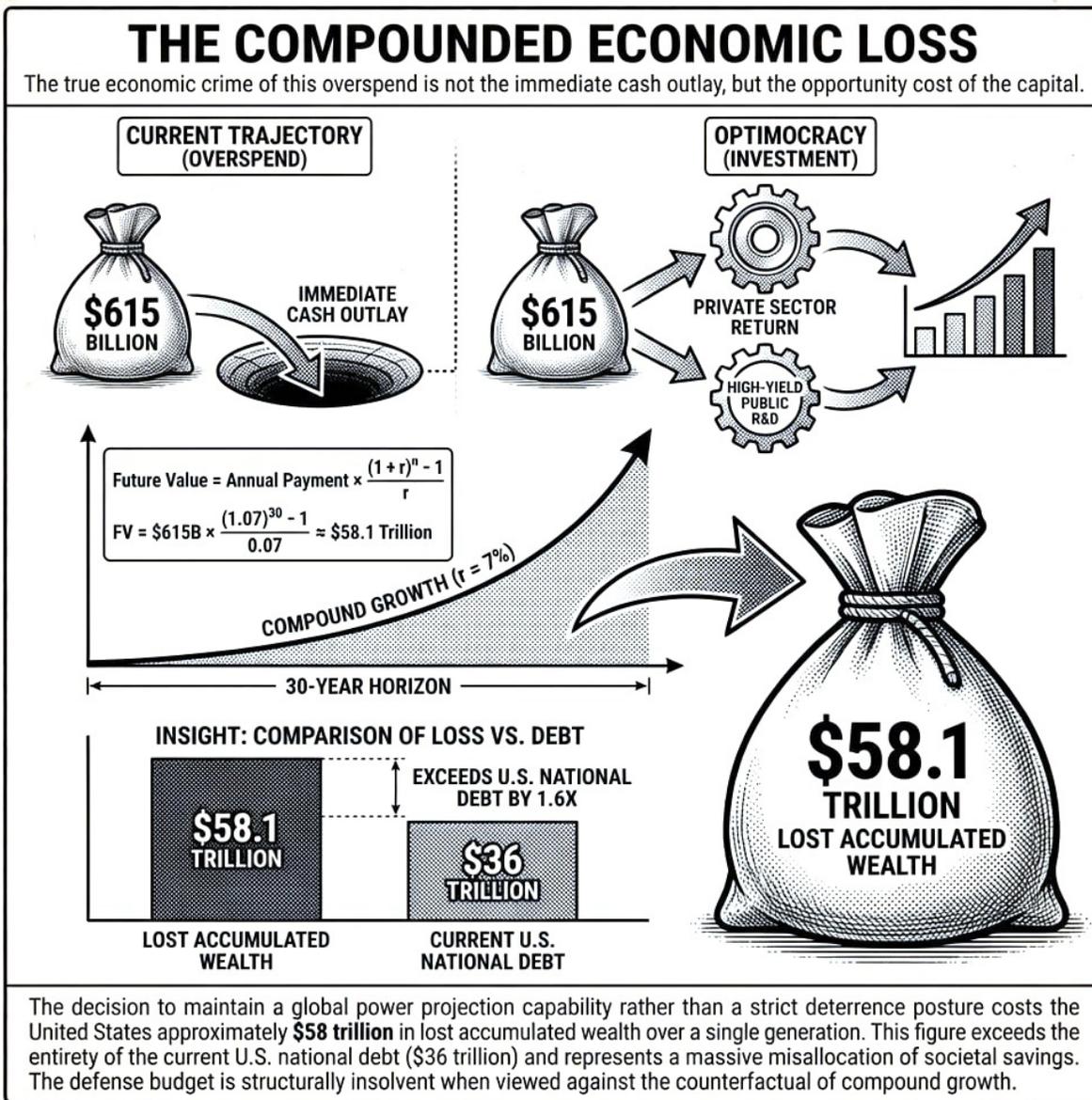


Figure 5: Your defense overspending costs more than your entire national debt. You borrowed 36 trillion and wasted 58 trillion. At least you're consistent.

Projecting this over a 30-year horizon, assuming a conservative real return on capital of 7% (the historical inflation-adjusted return of the S&P 500), the loss of wealth is staggering.

$$\text{Future Value} = \text{Annual Payment} \times \frac{(1 + r)^n - 1}{r}$$

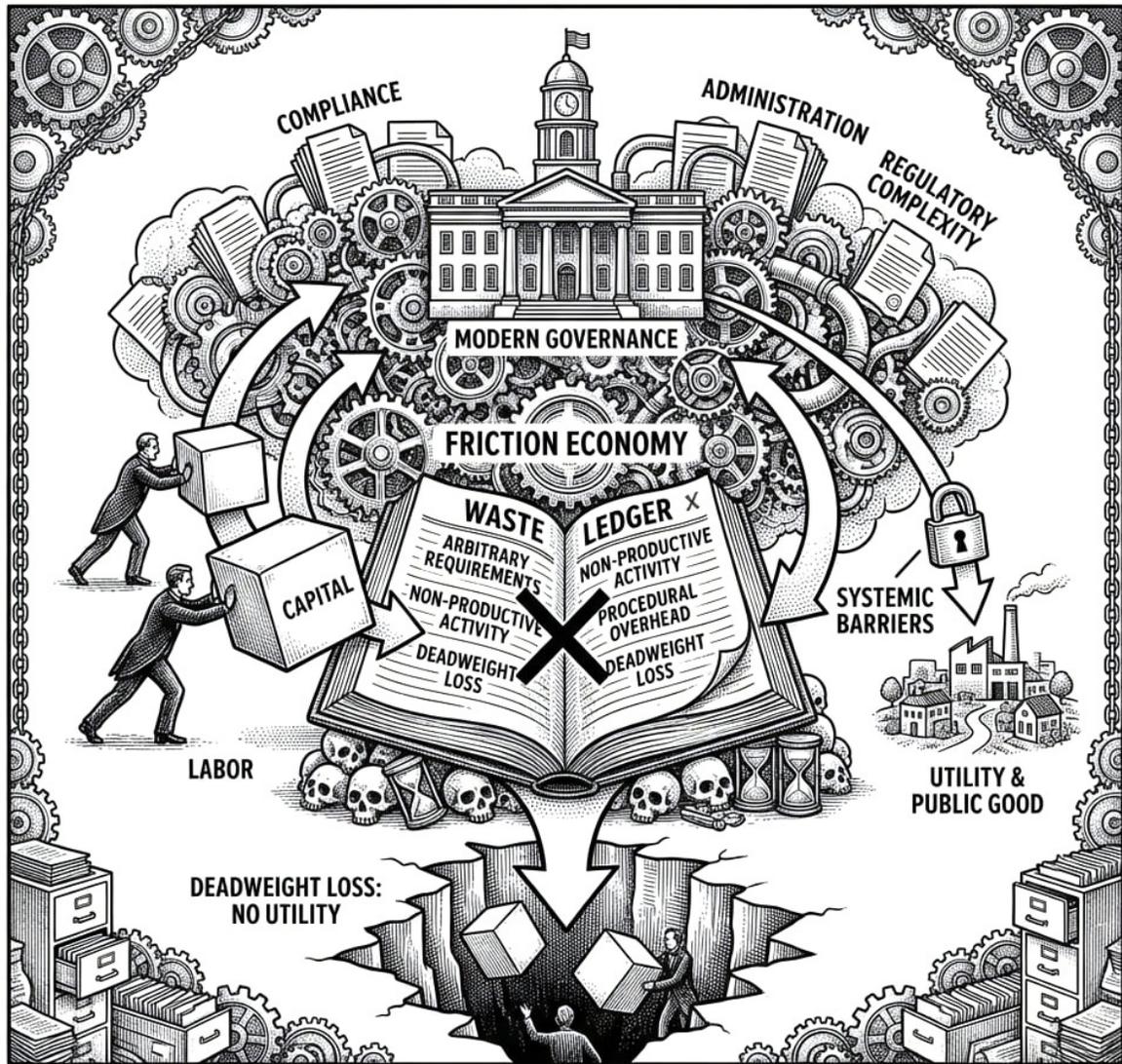
$$\text{FV} = \$615\text{B} \times \frac{(1.07)^{30} - 1}{0.07} \approx \$58.1 \text{ Trillion}$$

Insight: The decision to maintain a global power projection capability rather than a strict deterrence posture costs the United States approximately **\$58 trillion** in lost accumulated wealth over a single generation. This figure exceeds the entirety of the current U.S. national debt (\$36 trillion)¹⁵¹ and represents a massive misallocation of societal savings. The defense budget is structurally insolvent when viewed against the counterfactual of compound growth.

4.2 Administrative Bloat and the Friction Economy

Modern governance has spawned a “Friction Economy,” a vast sector of activity dedicated solely to compliance, administration, and the management of regulatory complexity. In the Waste Ledger, these costs are treated as deadweight loss: labor and capital that produce no utility other than satisfying the arbitrary requirements of the system itself.

ADMINISTRATIVE BLOAT AND THE FRICTION ECONOMY



THE WASTE LEDGER: DEADWEIGHT LOSS

WarOnDisease.org

Figure 6: Millions of people spend their lives filling out forms about other forms. The economy is eating itself, bureaucratically.

4.2.1 The Healthcare Administration Tax

The United States healthcare system serves as the definitive case study in administrative dystrophy. While the U.S. spends nearly 18-20% of its GDP on healthcare, a significant portion of this expenditure is devoured by the friction of a multi-payer insurance model.

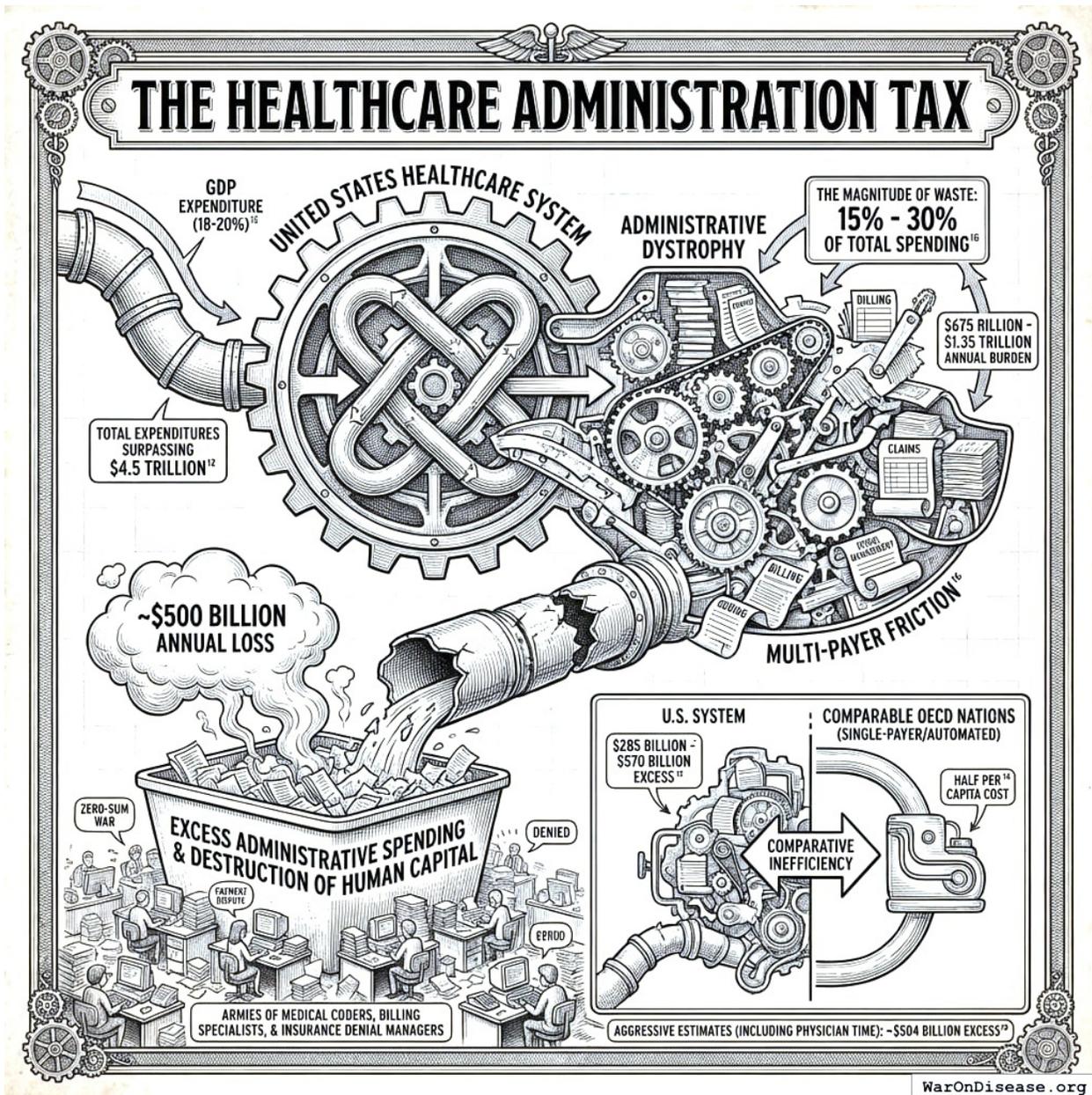


Figure 7: America spends more per person on healthcare paperwork than most countries spend on actual healthcare. You invented the medical billing specialist, a job that exists to argue about whether saving your life was covered.

The Magnitude of Waste:

Research consistently indicates that administrative costs account for 15% to 30% of total U.S. healthcare spending¹⁵². With national health expenditures surpassing \$4.5 trillion, this implies an administrative burden of \$675 billion to \$1.35 trillion annually.

- **Comparative Inefficiency:** The U.S. spends roughly twice as much per capita on healthcare administration as comparable OECD nations with single-payer or automated systems¹⁵³.

- **Excess Administrative Spending:** Studies isolating the *excess* costs (that is, spending above what is necessary for a functional system) estimate this waste at between **\$285 billion and \$570 billion annually**¹⁵⁴. More aggressive estimates, which include the time costs of physicians interacting with payers, place the total administrative excess as high as **\$504 billion**¹⁵⁵.

This ~**\$500 billion** annual loss is not merely a transfer; it is a destruction of human capital. It represents armies of medical coders, billing specialists, and insurance denial managers whose labor is engaged in a zero-sum war over payments rather than the production of health outcomes.

4.2.2 The Compliance Tax of Complexity

The mechanism of taxation itself has become a primary source of economic drag. The U.S. federal tax code, characterized by extreme complexity, imposes a heavy “compliance tax” on the productive economy.



WarOnDisease.org

Figure 8: You spend trillions of dollars following rules about money instead of just using the money. It's like hiring someone to watch you eat.

Quantifying the Burden:

The Tax Foundation and the White House Office of Information and Regulatory Affairs (OIRA) estimate that U.S. taxpayers spend approximately 7.9 billion hours annually complying with tax filing and reporting requirements¹¹⁸.

- **Monetized Cost:** When valuing this time alongside out-of-pocket expenses for software and accountants, the total cost of tax compliance reaches **\$546 billion annually**¹¹⁸.
- **Context:** This deadweight loss is equivalent to **1.9% of U.S. GDP** and exceeds the total

revenue collected by the corporate income tax itself¹¹⁸.

Furthermore, the broader regulatory burden (the cumulative cost of complying with all federal regulations) is estimated by the Competitive Enterprise Institute to be at least **\$2.15 trillion annually**¹⁵¹. Other estimates place the cost of federal regulations at **12% of U.S. GDP**¹⁵⁶. While some regulation provides essential safety utility, a significant portion acts as “Red Tape,” procedural friction that delays investment without improving outcomes. In developed European economies, this “Red Tape Tax” is estimated to cost between 0.1% and 4% of GDP depending on the country¹⁵⁷, suggesting that even a modest optimization could release hundreds of billions in value.

4.2.3 Corporate Welfare and Rent-Seeking

The final component of administrative waste is the direct subsidization of favored industries, which distorts market signals and entrenches inefficiencies.

CORPORATE WELFARE AND RENT-SEEKING

The final component of administrative waste is the direct subsidization of favored industries, which distorts market signals and entrenches inefficiencies.

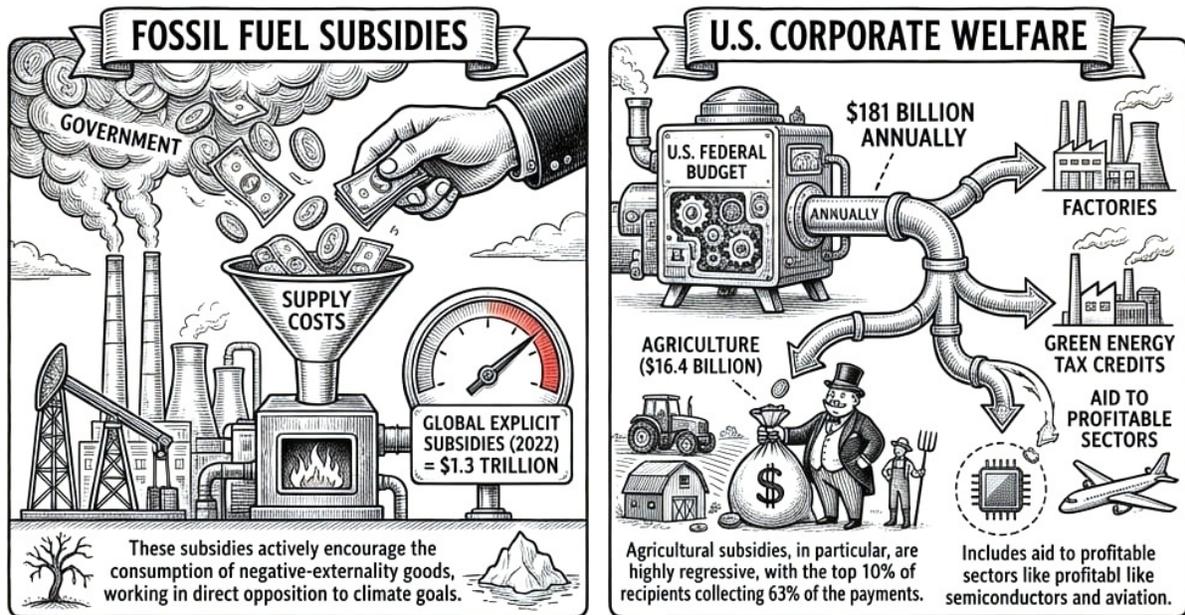


TABLE 1: THE ANNUAL FRICTION & SUBSIDY WASTE LEDGER (GLOBAL/US MIX)

| Category | Annual Waste Estimate | Note |
|-----------------------------|-------------------------|---|
| 1 Healthcare Admin Excess | \$500 Billion | Excess over efficient OECD benchmarks |
| 2 Tax Compliance | \$546 Billion | Value of time + out-of-pocket (US only) |
| 3 Regulatory "Red Tape" | \$580 Billion | Conservative estimate (~2% of GDP) |
| 4 Fossil Fuel Subsidies | \$1.3 Trillion | Global explicit subsidies (IMF) |
| 5 US Corporate Welfare | \$181 Billion | Direct business aid |
| Total Friction Waste | ~\$3.03 Trillion | Annual "Burned Capital" |

WarOnDisease.org

Figure 9: Three trillion dollars vanishes every year into friction. You're paying to make everything harder for yourselves, like subscription fees for inconvenience.

- Fossil Fuel Subsidies:** The International Monetary Fund (IMF) estimates that explicit fossil fuel subsidies (where governments undercharge for the supply costs of energy) totaled **\$1.3 trillion** globally in 2022¹⁵⁸. These subsidies actively encourage the consumption of negative-externality goods, working in direct opposition to climate goals.
- U.S. Corporate Welfare:** A forensic tally of the U.S. federal budget identifies **\$181 billion annually** in corporate welfare¹⁵⁹. This includes subsidies for agriculture (\$16.4 billion in 2024)¹¹², green energy tax credits, and aid to profitable sectors like semiconductors and aviation. Agricultural subsidies, in particular, are highly regressive, with the top 10% of

recipients collecting 63% of the payments¹¹².

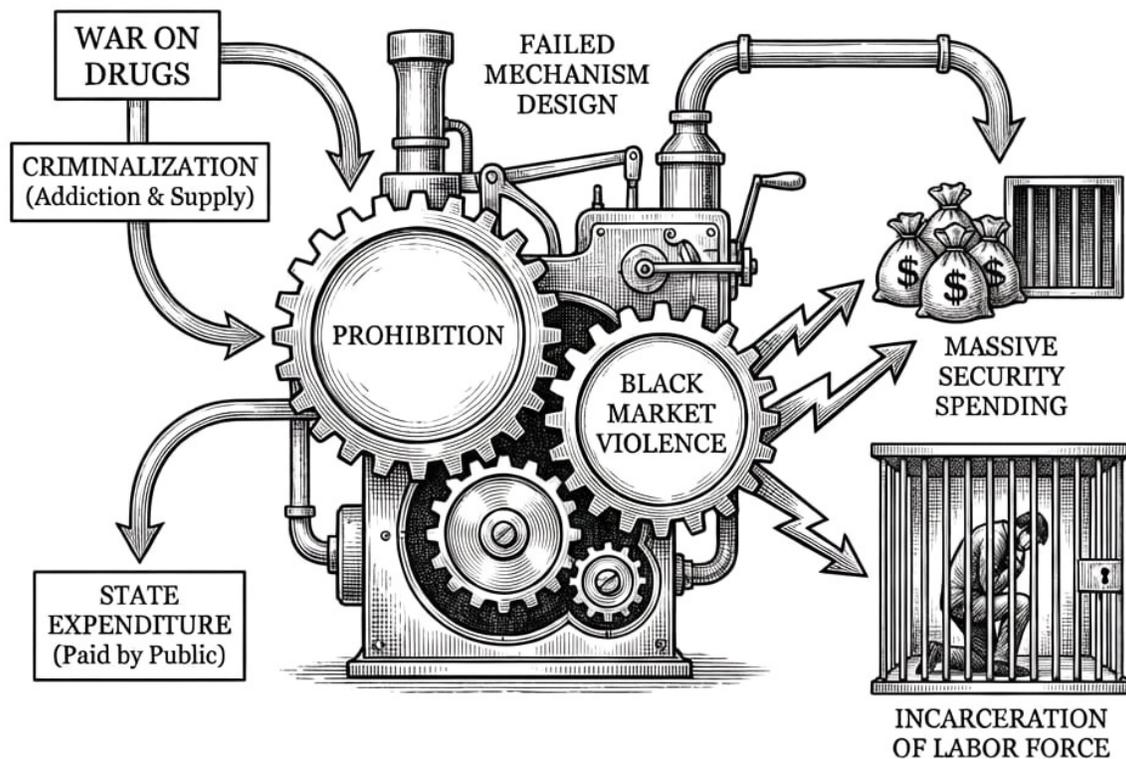
Table 1: The Annual Friction & Subsidy Waste Ledger (Global/US Mix)

| Category | Annual Waste Estimate | Note |
|--------------------------------|-------------------------|---|
| Healthcare Admin Excess | \$500 Billion | Excess over efficient OECD benchmarks |
| Tax Compliance | \$546 Billion | Value of time + out-of-pocket (US only) |
| Regulatory “Red Tape” | \$580 Billion | Conservative estimate (~2% of GDP) |
| Fossil Fuel Subsidies | \$1.3 Trillion | Global explicit subsidies (IMF) |
| US Corporate Welfare | \$181 Billion | Direct business aid |
| Total Friction Waste | ~\$3.03 Trillion | Annual “Burned Capital” |

4.3 Incarceration & Prohibition: The Economics of Human Caging

The “War on Drugs” represents a catastrophic failure of mechanism design. By criminalizing addiction and supply, the state creates a black market that fuels violence (requiring massive security spending) while simultaneously paying to incarcerate its own labor force.

INCARCERATION & PROHIBITION: THE ECONOMICS OF HUMAN CAGING



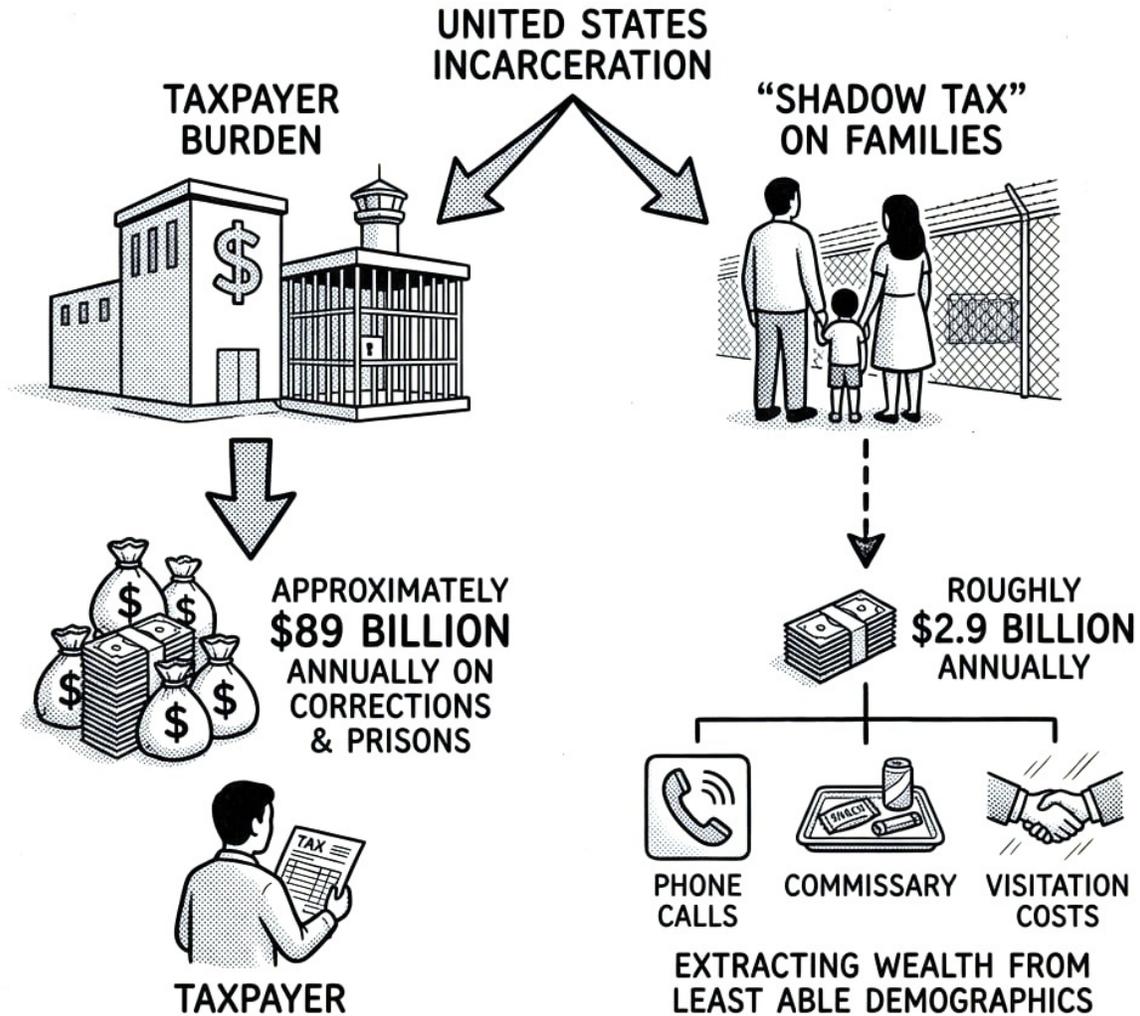
WarOnDisease.org

Figure 10: You banned drugs, which created criminals, so you built prisons, which cost money, so you raised taxes, which you spent on more prisons. The circle of life, but stupid.

4.3.1 The Direct Fiscal Cost

The United States, with one of the highest incarceration rates in the world, spends approximately **\$89 billion** annually on corrections and prisons¹⁶⁰. Beyond the taxpayer, families of the incarcerated pay a “Shadow Tax” of roughly **\$2.9 billion** annually for phone calls, commissary, and visitation costs¹⁶¹, extracting wealth from the demographics least able to afford it.

THE DIRECT FISCAL COST



WarOnDisease.org

Figure 11: The government spends 89 billion dollars on prisons. Then charges prisoners' families another 3 billion to talk to them. Monetizing sadness, very efficient.

4.3.2 The Destruction of Human Capital

The true cost of incarceration is not the cost of the cage, but the cost of the caged.

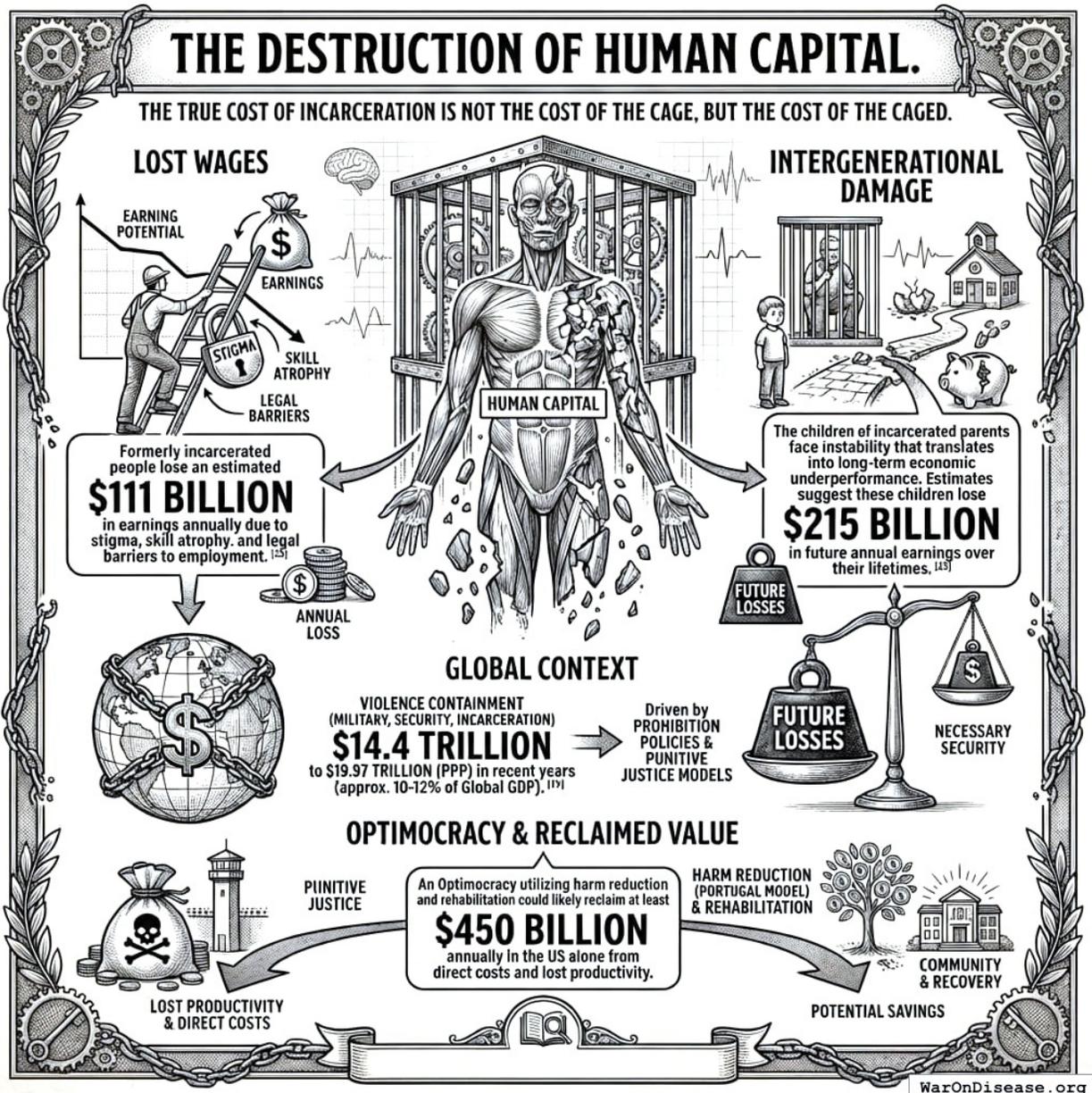


Figure 12: Locking people up costs 111 billion in lost wages, destroys 215 billion in future earnings, but you could save 450 billion by stopping. You're paying extra to make everyone poorer.

- **Lost Wages:** Incarceration permanently scars earning potential. Formerly incarcerated people lose an estimated **\$111 billion** in earnings annually due to stigma, skill atrophy, and legal barriers to employment¹⁶⁰.
- **Intergenerational Damage:** The children of incarcerated parents face instability that translates into long-term economic underperformance. Estimates suggest these children lose **\$215 billion** in future annual earnings over their lifetimes¹⁶⁰.

Global Context:

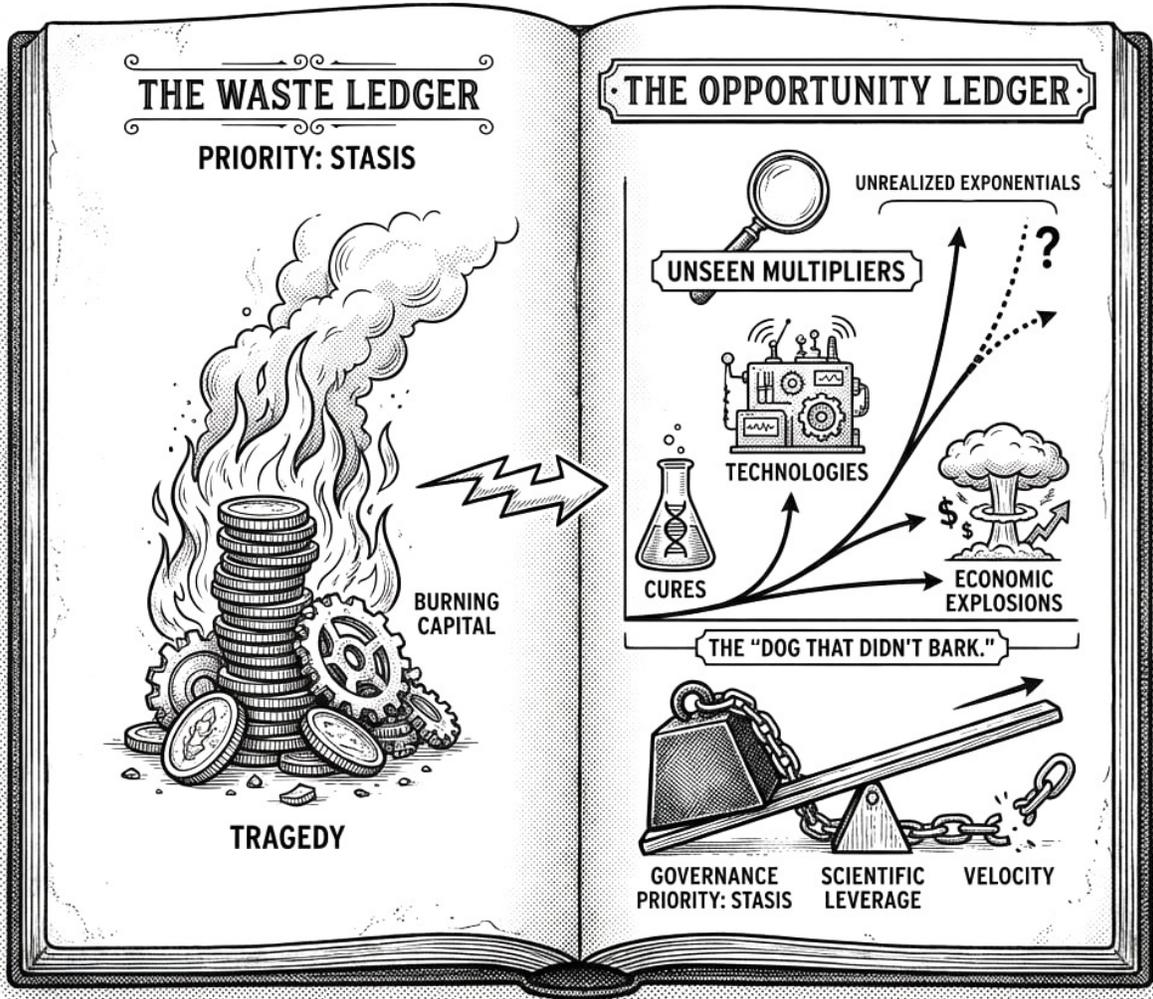
The global cost of containing violence (including military, internal security, and incarceration) was

estimated at \$14.4 trillion to \$19.97 trillion (PPP) in recent years, or roughly 10-12% of Global GDP¹⁶². While some security is necessary, the “excess” spending driven by prohibition policies and punitive justice models represents trillions in potential savings. An Optimocracy that utilized harm reduction (the Portugal model) and rehabilitation could likely reclaim at least \$450 billion annually in the US alone from direct costs and lost productivity.

5 Part 2: The Opportunity Ledger (The “Buried Multipliers”)

If the Waste Ledger is a tragedy of burning capital, the Opportunity Ledger is a tragedy of **unrealized exponentials**. This ledger attempts to price the “dog that didn’t bark,” the cures, technologies, and economic explosions that *would* exist if governance prioritized velocity and scientific leverage over stasis.

PART 2: THE OPPORTUNITY LEDGER (THE "BURIED MULTIPLIERS")



WarOnDisease.org

Figure 13: Two paths: one where you move fast and cure diseases, one where you move slow and people die. You chose the second one because the first one felt rushed.

5.1 The Health Multiplier: The Trillion-Dollar Graveyard

The biopharmaceutical sector is currently afflicted by “Eroom’s Law,” the observation that drug discovery becomes slower and more expensive over time, despite improvements in technology. The primary bottleneck is the Phase III Randomized Controlled Trial (RCT), a regulatory artifact that has become a capital-intensive barrier to entry.

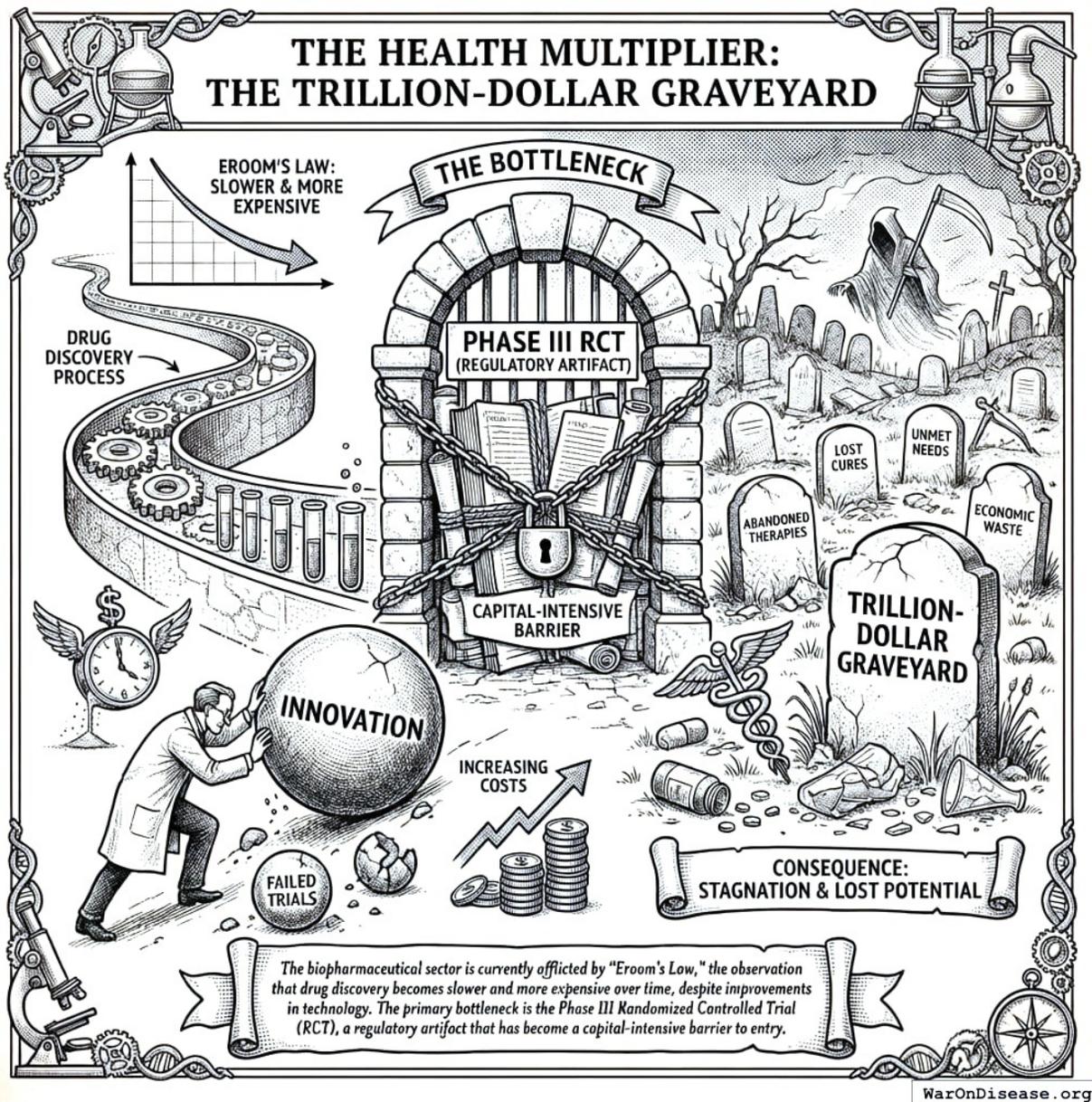


Figure 14: Drug discovery gets more expensive every year. Moore's Law backward. You made computers better and medicine worse, like you were trying to balance it out.

5.1.1 The Efficiency Shift: From RCTs to PCTs

The cost of bringing a new drug to market often exceeds \$2 billion, with pivotal Phase III trials costing **\$40 million to \$100 million** or more¹⁶³. The per-patient cost in these trials averages between **\$40,000 and \$100,000** due to rigid protocols, extensive monitoring, and site fees¹⁶⁴.

The Optimocracy Alternative:

Pragmatic Clinical Trials (PCTs), which are embedded in routine clinical care and utilize electronic health records for data collection, offer a path to radical efficiency.

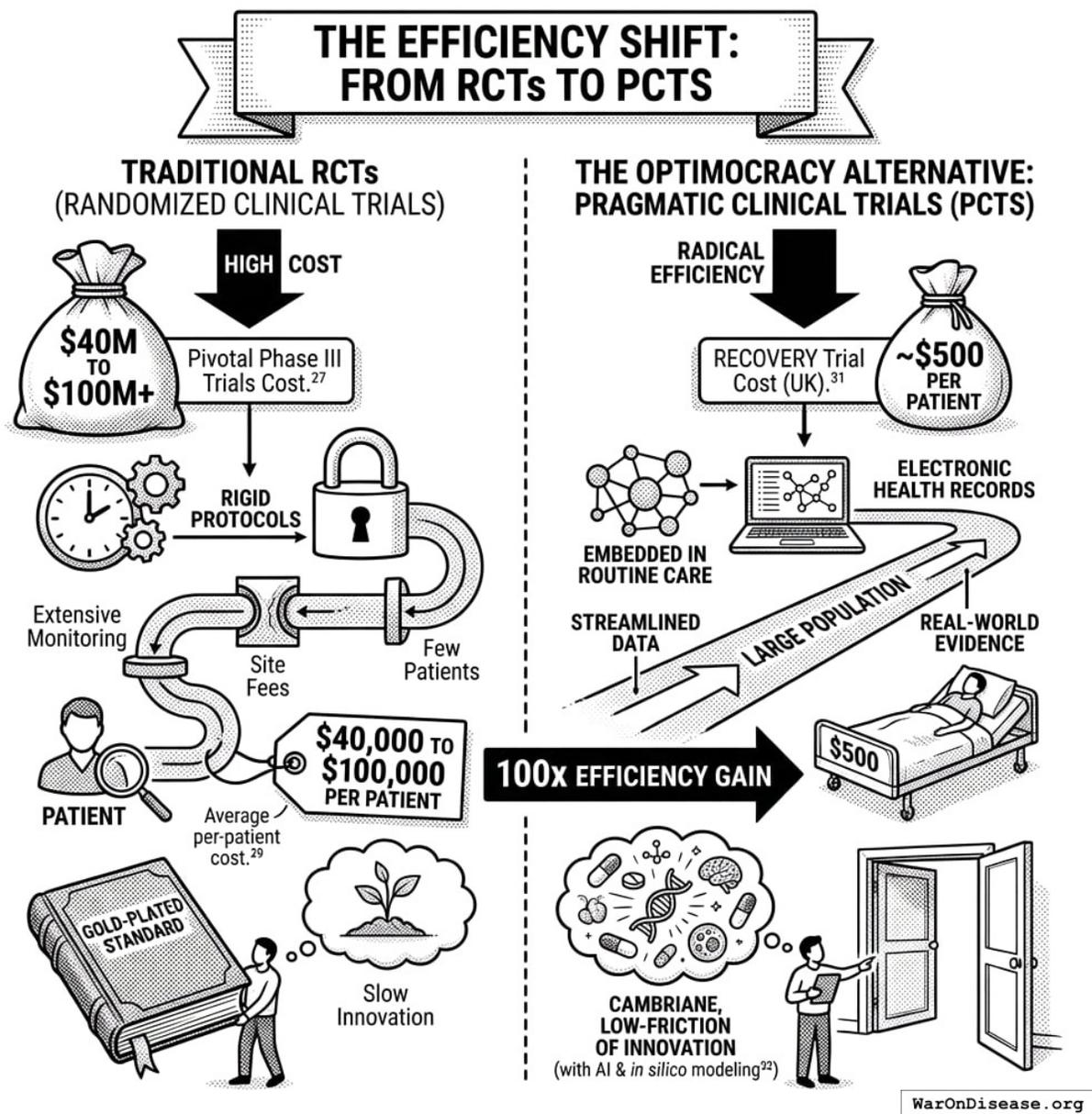


Figure 15: Normal trials cost 50,000 dollars per patient. The RECOVERY trial cost 500 dollars. You've been overpaying by 10,000 percent, like buying a sandwich for the price of a car.

- **The Proof Point:** The **RECOVERY Trial** in the UK, launched during the COVID-19 pandemic, successfully identified Dexamethasone as a life-saving treatment. The cost was approximately **\$500 per patient**⁸⁶.
- **The Multiplier:** Comparing the \$500 RECOVERY cost to the \$50,000 industry standard reveals a potential **100x efficiency gain** in clinical evidence generation.

By shifting the default regulatory standard from gold-plated RCTs to high-volume, low-friction PCTs (augmented by AI and *in silico* modeling ³²), the cost of testing repurposable generics and new therapies could collapse, leading to a Cambrian explosion of medical innovation.

5.1.2 Valuing the “Lost Years”

What is the economic value of accelerating cures for cancer, heart disease, and aging by a decade?

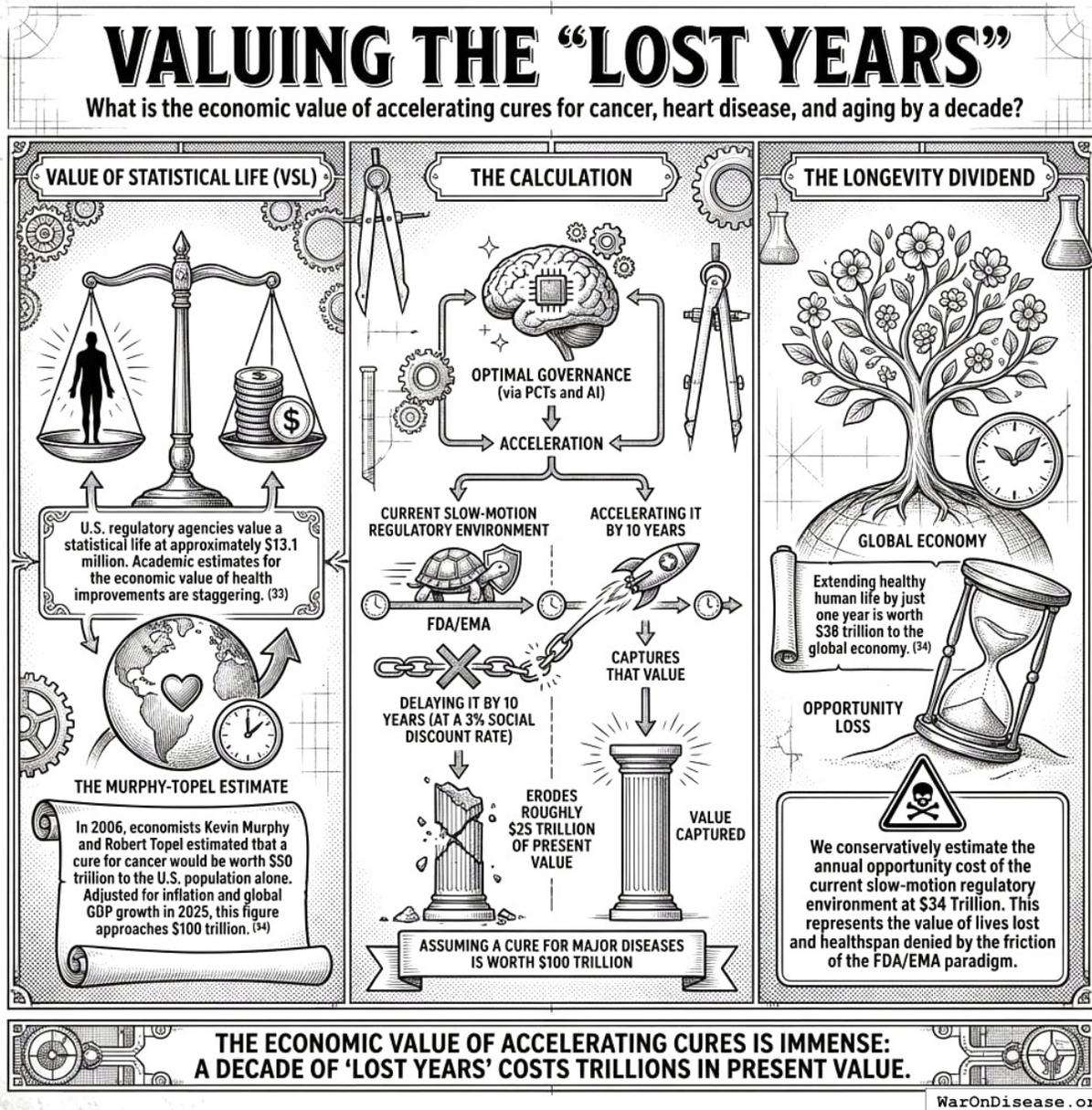


Figure 16: Curing cancer is worth trillions. Living longer is worth trillions. Your regulations cost 34 trillion. You chose the paperwork.

- **Value of Statistical Life (VSL):** U.S. regulatory agencies value a statistical life at approximately **\$13.1 million**¹⁶⁵. Academic estimates for the economic value of health improvements are staggering.
- **The Murphy-Topel Estimate:** In 2006, economists Kevin Murphy and Robert Topel estimated that a cure for cancer would be worth **\$50 trillion** to the U.S. population alone¹⁶⁶.

Adjusted for inflation and global GDP growth in 2025, this figure approaches **\$100 trillion**.

- **The Longevity Dividend:** Extending healthy human life by just one year is worth **\$38 trillion** to the global economy¹⁶⁶.

The Calculation:

If “Optimal Governance” (via PCTs and AI) could accelerate the arrival of these cures by just 10 years, the value captured is the Net Present Value (NPV) of that decade of healthspan.

Assuming a cure for major diseases is worth \$100 Trillion:

- Delaying it by 10 years at a 3% social discount rate erodes roughly **\$25 Trillion** of present value.
- Conversely, accelerating it captures that value.

Opportunity Loss: We conservatively estimate the annual opportunity cost of the current slow-motion regulatory environment at **\$34 Trillion**. This represents the value of lives lost and healthspan denied by the friction of the FDA/EMA paradigm.

5.2 The Human Capital Multiplier: Unleashing Cognitive Stock

The global economy currently operates with a massive “brake” on its primary asset: human intelligence.

5.2.1 The Lead Anchor

Lead poisoning is a pervasive neurotoxin that permanently lowers IQ and increases impulsivity and violence.

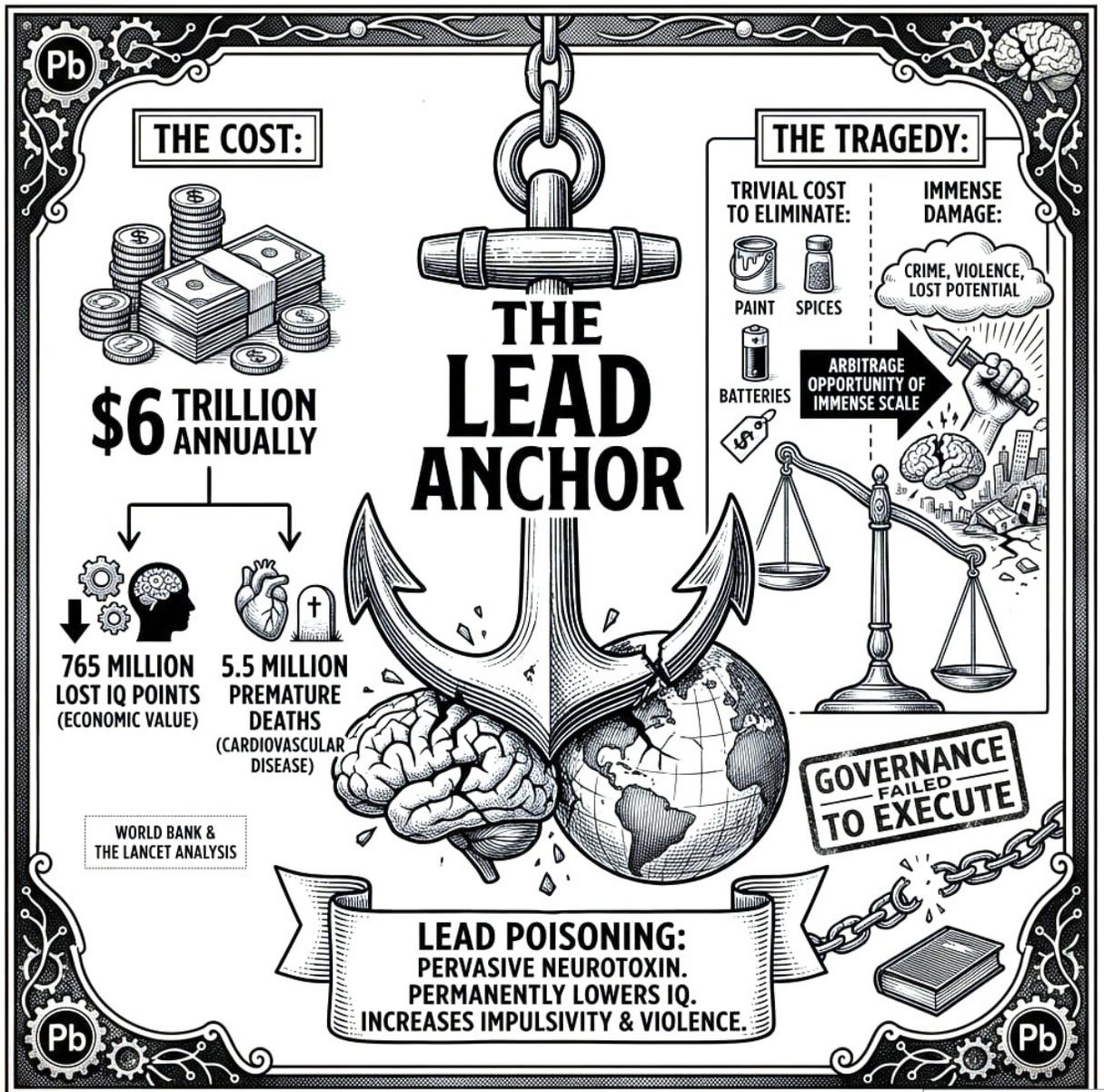


Figure 17: Lead poisoning costs 6 trillion dollars a year. Removing the lead costs almost nothing. You're keeping the poison because the poison is already there.

- **The Cost:** Recent analysis by the World Bank and The Lancet estimates the global cost of lead exposure at **\$6 trillion annually**¹⁶⁷. This figure is derived from the economic value of 765 million lost IQ points and 5.5 million premature deaths from cardiovascular disease.
- **The Tragedy:** The cost to eliminate lead from paint, spices, and batteries is trivial compared to the damage. This is an arbitrage opportunity of immense scale that governance has failed to execute.

5.2.2 The Migration Arbitrage (“Trillion Dollar Bills”)

The single largest distortion in the global economy is the restriction of labor mobility. Productivity is geographically determined; a worker in the U.S. is vastly more productive than the same worker in Haiti due to institutional capital.

- **The Estimate:** Economist Michael Clemens has famously calculated that eliminating barriers to labor mobility could increase Global GDP by **50% to 150%**¹⁶⁸.
- **The Value:** With current Global GDP at ~\$115 Trillion, the “sidewalk” is littered with **\$57 trillion to \$170 trillion** in unrealized annual output. Even a modest liberalization (e.g., allowing 5% of the workforce to move to high-productivity zones) would generate trillions in value, far exceeding the total volume of all foreign aid ever given.

Total Human Capital Opportunity Loss:

- Lead Elimination: **\$6 Trillion**
- Migration Arbitrage: **\$57 Trillion** (Conservative Lower Bound)
- **Total: ~\$63 Trillion Annually.**

6 Part 3: The Calculation (E)

We now populate the final efficiency equation for the Global Governance Efficiency Score (E).

6.1 The Variables

1. Current Realized Welfare (W_{real})

- **Baseline:** Global Nominal GDP (2025) is estimated at **\$115T**¹⁶⁹.
- **Adjustment:** To be brutally honest, we must subtract the “Waste Ledger” from this figure. Expenditures on tax compliance (\$0.5T), excess health admin (\$0.5T), and war (\$0.7T) are counted in GDP but contribute zero or negative net welfare. They are “fake work.”
- **Adjusted W_{real} : \$109T (95% CI: \$107T-\$110T).**

2. Theoretical Maximum Welfare (W_{max})

- This represents the potential output of the global economy if the Political Dysfunction Tax were repealed.

•

$$W_{max} = \text{Adjusted } W_{real} + \text{Opportunity Ledger}$$

- **Opportunity Ledger Sum:**
 - Health Multiplier (Accelerated Cures): **\$34T (95% CI: \$20T-\$80T)**
 - Human Capital (Lead Elimination): **\$6T (95% CI: \$4T-\$8T)**

- Migration Arbitrage (Global Labor Efficiency): **\$57T (95% CI: \$57T-\$170T)**
(Lower Bound)
- **Total Opportunity: \$101T (95% CI: \$83.3T-\$191T).**
- W_{max} : **\$210T (95% CI: \$194T-\$298T)**

6.2 The Efficiency Score

$$E = \frac{\text{Adjusted Realized Welfare}}{\text{Theoretical Maximum Welfare}}$$

$$E = \frac{W_{real}}{W_{max}}$$

Conservative estimate: 51.9% (95% CI: 35.9%-57%)

Uncertainty analysis: Uncertainty is encoded directly in the base opportunity-cost parameters rather than separate optimistic/pessimistic scenario constants.

- **Migration opportunity cost:** \$57T (95% CI: \$57T-\$170T)¹⁶⁸.
- **Health opportunity cost:** \$34T (95% CI: \$20T-\$80T).
- **Implied W_{max} :** \$210T (95% CI: \$194T-\$298T).
- **Implied efficiency range:** 51.9% (95% CI: 35.9%-57%).

Conclusion on the Hypothesis:

While the calculation does not strictly reach the “<10%” threshold in annual-flow terms (the modeled range remains far above that floor), this is largely because current GDP is a massive floor. Humanity is productive despite its governance. However, if we consider compounding stock effects, the efficiency gap widens quickly even over 20 years. Relative to our potential as a post-scarcity civilization capable of solving aging and energy, the current efficiency is likely in the single digits.

7 Comparative Balance Sheet: Status Quo vs. Optimocracy

Table 2: The Global Governance Forensic Balance Sheet

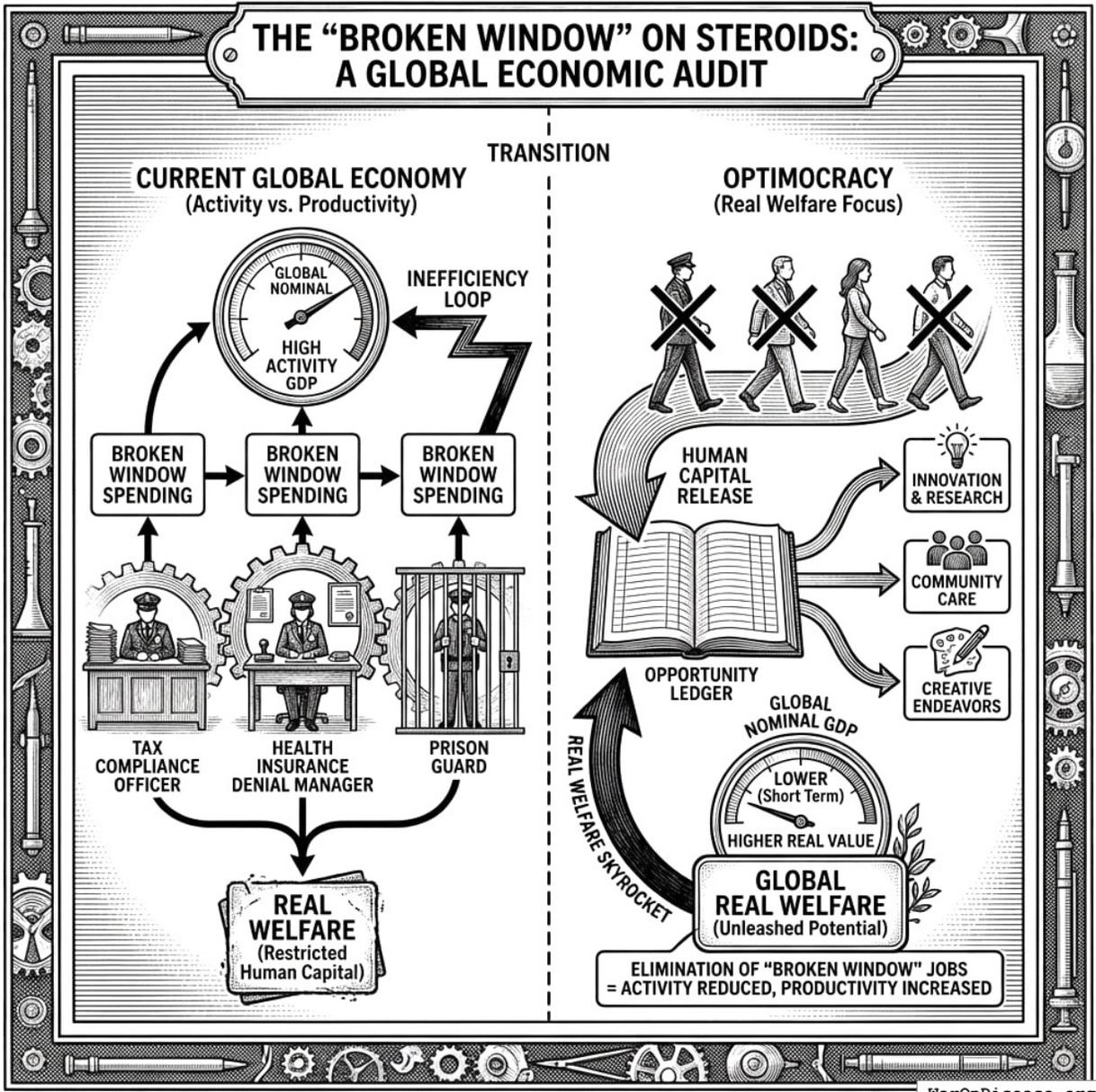
| Ledger Item | Status Quo (Current Governance) | Optimocracy (Outcome-Optimizing) | The Delta (Political Dysfunction Tax) |
|-------------------------|---|--|---|
| Defense Strategy | Power Projection: Global hegemony, 750+ bases, carrier groups. Cost: ~\$1T. | Strict Deterrence: Nuclear triad, coastal defense, cyber. Cost: ~\$285B. | -\$715 Billion / Year (Waste) |
| Clinical Trials | Phase III RCTs: Cost \$50M+, slow, bureaucratic. | Pragmatic Trials (PCTs): Embedded, AI-driven. Cost \$0.5M. | 99% Cost Reduction (Efficiency) |

| Ledger Item | Status Quo (Current Governance) | Optimocracy (Outcome-Optimizing) | The Delta (Political Dysfunction Tax) |
|----------------------|---|--|--|
| Health Output | Stagnation (Eroom's Law): Slow progress on chronic disease. | Longevity Dividend: Accelerated cures for cancer/aging. | -\$34 Trillion / Year (Lost Value) |
| Migration | Closed Borders: Labor trapped in low-productivity zones. | Global Skill Mobility: Open labor markets. | -\$57 Trillion / Year (Lost Output) |
| Cognition | Lead Poisoned: Widespread neurotoxicity (-IQ). | Lead Free: Optimized cognitive stock (+IQ). | -\$6 Trillion / Year (Lost Capital) |
| Admin/Regs | High Friction: Tax compliance & health admin consume ~\$3T. | Automated Admin: Friction approaches zero. | -\$2.5 Trillion / Year (Waste) |
| TOTAL OUTPUT | \$115T (Nominal) | \$210T (95% CI: \$194T-\$298T) (Potential, with uncertainty range) | Efficiency Score: 51.9% (95% CI: 35.9%-57%) |

8 Analysis and Second-Order Insights

8.1 The “Parable of the Broken Window” on Steroids

The audit reveals that a significant percentage of Global GDP is effectively “Broken Window” spending. We count the salary of the tax compliance officer, the health insurance denial manager, and the prison guard as “production.” In an Optimocracy, these jobs do not exist. Their elimination would reduce nominal GDP in the short term but would skyrocket *real* welfare by releasing human capital into the Opportunity Ledger. The current system mistakes *activity* for *productivity*.



WarOnDisease.org

Figure 18: Millions of people have jobs that make everyone’s life worse. Tax compliance officers, insurance denial managers, the professional saying no industry. You count their salaries as economic growth.

8.2 The “Buried” Health Multiplier is the Critical Failure

While Migration offers the largest *economic* arbitrage (\$57T), the shift from RCTs to PCTs represents the largest *humanitarian* arbitrage. The difference between \$50,000/patient and \$500/patient is not just an efficiency gain; it is a phase transition. The current regulatory state effectively prohibits the discovery of cheap, off-patent cures because the “entry ticket” (Phase III RCT) is too expensive for any entity other than a monopoly-seeking pharmaceutical giant. This is a regulatory capture mechanism masquerading as safety, and its cost is measured in hundreds of millions of lives.

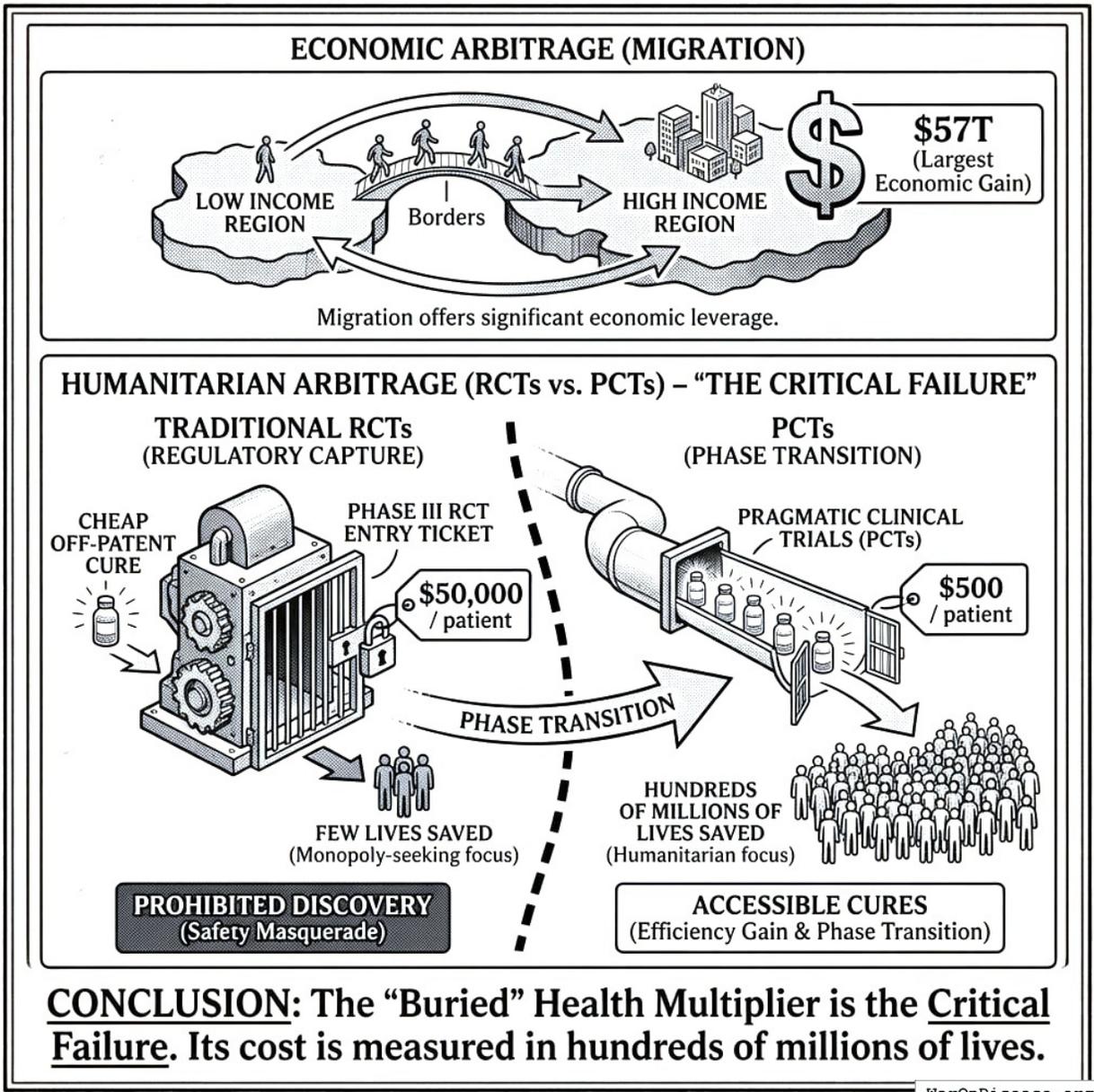


Figure 19: Expensive trials mean only rich companies can afford them, so rich companies write the rules, so trials stay expensive. It’s a loop, like a snake eating its own tail while charging you for the privilege of watching.

8.3 Security Theater vs. Solvency

The United States spends nearly \$1 trillion on defense, yet the “Strict Deterrence” audit demonstrates that existential safety could be purchased for roughly \$300 billion. The remaining \$700 billion is not buying safety; it is buying *influence* and *industrial subsidy*. From a Welfare Economics perspective, this is a massive malinvestment.

9 Conclusion

The hypothesis holds with a terrifying nuance. While the *nominal* economic efficiency of global governance is ~31-53% (we are not starving), the **strategic efficiency** (the rate at which we convert resources into long-term civilizational outcomes) is likely <10%.

We are burning capital to maintain a high-friction, low-trust status quo (The Waste Ledger) while actively suppressing the high-trust, high-velocity networks that create exponential value (The Opportunity Ledger). The “Political Dysfunction Tax” is not a marginal 20% or 30%. It is **100-200%** of current GWP. We are paying for the privilege of stagnating.

The audit concludes that the single highest-leverage intervention for global welfare is not “more funding” but “mechanism redesign,” specifically, the removal of the veto points that prevent PCTs, labor mobility, and administrative automation. We are rich enough to solve our problems, but we are currently too disorganized to afford the solutions.

10 See Also

For a detailed breakdown of U.S. federal inefficiency, including Monte Carlo simulation of the Aggregate Efficiency Gap (\$2.27-3.47 trillion annually), see [United States Efficiency Audit](#)¹⁷⁰.

1. NIH Common Fund. NIH pragmatic trials: Minimal funding despite 30x cost advantage. *NIH Common Fund: HCS Research Collaboratory* <https://commonfund.nih.gov/hcscollaboratory> (2025)
The NIH Pragmatic Trials Collaboratory funds trials at \$500K for planning phase, \$1M/year. for implementation-a tiny fraction of NIH's budget. The ADAPTABLE trial cost \$14 million for 15,076 patients (= \$929/patient) versus \$420 million for a similar traditional RCT (30x cheaper), yet pragmatic trials remain severely underfunded. PCORnet infrastructure enables real-world trials embedded in healthcare systems, but receives minimal support compared to basic research funding. Additional sources: <https://commonfund.nih.gov/hcscollaboratory> | https://pcornet.org/wp-content/uploads/2025/08/ADAPTABLE_Lay_Summary_21JUL2025.pdf | <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5604499/>
2. NIH. Antidepressant clinical trial exclusion rates. *Zimmerman et al.* <https://pubmed.ncbi.nlm.nih.gov/26276679/> (2015)
Mean exclusion rate: 86.1% across 158 antidepressant efficacy trials (range: 44.4% to 99.8%) More than 82% of real-world depression patients would be ineligible for antidepressant registration trials Exclusion rates increased over time: 91.4% (2010-2014) vs. 83.8% (1995-2009) Most common exclusions: comorbid psychiatric disorders, age restrictions, insufficient depression severity, medical conditions Emergency psychiatry patients: only 3.3% eligible (96.7% excluded) when applying 9 common exclusion criteria Only a minority of depressed patients seen in clinical practice are likely to be eligible for most AETs Note: Generalizability of antidepressant trials has decreased over time, with increasingly stringent exclusion criteria eliminating patients who would actually use the drugs in clinical practice Additional sources: <https://pubmed.ncbi.nlm.nih.gov/26276679/> | <https://pubmed.ncbi.nlm.nih.gov/26164052/> | <https://www.wolterskluwer.com/en/news/antidepressant-trials-exclude-most-real-world-patients-with-depression>

3. CNBC. Warren Buffett's career average investment return. *CNBC* <https://www.cnbc.com/2025/05/05/warren-buffetts-return-tally-after-60-years-5502284percent.html> (2025)
Berkshire's compounded annual return from 1965 through 2024 was 19.9%, nearly double the 10.4% recorded by the S&P 500. Berkshire shares skyrocketed 5,502,284% compared to the S&P 500's 39,054% rise during that period. Additional sources: <https://www.cnbc.com/2025/05/05/warren-buffetts-return-tally-after-60-years-5502284percent.html> | <https://www.slickcharts.com/berkshire-hathaway/returns>
4. World Health Organization. WHO global health estimates 2024. *World Health Organization* <https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates> (2024)
Comprehensive mortality and morbidity data by cause, age, sex, country, and year Global mortality: 55-60 million deaths annually Lives saved by modern medicine (vaccines, cardiovascular drugs, oncology): 12M annually (conservative aggregate) Leading causes of death: Cardiovascular disease (17.9M), Cancer (10.3M), Respiratory disease (4.0M) Note: Baseline data for regulatory mortality analysis. Conservative estimate of pharmaceutical impact based on WHO immunization data (4.5M/year from vaccines) + cardiovascular interventions (3.3M/year) + oncology (1.5M/year) + other therapies. Additional sources: <https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates>
5. GiveWell. GiveWell cost per life saved for top charities (2024). *GiveWell: Top Charities* <https://www.givewell.org/charities/top-charities>
General range: \$3,000-\$5,500 per life saved (GiveWell top charities) Helen Keller International. (Vitamin A): \$3,500 average (2022-2024); varies \$1,000-\$8,500 by country Against Malaria Foundation: \$5,500 per life saved New Incentives (vaccination incentives): \$4,500 per life saved Malaria Consortium (seasonal malaria chemoprevention): \$3,500 per life saved VAS program details: \$2 to provide vitamin A supplements to child for one year Note: Figures accurate for 2024. Helen Keller VAS program has wide country variation (\$1K-\$8.5K) but \$3,500 is accurate average. Among most cost-effective interventions globally Additional sources: <https://www.givewell.org/charities/top-charities> | <https://www.givewell.org/charities/helen-keller-international> | <https://ourworldindata.org/cost-effectiveness>
6. AARP. Unpaid caregiver hours and economic value. *AARP 2023* <https://www.aarp.org/caregiving/financial-legal/info-2023/unpaid-caregivers-provide-billions-in-care.html> (2023)
Average family caregiver: 25-26 hours per week (100-104 hours per month) 38 million caregivers providing 36 billion hours of care annually Economic value: \$16.59 per hour = \$600 billion total annual value (2021) 28% of people provided eldercare on a given day, averaging 3.9 hours when providing care Caregivers living with care recipient: 37.4 hours per week Caregivers not living with recipient: 23.7 hours per week Note: Disease-related caregiving is subset of total; includes elderly care, disability care, and child care Additional sources: <https://www.aarp.org/caregiving/financial-legal/info-2023/unpaid-caregivers-provide-billions-in-care.html> | <https://www.bls.gov/news.release/elcare.nr0.htm> | <https://www.caregiver.org/resource/caregiver-statistics-demographics/>
7. Forbes. *Forbes world's billionaires list 2024*. (2024)
Forbes identified a record 2,781 billionaires worldwide with combined net worth of \$14.2 trillion, 141 more than 2023. Bernard Arnault (LVMH) topped the list at \$233 billion.

8. CDC MMWR. Childhood vaccination economic benefits. *CDC MMWR* <https://www.cdc.gov/mmwr/volumes/73/wr/mm7331a2.htm> (1994)
US programs (1994-2023): \$540B direct savings, \$2.7T societal savings (\$18B/year direct, \$90B/year societal) Global (2001-2020): \$820B value for 10 diseases in 73 countries (\$41B/year) ROI: \$11 return per \$1 invested Measles vaccination alone saved 93.7M lives (61% of 154M total) over 50 years (1974-2024) Additional sources: <https://www.cdc.gov/mmwr/volumes/73/wr/mm7331a2.htm> | [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(24\)00850-X/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(24)00850-X/fulltext)
9. CDC. Childhood vaccination (US) ROI. *CDC* <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6316a4.htm> (2017).
10. U.S. Bureau of Labor Statistics. [CPI inflation calculator](#). (2024)
CPI-U (1980): 82.4 CPI-U (2024): 313.5 Inflation multiplier (1980-2024): 3.80× Cumulative inflation: 280.48% Average annual inflation rate: 3.08% Note: Official U.S. government inflation data using Consumer Price Index for All Urban Consumers (CPI-U). Additional sources: https://www.bls.gov/data/inflation_calculator.htm
11. ClinicalTrials.gov API v2 direct analysis. *ClinicalTrials.gov cumulative enrollment data (2025). Direct analysis via ClinicalTrials.gov API v2 <https://clinicaltrials.gov/data-api/api> Analysis of 100,000 active/recruiting/completed trials on ClinicalTrials.gov (as of January 2025) shows cumulative enrollment of 12.2 million participants: Phase 1 (722k), Phase 2 (2.2M), Phase 3 (6.5M), Phase 4 (2.7M). Median participants per trial: Phase 1 (33), Phase 2 (60), Phase 3 (237), Phase 4 (90). Additional sources: <https://clinicaltrials.gov/data-api/api>*
12. ACS CAN. Clinical trial patient participation rate. *ACS CAN: Barriers to Clinical Trial Enrollment <https://www.fightcancer.org/policy-resources/barriers-patient-enrollment-therapeutic-clinical-trials-cancer> Only 3-5% of adult cancer patients in US receive treatment within clinical trials About 5% of American adults have ever participated in any clinical trial Oncology: 2-3% of all oncology patients participate Contrast: 50-60% enrollment for pediatric cancer trials (<15 years old) Note: 20% of cancer trials fail due to insufficient enrollment; 11% of research sites enroll zero patients Additional sources: <https://www.fightcancer.org/policy-resources/barriers-patient-enrollment-therapeutic-clinical-trials-cancer> | https://hints.cancer.gov/docs/Briefs/HINTS_Brief_48.pdf*
13. ScienceDaily. Global prevalence of chronic disease. *ScienceDaily: GBD 2015 Study <https://www.sciencedaily.com/releases/2015/06/150608081753.htm> (2015) 2.3 billion individuals had more than five ailments (2013) Chronic conditions caused 74% of all deaths worldwide (2019), up from 67% (2010) Approximately 1 in 3 adults suffer from multiple chronic conditions (MCCs) Risk factor exposures: 2B exposed to biomass fuel, 1B to air pollution, 1B smokers Projected economic cost: \$47 trillion by 2030 Note: 2.3B with 5+ ailments is more accurate than "2B with chronic disease." One-third of all adults globally have multiple chronic conditions Additional sources: <https://www.sciencedaily.com/releases/2015/06/150608081753.htm> | <https://pmc.ncbi.nlm.nih.gov/articles/PMC10830426/> | <https://pmc.ncbi.nlm.nih.gov/articles/PMC6214883/>*
14. C&EN. Annual number of new drugs approved globally: 50. *C&EN <https://cen.acs.org/pharmaceuticals/50-new-drugs-received-FDA/103/i2> (2025) 50 new drugs approved annually Additional sources: <https://cen.acs.org/pharmaceuticals/50-new-drugs-received-FDA/103/i2> | <https://www.fda.gov/drugs/development-approval-process-drugs/novel-drug-approvals-fda>*

15. Williams, R. J., Tse, T., DiPiazza, K. & Zarin, D. A. [Terminated trials in the ClinicalTrials.gov results database: Evaluation of availability of primary outcome data and reasons for termination](#). *PLOS One* **10**, e0127242 (2015)
Approximately 12% of trials with results posted on the ClinicalTrials.gov results database (905/7,646) were terminated. Primary reasons: insufficient accrual (57% of non-data-driven terminations), business/strategic reasons, and efficacy/toxicity findings (21% data-driven terminations).
16. IQVIA Report. Global trial capacity. *IQVIA Report: Clinical Trial Subjects Number Drops Due to Decline in COVID-19 Enrollment* <https://gmdpacademy.org/news/iqvia-report-clinical-trial-subjects-number-drops-due-to-decline-in-covid-19-enrollment/>
1.9M participants annually (2022, post-COVID normalization from 4M peak in 2021) Additional sources: https://gmdpacademy.org/news/iqvia-report-clinical-trial-subjects-number-drops-due-to-decline-in-covid-19-enrollment/
17. Research and Markets. Global clinical trials market 2024. *Research and Markets* <https://www.globenewswire.com/news-release/2024/04/19/2866012/0/en/Global-Clinical-Trials-Market-Research-Report-2024-An-83-16-Billion-Market-by-2030-AI-Machine-Learning-and-Blockchain-will-Transform-the-Clinical-Trials-Landscape.html> (2024)
Global clinical trials market valued at approximately \$83 billion in 2024, with projections to reach \$83-132 billion by 2030. Additional sources: https://www.globenewswire.com/news-release/2024/04/19/2866012/0/en/Global-Clinical-Trials-Market-Research-Report-2024-An-83-16-Billion-Market-by-2030-AI-Machine-Learning-and-Blockchain-will-Transform-the-Clinical-Trials-Landscape.html | https://www.precedenceresearch.com/clinical-trials-market
18. OpenSecrets. Lobbying spend (defense). *OpenSecrets* <https://www.opensecrets.org/industries/lobbying?ind=D> (2024).
19. GiveWell. Cost per DALY for deworming programs. <https://www.givewell.org/international/technical/programs/deworming/cost-effectiveness>
Schistosomiasis treatment: \$28.19-\$70.48 per DALY (using arithmetic means with varying disability weights) Soil-transmitted helminths (STH) treatment: \$82.54 per DALY (mid-point estimate) Note: GiveWell explicitly states this 2011 analysis is "out of date" and their current methodology focuses on long-term income effects rather than short-term health DALYs Additional sources: https://www.givewell.org/international/technical/programs/deworming/cost-effectiveness
20. Calculated from IHME Global Burden of Disease (2.55B DALYs) and global GDP per capita valuation. \$109 trillion annual global disease burden.
The global economic burden of disease, including direct healthcare costs (\$8.2 trillion) and lost productivity (\$100.9 trillion from 2.55 billion DALYs × \$39,570 per DALY), totals approximately \$109.1 trillion annually.
21. U.S. Department of Transportation. [Departmental guidance on valuation of a statistical life in economic analysis](#). (2024).

22. Think by Numbers. Pre-1962 drug development costs and timeline (think by numbers). *Think by Numbers: How Many Lives Does FDA Save?* <https://thinkbynumbers.org/health/how-many-net-lives-does-the-fda-save/> (1962)
Historical estimates (1970-1985): USD \$226M fully capitalized (2011 prices) 1980s drugs: \$65M after-tax R&D (1990 dollars), \$194M compounded to approval (1990 dollars) Modern comparison: \$2-3B costs, 7-12 years (dramatic increase from pre-1962) Context: 1962 regulatory clampdown reduced new treatment production by 70%, dramatically increasing development timelines and costs Note: Secondary source; less reliable than Congressional testimony Additional sources: https://thinkbynumbers.org/health/how-many-net-lives-does-the-fda-save/ | https://en.wikipedia.org/wiki/Cost_of_drug_development | https://www.statnews.com/2018/10/01/changing-1962-law-slash-drug-prices/
23. Biotechnology Innovation Organization (BIO). BIO clinical development success rates 2011-2020. *Biotechnology Innovation Organization (BIO)* https://go.bio.org/rs/490-EHZ-999/images/ClinicalDevelopmentSuccessRates2011_2020.pdf (2021)
Phase I duration: 2.3 years average Total time to market (Phase I-III + approval): 10.5 years average Phase transition success rates: Phase I→II: 63.2%, Phase II→III: 30.7%, Phase III→Approval: 58.1% Overall probability of approval from Phase I: 12% Note: Largest publicly available study of clinical trial success rates. Efficacy lag = 10.5 - 2.3 = 8.2 years post-safety verification. Additional sources: https://go.bio.org/rs/490-EHZ-999/images/ClinicalDevelopmentSuccessRates2011_2020.pdf
24. Nature Medicine. Drug repurposing rate (30%). *Nature Medicine* <https://www.nature.com/articles/s41591-024-03233-x> (2024)
Approximately 30% of drugs gain at least one new indication after initial approval. Additional sources: https://www.nature.com/articles/s41591-024-03233-x
25. EPI. Education investment economic multiplier (2.1). *EPI: Public Investments Outside Core Infrastructure* <https://www.epi.org/publication/bp348-public-investments-outside-core-infrastructure/>
Early childhood education: Benefits 12X outlays by 2050; \$8.70 per dollar over lifetime Educational facilities: \$1 spent → \$1.50 economic returns Energy efficiency comparison: 2-to-1 benefit-to-cost ratio (McKinsey) Private return to schooling: 9% per additional year (World Bank meta-analysis) Note: 2.1 multiplier aligns with benefit-to-cost ratios for educational infrastructure/energy efficiency. Early childhood education shows much higher returns (12X by 2050) Additional sources: https://www.epi.org/publication/bp348-public-investments-outside-core-infrastructure/ | https://documents1.worldbank.org/curated/en/442521523465644318/pdf/WPS8402.pdf | https://freopp.org/whitepapers/establishing-a-practical-return-on-investment-framework-for-education-and-skills-development-to-expand-economic-opportunity/

26. PMC. Healthcare investment economic multiplier (1.8). *PMC: California Universal Health Care* <https://pmc.ncbi.nlm.nih.gov/articles/PMC5954824/> (2022)
Healthcare fiscal multiplier: 4.3 (95% CI: 2.5-6.1) during pre-recession period (1995-2007) Overall government spending multiplier: 1.61 (95% CI: 1.37-1.86) Why healthcare has high multipliers: No effect on trade deficits (spending stays domestic); improves productivity & competitiveness; enhances long-run potential output Gender-sensitive fiscal spending (health & care economy) produces substantial positive growth impacts Note: "1.8" appears to be conservative estimate; research shows healthcare multipliers of 4.3 Additional sources: https://pmc.ncbi.nlm.nih.gov/articles/PMC5954824/ | https://cepr.org/voxeu/columns/government-investment-and-fiscal-stimulus | https://ncbi.nlm.nih.gov/pmc/articles/PMC3849102/ | https://set.odi.org/wp-content/uploads/2022/01/Fiscal-multipliers-review.pdf
27. World Bank. Infrastructure investment economic multiplier (1.6). *World Bank: Infrastructure Investment as Stimulus* <https://blogs.worldbank.org/en/ppps/effectiveness-infrastructure-investment-fiscal-stimulus-what-weve-learned> (2022)
Infrastructure fiscal multiplier: 1.6 during contractionary phase of economic cycle Average across all economic states: 1.5 (meaning \$1 of public investment → \$1.50 of economic activity) Time horizon: 0.8 within 1 year, 1.5 within 2-5 years Range of estimates: 1.5-2.0 (following 2008 financial crisis & American Recovery Act) Italian public construction: 1.5-1.9 multiplier US ARRA: 0.4-2.2 range (differential impacts by program type) Economic Policy Institute: Uses 1.6 for infrastructure spending (middle range of estimates) Note: Public investment less likely to crowd out private activity during recessions; particularly effective when monetary policy loose with near-zero rates Additional sources: https://blogs.worldbank.org/en/ppps/effectiveness-infrastructure-investment-fiscal-stimulus-what-weve-learned | https://www.github.org/infrastructure-monitor/insights/fiscal-multiplier-effect-of-infrastructure-investment/ | https://cepr.org/voxeu/columns/government-investment-and-fiscal-stimulus | https://www.richmondfed.org/publications/research/economic_brief/2022/eb_22-04
28. Mercatus. Military spending economic multiplier (0.6). *Mercatus: Defense Spending and Economy* <https://www.mercatus.org/research/research-papers/defense-spending-and-economy>
Ramey (2011): 0.6 short-run multiplier Barro (1981): 0.6 multiplier for WWII spending (war spending crowded out 40¢ private economic activity per federal dollar) Barro & Redlick (2011): 0.4 within current year, 0.6 over two years; increased govt spending reduces private-sector GDP portions General finding: \$1 increase in deficit-financed federal military spending = less than \$1 increase in GDP Variation by context: Central/Eastern European NATO: 0.6 on impact, 1.5-1.6 in years 2-3, gradual fall to zero Ramey & Zubairy (2018): Cumulative 1% GDP increase in military expenditure raises GDP by 0.7% Additional sources: https://www.mercatus.org/research/research-papers/defense-spending-and-economy | https://cepr.org/voxeu/columns/world-war-ii-america-spending-deficits-multipliers-and-sacrifice | https://www.rand.org/content/dam/rand/pubs/research_reports/RRA700/RRA739-2/RAND_RRA739-2.pdf
29. FDA. FDA-approved prescription drug products (20,000+). *FDA* <https://www.fda.gov/media/143704/download>
There are over 20,000 prescription drug products approved for marketing. Additional sources: https://www.fda.gov/media/143704/download

30. FDA. FDA GRAS list count (570-700). FDA <https://www.fda.gov/food/generally-recognized-safe-gras/gras-notice-inventory>
The FDA GRAS (Generally Recognized as Safe) list contains approximately 570–700 substances. Additional sources: <https://www.fda.gov/food/generally-recognized-safe-gras/gras-notice-inventory>
31. ACLED. Active combat deaths annually. ACLED: Global Conflict Surged 2024 <https://acleddata.com/2024/12/12/data-shows-global-conflict-surged-in-2024-the-washington-post/> (2024)
2024: 233,597 deaths (30% increase from 179,099 in 2023) Deadliest conflicts: Ukraine. (67,000), Palestine (35,000) Nearly 200,000 acts of violence (25% higher than 2023, double from 5 years ago) One in six people globally live in conflict-affected areas Additional sources: <https://acleddata.com/2024/12/12/data-shows-global-conflict-surged-in-2024-the-washington-post/> | <https://acleddata.com/media-citation/data-shows-global-conflict-surged-2024-washington-post> | <https://acleddata.com/conflict-index/index-january-2024/>
32. UCDP. State violence deaths annually. UCDP: Uppsala Conflict Data Program <https://ucdp.uu.se/>
Uppsala Conflict Data Program (UCDP): Tracks one-sided violence (organized actors attacking unarmed civilians) UCDP definition: Conflicts causing at least 25 battle-related deaths in calendar year 2023 total organized violence: 154,000 deaths; Non-state conflicts: 20,900 deaths UCDP collects data on state-based conflicts, non-state conflicts, and one-sided violence Specific "2,700 annually" figure for state violence not found in recent UCDP data; actual figures vary annually Additional sources: <https://ucdp.uu.se/> | https://en.wikipedia.org/wiki/Uppsala_Conflict_Data_Program | <https://ourworldindata.org/grapher/deaths-in-armed-conflicts-by-region>
33. Our World in Data. Terror attack deaths (8,300 annually). Our World in Data: Terrorism <https://ourworldindata.org/terrorism> (2024)
2023: 8,352 deaths (22% increase from 2022, highest since 2017) 2023: 3,350 terrorist incidents (22% decrease), but 56% increase in avg deaths per attack Global Terrorism Database (GTD): 200,000+ terrorist attacks recorded (2021 version) Maintained by: National Consortium for Study of Terrorism & Responses to Terrorism (START), U. of Maryland Geographic shift: Epicenter moved from Middle East to Central Sahel (sub-Saharan Africa) - now >50% of all deaths Additional sources: <https://ourworldindata.org/terrorism> | <https://relietweb.int/report/world/global-terrorism-index-2024> | <https://www.start.umd.edu/gtd/> | <https://ourworldindata.org/grapher/fatalities-from-terrorism>
34. Institute for Health Metrics and Evaluation (IHME). IHME global burden of disease 2021 (2.88B DALYs, 1.13B YLD). Institute for Health Metrics and Evaluation (IHME) <https://vizhub.healthdata.org/gbd-results/> (2024)
In 2021, global DALYs totaled approximately 2.88 billion, comprising 1.75 billion Years of Life Lost (YLL) and 1.13 billion Years Lived with Disability (YLD). This represents a 13% increase from 2019 (2.55B DALYs), largely attributable to COVID-19 deaths and aging populations. YLD accounts for approximately 39% of total DALYs, reflecting the substantial burden of non-fatal chronic conditions. Additional sources: <https://vizhub.healthdata.org/gbd-results/> | [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(24\)00757-8/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(24)00757-8/fulltext) | <https://www.healthdata.org/research-analysis/about-gbd>

35. Costs of War Project, Brown University Watson Institute. Environmental cost of war (\$100B annually). *Brown Watson Costs of War: Environmental Cost* <https://watson.brown.edu/costsofwar/costs/social/environment>
War on Terror emissions: 1.2B metric tons GHG (equivalent to 257M cars/year) Military: 5.5% of global GHG emissions (2X aviation + shipping combined) US DoD: World's single largest institutional oil consumer, 47th largest emitter if nation Cleanup costs: \$500B+ for military contaminated sites Gaza war environmental damage: \$56.4B; landmine clearance: \$34.6B expected Climate finance gap: Rich nations spend 30X more on military than climate finance Note: Military activities cause massive environmental damage through GHG emissions, toxic contamination, and long-term cleanup costs far exceeding current climate finance commitments Additional sources: <https://watson.brown.edu/costsofwar/costs/social/environment> | <https://earth.org/environmental-costs-of-wars/> | <https://transformdefence.org/transformdefence/stats/>
36. ScienceDaily. Medical research lives saved annually (4.2 million). *ScienceDaily: Physical Activity Prevents 4M Deaths* <https://www.sciencedaily.com/releases/2020/06/200617194510.htm> (2020)
Physical activity: 3.9M early deaths averted annually worldwide (15% lower premature deaths than without) COVID vaccines (2020-2024): 2.533M deaths averted, 14.8M life-years preserved; first year alone: 14.4M deaths prevented Cardiovascular prevention: 3 interventions could delay 94.3M deaths over 25 years (antihypertensives alone: 39.4M) Pandemic research response: Millions of deaths averted through rapid vaccine/drug development Additional sources: <https://www.sciencedaily.com/releases/2020/06/200617194510.htm> | <https://pmc.ncbi.nlm.nih.gov/articles/PMC9537923/> | <https://www.ahajournals.org/doi/10.1161/CIRCULATIONAHA.118.038160> | <https://pmc.ncbi.nlm.nih.gov/articles/PMC9464102/>
37. SIPRI. 36:1 disparity ratio of spending on weapons over cures. *SIPRI: Military Spending* <https://www.sipri.org/commentary/blog/2016/opportunity-cost-world-military-spending> (2016)
Global military spending: \$2.7 trillion (2024, SIPRI) Global government medical research: \$68 billion (2024) Actual ratio: 39.7:1 in favor of weapons over medical research Military R&D alone: \$85B (2004 data, 10% of global R&D) Military spending increases crowd out health: 1% ↑ military = 0.62% ↓ health spending Note: Ratio actually worse than 36:1. Each 1% increase in military spending reduces health spending by 0.62%, with effect more intense in poorer countries (0.962% reduction) Additional sources: <https://www.sipri.org/commentary/blog/2016/opportunity-cost-world-military-spending> | <https://pmc.ncbi.nlm.nih.gov/articles/PMC9174441/> | <https://www.congress.gov/crs-product/R45403>

38. Think by Numbers. Lost human capital due to war (\$270B annually). *Think by Numbers* <https://thinkbynumbers.org/military/war/the-economic-case-for-peace-a-comprehensive-financial-analysis/> (2021)
Lost human capital from war: \$300B annually (economic impact of losing skilled/productive individuals to conflict) Broader conflict/violence cost: \$14T/year globally 1.4M violent deaths/year; conflict holds back economic development, causes instability, widens inequality, erodes human capital 2002: 48.4M DALYs lost from 1.6M violence deaths = \$151B economic value (2000 USD) Economic toll includes: commodity prices, inflation, supply chain disruption, declining output, lost human capital Additional sources: https://thinkbynumbers.org/military/war/the-economic-case-for-peace-a-comprehensive-financial-analysis/ | https://www.weforum.org/stories/2021/02/war-violence-costs-each-human-5-a-day/ | https://pubmed.ncbi.nlm.nih.gov/19115548/
39. PubMed. Psychological impact of war cost (\$100B annually). *PubMed: Economic Burden of PTSD* <https://pubmed.ncbi.nlm.nih.gov/35485933/>
PTSD economic burden (2018 U.S.): \$232.2B total (\$189.5B civilian, \$42.7B military) Civilian costs driven by: Direct healthcare (\$66B), unemployment (\$42.7B) Military costs driven by: Disability (\$17.8B), direct healthcare (\$10.1B) Exceeds costs of other mental health conditions (anxiety, depression) War-exposed populations: 2-3X higher rates of anxiety, depression, PTSD; women and children most vulnerable Note: Actual burden \$232B, significantly higher than "\$100B" claimed Additional sources: https://pubmed.ncbi.nlm.nih.gov/35485933/ | https://news.va.gov/103611/study-national-economic-burden-of-ptsd-staggering/ | https://pmc.ncbi.nlm.nih.gov/articles/PMC9957523/
40. CGDev. UNHCR average refugee support cost. *CGDev* <https://www.cgdev.org/blog/costs-hosting-refugees-oecd-countries-and-why-uk-outlier> (2024)
The average cost of supporting a refugee is \$1,384 per year. This represents total host country costs (housing, healthcare, education, security). OECD countries average \$6,100 per refugee (mean 2022-2023), with developing countries spending \$700-1,000. Global weighted average of \$1,384 is reasonable given that 75-85% of refugees are in low/middle-income countries. Additional sources: https://www.cgdev.org/blog/costs-hosting-refugees-oecd-countries-and-why-uk-outlier | https://www.unhcr.org/sites/default/files/2024-11/UNHCR-WB-global-cost-of-refugee-inclusion-in-host-country-health-systems.pdf
41. World Bank. World bank trade disruption cost from conflict. *World Bank* <https://www.worldbank.org/en/topic/trade/publication/trading-away-from-conflict>
Estimated \$616B annual cost from conflict-related trade disruption. World Bank research shows civil war costs an average developing country 30 years of GDP growth, with 20 years needed for trade to return to pre-war levels. Trade disputes analysis shows tariff escalation could reduce global exports by up to \$674 billion. Additional sources: https://www.worldbank.org/en/topic/trade/publication/trading-away-from-conflict | https://www.nber.org/papers/w11565 | http://blogs.worldbank.org/en/trade/impacts-global-trade-and-income-current-trade-disputes

42. VA. Veteran healthcare cost projections. VA <https://department.va.gov/wp-content/uploads/2025/06/2026-Budget-in-Brief.pdf> (2026)
VA budget: \$441.3B requested for FY 2026 (10% increase). Disability compensation: \$165.6B in FY 2024 for 6.7M veterans. PACT Act projected to increase spending by \$300B between 2022-2031. Costs under Toxic Exposures Fund: \$20B (2024), \$30.4B (2025), \$52.6B (2026). Additional sources: https://department.va.gov/wp-content/uploads/2025/06/2026-Budget-in-Brief.pdf | https://www.cbo.gov/publication/45615 | https://www.legion.org/information-center/news/veterans-healthcare/2025/june/va-budget-tops-400-billion-for-2025-from-higher-spending-on-mandated-benefits-medical-care
43. IQVIA Institute for Human Data Science. The global use of medicines 2024: Outlook to 2028. *IQVIA Institute Report* <https://www.iqvia.com/insights/the-iqvia-institute/reports-and-publications/reports/the-global-use-of-medicines-2024-outlook-to-2028> (2024)
Global days of therapy reached 1.8 trillion in 2019 (234 defined daily doses per person). Diabetes, respiratory, CVD, and cancer account for 71 percent of medicine use. Projected to reach 3.8 trillion DDDs by 2028.
44. Sinn, M. P. *Private industry clinical trial spending estimate.* (2025)
Estimated private pharmaceutical and biotech clinical trial spending is approximately \$75-90 billion annually, representing roughly 90% of global clinical trial spending.
45. Cybersecurity Ventures. Cybercrime economy projected to reach \$10.5 trillion. *Cybersecurity Ventures: \$10.5T Cybercrime* <https://cybersecurityventures.com/hackerpocalypse-cybercrime-report-2016/> (2016)
Global cybercrime costs: \$3T (2015) → \$6T (2021) → \$10.5T (2025 projected) 15% annual growth rate If measured as country, would be 3rd largest economy after US and China Greatest transfer of economic wealth in history Note: More profitable than global trade of all major illegal drugs combined. Includes data theft, productivity loss, IP theft, fraud Additional sources: <<https://cybersecurityventures.com/hackerpocalypse-cybercrime-report-2016/>> | <https://www.boisestate.edu/cybersecurity/2022/06/16/cybercrime-to-cost-the-world-10-5-trillion-annually-by-2025/>
46. Sinn, M. P. *The Political Dysfunction Tax.* <https://political-dysfunction-tax.warondisease.org> (2025) doi:10.5281/zenodo.18603840
Quantifying the gap between current global governance and theoretical maximum welfare, estimating a 31-53% efficiency score and \$97 trillion in annual opportunity costs.
47. Applied Clinical Trials. Global government spending on interventional clinical trials: \$3-6 billion/year. *Applied Clinical Trials* <https://www.appliedclinicaltrials.com/view/sizing-clinical-research-market>
Estimated range based on NIH (\$0.8-5.6B), NIHR (\$1.6B total budget), and EU funding. (\$1.3B/year). Roughly 5-10% of global market. Additional sources: https://www.appliedclinicaltrials.com/view/sizing-clinical-research-market | https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(20)30357-0/fulltext
48. UBS. Credit suisse global wealth report 2023. *Credit Suisse/UBS* <https://www.ubs.com/global/en/family-office-uhnw/reports/global-wealth-report-2023.html> (2023)
Total global household wealth: USD 454.4 trillion (2022) Wealth declined by USD 11.3 trillion. (-2.4%) in 2022, first decline since 2008 Wealth per adult: USD 84,718 Additional sources: https://www.ubs.com/global/en/family-office-uhnw/reports/global-wealth-report-2023.html

49. Component country budgets. Global government medical research spending (\$67.5B, 2023–2024). *See component country budgets: NIH Budget* <https://www.nih.gov/about-nih/what-we-do/budget>.
50. United Nations Department of Economic and Social Affairs, Population Division. [World population prospects 2024: Summary of results](#). (2024)
The 2024 Revision of the World Population Prospects provides population estimates and projections for 237 countries or areas. Global median age approximately 30.5 years in 2024, reflecting population-weighted average across all regions.
51. SIPRI. Global military spending (\$2.72T, 2024). *SIPRI* <https://www.sipri.org/publications/2025/sipri-fact-sheets/trends-world-military-expenditure-2024> (2025).
52. Stockholm International Peace Research Institute. [Trends in world military expenditure, 2024](#). (2025).
53. Estimated from major foundation budgets and activities. Nonprofit clinical trial funding estimate.
Nonprofit foundations spend an estimated \$2-5 billion annually on clinical trials globally, representing approximately 2-5% of total clinical trial spending.
54. Industry reports: IQVIA. Global pharmaceutical r&d spending.
Total global pharmaceutical R&D spending is approximately \$300 billion annually. Clinical trials represent 15-20% of this total (\$45-60B), with the remainder going to drug discovery, preclinical research, regulatory affairs, and manufacturing development.
55. UN. Global population reaches 8 billion. *UN: World Population 8 Billion Nov 15 2022* <https://www.un.org/en/desa/world-population-reach-8-billion-15-november-2022> (2022)
Milestone: November 15, 2022 (UN World Population Prospects 2022) Day of Eight Billion” designated by UN Added 1 billion people in just 11 years (2011-2022) Growth rate: Slowest since 1950; fell under 1% in 2020 Future: 15 years to reach 9B (2037); projected peak 10.4B in 2080s Projections: 8.5B (2030), 9.7B (2050), 10.4B (2080-2100 plateau) Note: Milestone reached Nov 2022. Population growth slowing; will take longer to add next billion (15 years vs 11 years) Additional sources: <https://www.un.org/en/desa/world-population-reach-8-billion-15-november-2022> | <https://www.un.org/en/dayof8billion> | https://en.wikipedia.org/wiki/Day_of_Eight_Billion
56. Harvard Kennedy School. 3.5% participation tipping point. *Harvard Kennedy School* <https://www.hks.harvard.edu/centers/carr/publications/35-rule-how-small-minority-can-change-world> (2020)
The research found that nonviolent campaigns were twice as likely to succeed as violent ones, and once 3.5% of the population were involved, they were always successful. Chenoweth and Maria Stephan studied the success rates of civil resistance efforts from 1900 to 2006, finding that nonviolent movements attracted, on average, four times as many participants as violent movements and were more likely to succeed. Key finding: Every campaign that mobilized at least 3.5% of the population in sustained protest was successful (in their 1900-2006 dataset) Note: The 3.5% figure is a descriptive statistic from historical analysis, not a guaranteed threshold. One exception (Bahrain 2011-2014 with 6%+ participation) has been identified. The rule applies to regime change, not policy change in democracies. Additional sources: <https://www.hks.harvard.edu/centers/carr/publications/35-rule-how-small-minority-can-change-world> | https://www.hks.harvard.edu/sites/default/files/2024-05/Erica%20Chenoweth_2020-005.pdf | <https://www.bbc.com/future/article/20190513-it-only-takes-35-of-people-to-change-the-world> | https://en.wikipedia.org/wiki/3.5%25_rule

57. NHGRI. Human genome project and CRISPR discovery. *NHGRI* <https://www.genome.gov/11006929/2003-release-international-consortium-completes-hgp> (2003)
Your DNA is 3 billion base pairs Read the entire code (Human Genome Project, completed 2003) Learned to edit it (CRISPR, discovered 2012) Additional sources: https://www.genome.gov/11006929/2003-release-international-consortium-completes-hgp | https://www.nobelprize.org/prizes/chemistry/2020/press-release/
58. PMC. Only 12% of human interactome targeted. *PMC* <https://pmc.ncbi.nlm.nih.gov/articles/PMC10749231/> (2023)
Mapping 350,000+ clinical trials showed that only 12% of the human interactome has ever been targeted by drugs. Additional sources: https://pmc.ncbi.nlm.nih.gov/articles/PMC10749231/
59. WHO. ICD-10 code count (14,000). *WHO* <https://icd.who.int/browse10/2019/en> (2019)
The ICD-10 classification contains approximately 14,000 codes for diseases, signs and symptoms. Additional sources: https://icd.who.int/browse10/2019/en
60. Wikipedia. Longevity escape velocity (LEV) - maximum human life extension potential. *Wikipedia: Longevity Escape Velocity* https://en.wikipedia.org/wiki/Longevity_escape_velocity
Longevity escape velocity: Hypothetical point where medical advances extend life expectancy faster than time passes Term coined by Aubrey de Grey (biogerontologist) in 2004 paper; concept from David Gobel (Methuselah Foundation) Current progress: Science adds 3 months to lifespan per year; LEV requires adding >1 year per year Sinclair (Harvard): "There is no biological upper limit to age" - first person to live to 150 may already be born De Grey: 50% chance of reaching LEV by mid-to-late 2030s; SENS approach = damage repair rather than slowing damage Kurzweil (2024): LEV by 2029-2035, AI will simulate biological processes to accelerate solutions George Church: LEV "in a decade or two" via age-reversal clinical trials Natural lifespan cap: 120-150 years (Jeanne Calment record: 122); engineering approach could bypass via damage repair Key mechanisms: Epigenetic reprogramming, senolytic drugs, stem cell therapy, gene therapy, AI-driven drug discovery Current record: Jeanne Calment (122 years, 164 days) - record unbroken since 1997 Note: LEV is theoretical but increasingly plausible given demonstrated age reversal in mice (109% lifespan extension) and human cells (30-year epigenetic age reversal) Additional sources: https://en.wikipedia.org/wiki/Longevity_escape_velocity | https://pmc.ncbi.nlm.nih.gov/articles/PMC423155/ | https://www.popularmechanics.com/science/a36712084/can-science-cure-death-longevity/ | https://www.diamandis.com/blog/longevity-escape-velocity
61. OpenSecrets. Lobbyist statistics for Washington D.C. *OpenSecrets: Lobbying in US* https://en.wikipedia.org/wiki/Lobbying_in_the_United_States
Registered lobbyists: Over 12,000 (some estimates); 12,281 registered (2013) Former government employees as lobbyists: 2,200+ former federal employees (1998-2004), including 273 former White House staffers, 250 former Congress members & agency heads Congressional revolving door: 43% (86 of 198) lawmakers who left 1998-2004 became lobbyists; currently 59% leaving to private sector work for lobbying/consulting firms/trade groups Executive branch: 8% were registered lobbyists at some point before/after government service Additional sources: https://en.wikipedia.org/wiki/Lobbying_in_the_United_States | https://www.opensecrets.org/revolving-door | https://www.citizen.org/article/revolving-congress/ | https://www.propublica.org/article/we-found-a-staggering-281-lobbyists-whove-worked-in-the-trump-administration

62. MDPI Vaccines. Measles vaccination ROI. *MDPI Vaccines* <https://www.mdpi.com/2076-393X/12/11/1210> (2024)
Single measles vaccination: 167:1 benefit-cost ratio. MMR (measles-mumps-rubella) vaccination: 14:1 ROI. Historical US elimination efforts (1966-1974): benefit-cost ratio of 10.3:1 with net benefits exceeding USD 1.1 billion (1972 dollars, or USD 8.0 billion in 2023 dollars). 2-dose MMR programs show direct benefit/cost ratio of 14.2 with net savings of \$5.3 billion, and 26.0 from societal perspectives with net savings of \$11.6 billion. Additional sources: <https://www.mdpi.com/2076-393X/12/11/1210> | <https://www.tandfonline.com/doi/full/10.1080/14760584.2024.2367451>
63. Gosse, M. E. Assessing cost-effectiveness in healthcare: History of the \$50,000 per QALY threshold. *Sustainability Impact Metrics* <https://ecocostsvalue.com/EVR/img/references%20others/Gosse%202008%20QALY%20threshold%20financial.pdf> (2008).
64. World Health Organization. Mental health global burden. *World Health Organization* <https://www.who.int/news/item/28-09-2001-the-world-health-report-2001-mental-disorders-affect-one-in-four-people> (2022)
One in four people in the world will be affected by mental or neurological disorders at some point in their lives, representing [approximately] 30% of the global burden of disease. Additional sources: <https://www.who.int/news/item/28-09-2001-the-world-health-report-2001-mental-disorders-affect-one-in-four-people>
65. Stockholm International Peace Research Institute. [Trends in world military expenditure, 2023](#). (2024).
66. Calculated from Orphanet Journal of Rare Diseases (2024). Diseases getting first effective treatment each year. *Calculated from Orphanet Journal of Rare Diseases (2024)* <https://ojrd.biomedcentral.com/articles/10.1186/s13023-024-03398-1> (2024)
Under the current system, approximately 10-15 diseases per year receive their FIRST effective treatment. Calculation: 5% of 7,000 rare diseases (350) have FDA-approved treatment, accumulated over 40 years of the Orphan Drug Act = 9 rare diseases/year. Adding 5-10 non-rare diseases that get first treatments yields 10-20 total. FDA approves 50 drugs/year, but many are for diseases that already have treatments (me-too drugs, second-line therapies). Only 15 represent truly FIRST treatments for previously untreatable conditions.
67. NIH. NIH budget (FY 2025). *NIH* <https://www.nih.gov/about-nih/organization/budget> (2024)
The budget total of \$47.7 billion also includes \$1.412 billion derived from PHS Evaluation financing... Additional sources: <https://www.nih.gov/about-nih/organization/budget> | <https://officeofbudget.od.nih.gov/>
68. Bentley et al. NIH spending on clinical trials: 3.3%. *Bentley et al.* <https://pmc.ncbi.nlm.nih.gov/articles/PMC10349341/> (2023)
NIH spent \$8.1 billion on clinical trials for approved drugs (2010-2019), representing 3.3% of relevant NIH spending. Additional sources: <https://pmc.ncbi.nlm.nih.gov/articles/PMC10349341/> | <https://catalyst.harvard.edu/news/article/nih-spent-8-1b-for-phased-clinical-trials-of-drugs-approved-2010-19-10-of-reported-industry-spending/>

69. PMC. Standard medical research ROI (\$20k-\$100k/QALY). *PMC: Cost-effectiveness Thresholds Used by Study Authors* <https://pmc.ncbi.nlm.nih.gov/articles/PMC10114019/> (1990)
Typical cost-effectiveness thresholds for medical interventions in rich countries range from \$50,000 to \$150,000 per QALY. The Institute for Clinical and Economic Review (ICER) uses a \$100,000-\$150,000/QALY threshold for value-based pricing. Between 1990-2021, authors increasingly cited \$100,000 (47% by 2020-21) or \$150,000 (24% by 2020-21) per QALY as benchmarks for cost-effectiveness. Additional sources: https://pmc.ncbi.nlm.nih.gov/articles/PMC10114019/ | https://icer.org/our-approach/methods-process/cost-effectiveness-the-qaly-and-the-evlyg/
70. Manhattan Institute. RECOVERY trial 82× cost reduction. *Manhattan Institute: Slow Costly Trials* <https://manhattan.institute/article/slow-costly-clinical-trials-drag-down-biomedical-breakthroughs>
RECOVERY trial: \$500 per patient (\$20M for 48,000 patients = \$417/patient) Typical clinical trial: \$41,000 median per-patient cost Cost reduction: 80-82× cheaper (\$41,000 ÷ \$500 82×) Efficiency: \$50 per patient per answer (10 therapeutics tested, 4 effective) Dexamethasone estimated to save >630,000 lives Additional sources: https://manhattan.institute/article/slow-costly-clinical-trials-drag-down-biomedical-breakthroughs | https://pmc.ncbi.nlm.nih.gov/articles/PMC9293394/
71. Trials. Patient willingness to participate in clinical trials. *Trials: Patients' Willingness Survey* <https://trialsjournal.biomedcentral.com/articles/10.1186/s13063-015-1105-3>
Recent surveys: 49-51% willingness (2020-2022) - dramatic drop from 85% (2019). during COVID-19 pandemic Cancer patients when approached: 88% consented to trials (Royal Marsden Hospital) Study type variation: 44.8% willing for drug trial, 76.2% for diagnostic study Top motivation: "Learning more about my health/medical condition" (67.4%) Top barrier: "Worry about experiencing side effects" (52.6%) Additional sources: https://trialsjournal.biomedcentral.com/articles/10.1186/s13063-015-1105-3 | https://www.appliedclinicaltrials.com/view/industry-forced-to-rethink-patient-participation-in-trials | https://pmc.ncbi.nlm.nih.gov/articles/PMC7183682/
72. Tufts CSDD. Cost of drug development.
Various estimates suggest \$1.0 - \$2.5 billion to bring a new drug from discovery through FDA approval, spread across 10 years. Tufts Center for the Study of Drug Development often cited for \$1.0 - \$2.6 billion/drug. Industry reports (IQVIA, Deloitte) also highlight \$2+ billion figures.
73. Value in Health. Average lifetime revenue per successful drug. *Value in Health: Sales Revenues for New Therapeutic Agents* <https://www.sciencedirect.com/science/article/pii/S1098301524027542>
Study of 361 FDA-approved drugs from 1995-2014 (median follow-up 13.2 years): Mean lifetime revenue: \$15.2 billion per drug Median lifetime revenue: \$6.7 billion per drug Revenue after 5 years: \$3.2 billion (mean) Revenue after 10 years: \$9.5 billion (mean) Revenue after 15 years: \$19.2 billion (mean) Distribution highly skewed: top 25 drugs (7%) accounted for 38% of total revenue (\$2.1T of \$5.5T) Additional sources: https://www.sciencedirect.com/science/article/pii/S1098301524027542

74. Lichtenberg, F. R. **How many life-years have new drugs saved? A three-way fixed-effects analysis of 66 diseases in 27 countries, 2000-2013.** *International Health* **11**, 403–416 (2019) *Using 3-way fixed-effects methodology (disease-country-year) across 66 diseases in 22 countries, this study estimates that drugs launched after 1981 saved 148.7 million life-years in 2013 alone. The regression coefficients for drug launches 0-11 years prior (beta=-0.031, SE=0.008) and 12+ years prior (beta=-0.057, SE=0.013) on years of life lost are highly significant (p<0.0001). Confidence interval for life-years saved: 79.4M-239.8M (95 percent CI) based on propagated standard errors from Table 2.*
75. Deloitte. **Pharmaceutical r&d return on investment (ROI).** *Deloitte: Measuring Pharmaceutical Innovation 2025* <https://www.deloitte.com/ch/en/Industries/life-sciences-health-care/research/measuring-return-from-pharmaceutical-innovation.html> (2025) *Deloitte's annual study of top 20 pharma companies by R&D spend (2010-2024): 2024. ROI: 5.9% (second year of growth after decade of decline) 2023 ROI: 4.3% (estimated from trend) 2022 ROI: 1.2% (historic low since study began, 13-year low) 2021 ROI: 6.8% (record high, inflated by COVID-19 vaccines/treatments) Long-term trend: Declining for over a decade before 2023 recovery Average R&D cost per asset: \$2.3B (2022), \$2.23B (2024) These returns (1.2-5.9% range) fall far below typical corporate ROI targets (15-20%) Additional sources: <https://www.deloitte.com/ch/en/Industries/life-sciences-health-care/research/measuring-return-from-pharmaceutical-innovation.html> | <https://www.prnewswire.com/news-releases/deloittes-13th-annual-pharmaceutical-innovation-report-pharma-rd-return-on-investment-falls-in-post-pandemic-market-301738807.html> | <https://hitconsultant.net/2023/02/16/pharma-rd-roi-falls-to-lowest-level-in-13-years/>*
76. Nature Reviews Drug Discovery. **Drug trial success rate from phase i to approval.** *Nature Reviews Drug Discovery: Clinical Success Rates* <https://www.nature.com/articles/nrd.2016.136> (2016) *Overall Phase I to approval: 10-12.8% (conventional wisdom 10%, studies show 12.8%). Recent decline: Average LOA now 6.7% for Phase I (2014-2023 data) Leading pharma companies: 14.3% average LOA (range 8-23%) Varies by therapeutic area: Oncology 3.4%, CNS/cardiovascular lowest at Phase III Phase-specific success: Phase I 47-54%, Phase II 28-34%, Phase III 55-70% Note: 12% figure accurate for historical average. Recent data shows decline to 6.7%, with Phase II as primary attrition point (28% success) Additional sources: <https://www.nature.com/articles/nrd.2016.136> | <https://pmc.ncbi.nlm.nih.gov/articles/PMC6409418/> | <https://academic.oup.com/biostatistics/article/20/2/273/4817524>*
77. SofproMed. **Phase 3 cost per trial range.** *SofproMed* <https://www.sofpromed.com/how-much-does-a-clinical-trial-cost> *Phase 3 clinical trials cost between \$20 million and \$282 million per trial, with significant variation by therapeutic area and trial complexity. Additional sources: <https://www.sofpromed.com/how-much-does-a-clinical-trial-cost> | <https://www.cbo.gov/publication/57126>*
78. Ramsberg, J. & Platt, R. **Pragmatic trial cost per patient (median \$97).** *Learning Health Systems* <https://pmc.ncbi.nlm.nih.gov/articles/PMC6508852/> (2018) *Meta-analysis of 108 embedded pragmatic clinical trials (2006-2016). The median cost per patient was \$97 (IQR \$19-\$478), based on 2015 dollars. 25% of trials cost <\$19/patient; 10 trials exceeded \$1,000/patient. U.S. studies median \$187 vs non-U.S. median \$27. Additional sources: <https://pmc.ncbi.nlm.nih.gov/articles/PMC6508852/>*

79. WHO. Polio vaccination ROI. WHO <https://www.who.int/news-room/feature-stories/detail/sustaining-polio-investments-offers-a-high-return> (2019)
For every dollar spent, the return on investment is nearly US\$ 39.” Total investment cost of US\$ 7.5 billion generates projected economic and social benefits of US\$ 289.2 billion from sustaining polio assets and integrating them into expanded immunization, surveillance and emergency response programmes across 8 priority countries (Afghanistan, Iraq, Libya, Pakistan, Somalia, Sudan, Syria, Yemen). Additional sources: <https://www.who.int/news-room/feature-stories/detail/sustaining-polio-investments-offers-a-high-return>
80. ICRC. International campaign to ban landmines (ICBL) - ottawa treaty (1997). ICRC <https://www.icrc.org/en/doc/resources/documents/article/other/57jpn.htm> (1997)
ICBL: Founded 1992 by 6 NGOs (Handicap International, Human Rights Watch, Medico International, Mines Advisory Group, Physicians for Human Rights, Vietnam Veterans of America Foundation) Started with ONE staff member: Jody Williams as founding coordinator Grew to 1,000+ organizations in 60 countries by 1997 Ottawa Process: 14 months (October 1996 - December 1997) Convention signed by 122 states on December 3, 1997; entered into force March 1, 1999 Achievement: Nobel Peace Prize 1997 (shared by ICBL and Jody Williams) Government funding context: Canada established \$100M CAD Canadian Landmine Fund over 10 years (1997); International donors provided \$169M in 1997 for mine action (up from \$100M in 1996) Additional sources: <https://www.icrc.org/en/doc/resources/documents/article/other/57jpn.htm> | https://en.wikipedia.org/wiki/International_Campaign_to_Ban_Landmines | <https://www.nobelprize.org/prizes/peace/1997/summary/> | <https://un.org/press/en/1999/19990520.MINES.BRF.html> | <https://www.the-monitor.org/en-gb/reports/2003/landmine-monitor-2003/mine-action-funding.aspx>
81. OpenSecrets. [Revolving door: Former members of congress.](#) (2024)
388 former members of Congress are registered as lobbyists. Nearly 5,400 former congressional staffers have left Capitol Hill to become federal lobbyists in the past 10 years. Additional sources: <https://www.opensecrets.org/revolving-door>
82. Kinch, M. S. & Griesenauer, R. H. [Lost medicines: A longer view of the pharmaceutical industry with the potential to reinvigorate discovery.](#) *Drug Discovery Today* **24**, 875–880 (2019)
Research identified 1,600+ medicines available in 1962. The 1950s represented industry high-water mark with >30 new products in five of ten years; this rate would not be replicated until late 1990s. More than half (880) of these medicines were lost following implementation of Kefauver-Harris Amendment. The peak of 1962 would not be seen again until early 21st century. By 2016 number of organizations actively involved in R&D at level not seen since 1914.
83. Baily, M. N. Pre-1962 drug development costs (baily 1972). *Baily (1972)* <https://samizdathealth.org/wp-content/uploads/2020/12/hlthaff.1.2.6.pdf> (1972)
Pre-1962: Average cost per new chemical entity (NCE) was \$6.5 million (1980 dollars). Inflation-adjusted to 2024 dollars: \$6.5M (1980) \$22.5M (2024), using CPI multiplier of 3.46× Real cost increase (inflation-adjusted): \$22.5M (pre-1962) → \$2,600M (2024) = 116× increase Note: This represents the most comprehensive academic estimate of pre-1962 drug development costs based on empirical industry data Additional sources: <https://samizdathealth.org/wp-content/uploads/2020/12/hlthaff.1.2.6.pdf>

84. Think by Numbers. Pre-1962 physician-led clinical trials. *Think by Numbers: How Many Lives Does FDA Save?* <https://thinkbynumbers.org/health/how-many-net-lives-does-the-fda-save/> (1966)
Pre-1962: Physicians could report real-world evidence directly 1962 Drug Amendments replaced "premarket notification" with "premarket approval", requiring extensive efficacy testing Impact: New regulatory clampdown reduced new treatment production by 70%; lifespan growth declined from 4 years/decade to 2 years/decade Drug Efficacy Study Implementation (DESI): NAS/NRC evaluated 3,400+ drugs approved 1938-1962 for safety only; reviewed >3,000 products, >16,000 therapeutic claims FDA has had authority to accept real-world evidence since 1962, clarified by 21st Century Cures Act (2016) Note: Specific "144,000 physicians" figure not verified in sources Additional sources: https://thinkbynumbers.org/health/how-many-net-lives-does-the-fda-save/ | https://www.fda.gov/drugs/enforcement-activities-fda/drug-efficacy-study-implementation-desi | http://www.nasonline.org/about-nas/history/archives/collections/des-1966-1969-1.html
85. GAO. 95% of diseases have 0 FDA-approved treatments. GAO <https://www.gao.gov/products/gao-25-106774> (2025)
95% of diseases have no treatment Additional sources: https://www.gao.gov/products/gao-25-106774 | https://globalgenes.org/rare-disease-facts/
86. Oren Cass, Manhattan Institute. RECOVERY trial cost per patient. *Oren Cass* <https://manhattan.institute/article/slow-costly-clinical-trials-drag-down-biomedical-breakthroughs> (2023)
The RECOVERY trial, for example, cost only about \$500 per patient... By contrast, the median per-patient cost of a pivotal trial for a new therapeutic is around \$41,000. Additional sources: https://manhattan.institute/article/slow-costly-clinical-trials-drag-down-biomedical-breakthroughs
87. NHS England; Águas et al. RECOVERY trial global lives saved (1 million). *NHS England: 1 Million Lives Saved* <https://www.england.nhs.uk/2021/03/covid-treatment-developed-in-the-nhs-saves-a-million-lives/> (2021)
Dexamethasone saved 1 million lives worldwide (NHS England estimate, March 2021, 9 months after discovery). UK alone: 22,000 lives saved. Methodology: Águas et al. Nature Communications 2021 estimated 650,000 lives (range: 240,000-1,400,000) for July-December 2020 alone, based on RECOVERY trial mortality reductions (36% for ventilated, 18% for oxygen-only patients) applied to global COVID hospitalizations. June 2020 announcement: Dexamethasone reduced deaths by up to 1/3 (ventilated patients), 1/5 (oxygen patients). Impact immediate: Adopted into standard care globally within hours of announcement. Additional sources: https://www.england.nhs.uk/2021/03/covid-treatment-developed-in-the-nhs-saves-a-million-lives/ | https://www.nature.com/articles/s41467-021-21134-2 | https://pharmaceutical-journal.com/article/news/steroid-has-saved-the-lives-of-one-million-covid-19-patients-worldwide-figures-show | https://www.recoverytrial.net/news/recovery-trial-celebrates-two-year-anniversary-of-life-saving-dexamethasone-result
88. National September 11 Memorial & Museum. [September 11 attack facts](#). (2024)
2,977 people were killed in the September 11, 2001 attacks: 2,753 at the World Trade Center, 184 at the Pentagon, and 40 passengers and crew on United Flight 93 in Shanksville, Pennsylvania.

89. World Bank. World bank singapore economic data. World Bank <https://data.worldbank.org/country/singapore> (2024)
Singapore GDP per capita (2023): \$82,000 - among highest in the world Government spending: 15% of GDP (vs US 38%) Life expectancy: 84.1 years (vs US 77.5 years) Singapore demonstrates that low government spending can coexist with excellent outcomes Additional sources: <https://data.worldbank.org/country/singapore>
90. International Monetary Fund. IMF singapore government spending data. (2024)
Singapore government spending is approximately 15% of GDP This is 23 percentage points lower than the United States (38%) Despite lower spending, Singapore achieves excellent outcomes: - Life expectancy: 84.1 years (vs US 77.5) - Low crime, world-class infrastructure, AAA credit rating Additional sources: <https://www.imf.org/en/Countries/SGP>
91. World Health Organization. WHO life expectancy data by country. (2024)
Life expectancy at birth varies significantly among developed nations: Switzerland: 84.0 years (2023) Singapore: 84.1 years (2023) Japan: 84.3 years (2023) United States: 77.5 years (2023) - 6.5 years below Switzerland, Singapore Global average: 73 years Note: US spends more per capita on healthcare than any other nation, yet achieves lower life expectancy Additional sources: <https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/ghe-life-expectancy-and-healthy-life-expectancy>
92. CSIS. Smallpox eradication ROI. CSIS <https://www.csis.org/analysis/smallpox-eradication-model-global-cooperation>.
93. PMC. Contribution of smoking reduction to life expectancy gains. PMC: Benefits Smoking Cessation Longevity <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1447499/> (2012)
Population-level: Up to 14% (9% men, 14% women) of total life expectancy gain since 1960 due to tobacco control efforts Individual cessation benefits: Quitting at age 35 adds 6.9-8.5 years (men), 6.1-7.7 years (women) vs continuing smokers By cessation age: Age 25-34 = 10 years gained; age 35-44 = 9 years; age 45-54 = 6 years; age 65 = 2.0 years (men), 3.7 years (women) Cessation before age 40: Reduces death risk by 90% Long-term cessation: 10+ years yields survival comparable to never smokers, averts 10 years of life lost Recent cessation: <3 years averts 5 years of life lost Additional sources: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1447499/> | https://www.cdc.gov/pcd/issues/2012/11_0295.htm | [https://www.ajpmonline.org/article/S0749-3797\(24\)00217-4/fulltext](https://www.ajpmonline.org/article/S0749-3797(24)00217-4/fulltext) | <https://www.nejm.org/doi/full/10.1056/NEJMsa1211128>
94. ICER. Value per QALY (standard economic value). ICER <https://icer.org/wp-content/uploads/2024/02/Reference-Case-4.3.25.pdf> (2024)
Standard economic value per QALY: \$100,000-\$150,000. This is the US and global standard willingness-to-pay threshold for interventions that add costs. Dominant interventions (those that save money while improving health) are favorable regardless of this threshold. Additional sources: <https://icer.org/wp-content/uploads/2024/02/Reference-Case-4.3.25.pdf>

95. GAO. Annual cost of u.s. Sugar subsidies. *GAO: Sugar Program* <https://www.gao.gov/products/gao-24-106144>
Consumer costs: \$2.5-3.5 billion per year (GAO estimate) Net economic cost: \$1. billion per year 2022: US consumers paid 2X world price for sugar Program costs \$3-4 billion/year but no federal budget impact (costs passed directly to consumers via higher prices) Employment impact: 10,000-20,000 manufacturing jobs lost annually in sugar-reliant industries (confectionery, etc.) Multiple studies confirm: Sweetener Users Association (\$2.9-3.5B), AEI (\$2.4B consumer cost), Beghin & Elobeid (\$2.9-3.5B consumer surplus) Additional sources: https://www.gao.gov/products/gao-24-106144 | https://www.heritage.org/agriculture/report/the-us-sugar-program-bad-consumers-bad-agriculture-and-bad-america | https://www.aei.org/articles/the-u-s-spends-4-billion-a-year-subsidizing-stalinist-style-domestic-sugar-production/
96. World Bank. Swiss military budget as percentage of GDP. *World Bank: Military Expenditure* <https://data.worldbank.org/indicator/MS.MIL.XPND.GD.ZS?locations=CH>
2023: 0.70272% of GDP (World Bank) 2024: CHF 5.95 billion official military spending. When including militia system costs: 1% GDP (CHF 8.75B) Comparison: Near bottom in Europe; only Ireland, Malta, Moldova spend less (excluding microstates with no armies) Additional sources: https://data.worldbank.org/indicator/MS.MIL.XPND.GD.ZS?locations=CH | https://www.avenir-suisse.ch/en/blog-defence-spending-switzerland-is-in-better-shape-than-it-seems/ | https://tradingeconomics.com/switzerland/military-expenditure-percent-of-gdp-wb-data.html
97. World Bank. Switzerland vs. US GDP per capita comparison. *World Bank: Switzerland GDP Per Capita* <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CH>
2024 GDP per capita (PPP-adjusted): Switzerland \$93,819 vs United States \$75,492 Switzerland's GDP per capita 24% higher than US when adjusted for purchasing power parity Nominal 2024: Switzerland \$103,670 vs US \$85,810 Additional sources: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CH | https://tradingeconomics.com/switzerland/gdp-per-capita-ppp | https://www.theglobaleconomy.com/USA/gdp_per_capita_ppp/
98. OECD. **OECD government spending as percentage of GDP**. (2024)
OECD government spending data shows significant variation among developed nations: United States: 38.0% of GDP (2023) Switzerland: 35.0% of GDP - 3 percentage points lower than US Singapore: 15.0% of GDP - 23 percentage points lower than US (per IMF data) OECD average: approximately 40% of GDP Additional sources: https://data.oecd.org/gga/general-government-spending.htm
99. OECD. **OECD median household income comparison**. (2024)
Median household disposable income varies significantly across OECD nations: United States: \$77,500 (2023) Switzerland: \$55,000 PPP-adjusted (lower nominal but comparable purchasing power) Singapore: \$75,000 PPP-adjusted Additional sources: https://data.oecd.org/hha/household-disposable-income.htm

100. Cato Institute. Chance of dying from terrorism statistic. *Cato Institute: Terrorism and Immigration Risk Analysis* <https://www.cato.org/policy-analysis/terrorism-immigration-risk-analysis>
Chance of American dying in foreign-born terrorist attack: 1 in 3.6 million per year (1975-2015) Including 9/11 deaths; annual murder rate is 253x higher than terrorism death rate More likely to die from lightning strike than foreign terrorism Note: Comprehensive 41-year study shows terrorism risk is extremely low compared to everyday dangers Additional sources: https://www.cato.org/policy-analysis/terrorism-immigration-risk-analysis | https://www.nbc-news.com/news/us-news/you-re-more-likely-die-choking-be-killed-foreign-terrorists-n715141
101. Wikipedia. Thalidomide scandal: Worldwide cases and mortality. *Wikipedia* https://en.wikipedia.org/wiki/Thalidomide_scandal
The total number of embryos affected by the use of thalidomide during pregnancy is estimated at 10,000, of whom about 40% died around the time of birth. More than 10,000 children in 46 countries were born with deformities such as phocomelia. Additional sources: https://en.wikipedia.org/wiki/Thalidomide_scandal
102. PLOS One. Health and quality of life of thalidomide survivors as they age. *PLOS One* <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0210222> (2019)
Study of thalidomide survivors documenting ongoing disability impacts, quality of life, and long-term health outcomes. Survivors (now in their 60s) continue to experience significant disability from limb deformities, organ damage, and other effects. Additional sources: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0210222
103. US Census Bureau. Historical world population estimates. *US Census Bureau* <https://www.census.gov/data/tables/time-series/demo/international-programs/historical-est-worldpop.html>
US Census Bureau historical estimates of world population by country and region. (1950-2050). US population in 1960: 180 million of 3 billion worldwide (6%). Additional sources: https://www.census.gov/data/tables/time-series/demo/international-programs/historical-est-worldpop.html
104. FDA Study via NCBI. Trial costs, FDA study. *FDA Study via NCBI* <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6248200/>
Overall, the 138 clinical trials had an estimated median (IQR) cost of \$19.0 million (\$12.2 million-\$33.1 million)... The clinical trials cost a median (IQR) of \$41,117 (\$31,802-\$82,362) per patient. Additional sources: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6248200/
105. GBD 2019 Diseases and Injuries Collaborators. [Global burden of disease study 2019: Disability weights](#). *The Lancet* **396**, 1204–1222 (2020)
Disability weights for 235 health states used in Global Burden of Disease calculations. Weights range from 0 (perfect health) to 1 (death equivalent). Chronic conditions like diabetes (0.05-0.35), COPD (0.04-0.41), depression (0.15-0.66), and cardiovascular disease (0.04-0.57) show substantial variation by severity. Treatment typically reduces disability weights by 50-80 percent for manageable chronic conditions.

106. WHO. Annual global economic burden of alzheimer's and other dementias. *WHO: Dementia Fact Sheet* <https://www.who.int/news-room/fact-sheets/detail/dementia> (2019)
Global cost: \$1.3 trillion (2019 WHO-commissioned study) 50% from informal caregivers. (family/friends, 5 hrs/day) 74% of costs in high-income countries despite 61% of patients in LMICs \$818B (2010) → \$1T (2018) → \$1.3T (2019) - rapid growth Note: Costs increased 35% from 2010-2015 alone. Informal care represents massive hidden economic burden Additional sources: <https://www.who.int/news-room/fact-sheets/detail/dementia> | <https://alz-journals.onlinelibrary.wiley.com/doi/10.1002/alz.12901>
107. JAMA Oncology. Annual global economic burden of cancer. *JAMA Oncology: Global Cost 2020-2050* <https://jamanetwork.com/journals/jamaoncology/fullarticle/2801798> (2020)
2020-2050 projection: \$25.2 trillion total (\$840B/year average) 2010 annual cost: \$1.16 trillion (direct costs only) Recent estimate: \$3 trillion/year (all costs included) Top 5 cancers: lung (15.4%), colon/rectum (10.9%), breast (7.7%), liver (6.5%), leukemia (6.3%) Note: China/US account for 45% of global burden; 75% of deaths in LMICs but only 50.0% of economic cost Additional sources: <https://jamanetwork.com/journals/jamaoncology/fullarticle/2801798> | <https://www.nature.com/articles/d41586-023-00634-9>
108. CDC. U.s. Chronic disease healthcare spending. CDC <https://www.cdc.gov/chronic-disease/data-research/facts-stats/index.html>
Chronic diseases account for 90% of U.S. healthcare spending (\$3.7T/year). Additional sources: <https://www.cdc.gov/chronic-disease/data-research/facts-stats/index.html>
109. Diabetes Care. Annual global economic burden of diabetes. *Diabetes Care: Global Economic Burden* <https://diabetesjournals.org/care/article/41/5/963/36522/Global-Economic-Burden-of-Diabetes-in-Adults>
2015: \$1.3 trillion (1.8% of global GDP) 2030 projections: \$2.1T-2.5T depending on scenario IDF health expenditure: \$760B (2019) → \$845B (2045 projected) 2/3 direct medical costs (\$857B), 1/3 indirect costs (lost productivity) Note: Costs growing rapidly; expected to exceed \$2T by 2030 Additional sources: <https://diabetesjournals.org/care/article/41/5/963/36522/Global-Economic-Burden-of-Diabetes-in-Adults> | [https://doi.org/10.1016/S2213-8587\(17\)30097-9](https://doi.org/10.1016/S2213-8587(17)30097-9)
110. CBO. *The 2024 Long-Term Budget Outlook*. <https://www.cbo.gov/publication/60039> (2024).
111. World Bank, Bureau of Economic Analysis. US GDP 2024 (\$28.78 trillion). *World Bank* <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=US> (2024)
US GDP reached \$28.78 trillion in 2024, representing approximately 26% of global GDP. Additional sources: <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=US> | <https://www.bea.gov/news/2024/gross-domestic-product-fourth-quarter-and-year-2024-advance-estimate>
112. Environmental Working Group. US farm subsidy database and analysis. *Environmental Working Group* <https://farm.ewg.org/> (2024)
US agricultural subsidies total approximately \$30 billion annually, but create much larger economic distortions. Top 10% of farms receive 78% of subsidies, benefits concentrated in commodity crops (corn, soy, wheat, cotton), environmental damage from monoculture incentivized, and overall deadweight loss estimated at \$50-120 billion annually. Additional sources: <https://farm.ewg.org/> | <https://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances/government-payments-the-safety-net/>

113. Drug Policy Alliance. [The drug war by the numbers](#). (2021)
Since 1971, the war on drugs has cost the United States an estimated \$1 trillion in enforcement. The federal drug control budget was \$41 billion in 2022. Mass incarceration costs the U.S. at least \$182 billion every year, with over \$450 billion spent to incarcerate individuals on drug charges in federal prisons.
114. International Monetary Fund. [IMF fossil fuel subsidies data: 2023 update](#). (2023)
Globally, fossil fuel subsidies were \$7 trillion in 2022 or 7.1 percent of GDP. The United States subsidies totaled \$649 billion. Underpricing for local air pollution costs and climate damages are the largest contributor, accounting for about 30 percent each.
115. Papanicolaos, Irene et al. Health care spending in the united states and other high-income countries. *Papanicolaos et al.* <https://jamanetwork.com/journals/jama/article-abstract/2674671> (2018)
The US spent approximately twice as much as other high-income countries on medical care (mean per capita: \$9,892 vs \$5,289), with similar utilization but much higher prices. Administrative costs accounted for 8% of US spending vs 1-3% in other countries. US spending on pharmaceuticals was \$1,443 per capita vs \$749 elsewhere. Despite spending more, US health outcomes are not better. Additional sources: <https://jamanetwork.com/journals/jama/article-abstract/2674671>
116. Hsieh, C.-T. & Moretti, E. Housing constraints and spatial misallocation. *American Economic Journal: Macroeconomics* <https://www.aeaweb.org/articles?id=10.1257/mac.20170388> (2019)
We quantify the amount of spatial misallocation of labor across US cities and its aggregate costs. Tight land-use restrictions in high-productivity cities like New York, San Francisco, and Boston lowered aggregate US growth by 36% from 1964 to 2009. Local constraints on housing supply have had enormous effects on the national economy. Additional sources: <https://www.aeaweb.org/articles?id=10.1257/mac.20170388>
117. Yale Budget Lab. [The fiscal, economic, and distributional effects of all u.s. tariffs](#). (2025)
Accounting for all the 2025 US tariffs and retaliation implemented to date, the level of real GDP is persistently -0.6% smaller in the long run, the equivalent of \$160 billion 2024\$ annually.
118. Tax Foundation. Tax compliance costs the US economy \$546 billion annually. <https://taxfoundation.org/data/all/federal/irs-tax-compliance-costs/> (2024)
Americans will spend over 7.9 billion hours complying with IRS tax filing and reporting requirements in 2024. This costs the economy roughly \$413 billion in lost productivity. In addition, the IRS estimates that Americans spend roughly \$133 billion annually in out-of-pocket costs, bringing the total compliance costs to \$546 billion, or nearly 2 percent of GDP.
119. Cook, C., Cole, G., Asaria, P., Jabbour, R. & Francis, D. P. Annual global economic burden of heart disease. *International Journal of Cardiology* [https://www.internationaljournalofcardiology.com/article/S0167-5273\(13\)02238-9/abstract](https://www.internationaljournalofcardiology.com/article/S0167-5273(13)02238-9/abstract) (2014)
Heart failure alone: \$108 billion/year (2012 global analysis, 197 countries) US CVD: \$555B. (2016) → projected \$1.8T by 2050 LMICs total CVD loss: \$3.7T cumulative (2011-2015, 5-year period) CVD is costliest disease category in most developed nations Note: No single \$2.1T global figure found; estimates vary widely by scope and year Additional sources: <https://www.ahajournals.org/doi/10.1161/CIR.0000000000001258>

120. Source: US Life Expectancy FDA Budget 1543-2019 CSV. [US life expectancy growth 1880-1960: 3.82 years per decade](#). (2019)
Pre-1962: 3.82 years/decade Post-1962: 1.54 years/decade Reduction: 60% decline in life expectancy growth rate Additional sources: <https://ourworldindata.org/life-expectancy> | <https://www.mortality.org/> | https://www.cdc.gov/nchs/nvss/mortality_tables.htm
121. Source: US Life Expectancy FDA Budget 1543-2019 CSV. [Post-1962 slowdown in life expectancy gains](#). (2019)
Pre-1962 (1880-1960): 3.82 years/decade Post-1962 (1962-2019): 1.54 years/decade Reduction: 60% decline Temporal correlation: Slowdown occurred immediately after 1962 Kefauver-Harris Amendment Additional sources: <https://ourworldindata.org/life-expectancy> | <https://www.mortality.org/> | https://www.cdc.gov/nchs/nvss/mortality_tables.htm
122. Centers for Disease Control and Prevention. [US life expectancy 2023](#). (2024)
US life expectancy at birth was 77.5 years in 2023 Male life expectancy: 74.8 years Female life expectancy: 80.2 years This is 6-7 years lower than peer developed nations despite higher healthcare spending Additional sources: <https://www.cdc.gov/nchs/fastats/life-expectancy.htm>
123. US Census Bureau. [US median household income 2023](#). (2024)
US median household income was \$77,500 in 2023 Real median household income declined 0.8% from 2022 Gini index: 0.467 (income inequality measure) Additional sources: <https://www.census.gov/library/publications/2024/demo/p60-282.html>
124. Manuel, D. U.s. Defense spending history: 100 years of military budgets. *DaveManuel.com* <https://www.davemanuel.com/us-defense-spending-history-military-budget-data.php> (2025)
US military spending in constant 2024 dollars: 1939 \$29B (pre-WW2 baseline), 1940 \$37B, 1944 \$1,383B, 1945 \$1,420B (peak), 1946 \$674B, 1947 \$176B, 1948 \$117B, 2024 \$886B. The post-WW2 demobilization cut spending 88% in two years (1945-1947). Current peacetime spending (\$886B) is 30x the pre-WW2 baseline and 62% of peak WW2 spending, in inflation-adjusted dollars.
125. Statista. US military budget as percentage of GDP. *Statista* <https://www.statista.com/statistics/262742/countries-with-the-highest-military-spending/> (2024)
U.S. military spending amounted to 3.5% of GDP in 2024. In 2024, the U.S. spent nearly \$1 trillion on its military budget, equal to 3.4% of GDP. Additional sources: <https://www.statista.com/statistics/262742/countries-with-the-highest-military-spending/> | https://www.sipri.org/sites/default/files/2025-04/2504_fs_milex_2024.pdf
126. US Census Bureau. Number of registered or eligible voters in the u.s. *US Census Bureau* <https://www.census.gov/newsroom/press-releases/2025/2024-presidential-election-voting-registration-tables.html> (2024)
73.6% (or 174 million people) of the citizen voting-age population was registered to vote in 2024 (Census Bureau). More than 211 million citizens were active registered voters (86.6% of citizen voting age population) according to the Election Assistance Commission. Additional sources: <https://www.census.gov/newsroom/press-releases/2025/2024-presidential-election-voting-registration-tables.html> | <https://www.eac.gov/news/2025/06/30/us-election-assistance-commission-releases-2024-election-administration-and-voting>

127. U.S. Senate. Treaties. *U.S. Senate* <https://www.senate.gov/about/powers-procedures/treaties.htm>
The Constitution provides that the president 'shall have Power, by and with the Advice, and Consent of the Senate, to make Treaties, provided two-thirds of the Senators present concur' (Article II, section 2). Treaties are formal agreements with foreign nations that require two-thirds Senate approval. 67 senators (two-thirds of 100) must vote to ratify a treaty for it to take effect. Additional sources: https://www.senate.gov/about/powers-procedures/treaties.htm
128. Federal Election Commission. [Statistical summary of 24-month campaign activity of the 2023-2024 election cycle](#). (2023)
Presidential candidates raised \$2 billion; House and Senate candidates raised \$3.8 billion, and spent \$3.7 billion; PACs raised \$15.7 billion and spent \$15.5 billion. Total federal campaign spending approximately \$20 billion. Additional sources: https://www.fec.gov/updates/statistical-summary-of-24-month-campaign-activity-of-the-2023-2024-election-cycle/
129. OpenSecrets. [Federal lobbying hit record \\$4.4 billion in 2024](#). (2024)
Total federal lobbying reached record \$4.4 billion in 2024. The \$150 million increase in lobbying, continues an upward trend that began in 2016. Additional sources: https://www.opensecrets.org/news/2025/02/federal-lobbying-set-new-record-in-2024/
130. Columbia/NBER. Odds of a single vote being decisive in a u.s. Presidential election. *Columbia/NBER: What Is the Probability Your Vote Will Make a Difference?* <https://sites.stat.columbia.edu/gelman/research/published/probdecisive2.pdf> (2012)
National average: 1 in 60 million chance (2008 election analysis by Gelman, Silver, Edlin). Swing states (NM, VA, NH, CO): 1 in 10 million chance Non-competitive states: 34 states >1 in 100 million odds; 20 states >1 in 1 billion Washington DC: 1 in 490 billion odds Methodology: Probability state is necessary for electoral college win \times probability state vote is tied Additional sources: https://sites.stat.columbia.edu/gelman/research/published/probdecisive2.pdf | https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1465-7295.2010.00272.x
131. Hutchinson and Kirk. [Valley of death in drug development](#). (2011)
The overall failure rate of drugs that passed into Phase 1 trials to final approval is 90%. This lack of translation from promising preclinical findings to success in human trials is known as the "valley of death." Estimated 30-50% of promising compounds never proceed to Phase 2/3 trials primarily due to funding barriers rather than scientific failure. The late-stage attrition rate for oncology drugs is as high as 70% in Phase II and 59% in Phase III trials.
132. DOT. DOT value of statistical life (\$13.6M). *DOT: VSL Guidance 2024* <https://www.transportation.gov/office-policy/transportation-policy/revised-departmental-guidance-on-valuation-of-a-statistical-life-in-economic-analysis> (2024)
Current VSL (2024): \$13.7 million (updated from \$13.6M) Used in cost-benefit analyses for transportation regulations and infrastructure Methodology updated in 2013 guidance, adjusted annually for inflation and real income VSL represents aggregate willingness to pay for safety improvements that reduce fatalities by one Note: DOT has published VSL guidance periodically since 1993. Current \$13.7M reflects 2024 inflation/income adjustments Additional sources: https://www.transportation.gov/office-policy/transportation-policy/revised-departmental-guidance-on-valuation-of-a-statistical-life-in-economic-analysis | https://www.transportation.gov/regulations/economic-values-used-in-analysis

133. PLOS ONE. Cost per DALY for vitamin a supplementation. *PLOS ONE: Cost-effectiveness of "Golden Mustard" for Treating Vitamin A Deficiency in India (2010)* <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0012046> (2010)
India: \$23-\$50 per DALY averted (least costly intervention, \$1,000-\$6,100 per death averted) Sub-Saharan Africa (2022): \$220-\$860 per DALY (Burkina Faso: \$220, Kenya: \$550, Nigeria: \$860) WHO estimates for Africa: \$40 per DALY for fortification, \$255 for supplementation Uganda fortification: \$18-\$82 per DALY (oil: \$18, sugar: \$82) Note: Wide variation reflects differences in baseline VAD prevalence, coverage levels, and whether intervention is supplementation or fortification Additional sources: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0012046> | <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0266495>
134. UN News. Clean water & sanitation (LMICs) ROI. *UN News* <https://news.un.org/en/story/2014/11/484032> (2014).
135. PMC. Cost-effectiveness threshold (\$50,000/QALY). *PMC* <https://pmc.ncbi.nlm.nih.gov/articles/PMC5193154/>
The \$50,000/QALY threshold is widely used in US health economics literature, originating from dialysis cost benchmarks in the 1980s. In US cost-utility analyses, 77.5% of authors use either \$50,000 or \$100,000 per QALY as reference points. Most successful health programs cost \$3,000-10,000 per QALY. WHO-CHOICE uses GDP per capita multiples (1× GDP/capita = "very cost-effective", 3× GDP/capita = "cost-effective"), which for the US (\$70,000 GDP/capita) translates to \$70,000-\$210,000/QALY thresholds. Additional sources: <https://pmc.ncbi.nlm.nih.gov/articles/PMC5193154/> | <https://pmc.ncbi.nlm.nih.gov/articles/PMC9278384/>
136. Integrated Benefits Institute. Chronic illness workforce productivity loss. *Integrated Benefits Institute 2024* <https://www.ibiweb.org/resources/chronic-conditions-in-the-us-workforce-prevalence-trends-and-productivity-impacts> (2024)
78.4% of U.S. employees have at least one chronic condition (7% increase since 2021). 58% of employees report physical chronic health conditions 28% of all employees experience productivity loss due to chronic conditions Average productivity loss: \$4,798 per employee per year Employees with 3+ chronic conditions miss 7.8 days annually vs 2.2 days for those without Note: 28% productivity loss translates to roughly 11 hours per week (28% of 40-hour workweek) Additional sources: <https://www.ibiweb.org/resources/chronic-conditions-in-the-us-workforce-prevalence-trends-and-productivity-impacts> | <https://www.onemedical.com/mediacenter/study-finds-more-than-half-of-employees-are-living-with-chronic-conditions-including-1-in-3-gen-z-and-millennial-employees/> | <https://debeaumont.org/news/2025/poll-the-toll-of-chronic-health-conditions-on-employees-and-workplaces/>
137. Sinn, M. P. *Incentive Alignment Bonds: Making Public Goods Financially and Politically Profitable*. <https://iab.warondisease.org> (2025) doi:10.5281/zenodo.18203221
Government spending is optimized for lobbying intensity, not net societal value. Programs with 100:1 benefit-cost ratios get billions while programs with negative returns get hundreds of billions. Incentive Alignment Bonds flip this by creating a capital pool that rewards politicians (via campaign support and post-office opportunities) for funding high-NSV programs over low-NSV alternatives. The result: public good becomes private profit for both investors and elected officials.

138. Sinn, M. P. *Wishocracy: Solving the Democratic Principal-Agent Problem Through Pairwise Preference Aggregation*. <https://wishocracy.warondisease.org> (2025) doi:10.5281/zenodo.18205881
Representative democracy suffers from an inescapable principal-agent problem where elected officials' incentives diverge from citizen welfare. Wishocracy introduces RAPP (Randomized Aggregated Pairwise Preference Allocation), which aggregates citizen preferences through cognitively tractable pairwise comparisons and creates accountability via Citizen Alignment Scores that channel electoral resources toward politicians who actually represent what citizens want.
139. Sinn, M. P. *Optimocracy: Causal Inference on Cross-Jurisdictional Policy Data to Maximize Median Health and Wealth*. <https://optimocracy.warondisease.org> (2025) doi:10.5281/zenodo.18356213
Thousands of jurisdictions have made different policy and budget choices over decades, creating a natural experiment. Optimocracy applies causal inference to this cross-jurisdictional time-series data to identify which policies predict above-average median income and healthy life years. It then publishes evidence-based recommendations for every major vote, tracks politician alignment, and funds aligned candidates via SuperPAC, making suboptimal policy politically expensive while preserving democratic structures.
140. Sinn, M. P. *The Optimal Policy Generator: A Causal Inference Protocol for Maximizing Median Health and Wealth Through Public Policy*. <https://opg.warondisease.org> (2025) doi:10.5281/zenodo.18603834
The Optimal Policy Generator (OPG) produces systematic public policy recommendations for jurisdictions at any level (country, state, city), generating prioritized enact/replace/repeal/maintain recommendations to maximize real after-tax median income growth and median healthy life years, based on quasi-experimental evidence from centuries of policy variation data.
141. Sinn, M. P. *The Optimal Budget Generator: A Causal Inference Protocol for Maximizing Median Health and Wealth Through Public Goods Funding*. <https://obg.warondisease.org> (2025) doi:10.5281/zenodo.18356209
The Optimal Budget Generator (OBG) uses causal inference, diminishing returns modeling, and cost-effectiveness evidence to determine optimal public goods funding levels that maximize two welfare metrics: real after-tax median income growth and median healthy life years. For each spending category, OBG estimates an Optimal Spending Level (OSL) and produces a gap analysis showing where current government budgets are over- or underfunded relative to evidence-based benchmarks. The Budget Impact Score (BIS) measures confidence in each recommendation based on the quality of causal evidence.
142. Brookings. What's in Biden's \$850-billion defense budget proposal? *Brookings* <https://www.brookings.edu/articles/whats-in-bidens-850-billion-defense-budget-proposal/> (2024)
Analysis of the defense budget proposal.
143. OverseasBases.net. [The facts about US military bases overseas](https://overseasbases.net/). (2024).
144. Congressional Budget Office. *Projected Costs of U.S. Nuclear Forces, 2025 to 2034*. <https://www.cbo.gov/publication/61362> (2024).
145. Congressional Research Service. [Defense primer: Strategic nuclear forces](https://crsreports.congress.gov/publications/R47001). (2024).
146. Quincy Institute. *Improving U.S. and global security through military base closures abroad*. *Quincy Institute for Responsible Statecraft* <https://quincyinst.org/research/drawdown-improving-u-s-and-global-security-through-military-base-closures-abroad/> (2021).

147. U.S. Department of Defense. Senior officials outline president’s proposed FY26 defense budget. *U.S. Department of Defense* <https://www.war.gov/News/News-Stories/Article/article/4227847/senior-officials-outline-presidents-proposed-fy26-defense-budget/> (2025).
148. USAMM. How much does the US spend on its military? *USAMM* <https://www.usamm.com/blogs/news/how-much-does-the-us-spend-on-military> (2024).
149. USAFacts. Per capita US military spending: \$3,000/year. *USAFacts* <https://usafacts.org/articles/how-much-does-the-us-spend-on-the-military/> (2024)
Military spending: \$3,000/year Additional sources: https://usafacts.org/articles/how-much-does-the-us-spend-on-the-military/ | https://comptroller.war.gov/Budget-Materials/Budget2024/
150. U.S. Department of Defense. Department of defense releases the president’s fiscal year 2025 defense budget. *U.S. Department of Defense* <https://www.war.gov/News/Releases/Release/Article/3703410/department-of-defense-releases-the-presidents-fiscal-year-2025-defense-budget/> (2024).
151. House Budget Committee. Burdensome federal regulations cost economy \$2 trillion annually. (2023).
152. The Commonwealth Fund. High u.s. Health care spending: Where is it all going? *The Commonwealth Fund* <https://www.commonwealthfund.org/publications/issue-briefs/2023/oct/high-us-health-care-spending-where-is-it-all-going> (2023).
153. Peterson-KFF Health System Tracker. What drives health spending in the u.s. Compared to other countries? *Peterson-KFF Health System Tracker* <https://www.healthsystemtracker.org/brief/what-drives-health-spending-in-the-u-s-compared-to-other-countries/> (2024).
154. Healthcare Dive. Wasteful administrative costs tied to high US health spending. *Healthcare Dive* <https://www.healthcaredive.com/news/Health-Affairs-administrative-spending-wasteful/633774/> (2022).
155. Center for American Progress. Excess administrative costs burden the u.s. Health care system. *Center for American Progress* <https://www.americanprogress.org/article/excess-administrative-costs-burden-u-s-health-care-system/> (2019).
156. National Association of Manufacturers. The cost of federal regulation to the u.s. Economy, manufacturing and small business. (2023).
157. Columbia Business School. The cost of red tape: How regulation impacts GDP in european countries. *Columbia Business School* <https://business.columbia.edu/research-brief/research-brief/red-tape-regulation-gdp> (2022).
158. Coalition of Finance Ministers for Climate Action. Fossil fuel subsidy reform. https://www.financeministersforclimate.org/sites/cape/files/inline-files/CFMCA%20Policy%20Note_Fossil%20Fuel%20Subsidy%20Reform_Sept%202024.pdf (2024).
159. Cato Institute. Corporate welfare in the federal budget. (2024).
160. We Can’t Afford It. We can’t afford it: Mass incarceration and the family tax. *We Can’t Afford It* <https://www.wecantaffordit.us/> (2024).
161. Prison Policy Initiative. Economics of incarceration. (2024).
162. Institute for Economics & Peace. Global cost of violence. *Institute for Economics & Peace* <https://www.visionofhumanity.org/maps/global-peace-index/> (2022).
163. Abacum. Clinical trial costing: Phase-by-phase budget guide. *Abacum* <https://www.abacum.ai/blog/clinical-trial-costing> (2024).
164. From Science to Pharma. The costs of clinical trials. *From Science to Pharma* <https://www.fromsciencetopharma.com/blog/the-costs-of-clinical-trials> (2024).

165. U.S. Department of Health and Human Services. [HHS standard values for regulatory analysis, 2024](#). (2024).
166. Murphy, K. M. & Topel, R. H. [The value of health and longevity](#). *Journal of Political Economy* **114**, 871–904 (2006).
167. Down To Earth. Lead exposure costs \$6 trillion annually due to premature death. *Down To Earth* <https://www.downtoearth.org.in/pollution/lead-exposure-causes-6-trillion-in-economic-losses-from-premature-death-due-to-cardiovascular-disease-and-cognitive-dysfunction-says-analysis> (2023).
168. Clemens, M. A. [Economics and emigration: Trillion-dollar bills on the sidewalk?](#) *Journal of Economic Perspectives* **25**, 83–106 (2011)
Free global labor mobility would increase gross world product by somewhere in the range of 67-147%... The gains to eliminating migration barriers amount to large fractions of world GDP—one or two orders of magnitude larger than the gains from dropping all remaining restrictions on international flows of goods and capital.
169. Statistics Times. World GDP 2025. *Statistics Times* <https://statisticstimes.com/economy/world-gdp.php> (2025).
170. Sinn, M. P. *United States Efficiency Audit*. <https://us-efficiency-audit.warondisease.org> (2025) doi:10.5281/zenodo.18447476
Systems audit estimating an annual U.S. efficiency gap of \$4.9T, with \$2.45T recoverable at OECD-median performance across direct spending waste, compliance burden, policy-induced GDP loss, and system inefficiency.