

AN ASSESSMENT OF THE ECONOMIC IMPACT OF THE GEORGIA STATE TRAUMA SYSTEM

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A 2007 REPORT REVISITED

Economic Impact Model for the Development of a Statewide Trauma System in Georgia

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The detrimental impact of trauma in the United States cannot be overstated. Statistically, trauma represents the fourth-leading cause of death among all Americans, and is the leading cause of death for those under the age of 44.¹ Trauma is the most significant cause of disability and a major contributor

appropriate. The following is an analysis of the potential financial benefits that might correlate with an improvement in the state trauma system. We postulate that a coordinated statewide trauma system would reduce trauma-related morbidity and mortality and reduce health care costs by returning citizens to productive labor, thereby increasing local and state tax revenue over the longterm.

ASSUMPTIONS OF OUR PRESENT PAPER

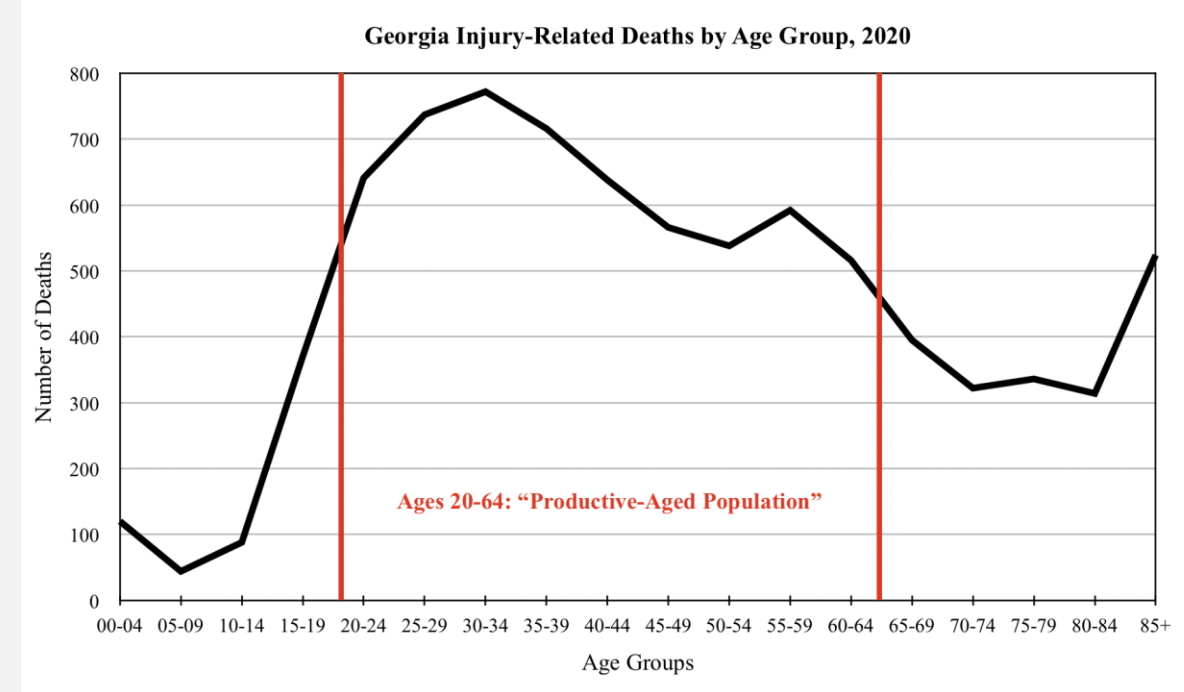
1. **Changes in mortality rates are due primarily to the impact of an expanded state trauma network and an improved ability to treat severely injured patients**
2. Mortality rates can be used as a marker for the number of individuals left disabled by their trauma
 1. Evidence suggests that severe trauma leads to a 1-3 ratio of deceased to severely disabled individuals, though this may vary
3. During their productive years, trauma victims are assumed to be economically “normal,” i.e. gainfully employed, earning wages, and paying taxes.
4. In our final calculations, Years of Potential Life Lost (YPLL) are only calculated for those under 65, as we assume that there is a relationship between these years and economically productive activity. All YPLL associated with trauma mortality over the age of 65 are excluded from our analysis, using the CDC’s under-65 YPLL measurements.
5. Trauma victims’ status is considered to be unaffected by differing socio-economic status, comorbidities, or existing disabilities
6. For simplicity, severely disabled individuals are assumed to suffer the same YPLL as if they had died. While this is likely not the case, as partial disability and varying degrees of economic productivity are still possible, it does account for loss of productivity and wages, associated costs of care and government support, and the impact of disability on earning potential. Thus, the presented disability costs represent an assumed worst-case scenario for the economy.
7. Money saved by averting death or severe disability reenters the economy as spending and taxes, and is affected by a multiplier effect, magnifying its impact. Multiplier effects of trauma systems can be quite large (Arkansas’ is estimated to have had an impact of 9 in 2013-2014), but we have opted to use a much more conservative multiplier effect of 2.33

THE MODEL

- Mortality Calculations
 - CDC WISQARS Database used to access number of trauma deaths, under-65 YPLL for US, GA, and IL in 2020
 - Years of Potential Life Lost (YPLL) for those under 65 $\times$ GA average per capita income for 2020 (\$51,967) = lifetime personal income potential
 - Lifetime personal income potential $\times$ 2020 GA state and local tax rate (11.8%) = lifetime potential state and local tax revenue
- Disability Calculations
 - Multiply each mortality calculation by 3
- Total Costs = mortality costs + disability costs
- Compare total IL-based hypothetical costs to actual GA costs for 2020
 - Hypothetical costs – actual costs = averted costs (i.e. savings) associated with trauma care

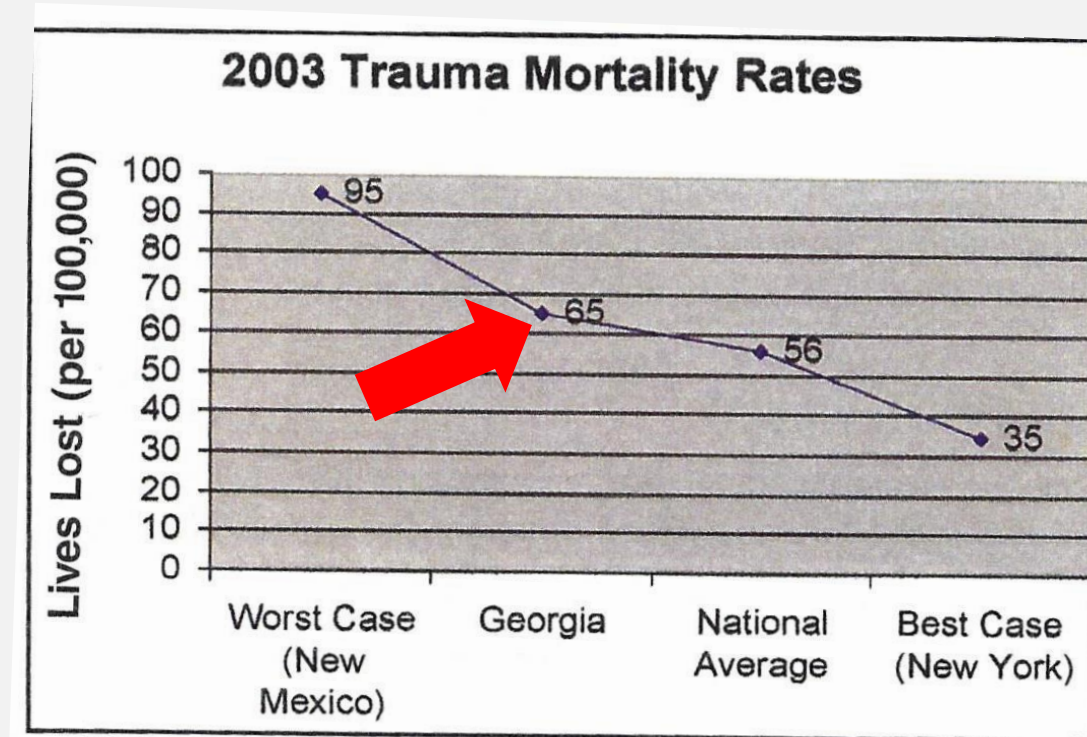
TRAUMA'S IMPACT ON SOCIETY

- Unintentional injury 4th leading cause of death for all Americans in 2020
 - Leading cause of death for Americans under 44
- CDC estimates trauma cost the US economy \$4.2 trillion in 2019 as a result of lost wages, tax revenue, productivity, etc.
 - \$2.4 trillion of loss associated with working age Americans (age 20-64)
- CDC estimates that trauma cost Georgia's economy \$83 billion in 2020



2007 PAPER: “ECONOMIC IMPACT MODEL FOR THE DEVELOPMENT OF A STATEWIDE TRAUMA SYSTEM IN GEORGIA” BY ROBINSON ET AL.

- Assessed cost of trauma-related mortality and disability to Georgia’s economy and the state’s coffers
 - GA mortality 16% above national average in 2003
- Using a multiplier effect model, calculated the lifetime personal income and tax revenue lost as a result of trauma in a given year based on the state’s years of potential life lost (YPLL)
- Argued that a \$100 million investment by the state in a reduction of trauma mortality rates by 14% would result in an 18% return on investment in the first year and a 543% lifetime return in tax revenue, as well as hundreds of lives saved each year



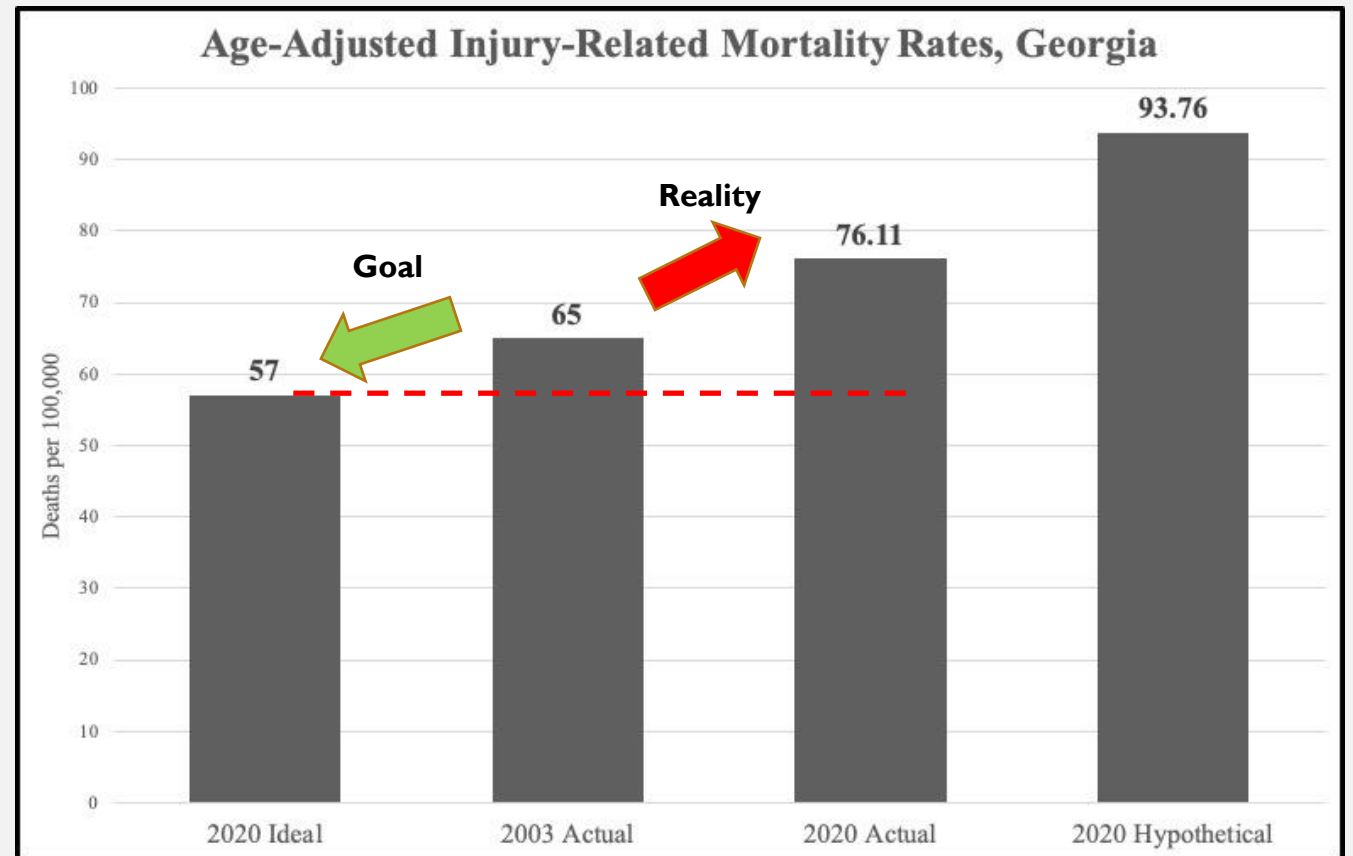
TRAUMA COMMISSION ESTABLISHED IN 2007

- Georgia Senate Bill (SB) 60 established the Georgia Trauma Care Network Commission to establish, administer, and maintain a trauma network, improve its efficiency, and oversee the allocation of trauma funding.
- Initially incredibly successful at reducing mortality rates, with a 10% decrease to 59 per 100,000 by 2011 – almost exactly on par with the national average that year

What Was Hoped

HOWEVER, DIVERGENCE FROM DESIRE: FAILURE TO LOWER MORTALITY RATES

- Since 2011, mortality rates have steadily risen
- In 2007 paper, argued for investment to reduce mortality by 14% compared to 2003
- **Goal of trauma systems was a trauma mortality rate of ~57**
- **Instead, trauma mortality rate rose ~17% to 76.11**

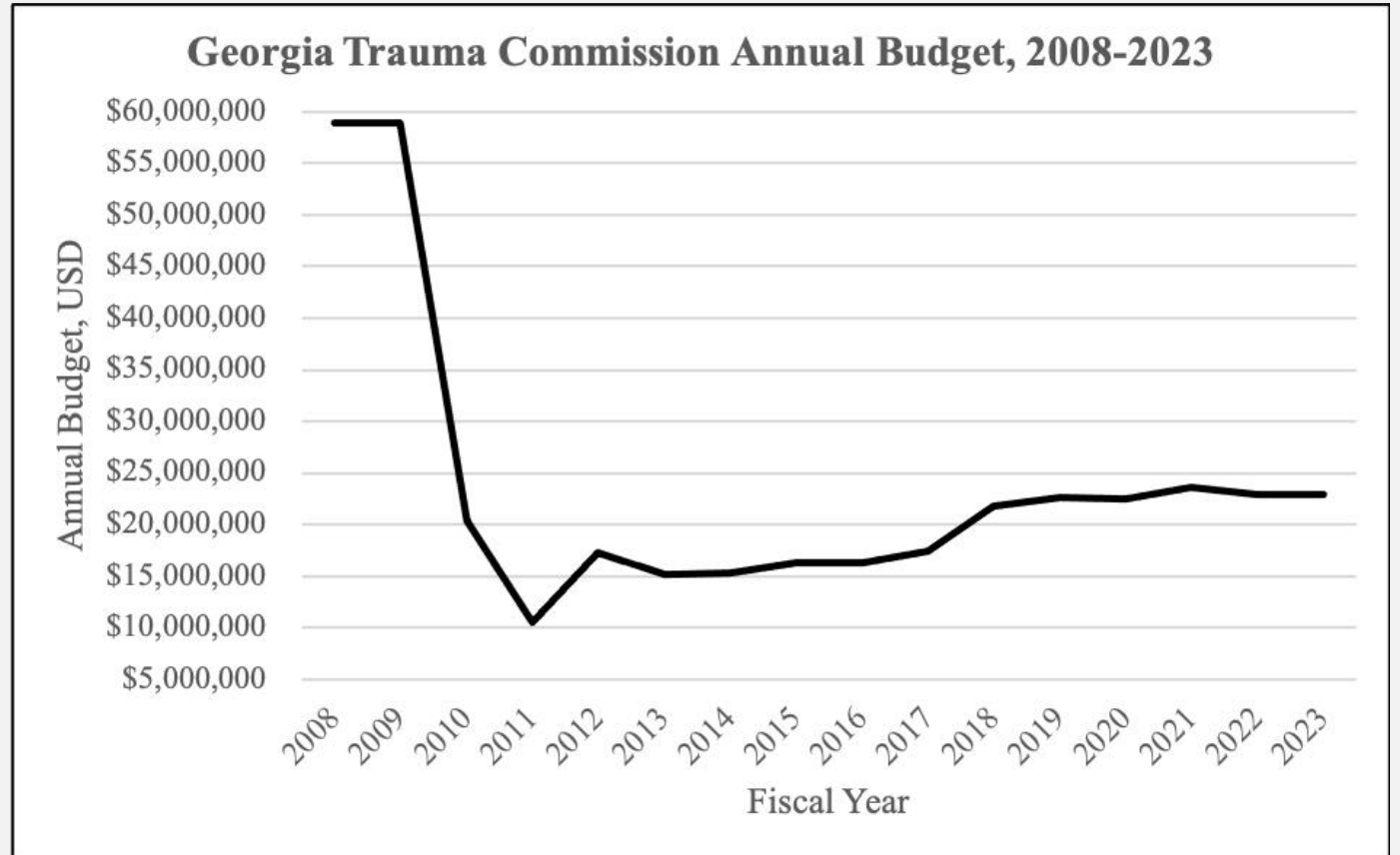


Why Did Mortality Increase?

Decreased Funding For Trauma Centers

TRAUMA FUNDING OVER TIME

- S.B 60 establishes Commission with initial \$58.9 million for 2008-9 from budget
- 2010-23 funding derived from super-speeder fines, fireworks tax; massive cut



Why Did Mortality Increase?

Financial Pressures on System

DESIGNATED TRAUMA CENTERS UNDER PRESSURE

- Number of patients to treat has grown, while funding has shrunk
 - Readiness costs require significant funding
 - Uncompensated care rates increasing, with less funding to offset costs
- 10 hospitals have left the system entirely
- 3 have downgraded trauma levels due to financial pressures
 - 2 Level IIs → Level III
 - 1 Level III → Level IV



The Atlanta Medical Center:
A Key Level I Trauma Center Closes
in 2022

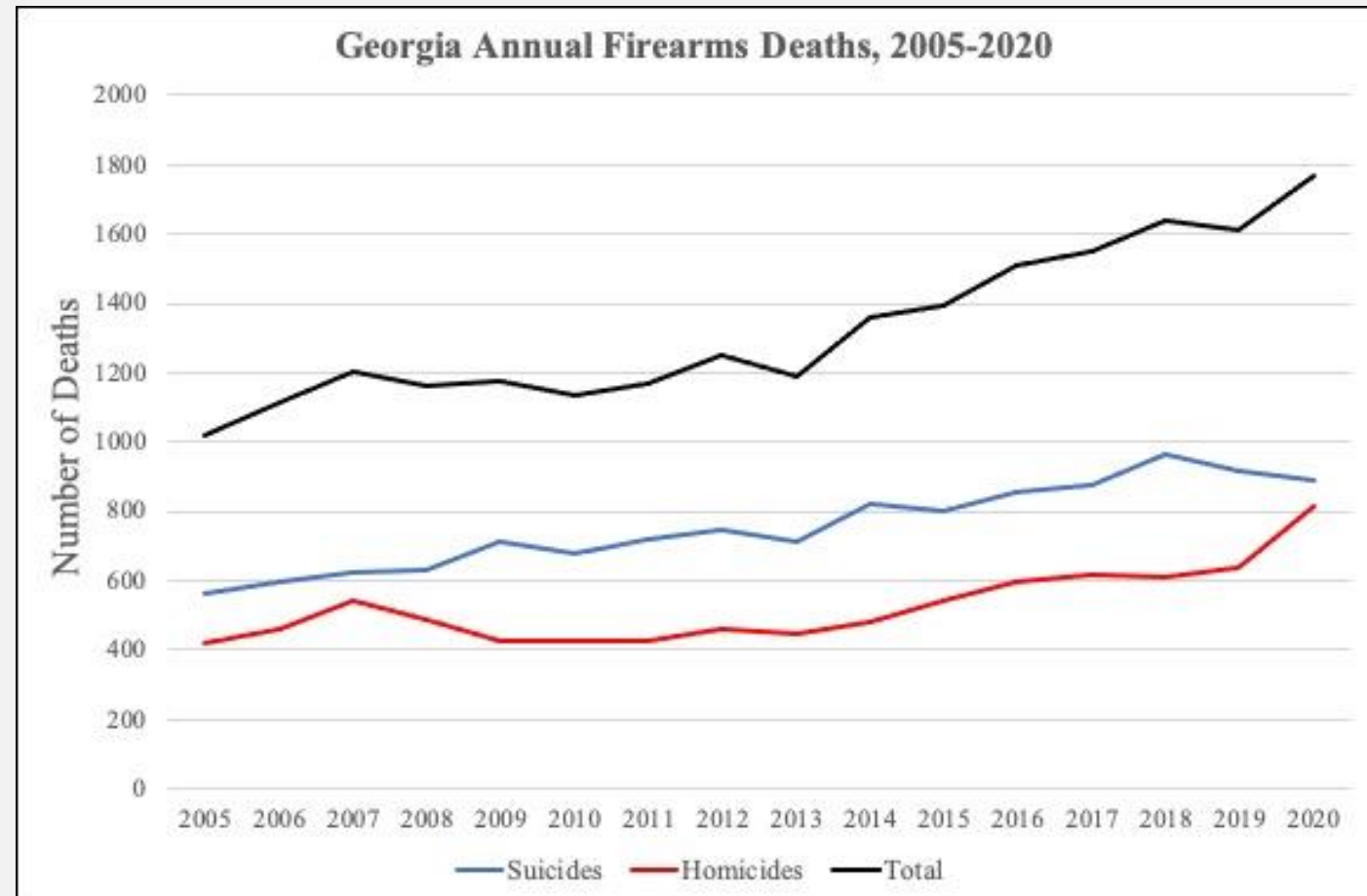
Why Did Mortality Increase?

Rising Gun Violence and Suicide Rates



FIREARMS DEATHS

- Nationally increasing trend in gun violence present in GA, especially among young people



Source:
CDC,
National
Violent
Deaths
Report

Why Did Mortality Increase?

An Aging Populace More Prone to Falls

DEATHS FROM FALLS IN GEORGIA



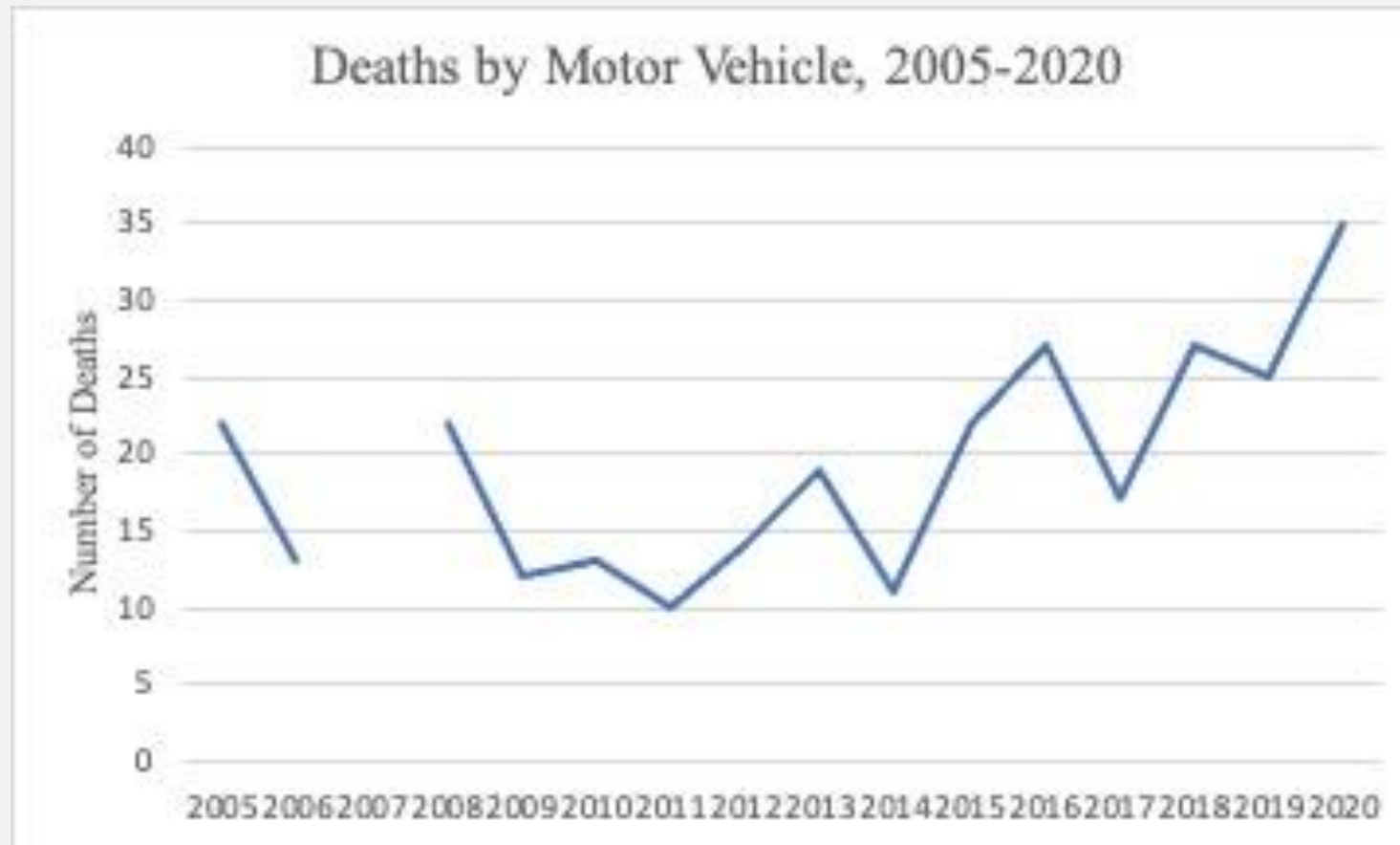
Source: CDC,
National Violent
Deaths Report

Why Did Mortality Increase?

2 Million New Georgians Since 2003 Means Thousands More Cars On The Roads

V

MOTOR VEHICLE DEATHS IN GEORGIA



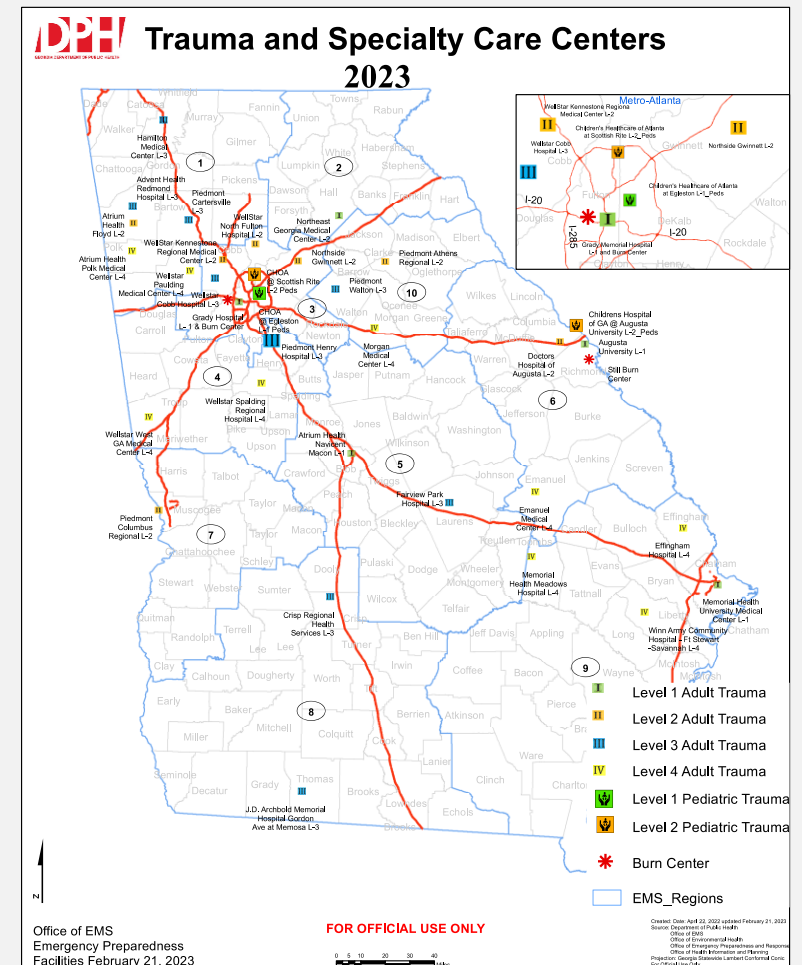
Source: CDC,
National Violent
Deaths Report

NOW, THE GOOD NEWS



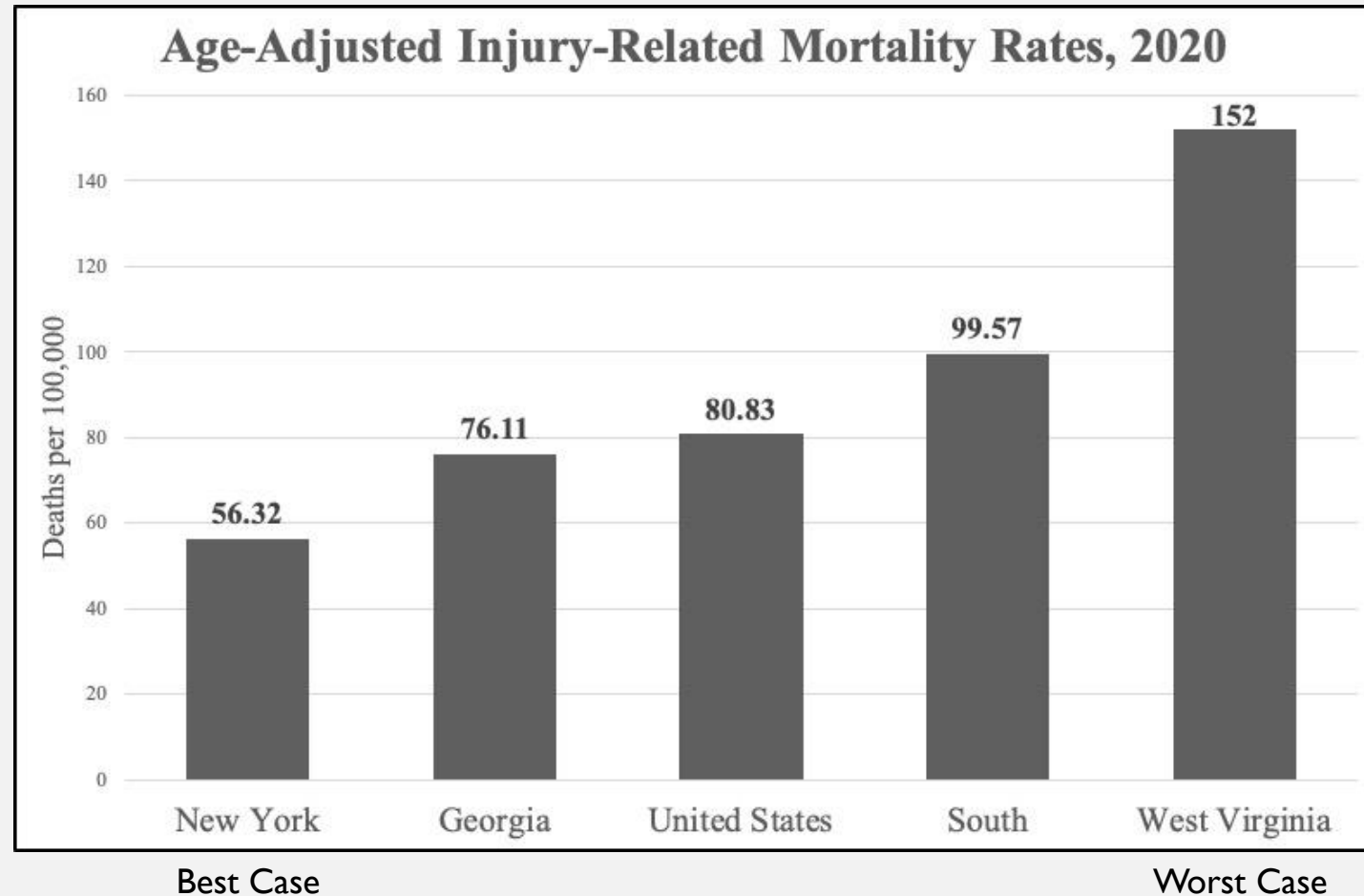
WHAT THE TRAUMA COMMISSION ACCOMPLISHED

- System greatly expanded
 - 34 designated trauma hospitals in 2023 vs 14 in 2003
 - 93% of severely injured patients now receive treatment at one of these hospitals vs 30% in 2003



2020 MORTALITY TRENDS

- Higher in absolute terms than 2003, but below national average
- Not as bad as they could have been, however



A BIG ECONOMIC BENEFIT



TRAUMA: A GREAT TARGET FOR IMPROVEMENT



THE ENORMOUS ECONOMIC COSTS OF TRAUMA IN GEORGIA: DEATH AND DISABILITY IN 2020

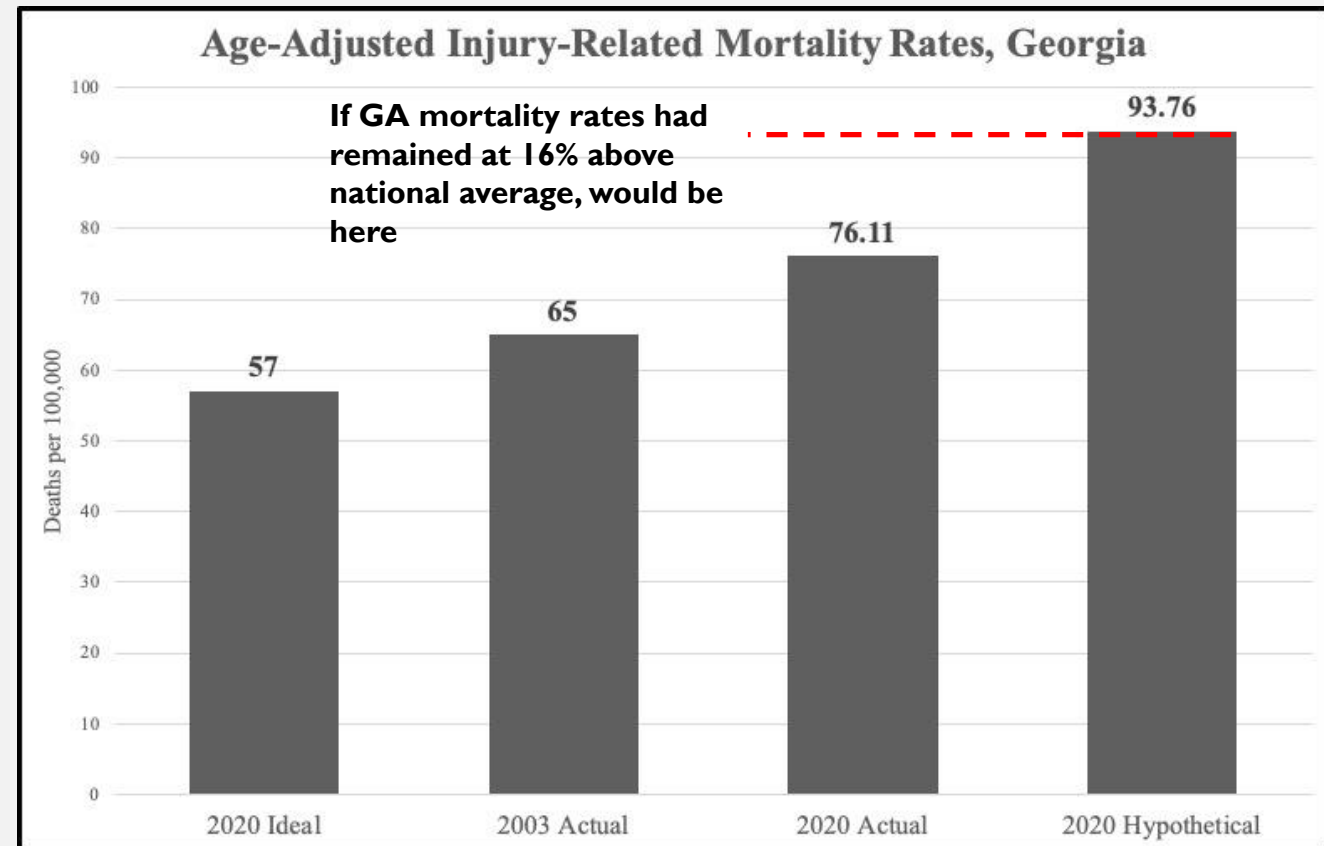
- Georgia's 8,229 trauma deaths in 2020 resulted in an under-65 YPLL of 171,702
 - Given a per-capita income of \$51,697, trauma deaths resulted in the **loss of \$8.9 billion in lifetime personal income**
 - Given that some 11.8% of personal income went to state and local taxes in 2020, the **state lost out on roughly \$1 billion in lifetime tax revenue**
- **It is estimated that for every one trauma death, roughly three individuals are severely disabled and cannot return to work***
 - Thus, disability costs should be three times that of mortality
- **In total, trauma-related death and disability resulted in an estimated loss of \$35.7 billion in lifetime personal income and \$4.2 billion in state and local tax revenue**

CALCULATING MORTALITY COSTS: GEORGIA 2020 ACTUAL

- Lost Lifetime Potential Personal Income = YPLL(per capita income)
 - $171,702 \times 51,697 = \mathbf{\$8,922,837,834}$
- Lost State and Local Tax Revenue = personal income(state and local tax rate)
 - $8,922,837,834 \times 0.118 = \mathbf{\$1,052,994,864.41}$
- Disability-Associated Costs = 3(mortality costs)
 - $3 \times 8,922,837,834 = \mathbf{\$26,768,513,502}$
 - $3 \times 1,052,994,864.41 = \mathbf{\$3,158,684,593.236}$
- Total Costs = mortality costs + disability costs
 - $8,922,837,834 + 26,768,513,502 = \mathbf{\$35,691,351,336}$
 - $1,052,994,864.41 + 3,158,684,593.236 = \mathbf{\$4,211,579,457.65}$

THE POSITIVE IMPACT OF THE TRAUMA COMMISSION ON TRAUMA CARE

- While absolute rates of mortality did increase, proportional gains were made
 - Moved from 16% above national average to ~6% below
- Had GA stayed at 16% above national average, **would have had a mortality rate of 93.76 per 100,000**
 - That translates to an additional 1,803 trauma deaths in 2020



THE HYPOTHETICAL ALTERNATIVE FOR 2020: 16% ABOVE NATIONAL AVERAGE

- **What if there was no Trauma Commission established and Georgia had remained 16% above the national average in trauma mortality?**
- All other things equal, Georgia would have had an estimated 2020 trauma mortality rate of 93.76 per 100,000, resulting in roughly 10,032 trauma-related deaths
- Assuming under-65 YPLL increased by 22% compared to 2020's actual rate to match that position, would have suffered **loss of 209,476 years. This is likely an overstatement, as it effectively assumes that all additional deaths occurred among those under 65.**
- **Would have resulted in an estimated total loss of \$43.5 billion in lifetime personal income and \$5.1 billion in state and local tax revenue**

CALCULATING MORTALITY COSTS: GEORGIA 2020 HYPOTHETICAL

- Lost Lifetime Potential Personal Income = YPLL(per capita income)
 - $209,476 \times 51,697 = \text{\$10,885,839,292}$
- Lost State and Local Tax Revenue = personal income(state and local tax rate)
 - $10,270,030,340 \times 0.118 = \text{\$1,284,529,036.46}$
- Disability-Associated Costs = 3(mortality costs)
 - $3 \times 10,885,839,292 = \text{\$32,657,517,876}$
 - $3 \times 1,284,529,036.46 = \text{\$3,853,587,109.38}$
- Total Costs = mortality costs + disability costs
 - $10,885,839,292 + 32,657,517,876 = \text{\$43,543,357,168}$
 - $1,284,529,036.46 + 3,853,587,109.38 = \text{\$5,138,116,145.82}$



ILLINOIS, WITH ACTUAL DATA, OFFERS A MORE REALISTIC, BUT SIMILAR, SCENARIO COMPARED TO THE EARLIER HYPOTHETICAL



- Illinois an excellent comparison
 - **10,023 trauma-related deaths in 2020, only 9 off of the hypothesized 10,032 for GA**
 - Actual age-adjusted mortality rate of 76.08 vs Georgia's 76.11 per 100,000 means people are dying at roughly the same ages from trauma
 - **Actual under-65 YPLL data for 2020 offers us a metric with a realistically similar distribution of deaths by age to Georgia, permitting more grounded hypothetical estimations of cost**
- Used Illinois's under-65 YPLL in 2020 to calculate the impact of higher trauma deaths on personal income and state and local tax revenue in Georgia for 2020
 - What if the same number of people had died at the same ages in Georgia? What would that impact have been?
 - **Total loss of \$41 billion in lifetime personal income and \$4.8 billion in state and local tax revenue**

CALCULATING MORTALITY COSTS: ILLINOIS-BASED 2020 HYPOTHETICAL

- Lost Lifetime Potential Personal Income = YPLL(per capita income)
 - $197,626 \times 51,697 = \text{\$10,270,030,340}$
- Lost State and Local Tax Revenue = personal income(state and local tax rate)
 - $10,270,030,340 \times 0.118 = \text{\$1,211,863,580.12}$
- Disability-Associated Costs = 3(mortality costs)
 - $3 \times 10,270,030,340 = \text{\$30,810,091,020}$
 - $3 \times 1,211,863,580.12 = \text{\$3,635,590,740.36}$
- Total Costs = mortality costs + disability costs
 - $10,270,030,340 + 30,810,091,020 = \text{\$41,080,121,360}$
 - $1,211,863,580.12 + 3,635,590,740.36 = \text{\$4,847,454,320.48}$

MONEY FOR THE STATE



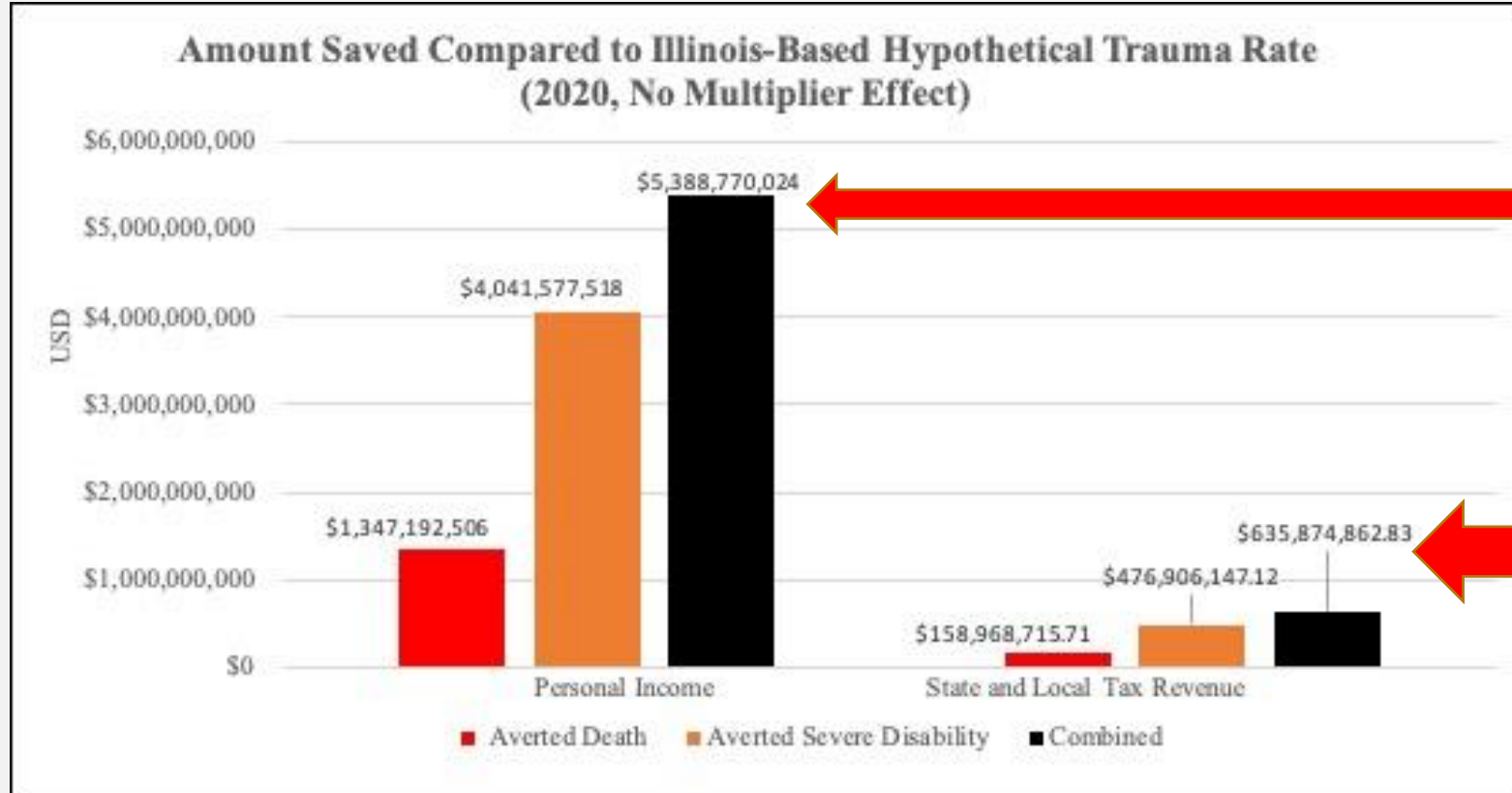


THE TRAUMA COMMISSION: A GREAT INVESTMENT



- For a relatively small yearly investment, an enormous long-tail benefit occurs, compounding over years for an exponential investment return
- We assume a multiplier effect applies to the money saved, furthering its benefit
 - Use a multiplier effect value of 2.33 from our 2007 paper
- Each year's investment in the Trauma Commission's budget yields increasingly additive effects
 - **Every life saved is a productive resident and taxpayer for the rest of their lives**

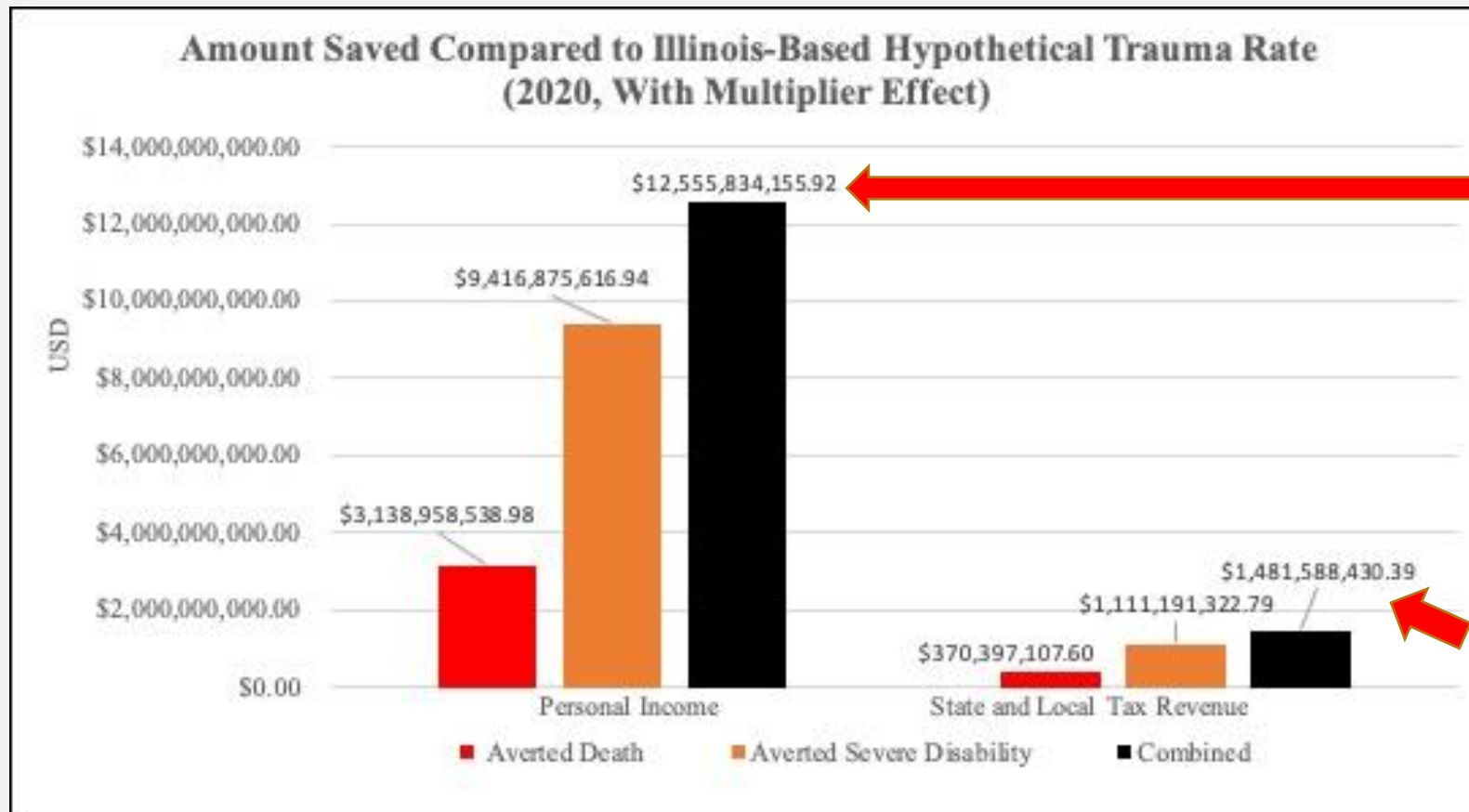
THE TRAUMA COMMISSION'S IMPACT: THE ESTIMATED BASE ECONOMIC EFFECTS OF LOWER MORTALITY RATES IN 2020



**\$5.4 billion in
lifetime personal
income preserved**

**\$636 million in
lifetime tax revenue
preserved**

THE TRAUMA COMMISSION'S IMPACT: THE ESTIMATED MULTIPLIED EFFECTS OF LOWER TRAUMA MORTALITY IN 2020



**\$12.5 billion in
lifetime personal
income preserved**

**\$1.4 billion in
lifetime tax revenue
preserved**

CALCULATING MORTALITY COSTS: 2020 ACTUAL VS 2020 IL-BASED HYPOTHETICAL

- Total Costs Averted = Hypothetical – Actual
 - $\$41,080,121,360 - \$35,691,351,336 = \$5,388,770,024$
 - $\$4,847,454,320.48 - \$4,211,579,457.65 = \$635,874,862.83$
- Multiplier Effect = 2.33(Total Costs Averted)
 - $\$5,388,770,024 \times 2.33 = \$12,555,834,155.92$
 - $\$635,874,862.83 \times 2.33 = \$1,481,588,430.39$

AN INCREDIBLE RETURN ON INVESTMENT

- For every \$1 the state invested in the Trauma Commission between 2008 and 2020, an estimated \$17.19 in potential lifetime personal income and \$2.03 in potential lifetime tax revenue was saved in 2020 alone
- **For every \$1 the state invested in the Trauma Commission in 2020, an estimated \$239.39 in potential lifetime personal income and \$28.25 in potential lifetime tax revenue was saved**
- With the multiplier effect of personal income, double the base return on investment

A COMPARABLE INVESTMENT

- Investing \$1 in Tesla in 2010 would have yielded \$27.88 in 2019
- Matching the \$28.25 return in lifetime potential tax revenue from investment in Trauma Commission



FURTHER INVESTMENT:
A GREAT OPPORTUNITY
MONEY FOR THE TRAUMA COMMISSION

- Trauma Commission poised to play a key role in Georgia healthcare and could be a good agent for conducting analyses of the state's health systems in order to improve efficiency and lower costs
- Roughly \$125 billion spent on healthcare in Georgia in 2022
- State allocating roughly \$6.7 billion to state health agencies in FY 2024, mostly for Medicaid
 - Investment in trauma care is a pittance of that

HEALTHCARE AN APPROPRIATE, USEFUL GOVERNMENT INVESTMENT

- Just like the federal highway system, dams, and other key pieces of infrastructure, healthcare is a public good worthy of government investment



SOME POSSIBILITIES FOR THE FUTURE

1. Major, funded attention to trauma prevention
2. An Artificial Intelligence, NORAD-type acute adjudication for trauma disposition and triage
3. An in-folding of all time-sensitive medical emergencies into the NORAD-type network
4. A dispassionate economic and structural review of shortfalls in trauma and acute care, with suggestions for improvement



Thank you!