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Disparities in National Institute of Health trauma research funding

The search for sufficient funding opportunities

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Abstract

To evaluate disparities in the National Institute of Health (NIH) trauma research funding.

Traumatic injury has increased in both prevalence and cost over the last decade. In the event of a traumatic injury, patients in the United States (US) rely on the trauma system to provide high-quality care. The current trauma research funding is not commensurate with the extent of the burden of trauma on the US population.

In this qualitative study, the National Institutes of Health's Estimates of Funding for Various Research, Condition, and Disease Categories (RCDC) data were reviewed. The burden of traumatic injury on the US and the NIH trauma research funding was examined and compared with other diseases.

In 2018, the NIH funded an estimated $639 million to traumatic injury research projects, <2% of the NIH budget. Comparatively, the NIH funded an estimated $6.3 billion towards cancer research in 2018. Cancer research receives extensively more funding than trauma research despite that trauma accounts for 24.1% of all years of potential life lost (YPLL) before age 75 compared with 21.3% for cancer.

In the event of traumatic injury, trauma systems in the US should be able to provide high-quality care to patients yet cannot do so without adequate research funding. The federal funding contributed towards trauma research deserves a re-evaluation.

Abbreviations: AAST = American Association for the Surgery of Trauma, ACS = American College of Surgeons, ACS COT = American College of Surgeons Committee on Trauma, EAST = Eastern Association for the Surgery of Trauma, ED = emergency department, HIV/AIDS = human immunodeficiency virus/acquired immunodeficiency syndrome, NCI = National Cancer Institute, NIGMS = National Institute of General Medical Sciences, NIH = National Institute of Health, NTI = National Trauma Institute, RCDC = Research, Condition, and Disease Categories, U.S. = United States, WTA = Western Trauma Association, YPLL = years of potential life lost.

Keywords: funding disparities, National Institute of Health funding, trauma research, traumatic injury

1. Introduction

Traumatic injury has increased in both prevalence and cost over the last decade.[1] In the event of a traumatic injury, patients in the United States (US) rely on the trauma system to provide high-quality care. The current trauma research funding is not commensurate with the extent of the burden of trauma on the US population.[2] This prevents the trauma system from delivering the most advanced care to patients. The funding contributed to trauma research deserves a reevaluation.

Traumatic injury significantly contributes to societal mortality. Traumatic injury is the leading cause of death among people aged 1 to 44 years old and the third leading cause of death of all age groups in the US.[3,4] Every year 214,000 people die from traumatic injury, which translates to 1 person every 3 minutes.[3] This is more deaths than non-communicable diseases and infectious diseases combined. The deaths from traumatic injury are alarmingly increasing and have been on the rise since 2000.[5] As such, the funding for traumatic injury research should be expanding. Funding could facilitate the identification of the cause of rising trauma deaths and may formulate preventative measures for this problem. The annual mortality caused by traumatic injury in the US is displayed in Fig. 1.

The mortalities caused by traumatic injury is only a part of the problem. Approximately 2.8 million people are hospitalized, and 27.6 million people are treated in an emergency department (ED) for traumatic injuries each year.[3] To suffer a severe injury and survive often is followed by sustained mental, physical, and financial problems. The total costs of traumatic injuries in the US is $671 billion per year.[6] The costs associated with traumatic injury are a burden not only on the patient, but on the entire healthcare system. With the increasing rate of traumatic injuries,

Editor: Ediriweera Desapriya.

Funding: None.

The authors have no conflicts of interest to disclose.

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How to cite this article: Dowd B, McKenney M, Boneva D, Elkbuli A. Disparities in NIH trauma research funding: The search for sufficient funding opportunities. Medicine 2020;99:6(e19027).

Received: 3 October 2019 / Received in final form: 2 December 2019 / Accepted: 6 January 2020

http://dx.doi.org/10.1097/MD.0000000000019027

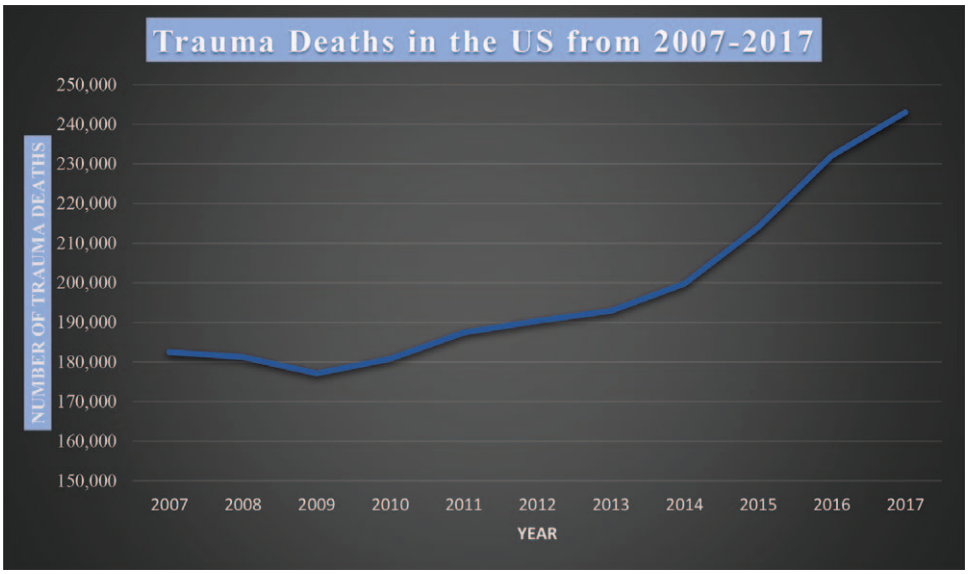

Figure 1. Trauma deaths in the US shows the annual number of deaths due to traumatic injury from 2007 to 2017. Data from the National Center for Health Statistics (NCHS), National Vital Statistics System.

trauma costs are a healthcare crisis. Trauma has a substantial burden on the US in terms of mortality, rehabilitation, and financial costs.

Traumatic injury affects all age groups, from infants to the elderly. There is no age group that is immune from traumatic injury. Trauma is the fifth leading cause of death in infants <1 year of age.[7] Trauma is the most common cause of death in people aged 1 to 44 years old.[7] Trauma is the third leading cause of death in people aged 45 to 64 years old and the seventh leading cause of death in people aged 65 years and older.[7] Nevertheless, the elderly are a subset of patients that are often left behind in traumatic injury discussions. The significance of traumatic injury among older adults is under appreciated, with the largest increases in trauma deaths among individuals in their fifth and sixth decades of life.[5] As the population ages, traumatic injuries and subsequent deaths may continue to increase. Trauma deaths overall increased by 22.8% from 2000 to 2010.[5] This demonstrates the increasing rate of traumatic deaths in the US and calls for disease appropriate federal funding to be allocated to address this burden. With the recent mass shooting trauma emergencies, trauma care among all ages in the US has been tested. Trauma research funding would enable the investigation into patterns and interventions that would help the gun violence epidemic. Prevention of gun violence would avert serious traumatic injuries among the population. A recent study on the long-term physical, mental, emotional, and social outcomes among individuals with gunshot wounds determined that such trauma has lasting effects beyond mortality and economic burden.[8] Survivors of gunshot wounds may have adverse outcomes for years after the injury, which demonstrates the need for long-term longitudinal care.[8] This is only one subset of trauma care that is in need of further research on prevention efforts and prevention effectiveness.

Adequate National Institute of Health (NIH) funding for trauma would facilitate the discovery of preventions or treatments that may contribute to reduction of the burden of trauma. Our study aimed to examine the burden of traumatic injury in the US and the NIH funding dedicated to trauma research as compared with other impactful diseases.

2. Methods

In this qualitative study, the NIH's Estimates of Funding for Various Research, Condition, and Disease Categories (RCDC) data were reviewed.[9] This data was published in April 2019 and includes annual NIH funding from 2015 to 2020 categorized by research/disease areas. The burden of traumatic injury on the US and the NIH trauma research funding was examined and compared with other diseases. This study received an exempt determination from our institutional review board.

3. Results

Trauma Research in the US is currently funded by a combination of private and federal programs. The primary federal funding is through the NIH. The NIH funding for disease-related research is determined by Congress appropriations and incorporates input from the NIH, scientists, health care providers, and special interest groups. Congressional leaders have the authority to promote legislation to authorize such appropriations. In 2018, the NIH funded an estimated $639 million to traumatic injury research projects.[9] This accounts for approximately 1.6% of the available $39.2 billion in NIH funding. In 2019, the NIH is estimated to fund $725 million, also <2% of available funding, towards traumatic injury research.[9] From 2015 to 2018, the NIH funding for traumatic injury research increased by $240 million (38% growth).[9] The amount of federal funding towards trauma research is slowly improving, yet not enough to keep up with the increasing rates of trauma deaths. In fact, the lack of adequate trauma research funding has been long recognized. The severity of traumatic injury and lack of sufficient funding was acknowledged in 1966 by the National Research Council and

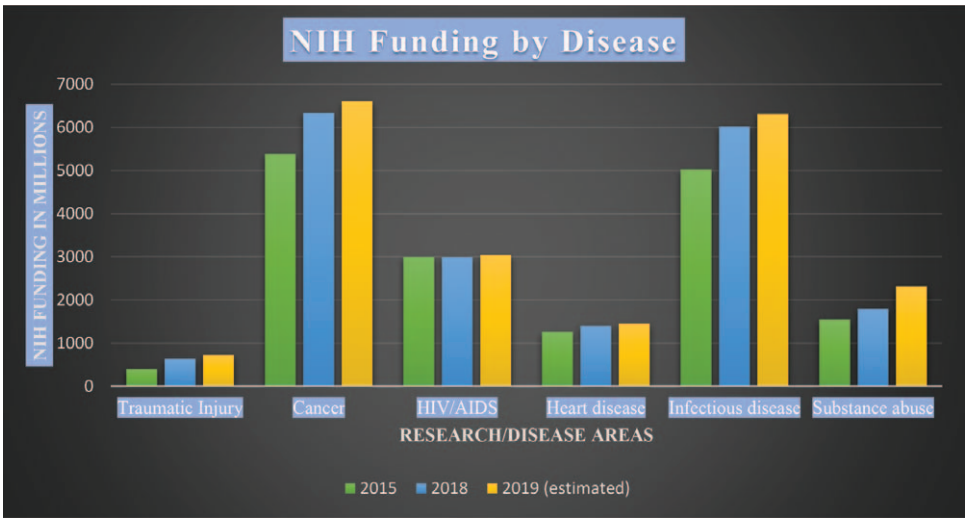

Figure 2. NIH funding by disease shows the NIH research funding in millions towards common diseases for 2015, 2018, and estimates for 2019. Data from the US Department of Health and Human Services, National Institutes of Health. Estimates of Funding for Various Research, Condition, and Disease Categories (RCDC).

again in 1985, in 1994 by the NIH, in 1999 by the Institute of Medicine, in 2004 by the National Highway Traffic Safety Administration, in 2007 by the Institute of Medicine again, and in 2016 by the National Academies of Sciences. Despite recognition for over 50 years, the funding allocated towards trauma research is still insufficient.

Trauma research funding is diminutive compared with other impactful diseases. When compared with other diseases, trauma research is severely underfunded relative to the burden of the disease. The NIH funded an estimated $6.3 billion towards cancer research in 2018.[9] In 2019, the NIH is expecting to fund $6.6 billion towards cancer research.[9] Cancer research receives extensively more funding than trauma research despite that trauma has more years of potential life lost (YPLL). Traumatic injuries account for 24.1% of all YPLL before age 75 compared with 21.3% for cancer.[10] The NIH also funded an estimated $3 billion towards human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) research and is expected to fund the same for 2019.[9] Trauma research, in comparison to diseases with less incidence and more YPLLs, is significantly underfunded. Diseases with adequate funding, such as cancer, have made significant advances in preventing and alleviating the burden of the disease. Such funding facilitates identifying prevention efforts or medical treatments that may contribute to reduction of the burden of disease. With the help of sufficient funding, death rates from cancer decreased over all age groups from 2000 to 2010.[6] While this has enabled the population to live longer and healthier lives, it has pushed trauma advancements behind, which resulted in an increase in the epidemiological impact of traumatic injuries. The NIH established the National Cancer Institute (NCI) to eliminate suffering and deaths from cancer, however, there is no such institute dedicated to traumatic injuries. Diseases such as cancer and HIV/AIDS have been successful in obtaining funding because of the awareness of such diseases. A dedicated institute, such as the NCI, establishes awareness among the public, and most importantly, among congressional members. This results in higher appropriation of NIH funding dedicated to cancer research. This level of awareness is necessary in order to increase dedicated trauma funding. Appropriate funding is needed in order to enable advancements in trauma care that would impede the growing mortality and costs as a result of traumatic injury. The NIH funding for several common diseases as compared with traumatic injury is displayed in Fig. 2. The NIH funding compared with the YPLL for traumatic injury and other diseases is displayed in Fig. 3.

Alleviation of traumatic injury, as compared with cancer and HIV/AIDS which focus on medical treatment, involves concentration on social action, governmental policies, and behavior prevention. Due to the emphasis on prevention measures rather than pharmaceuticals and medical treatments, there is likely less interest in funding such research due to lack of return. Despite this, other common diseases which also rely on prevention efforts still receive more NIH funding than traumatic injury. In 2018, the NIH funded an estimated $1.4 billion towards heart disease, $6.0 billion towards infectious disease, and $1.5 billion towards substance abuse research.[9] In 2019, the NIH is expecting to fund $1.5 billion towards heart disease, $6.3 billion towards infectious disease, and $2.3 billion towards substance abuse research.[9] All these diseases have a strong reliance on prevention efforts, and all receive extensively more funding than traumatic injury. The effectiveness of the prevention efforts of such diseases is an important factor in decreasing the burden of the disease, and adequate research funding is needed to identify effective prevention efforts.

4. Discussion

With the burden of traumatic injury on the US population, federal funding towards trauma research needs to be expanded. It is imperative to the progress of trauma care that the NIH increase support and funding for trauma research. This research funding would allow for the development of a more robust trauma system which can provide lasting treatment for trauma victims and improve trauma center outcomes. Increased funding by the NIH could be achieved by increasing the awareness of the burden of

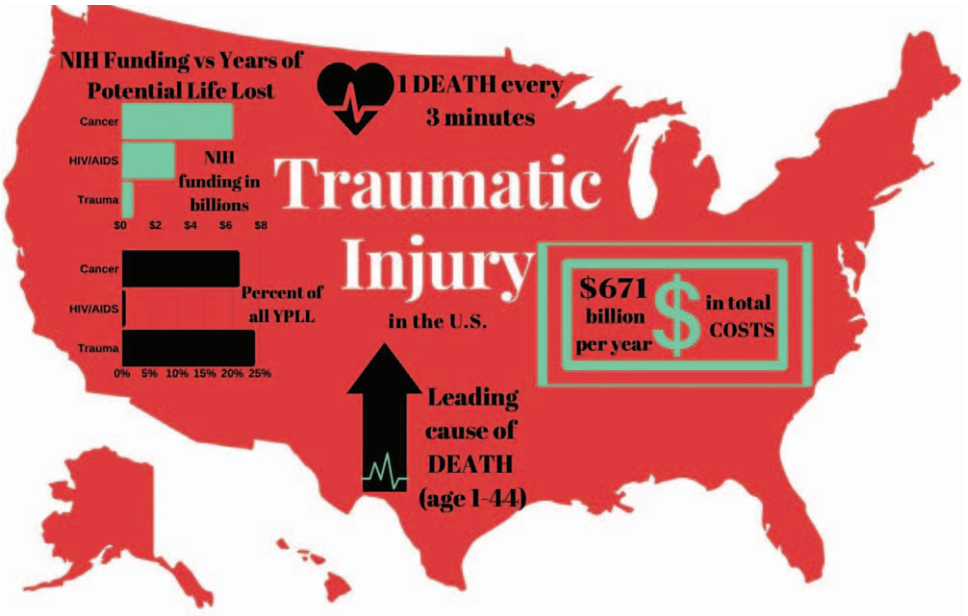

Figure 3. Traumatic injury in the US represents various data regarding traumatic injury in the United States. The NIH funding compared with the percent of all years of potential life lost (YPLL) is displayed for trauma, cancer, and HIV/AIDS to show a relative comparison of trauma to other diseases. Data were obtained from the Center for Disease Control (CDC), the National Institute of Health (NIH), and the National Trauma Institute. HIV/AIDS = human immunodeficiency virus/acquired immunodeficiency syndrome.

trauma among Congress. This would encourage Congressional leaders to promote legislation that either expands or reallocates funding towards trauma research. Expanded and re-focused mission statements of existing institutions within the NIH are also needed. In order for trauma research to obtain the funding it deserves, the American College of Surgeons (ACS) has suggested developing a standard definition for trauma research, a comprehensive research agenda, a federal home for trauma research, and a National Trauma Research Action plan.[2]

Currently, the largest institute for trauma research funding within the NIH is the National Institute of General Medical Sciences (NIGMS). While residing in such a large institute allows trauma to take advantage of the institute's broader resources, there would be significant advantages to establishing a smaller institute entirely dedicated to trauma. Advantages to a trauma institute include raised awareness, dedicated mission statements, and possibly increased funding by Congress appropriations. Nevertheless, larger, more prestigious institutions tend to have higher success in obtaining NIH grants over smaller institutions.

The Coalition for National Trauma Research was founded by the American Association for the Surgery of Trauma (AAST), the National Trauma Institute (NTI), the Eastern Association for the Surgery of Trauma (EAST), the ACS Committee on Trauma (ACS COT), and the Western Trauma Association (WTA). This coalition provides an example of the success that a dedicated trauma institute could have in raising awareness and unifying traumatic injury research efforts. Ultimately, an increase in congressional awareness of the burden of trauma would result in the highest chance of an expansion or reallocation of NIH funding towards trauma research. These initiatives, along with those suggested by the ACS, would assist in establishing the trauma research field which could facilitate the funding of trauma by federal and private programs.

Beyond this, it would be beneficial to increase societal awareness of the impact of traumatic injury. It is important that awareness is increased among the public to increase preventative measures against traumatic injury. This awareness would also increase national support of trauma research, leading to a public push to increase the funding. Diseases such as cancer and HIV/AIDS have benefited enormously from public awareness and support. It is such dedication that advances funding and allows for medical breakthroughs and trauma survival.

With the extremely high costs of traumatic injury that places a burden on both the patients and the healthcare system, it is worthwhile to invest in furthering research efforts for new treatments and devices to save lives and minimize disability following traumatic injury. In the event of traumatic injury, trauma systems in the US should be able to provide high-quality care to patients yet cannot do so without adequate research funding. The federal funding contributed towards trauma research deserves a reevaluation.

5. Conclusion

In the event of traumatic injury, trauma systems in the US should be able to provide high-quality care to patients yet cannot do so without adequate research funding. The federal funding contributed towards trauma research deserves a reevaluation.

Author contributions

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Drafting the manuscript: Brianna Dowd, Adel Elkbuli.
Critical revisions of manuscript: Adel Elkbuli, Brianna Dowd, Dessy Boneva, Mark McKenney.

Final approvals: All authors reviewed and approved the final manuscript.

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References

[1] DiMaggio C, Ayoung-Chee P, Shinseki M, et al. Traumatic injury in the United States: In-patient epidemiology 2000-2011. Injury 2016;47:1393–403.

[2] American College of Surgeons. Research Funding in Trauma; 2017. Available at: https://www.facs.org/~/media/files/quality%20programs/trauma/zpd%20conf/05_jurkovich.ashx [Last accessed August 07, 2019].

[3] Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS) Fatal and Nonfatal Injury Data; 2017.

[4] Murphy SL, Xu J, Kochanek KD, et al. Mortality in the United States, 2017. NCHS Data Brief 2018;1–8.

[5] Rhee P, Joseph B, Pandit V, et al. Increasing trauma deaths in the united states. Ann Surg 2014;260:13–21.

[6] Florence C, Haegerich T, Simon T, et al. Estimated lifetime medical and work-loss costs of emergency department-treated nonfatal injuries—United states, 2013. Morb Mortal Weekly Rep 2015;64:1078–82.

[7] National Center for Health Statistics (NCHS), National Vital Statistics System. Ten Leading Causes of Death, United States; 2019. Available at: https://www.cdc.gov/injury/wisqars/LeadingCauses.html [Last accessed November 23, 2019].

[8] Vella MA, Warshauer A, Tortorello G, et al. Long-term functional, psychological, emotional, and social outcomes in survivors of firearm injuries. JAMA Surg 2019;Available at: https://doi.org/10.1001/jamasurg.2019.4533. Accessed November 24, 2019. [Epub ahead of print]

[9] U.S. Department of Health and Human Services, National Institutes of Health. Estimates of Funding for Various Research, Condition, and Disease Categories (RCDC); 2019. Available at: https://report.nih.gov/categorical_spending.aspx. [Last accessed July 03, 2019].

[10] National Trauma Institute. Trauma Statistics and Facts; 2019. Available at: https://www.nattrauma.org/what-is-trauma/trauma-statistics-facts/ [Last accessed July 21, 2019].