



Understanding the Economic Losses Resulting From Opioid Overdose Deaths in the USA Between 2018-2020

Shalinie Mahadeo, BA¹, Briana Lui, BS¹, Elizabeth Khusid, BA¹, Marisa Weber, MD², Rohan Jotwani, MD², Marguerite Hoyler, MD², and Robert White, MD²

¹MD Program, Weill Cornell Medicine, New York, NY USA, ²Department of Anesthesiology, Weill Cornell Medicine, New York, NY USA

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Background

Opioids—mainly synthetic opioids (other than methadone)—are currently the main driver of drug overdose deaths, with fentanyl taking over as the nexus of this epidemic. Our knowledge of the pharmacodynamics of these drugs that make them highly addictive continues to grow, as does our understanding of the psychosocial implications of this crisis. Although prior studies have assessed the economic impacts of total overdose deaths at a regional level, there remains a paucity of information regarding the financial burdens due to specific types of opioids at a national level.

The aim of the paper is to examine the economic burdens of the opioid overdose crisis by quantifying years of potential lives lost (YPLL) due to premature mortality and the value of those statistical lives (VSL) to estimate monetary losses to the economy. We hypothesize that fentanyl will contribute a significant portion of financial burdens from overdose deaths.

Methods

Data Acquisition – Overdose Deaths

- The total number of deaths from drug overdoses from fentanyl, hydrocodone, hydromorphone, oxycodone, and oxymorphone was extracted from the National Vital Statistics System (NVSS) for 2018-2020 (1).
- The data were stratified by age range and gender.

Data Acquisition – Life Expectancy

- Period life expectancy was extracted from the 2019 actuarial life tables from the Social Security Administration website.
- Period life expectancy is defined as the average number of years of life remaining if a group of persons at that age were to experience the mortality rates for 2017 over the course of their remaining life.

Statistical Analysis

- The baseline age of death was calculated by taking the upper value of the midpoint for each age range. Annual YPLL for each age range was calculated by multiplying the number of deaths by the 2019 period life expectancy for males and females at the midpoint of each respective age range.
- The population average value of statistical life year (VSLY), which is used by policymakers to calculate the economic value of reducing mortality risks, was determined to be US\$240,676 based on previously published literature.
- The VSL for each age range was then calculated by multiplying the YPLL by the VSLY to quantify the economic burden of these premature deaths.

Results

There was a 65% increase in opioid-induced overdose deaths between 2018-2020. Fentanyl consistently accounted for an overwhelming proportion of opioid-induced deaths (77% of deaths in 2018 and 86% in 2020 resulting in 2.2 million YPLL and \$527 billion VSL). The greatest percentage of deaths from fentanyl and oxymorphone was seen in the 25-34 age range and nearly two-thirds of all fatalities were men.

Oxycodone accounted for 13% of overdose deaths in 2018 but dropped to 8% in 2020. Hydrocodone, hydromorphone, and oxymorphone contributed to 4%, 0.9%, and 0.87% of overdose deaths in 2020, respectively.

Figure 1. Years of potential life lost (YPLL) by opioid type and year

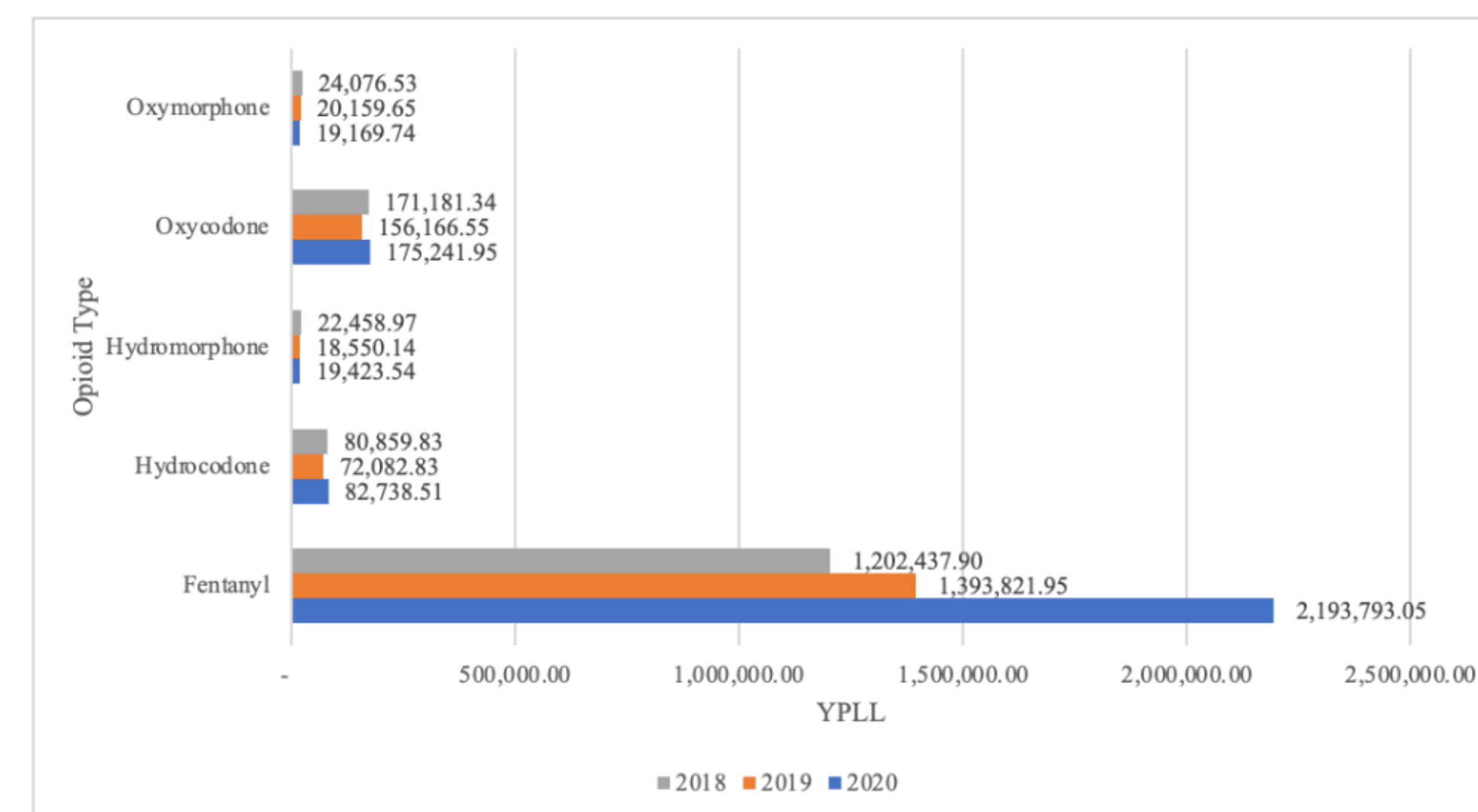


Figure 2. Years of potential life lost (YPLL) from fentanyl overdose deaths by age groups and year

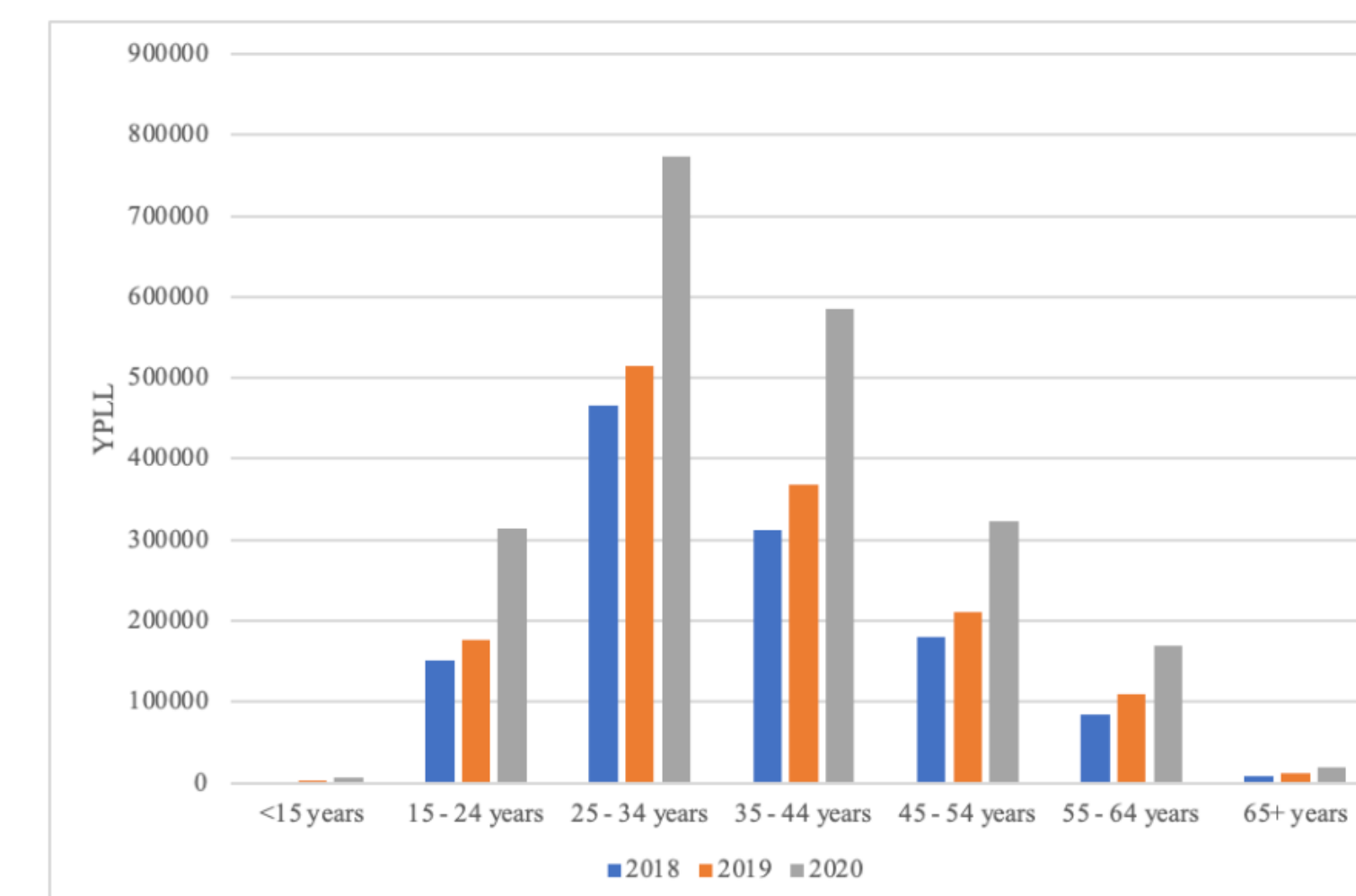


Table 1. Total years of potential life lost (YPLL) & total value of statistical life (VSL) from

fentanyl overdose deaths by year

	2018		2019		2020	
Deaths	30,230		35,449		55,653	
	Total YPLL	Total VSL (USD)	Total YPLL	Total VSL (USD)	Total YPLL	Total VSL (USD)
Base case	1,202,437.9	\$289,397,944,020.40	1,393,821.95	\$335,459,491,638.20	2,193,793.05	\$527,993,336,101.80
Lower bound	1,093,645.84	\$263,214,306,187.84	1,266,297.03	\$304,767,303,992.28	1,993,270.68	\$479,732,414,179.68
Upper bound	1,341,069.22	\$322,763,175,592.72	1,556,391.14	\$374,585,994,010.64	2,449,420.53	\$589,516,735,478.28

Discussion

Opioid overdose deaths rose between 2018-2020, with a notable upsurge in 2020, possibly a sequela of the socioeconomic burdens of the COVID-19 pandemic. COVID-19 brought economic and social instability for many Americans, and these stressors disproportionately affected populations with a history of substance use disorders, mental illness, and homelessness. Combating the opioid overdose crisis will require a comprehensive understanding psychosocial context of opioid use and abuse.

Fentanyl overdose deaths consistently led to the most premature years of life lost (YPLL) and the greatest losses to the economy (VSL). This may be linked to newer, potent fentanyl derivatives (2) and their low cost leading to more lacing of fentanyl with other drugs including heroin, methamphetamine, and cocaine, increasing the likelihood of a fatal interaction (3). Sources of limitation include the lack of data on how the opioids were obtained (prescription, illicit, etc.) and routes of administration (parenteral, transdermal, trans-buccal).

Conclusions

Opioid overdose deaths rose between 2018 and 2020, with a collective upsurge in overdose deaths in 2020, possibly a sequela of the socioeconomic burdens of the COVID-19 pandemic. Fentanyl consistently accounted for the majority of opioid-induced deaths during this time. Combating the opioid overdose crisis requires a comprehensive understanding of the economic and psychosocial costs of overdose deaths.

References

- NCHS (National Center for Health Statistics) National Vital Statistics System, 2019-2021. Number and Rates of Drug Overdose Deaths Involving Fentanyl, Hydrocodone, Hydromorphone, Oxycodone and Oxymorphone.
- Ellis CR., et al.. PLoS One. 2018 May 24;13(5):e0197734.
- United States Drug Enforcement Agency. Facts about Fentanyl.