**ONLINE SUPPLEMENT FOR “IMPACT OF A COMMUNITY-BASED NALOXONE DISTRIBUTION PROGRAM ON OPIOID OVERDOSE DEATH RATES”**

1. **Cost-benefit analysis of a naloxone distribution program in North Carolina**

*Naloxone distribution program costs*

In 2015 and 2016, the NCHRC purchased naloxone kits at a cost of $18,000 in 2015 and $54,000 in 2016 (Table S1). Based on the number of kits distributed in 2015 and 2016, the average per unit price of a naloxone kit was approximately $2/kit. While the NCHRC did not collect data on the personal distribution or training costs associated with the naloxone distribution program, Coffin & Sullivan (2013) estimated the cost of naloxone kit distribution to be approximately $25 ($12=cost of naloxone; $3=cost of other components, and $10=staff time/training/distribution costs). As such, we increased the cost of naloxone distribution in NC by $10, assuming the cost of other components is accounted for in the reported NCHRC costs. In what follows, we assume that a distributed naloxone kit costs NCHRC approximately $12/kit. Therefore, we estimate that in addition to the $72,000 spent on naloxone kits between 2015 and 2016, an additional $337,200 may have also been incurred from distribution of naloxone, for a total of $409,200 across those two years.

**Table S1.** Naloxone distribution program costs to North Carolina Harm Reduction Coalition, 2015-2016

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Cost of naloxone kits** | **Average cost per kit** | **Estimated distribution cost per kit** | **Estimated total cost per kit** | **Estimated total distribution costs** | **Estimated total costs of distributed kits** |
| 2015 | $18,000 | $1.13/kit | $10/kit | $11.13/kit | $158,740 | $176,740 |
| 2016 | $54,000 | $3.03/kit | $10/kit | $13.03/kit | $178,460 | $232,460 |
| Total | $72,000 |  |  |  | $337,200 | $409,200 |

*Deaths avoided*

To calculate deaths avoided, we: (1) calculated the exposure category-specific rates of overdose deaths by year; (2) multiplied these exposure category-specific rates by respective county population sizes in each exposure category and year to obtain estimated deaths, (3) calculated expected deaths, assuming no counties had received naloxone, and (4) took the difference between the calculations in (2) and (3) to estimate the number of deaths avoided (and corresponding confidence intervals).

**Table S2.** Estimated deaths avoided due to naloxone distribution program

in North Carolina counties, August 2013-December 2016

|  |  |
| --- | --- |
| **Year** | **Estimated deaths avoided**  **(95% confidence interval)** |
| 2013\* | 18 (16, 21) |
| 2014 | 79 (59, 105) |
| 2015 | 108 (62, 172) |
| 2016 | 147 (53, 282) |
| Total | 352 (189, 580) |

\* Partial year, August 2013 through December 2013

*Value of statistical life estimates*

The federal government often uses value of a statistical life (VSL) calculations when estimating the life-saving benefits of a particular policy or program. The VSL is based on how individuals value reductions in the risk of death. Much literature has been published on the appropriate measure of VSL, but there is considerable variation in that value. Federal agencies use different VSLs (CEA, 2017). For example, the Department of Transportation (DOT) uses $9.6 million (with a range of $5.4 million – 13.4 million in 2015 dollars); the Environmental Protection Agency (EPA) uses $10.1 million (in 2015 dollars); and the Department of Health and Human Services (DHHS) uses $9.4 million (with a range of $4.4 – $14.3 million in 2015 dollars). These figures indicate a range of $4.4 - $14.3 million, with a median of $9.6 million. There are limitations to VSL calculations, and there is concern that some VSL estimates are overstated. We used a conservative value of $4.4 million in analyses.

*References for online supplement*

Coffin, P.O., Sullivan, S.D., 2013. Cost-effectiveness of distributing naloxone to heroin users for lay overdose reversal. Ann. Intern. Med. 158, 1-9.

The Council of Economic Advisers (CEA), 2017. The underestimated cost of the opioid crisis. Washington, DC: CEA. Available online: https://www.whitehouse.gov/sites/whitehouse.gov/files/images/The%20Underestimated%20Cost%20of%20the%20Opioid%20Crisis.pdf. Accessed on December 11, 2018.

1. **FIGURE S1.** Number and rate of opioid overdose deaths\* per 100,000 population, North Carolina, 2000-2016

**\*** Opioid overdose deaths were defined as any death associated with an ICD-10 code of T40.0 (opium), T40.1 (heroin), T40.2 (other opioids, commonly prescribed opioids), T40.3 (methadone), T40.4 (other synthetic narcotics, commonly fentanyl or its analogs), or T40.6 (other and unspecified narcotics).