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## Naloxone Dispensing to Youth Ages 10–19: 2017–2022

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### Abstract

**BACKGROUND AND OBJECTIVES:** Naloxone is lifesaving in the event of an opioid overdose but is underutilized in adolescents. Youth-serving clinicians can play a role in expanding naloxone access by offering it to all youth at risk for opioid-involved overdose, including by prescription. Understanding naloxone dispensing trends to youth can inform efforts to expand its use.

**METHODS:** We used IQVIA National Prescription Audit Patient Insights data, which contains prescriptions dispensed from ~48 900 retail pharmacies, representing 93% of all prescriptions from all payers in the United States. Cross-sectional analyses were used to describe naloxone dispensing trends among youth ages 10 to 19 years over time and by patient sex, out-of-pocket cost, prescriber specialty, and payer.

**RESULTS:** From 2017 to 2022, 59 077 prescriptions for naloxone were dispensed to youth ages 10 to 19. Dispensing rates increased 669%, from 6.6 to 50.9 prescriptions per 100 000 adolescents, with increases each year. Dispensing varied by specialty and sex. Pediatricians accounted for an increasing proportion of prescriptions dispensed with a 6-year increase of 991%. Seventy-four percent of prescriptions were paid through commercial insurance. Although most prescriptions dispensed had low to 0 cost-sharing, 20% had out-of-pocket costs exceeding \$25, and over 6% had out-of-pocket costs exceeding \$75.

**CONCLUSIONS:** Pediatricians and other youth-serving clinicians can play an important role in expanding access to naloxone and harm reduction information by prescribing naloxone to all youth who are at risk for overdose. Clinician prescribing of naloxone can augment community distribution and over-the-counter access by making naloxone more widely available at all touchpoints with the health care system.

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Dr Terranella conceptualized and designed the study, conducted the initial analysis, and drafted the initial manuscript; Dr Guy assisted with the initial analysis; and all authors critically reviewed and revised the manuscript, approved the final manuscript as submitted, and agree to be accountable for all aspects of the work.

The findings and conclusions in this article are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

**CONFLICT OF INTEREST DISCLOSURES:** The authors have indicated they have no conflicts of interest relevant to this article to disclose.

Provisional data indicate that there were over 107 000 overdose deaths in 2022, largely driven by illegally-made fentanyl.<sup>1</sup> Adolescents and young adults have not been spared, with overdose rates among youth aged 14 to 18 years more than doubling from 2.36 to 5.49 deaths per 100 000 from 2019 to 2021.<sup>2</sup> This rapid increase in mortality among youth is 3-fold higher than seen in adults over the same time period (44% increase, from 21.52 per 100 000 in 2019 to 31.06 per 100 000 in 2021).<sup>2</sup> Naloxone is an opioid antagonist that can reverse an overdose. Timely administration of naloxone to someone experiencing an opioid overdose can save lives, and making naloxone widely available is an important harm reduction tool.<sup>3</sup> One study found that enacting state policies that increase availability of naloxone reduced overdose deaths by 14%.<sup>4</sup> Offering naloxone to people, including youth who use drugs, those diagnosed with substance use disorders (SUDs), and their family and caregivers, is widely recommended by Centers for Disease Control and Prevention, the American Society for Addiction Medicine, and the American Academy of Pediatrics.<sup>5–8</sup>

Despite the lifesaving effects of naloxone, many youth who experience an overdose may not receive it. In a recent report of overdoses among adolescents in the US State Unintentional Drug Overdose Reporting System from 2019 to 2021, 67% of reported youth deaths had documentation of a potential bystander, but only 32% documented any bystander response. Only 30% of deaths documented any naloxone administration from a bystander or a medical professional.<sup>9</sup>

To help youth access naloxone, several methods of distribution, in addition to pharmacies, are available, including dispensing at community events, schools, and naloxone vending machines.<sup>10–12</sup> Pediatricians and medical professionals can play a role in expanding access to naloxone, including by prescription, by offering it to all youth who report substance use, or who are at risk for opioid overdose. Although clinicians are aware of overdose prevention principles, relatively few discuss overdose prevention in practice and self-report of naloxone prescribing to youth is low.<sup>13</sup> In a 22-month study of 38 pediatric emergency visits for opioid overdose, only 1 patient was prescribed naloxone on discharge.<sup>14</sup> Primary care clinicians, addiction medicine specialists, and clinicians who treat overdoses in youth are in unique positions to ensure patients have access to this key component of harm reduction. A better understanding of naloxone prescribing and dispensing practices to youth could inform clinician education efforts toward overdose prevention. To our knowledge, no nationally representative studies of pharmacy-based naloxone dispensing to youth have been published to date.

## METHODS

We used data from IQVIA National Prescription Audit (NPA) Patient Insights and NPA Extended Insights to describe naloxone dispensing trends to youth (defined as individuals aged 10–19 years) from 2017 to 2022. For comparison, naloxone prescriptions dispensed to adults aged ≥ 20 years were also examined. These data include prescriptions dispensed from approximately 48 900 retail pharmacies, representing 93% of all prescriptions in the United States. These data include all payers and are projected to be nationally representative of all prescriptions dispensed from retail pharmacies in the United States. Cross-sectional analyses were used to describe naloxone dispensing trends over time and by sex, prescriber specialty,

out-of-pocket cost, and payer. Data on payer and cost were only available from 2020 to 2022. Payer types analyzed were Medicaid (including the Child Health Insurance Program - CHIP), commercial insurance, and self-pay. Medicare prescriptions were excluded from payer analysis, given the small number of prescriptions paid for with Medicare among this population. Annual dispensing rates of naloxone prescriptions per 100 000 youth aged 10 to 19 years and adults aged 20 years were calculated for all years using annual population estimates for each of the study years from the US Census Bureau.<sup>15</sup> Annual dispensing rates per opioid overdose fatality were also calculated. Opioid fatalities by age and year were gathered using Centers for Disease Control and Prevention Wonder Multiple Cause of Death data.<sup>16</sup> To quantify growth in naloxone dispensing over time, we calculated the percent change in rate of naloxone prescriptions dispensed per 100 000 population and per opioid overdose fatality among youth and adults from 2017 to 2022. In accordance with the Common Rule, this cross-sectional study was exempt from institutional review board review and informed consent, given its use of publicly available data. Data were analyzed between January and April 2023 using Microsoft Excel (2017). We followed the STROBE reporting guideline.

## RESULTS

From 2017 to 2022, 59 077 prescriptions for naloxone were dispensed to youth ages 10 to 19 years (annual range: 2754–21 725) (Table 1). The annual dispensing rate increased from 6.6 to 50.9 prescriptions per 100 000 youth from 2017 to 2022 (annual mean: 23.5), an increase of 669%, with increases observed each year (Fig 1). Dispensing rates increased annually for both males and females (Fig 1). Dispensing rates in females increased by 722%, compared with an increase of 625% in males, whereas absolute dispensing rates were slightly lower among females overall (females –6.1 and 50.1 per 100 000 versus males –7.1 and 51.8 in 2017 and 2022, respectively) (Table 1). Over the study period, there were 95.9 naloxone prescriptions dispensed among adults aged 20 years for every 1 naloxone prescription dispensed to youth. However, from 2017 to 2022, naloxone dispensing rates rose faster among youth (669% increase) compared with adults (378% increase).

Naloxone dispensing rates among youth per opioid overdose death increased from 5.7 naloxone prescriptions per opioid overdose death in 2017 to 15.2 prescriptions in 2022, a 168% increase (annual mean: 10.05) (Table 1). The mean dispensing rate per opioid overdose death was 64% that of adults (Table 1).

General practice physicians, including physicians whose specialty was not specified, accounted for 16.5% of naloxone prescriptions dispensed from 2017 to 2022 (Table 2). This was followed by nurse practitioners (14.2%), surgical specialists (12.7%), family physicians (9.5%), and physician assistants (9.2%). The proportion of naloxone prescribed by each specialty over time is presented in Fig 2. Pediatricians (including internal medicine or pediatrics specialists) prescribed 5.6% of naloxone dispensed. Pediatricians accounted for an increasing proportion of number of prescriptions dispensed, with a 6-year increase of 991%, compared with an overall increase among other specialties of 674%, and an overall increase among all specialties of 689%. Although pharmacists and dentists prescribed relatively

few of the naloxone prescriptions dispensed, they were among specialties with the largest increases over the study period (2575% and 2590% increases, respectively).

A majority (74.6%) of naloxone prescriptions dispensed were paid for through commercial insurance, followed by Medicaid (20.5%), and self-pay (4.9%). Among all payers, 62% had no out-of-pocket costs associated with the prescription, and among those paid by Medicaid, nearly 100% had no out-of-pocket costs. Among the remaining prescriptions with cost-sharing, most had copays under \$25; however, 13.7% had copays \$25 to \$75 and 6.4% over \$75. Although 30% of prescriptions with self-payers had no out-of-pocket costs, 33% of prescriptions with self-payers had out-of-pocket costs exceeding \$75 (Fig 3).

## DISCUSSION

Clinicians, in general, and pediatricians, in particular, are in a unique position to offer naloxone along with harm reduction education to youth. Over the study period, opioid overdose fatalities in youth nearly tripled,<sup>16</sup> whereas naloxone prescriptions increased nearly 8-fold, suggesting that clinicians are responding to recent increases in overdose-related mortality. Moreover, during the study period, dispensing rates per 100 000 youth rose faster than dispensing rates to adults. Despite these encouraging trends, clinicians could contribute more to increasing naloxone access among this population. Most youth see a pediatrician for primary care,<sup>17</sup> but pediatricians prescribed only 5.6% of naloxone dispensed. Overall, naloxone dispensing rates to youth remain low and are far below dispensing rates to adults, despite a high prevalence of opioid and substance use and a rapid rise in opioid involved overdoses since 2020.<sup>2,18</sup> In 2021, there were an estimated 259 000 youth aged 12 to 17 years with an opioid use disorder and over 2 million adolescents with any SUD in the United States.<sup>19</sup> Nearly 1 in 3 high school students reported past 30-day substance use in 2021.<sup>20</sup> Considering the increasing presence of counterfeit pills and contaminated drug supply with fentanyl,<sup>21</sup> youth who use illegal drugs and misuse prescription drugs are at heightened risk for an unintentional opioid-involved overdose and could benefit from access to naloxone.

One challenge to increased access for youth is cost. In this study, although most patients (62%) experienced no cost-sharing in purchasing dispensed naloxone, 20% had copays greater than \$25 and over 6% had copays greater than \$75. Multiple studies have identified cost as a significant barrier to naloxone dispensing, suggesting that increasing enrollment of Medicaid-eligible youth and minimizing copays at the point of sale could increase naloxone's availability to youth.<sup>22–25</sup> Additionally, over-the-counter access might reduce cost as a barrier, particularly for those without insurance, where over 30% of prescriptions dispensed had out-of-pocket costs greater than \$75. In 2023, the Food and Drug Administration approved certain naloxone formulations for over-the-counter use, with an average price for these formulations of \$45, a lower cost that could be important to sustaining accessibility to all youth.<sup>26</sup>

Another challenge to youth access to naloxone is training. A recent study of pediatric residents found that only 32% knew indications to prescribe naloxone, 22% felt they had sufficient education on SUDs, and only 16% knew how to educate patients to reduce overdose risk.<sup>13</sup> Residency training and continuing education programs for all clinicians

on naloxone indications and use as well as on preventing and treating SUDs could build capacity of the youth-serving health care workforce to better meet this growing need. Mentorship and remote services emulating the model of Project ECHO (Extension for Community Health care Outcomes) or the Providers Clinical Support System could provide real time support for clinicians, particularly in rural and underserved areas of the country.<sup>27,28</sup>

Encounters in the emergency department and during hospital admissions also offer opportunities for overdose prevention messaging and naloxone delivery. In a recent study of pediatric emergency department admissions for opioid-related visits, naloxone was prescribed in only 1 of 38 opioid-related visits over a 22 month period.<sup>14</sup> Moreover, few pediatric emergency departments have protocols in place for standardized management of youth who present with substance use related complaints.<sup>29</sup> These studies, in conjunction with our analysis, suggest emergency medicine clinicians could play an even greater role in ensuring youth access to naloxone. Emergency department and hospital discharge protocols can dramatically increase the proportion of patients at risk for overdose who receive naloxone and overdose education.<sup>30</sup> Health systems could consider implementing routine naloxone dispensing and harm reduction education protocols for all patients, including youth, who present to the emergency department and/or are admitted for non-fatal overdoses or are otherwise found to be at risk for overdose.

Naloxone access could further be expanded by engaging clinicians not typically seen as managing SUDs. Over the study period, prescriptions by dentists, obstetricians, surgical subspecialists, and pharmacists increased disproportionately relative to other prescribers. These specialties are among those that prescribe the most opioids to youth.<sup>31,32</sup> The dramatic increases in naloxone prescriptions from these specialties highlights the effectiveness of harm reduction messaging encouraging naloxone distribution accompanying opioid prescriptions.<sup>5</sup> This increase also emphasizes how harm reduction messaging that encourages naloxone dispensing and education at every health care touchpoint, including encounters not traditionally viewed as related to substance use prevention, could potentially be extremely effective in expanding the volume of naloxone prescribed.

Pharmacists can play a particularly important role in dispensing naloxone. All states allow naloxone dispensing directly by pharmacies without a prescription or through a state or local standing order.<sup>33</sup> These laws are associated with increased naloxone dispensing in retail pharmacies,<sup>34</sup> and the proliferation of these laws over the last decade might account for the dramatic increase in the proportion of naloxone dispensed with a pharmacist's prescription. However, barriers to dispensing to youth through pharmacies remain. In a 2020 study of 120 US pharmacies, 20% did not have naloxone in stock, and 48% of employees mistakenly stated that there was a minimum age for naloxone dispensing.<sup>35</sup> Such barriers might have contributed to the overall finding of low dispensing in our study and suggest that education of pharmacists and pharmacy managers on the importance of maintaining availability of naloxone for all ages could increase access for youth.

Naloxone access for youth could also be expanded through increased community distribution, particularly through schools and youth-serving organizations. The new over-

the-counter access for nasal spray products is another promising strategy to make naloxone widely available, although over-the-counter availability may not address barriers associated with stigma or cost. These nonpharmacy based distribution methods might offer confidential alternatives to clinician prescription for particularly high risk youth.

This study was subject to several limitations. First, the dataset does not capture prescriptions that were not dispensed, resulting in lower rates than what was actually prescribed. It is likely that many naloxone prescriptions remained unfilled. Second, this study only reports data on naloxone dispensed from retail pharmacies. Data on prescriptions filled through mail order, Indian Health Service, Veterans Affairs, opioid treatment programs, or large health systems are not captured. Also not included in the data are naloxone dispensed directly by a clinician office, hospital, emergency department, or community distribution programs, a common method of distribution outside of clinical settings and pharmacies. Third, prescriptions dispensed from a retail pharmacy by standing order are captured in this data but under the specialty of the clinician authorizing the standing order; thus, the number of prescriptions dispensed directly by pharmacists might be undercounted. Fourth, we do not have data on race and ethnicity, so factors related to health equity could not be assessed. Finally, data on individual years of age between 10 and 19 are not available. The rates of dispensing among older youth is likely higher than among younger. Because of these limitations, this study does not capture the full breadth of ways youth may access naloxone. Nonetheless, the study points to important ways clinicians can contribute to naloxone's wider availability to youth.

## CONCLUSIONS

Naloxone dispensing to youth remains low but has increased markedly from 2017 to 2022. Pediatricians and other youth-serving clinicians can play an important role in expanding access to naloxone and harm reduction information by prescribing naloxone to all youth who are at risk for overdose. Clinician prescribing of naloxone can augment community distribution and expanded over-the-counter access to this lifesaving drug. Clinicians can make naloxone more widely available at all touchpoints with the health care system while simultaneously creating opportunities for education and harm reduction messaging for youth who use drugs.

## ABBREVIATION

SDU                      substance use disorder

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**WHAT’S KNOWN ON THIS SUBJECT:**

Naloxone is an important harm reduction tool for youth who use drugs. Despite its lifesaving effects, naloxone is not administered in most youth opioid overdose deaths. Clinicians can play an important role in ensuring access to naloxone for youth.

**WHAT THIS STUDY ADDS:**

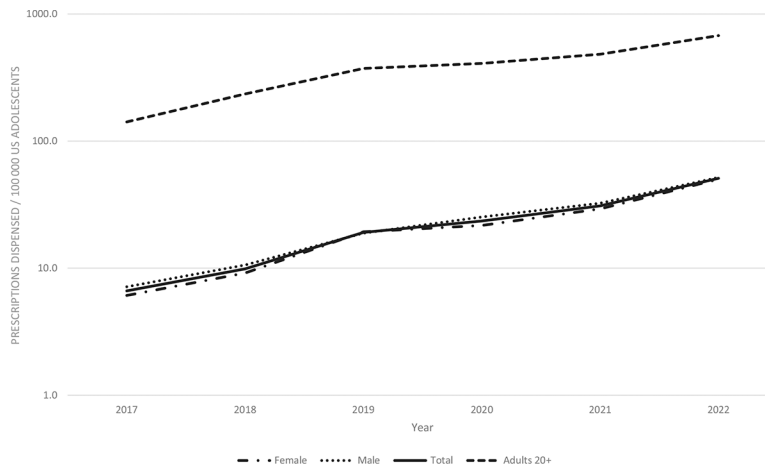
This study provides the first national estimate of trends in naloxone dispensing to youth. Dispensing remains low but is increasing across specialties. Although most prescriptions were dispensed with no out-of-pocket costs, price could continue to be a barrier to access.

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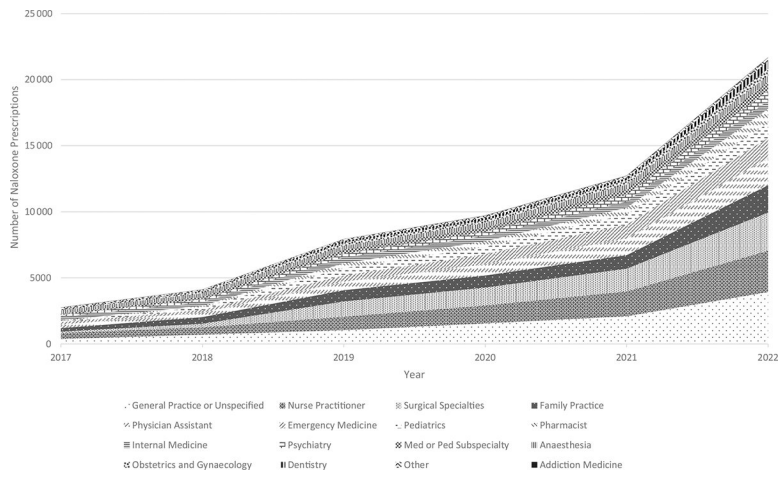
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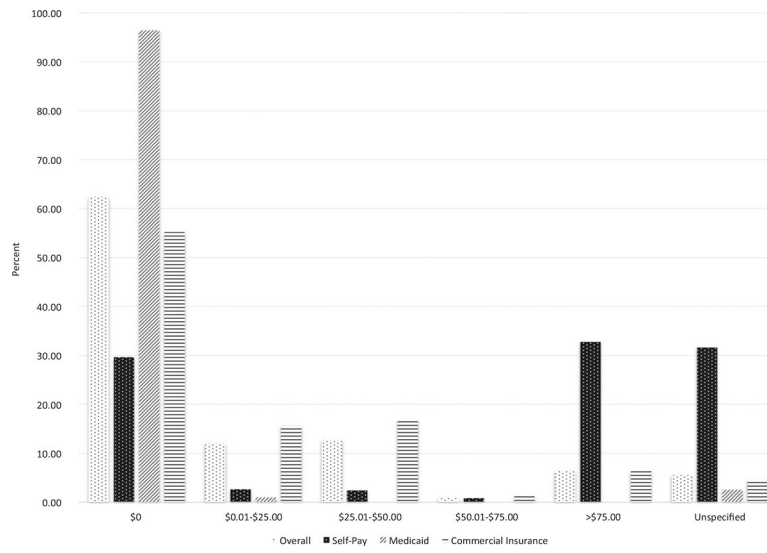
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**FIGURE 1.** Retail pharmacy dispensing rates to youth aged 10 to 19 years - United States, 2017 to 2022.



**FIGURE 2.** Number of naloxone prescriptions dispensed to youth aged 10 to 19 years by specialty –United States 2017 to 2022.



**FIGURE 3.** Naloxone dispensing to youth aged 10 to 19 years by out-of-pocket cost and payer - United States 2020 to 2022 (N= 23 859 prescriptions).

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Rates of Naloxone Prescriptions Dispensed by Retail Pharmacies, per 100 000 US Population and per Opioid Overdose Fatality – United States, 2017 to 2022

**TABLE 1**

	2017	2018	2019	2020	2021	2022	Total	% Increase (2017–2022)
Total prescriptions dispensed (20+ years)	337 541	567 203	904 264	997 957	1 186 376	1 672 510	5 665 851	395
Rate (per 100 000 US adults)	141.5	235.1	372.5	408.8	483.1	676.3	386.2	378
Rate (per opioid overdose fatality)	7.68	12.98	19.33	15.35	18.25	21.35	15.82	178
Total prescriptions dispensed (10 — 19 y)	2754	4124	7959	9750	12 765	21 725	59 077	689
Rate (per 100 000 youth)	6.63	9.88	19.1	23.5	30.9	50.9	23.5	669
Rate (per opioid overdose fatality)	5.69	8.33	14.63	7.64	8.80	15.23	10.05	168
Female (N)	1245	1876	3959	4420	5949	10 473	27 922	741
Rate (per 100 000)	6.10	9.15	19.3	21.7	29.3	50.1	22.6	722
Male (N)	1509	2248	4000	5330	6816	11 252	31 155	646
Rate (per 100 000)	7.14	10.6	18.9	23.5	32.5	51.78	24.3	625

Data source and year: IQVIA NPA Patient Insights, 2017 to 2022.

**TABLE 2**  
Total Naloxone Prescriptions Dispensed by Retail Pharmacies by Prescribing Specialty – United States, 2017 to 2022

Specialty	2017	2018	2019	2020	2021	2022	Total	Proportion, %	Mean	% Increase (2017–2022)
General practice or unspecified	374	712	1046	1552	2093	3932	9709	16.5	1618	951.3
Nurse practitioner	456	550	1014	1358	1885	3128	8391	14.2	1399	586.0
Surgical specialties	106	278	1157	1358	1726	2891	7516	12.7	1253	2627.4
Family practice	262	498	850	918	1021	2055	5604	9.5	934	684.4
Physician assistant	267	336	649	847	1261	2044	5404	9.2	901	665.5
Emergency medicine	183	201	464	761	1050	1536	4195	7.1	699	739.3
Pediatrics	101	215	551	549	775	1102	3293	5.6	549	991.1
Pharmacist	41	102	371	435	503	1097	2549	4.3	425	2575.6
Internal Medicine	257	270	442	401	461	626	2457	4.2	410	143.6
Psychiatry	156	223	289	307	517	738	2230	3.8	372	373.1
Med or ped subspecialty	93	200	313	343	410	679	2038	3.5	340	630.1
Anesthesia	257	249	276	319	363	475	1939	3.3	323	84.8
OB/Gyn	38	149	255	223	330	527	1522	2.6	254	1286.8
Dentistry	21	35	128	161	151	565	1061	1.8	177	2590.5
Other	135	96	121	171	163	267	953	1.6	159	97.8
Addiction medicine	15	9	16	22	26	24	112	0.2	19	60.0

Total is greater than the sum of all specialties because of missing data. Specialties ordered by highest to lowest proportion of total. Data source and year: IQVIA NPA Patient Insights, 2017 to 2022. OB/Gyn, obstetrics and gynaecology.