

## Nebraska Emergency Medical Services (EMS) Nonfatal Opioid-Involved Overdose Five-Year Surveillance Report, September 2017–August 2022

---

Office of Injury Surveillance  
Nebraska Department of Health and Human Services

**Report prepared by:**

Qianqian Li, Injury Data Analyst, [Qianqian.Li@nebraska.gov](mailto:Qianqian.Li@nebraska.gov)

Yi Du, Healthcare Epidemiologist, [Yi.Du@nebraska.gov](mailto:Yi.Du@nebraska.gov)

Ming Qu, DHHS Administrator II, [Ming.Qu@nebraska.gov](mailto:Ming.Qu@nebraska.gov)

Jennifer Parmeley, GIS Coordinator, [Jennifer.Parmeley@nebraska.gov](mailto:Jennifer.Parmeley@nebraska.gov)

Davidson Wissing, Drug Overdose Prevention Coordinator, [Davidson.Wissing@nebraska.gov](mailto:Davidson.Wissing@nebraska.gov)

Tim Wilson, Emergency Health System Program Director, [Tim.Wilson@nebraska.gov](mailto:Tim.Wilson@nebraska.gov)

Felicia Quintana-Zinn, Public Health Deputy Director, [Felicia.quintana-zinn@nebraska.gov](mailto:Felicia.quintana-zinn@nebraska.gov)

# Table of Contents

<b>Executive Summary</b> .....	<b>3</b>
<b>Definitions</b> .....	<b>4</b>
<b>Key Elements of Methods</b> .....	<b>5</b>
<b>Findings</b> .....	<b>6</b>
Table 1. Number of EMS incidents, suspected opioid overdoses, impression of opioid overdose, symptom of opioid overdose, narrative of opioid overdose, naloxone given, and improved naloxone response, Nebraska, 2017–2022.....	6
Table 2. Patients Characteristics in suspected opioid overdose, impression of opioid overdose, symptom of opioid overdose, narrative of opioid overdose, naloxone given, and improved naloxone response events, Nebraska, 2017–2022 <sup>s</sup> .....	7
Figure 1. Numbers of suspected opioid overdose, impression of opioid overdose, symptom of opioid overdose, narrative of opioid overdose, naloxone given, and improved naloxone response, Nebraska, 2017–2022.....	8
Figure 2. Nonfatal opioid-involved overdose rates by sex*, Nebraska, 2017–2022.....	9
Figure 3. Nonfatal opioid-involved overdose rates by race*, Nebraska, 2017–2022 .....	10
Figure 4. Nonfatal opioid-involved overdose rates by age group*, Nebraska, 2017–2022.....	11
Figure 5.1. Nonfatal opioid-involved overdose rates by age group for females, Nebraska, 2017–2022 .....	12
Figure 5.2. Nonfatal opioid-involved overdose rates by age group for males, Nebraska, 2017–2022.....	13
Figure 6. Average annual nonfatal opioid-involved overdose rates by age group and sex*, Nebraska, 2017–2022.....	14
Figure 7. Average annual nonfatal opioid-involved overdose rates by residence and occurrence address, Nebraska, 2017–2022.....	15
Map 1. Average annual suspected nonfatal opioid-involved overdose rates by local health district, Nebraska, Sep 2017– Aug 2022.....	16
Map 2. Suspected nonfatal opioid-involved overdose rates by local health district, Nebraska, Sep 2017– Aug 2018 .....	17
Map 3. Suspected nonfatal opioid-involved overdose rates by local health district, Nebraska, Sep 2018– Aug 2019 .....	18
Map 4. Suspected nonfatal opioid-involved overdose rates by local health district, Nebraska, Sep 2019– Aug 2020 .....	19
Map 5. Suspected nonfatal opioid-involved overdose rates by local health district, Nebraska, Sep 2020– Aug 2021 .....	20
Map 6. Suspected nonfatal opioid-involved overdose rates by local health district, Nebraska, Sep 2021– Aug 2022 .....	21
<b>Key Takeaways</b> .....	<b>22</b>
<b>References</b> .....	<b>24</b>

## Executive Summary

Nonfatal opioid overdoses (NFOOs) have become a growing public health concern nationwide as the entire US fights with a decades-long opioid epidemic. It is essential to use timely data to monitor the trend, identify people at risk, and detect hotspots. The EMS data can address these needs as a surrogate data source for supplementally tracking NFOOs in near real-time. We aimed to use the Nebraska EMS data to monitor and characterize trends of suspected NFOOs and assist in overdose prevention and response activities.

Suspected NFOOs were identified through querying EMS incidents reports from September 1, 2017 to August 31, 2022 based on the Council of State and Territorial Epidemiologists (CSTE) EMS NFOOs standard guidance. The guidance defined NFOOs using a combination of fields including opioid impressions, opioid symptoms, medications administered and responses to medications, and patient care report narratives. Trends of NFOOs were analyzed by patient characteristics, residence, and incidence location. Maps were made to show spatiotemporal patterns.

Overall, the rates of suspected NFOOs increased by 33.2% from 2017 to 2022, with all four of its component fields showing an increase. While a small number of NFOOs were identified based on opioid symptoms, the patient care report narratives identified more NFOOs than the other three components. The overdose rates have increased in both males and females, all races, and all age groups except 0-14 and 85 or older. The highest rates were among those aged 65 and older (126.2 per 100,000 persons), and the lowest in age group 0-14 (3.9 per 100,000 persons). Males' rates were higher than females' except in age group 45-54, and the discrepancies between genders increased over year. The largest increase in rates in males was among age group 35-44 (138.6%). Interestingly, rates of the female age group 35-44 decreased by 16.7% from 2017 to 2022, meanwhile the largest increase in females was in age group 25-34 (110.3%). The increase in rates was higher among Black (142.1%) compared to White (23.7%) and American Indian/Alaska Native (16.7%). Overdose rates were actually higher in rural than in urban areas, no matter estimated by where people lived or where the events happened. The rates varied by area, with higher in the eastern and western than the central areas of Nebraska. Temporally, the overdose rates have been increasing year after year in most local health districts, especially in central Nebraska.

This study demonstrated that EMS data are valuable for NFOOs surveillance, which provided critical information for monitoring trends and patterns of NFOOs. The 'Patient Care Report Narrative' was proven to be a highly effective component and thus, should not be overlooked when tracking NFOOs from EMS data. Our findings indicate that NFOOs had an upward trend and variations in age, gender, race, and area in Nebraska in the past five years. Our study highlights the need for tailoring public health efforts to ensure implementation of equitable prevention and response services.

## Definitions

**EMS Incidents**, are also referred to as EMS Runs or EMS Transports, included in this report if *Type of Service Requested* (eResponse.05 of NEMSIS v3.4.0) indicates an emergency response (including 911 response, intercept, and mutual aid). EMS incidents should be excluded from this report if a) *Type of Service Requested* (eResponse.05) is a non-emergency response (e.g., interfacility transfer, medical transport, standby, public assistance/other not listed, etc.), OR b) *Initial Patient Acuity* (eSituation.13) indicates “Dead Without Resuscitation Efforts (Black)”.

**Opioid Impression** is defined as any EMS incident that meets above criteria, where *Provider's Primary Impression* (eSituation.11) or *Provider's Secondary Impression* (eSituation.12) was opioid overdose related, which can be identified by any of the following ICD10 codes: F11, T40.0-T40.4, and T40.6.

**Opioid Symptom** is defined as any eligible EMS incident where *Primary Symptom* (eSituation.09) or *Other Associated Symptoms* (eSituation.10) is opioid overdose related, which can be identified by any of the following ICD10 codes: F11, T40.0-T40.4, and T40.6.

**Opioid Narrative** is defined as any eligible EMS incident where *Patient Care Report Narrative* (eNarrative.01) contains **at least ONE opioid-related keyword** (including buprenorphine, carfentanyl, codeine, codiene, codene, dilaudid, dilaud, dope, evzio, fentanyl, fent, heroin, herion, heroine, hod, spheroin, hydrocodone, hydrocod, hydromorphone, hydromor, methadone, morphine, morphin, narcan, naloxone, naloxd, opiate[s], opate[s], opioid[s], opiod[s], opoid[s], opium, opium, opum, oxymorphone, oxymor, oxycodone [oxyco, oxy, oxyi], percocet, percoc, speed ball, speedball, suboxin, suboxone, tramadol, tramad, vicodin, vicodine, and vicod) **AND at least TWO overdose-related keywords** (including agonal, altered mental status [ams], apnea, constricted pupil, decreased resp, decreased rr, decreasing resp, depressed resp, dyspnea, ingestion [ingest, inject], intoxication [intoxic], loss of conscious [syncopy, syncope], miosis [miotic], nodding off, overdose [overdosed, overdosing, overdose, overdoes, averdose, averdoes, over does, over dose], pinpoint [pin point, pin-point], poisoning [poison], pupil\*constricted, resp\*decreased, resp\*depression, snort, snorted, unresponsive [unresponsiv]) (1).

**Naloxone Given** is defined as any eligible EMS incident where *Medication Given* (eMedications.03) is naloxone or Narcan.

**Improved Naloxone Response** is defined as any eligible EMS incident where *Medication Given* (eMedications.03) is naloxone or Narcan and *Response to Medication* (eMedications.07) is recorded as “Improved”.

**Nonfatal Opioid-involved Overdoses (NFOOs) or Suspected Opioid Overdose** is defined as “Opioid Impression”, “Opioid Symptom”, “Improved Naloxone Response”, or “Opioid Narrative” presented in a single patient record, which reflects the unduplicated combination of these four terms.

## Key Elements of Methods

- 1) This report describes suspected nonfatal opioid-involved overdoses (NFOO) events identified from Emergency Medical Services (EMS) incidents, which refer to the case definition from the Council of State and Territorial Epidemiologists (CSTE) EMS NFOO standard guidance (1). This report reflects only those records submitted to the Electronic Nebraska Ambulance Rescue Service Information System (eNARSIS) from September 1<sup>st</sup>, 2017 to August 31<sup>st</sup>, 2022.
- 2) One patient in an EMS incident could receive more than one administration of naloxone. Multiple naloxone administrations or improved responses were only counted once in one patient record.
- 3) This report focuses on the analyses of suspected NFOO patients who are Nebraska residents. This report only includes EMS incidents where the location was in Nebraska. As a result, non-Nebraska residents and EMS incidents whose location is outside of Nebraska were excluded from the analyses.
- 4) This report describes yearly trends in the number of EMS incidents that met the case definitions of suspected NFOO, impression of opioid-involved overdose, symptom of opioid-involved overdose, narrative of opioid-involved overdose, naloxone given, and improved naloxone response in Nebraska, from September 1, 2017 to August 31, 2022. The report also presents the numbers of these indicators by patient characteristics (i.e., age, sex, race, residence, and incidence location).
- 5) This report also describes yearly trends in rates of EMS incidents for suspected NFOO per 100,000 people by patient residence at the local health districts (LHDs) level and other patient characteristics including age, sex, and race, in Nebraska from September 1, 2017 to August 31, 2022.
- 6) After geocoding and aggregating patients' home addresses into LHDs, maps were generated to show spatial and temporal trends in rates (per 100,000) of suspected opioid-involved overdose in the 19 LHDs in Nebraska. Suppression methods were performed on mapping when the number of cases was less than or equal to 5.

## Findings

Table 1. Number of EMS incidents, suspected opioid overdoses, impression of opioid overdose, symptom of opioid overdose, narrative of opioid overdose, naloxone given, and improved naloxone response, Nebraska, 2017–2022

Period	EMS Incidents	Suspected Opioid Overdoses*	Opioid Impression	Opioid Symptom	Opioid Narrative	Naloxone Given <sup>†</sup>	Improved Response <sup>§</sup>	Percentage of Improvement
Sep 17-Aug 18	219,527	918	94	--	582	701	327	46.6
Sep 18-Aug 19	229,176	909	129	0	621	560	245	43.8
Sep 19-Aug 20	224,825	970	138	--	629	649	325	50.1
Sep 20-Aug 21	244,721	1,195	187	17	707	868	473	54.5
Sep 21-Aug 22	213,991	1,223	252	24	726	903	425	47.1
Total	1,132,240	5,215	800	47	3,265	3,681	1,795	48.8

\*Suspected opioid overdose is the unduplicated combination of "Opioid Impression", "Opioid Symptom", "Improved Naloxone Response", and "Opioid Narrative".

--Suppress all counts between 1 to 5.

<sup>†</sup>For an EMS incident, one unique patient could be given more than one naloxone; multiple naloxone administrations or improved responses were only counted once in one unique patient's record.

<sup>§</sup>Multiple improved naloxone responses were only counted once in one unique patient's record.

Table 2. Patients Characteristics in suspected opioid overdose, impression of opioid overdose, symptom of opioid overdose, narrative of opioid overdose, naloxone given, and improved naloxone response events, Nebraska, 2017–2022<sup>§</sup>

Characteristic	Suspected Opioid Overdoses (n=5,215)	Opioid Impression (n=800)	Opioid Symptom (n=47)	Opioid Narrative (n=3,265)	Naloxone Given (n=3,681)	Improved Response (n=1,795)
<b>Sex</b>						
Female	2,415 (46.3)	386 (48.3)	18 (38.3)	1,573 (48.2)	1,556 (42.3)	732 (40.8)
Male	2,793 (53.6)	413 (51.6)	29 (61.7)	1,686 (51.6)	2,120 (57.6)	1,062 (59.1)
Unknown	7 (0.1)	--	0 (0.0)	6 (0.2)	--	--
<b>Race</b>						
White	4,238 (81.3)	652 (81.5)	35 (74.5)	2,807 (86.0)	2,583 (70.2)	1,283 (71.5)
Black	456 (8.7)	30 (3.8)	--	149 (4.6)	706 (19.2)	334 (18.6)
American Indian/Alaska Native	121 (2.3)	30 (3.8)	--	80 (2.5)	57 (1.6)	25 (1.4)
Asian	19 (0.4)	--	0 (0.0)	10 (0.3)	26 (0.7)	6 (0.3)
Multi or Other Race	340 (6.5)	78 (9.8)	--	191 (5.9)	302 (8.2)	143 (8.0)
Unknown	41 (0.8)	7 (0.9)	--	28 (0.9)	7 (0.2)	--
<b>Age Group (Years)</b>						
0-14	78 (1.5)	10 (1.3)	0 (0.0)	61 (1.9)	37 (1.0)	12 (0.7)
15-24	496 (9.5)	129 (16.1)	7 (14.9)	223 (6.8)	472 (12.8)	249 (13.9)
25-34	816 (15.7)	188 (23.5)	22 (46.8)	309 (9.5)	786 (21.4)	488 (27.2)
35-44	555 (10.6)	118 (14.8)	7 (14.9)	267 (8.2)	541 (14.7)	260 (14.5)
45-54	557 (10.7)	91 (11.4)	--	341 (10.4)	501 (13.6)	210 (11.7)
55-64	734 (14.1)	120 (15.0)	6 (12.8)	474 (14.5)	524 (14.2)	228 (12.7)
65-74	791 (15.2)	88 (11.0)	--	570 (17.5)	405 (11.0)	191 (10.6)
75-84	614 (11.8)	35 (4.4)	--	524 (16.1)	230 (6.3)	79 (4.4)
85+	566 (10.9)	19 (2.4)	0 (0.0)	491 (15.0)	179 (4.9)	77 (4.3)
Unknown	8 (0.2)	--	0 (0.0)	--	6 (0.2)	--
<b>Residence*</b>						
Metropolitan	2,339 (44.9)	200 (25.0)	--	1,099 (33.7)	2,721 (73.9)	1,292 (72.0)
Micropolitan	1,408 (27.0)	294 (36.8)	30 (63.8)	1,042 (31.9)	544 (14.8)	295 (16.4)
Small town	837 (16.1)	156 (19.5)	12 (25.5)	679 (20.8)	207 (5.6)	111 (6.2)
Rural	599 (11.5)	149 (18.6)	--	428 (13.1)	169 (4.6)	83 (4.6)
Unknown	32 (0.6)	--	--	17 (0.5)	40 (1.1)	14 (0.8)
<b>Incident Location<sup>†</sup></b>						
Metropolitan	2,353 (45.1)	192 (24.0)	--	1,094 (33.5)	2,776 (75.4)	1,311 (73.0)
Micropolitan	1,440 (27.6)	304 (38.0)	30 (63.8)	1,068 (32.7)	540 (14.7)	300 (16.7)
Small town	860 (16.5)	160 (20.0)	12 (25.5)	703 (21.5)	208 (5.7)	110 (6.1)
Rural	542 (10.4)	140 (17.5)	--	386 (11.8)	146 (4.0)	71 (4.0)
Unknown	20 (0.4)	--	--	14 (0.4)	11 (0.3)	--

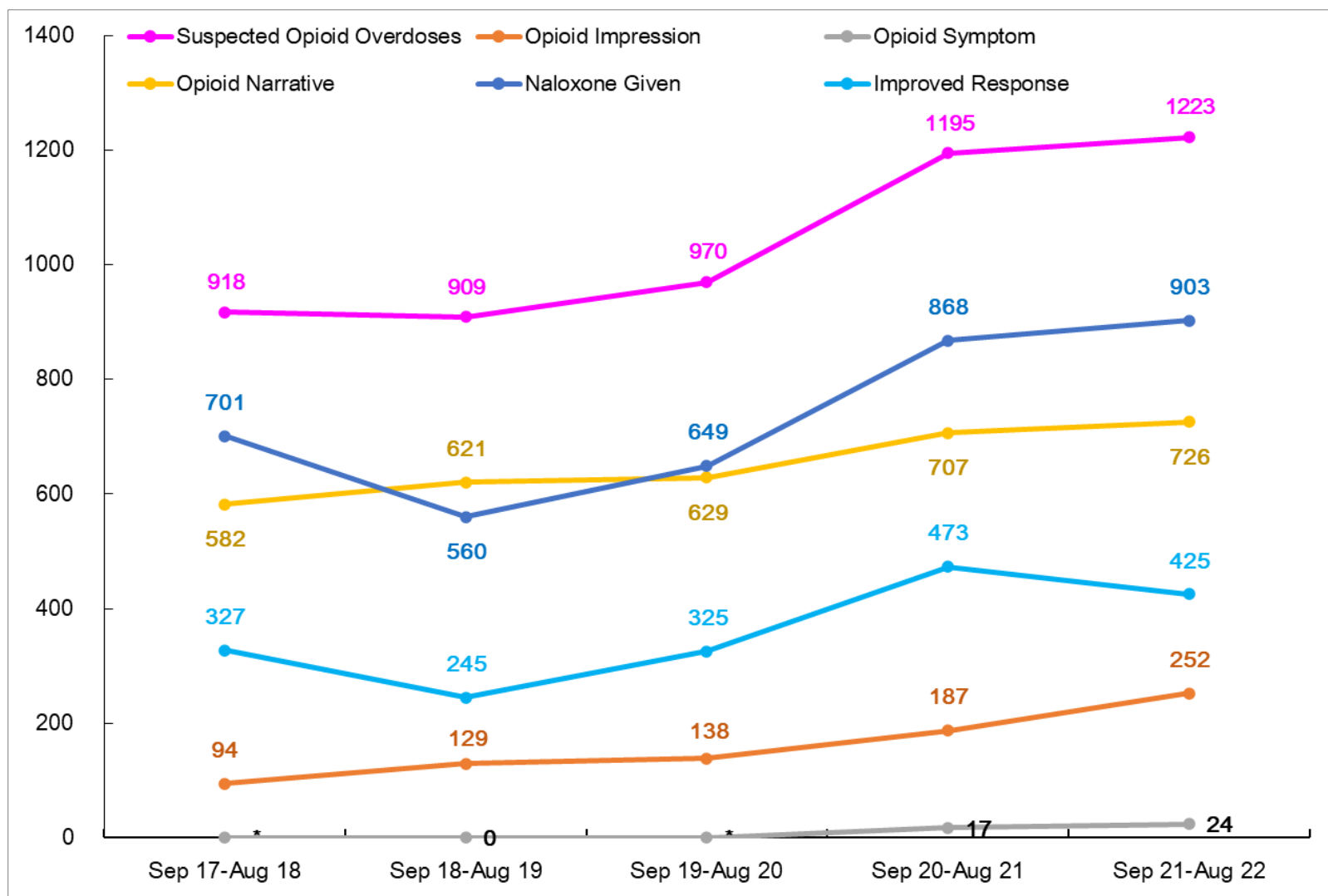
<sup>§</sup>All values are count (percentage) of exposed patients in Nebraska from September 1, 2017 to August 31, 2022 unless otherwise indicated.

--Suppress all counts between 1 to 5.

\*The Zip code of patients' home address was transferred into Rural-Urban Commuting Area (RUCA) Codes, using the RUCA codes categorization A, having the following categories: Metropolitan: 1.0, 1.1, 2.0, 2.1, 3.0, 4.1, 5.1, 7.1, 8.1, and 10.1; Micropolitan: 4.0, 4.2, 5.0, 5.2, 6.0, and 6.1; Small town: 7.0, 7.2, 7.3, 7.4, 8.0, 8.2, 8.3, 8.4, 9.0, 9.1, 9.2; Rural: 10.0, 10.2, 10.3, 10.4, 10.5, and 10.6.

<sup>†</sup>The Zip code of EMS incident location was transferred into Rural-Urban Commuting Area (RUCA) Codes, using the RUCA codes categorization A, having the following categories: Metropolitan: 1.0, 1.1, 2.0, 2.1, 3.0, 4.1, 5.1, 7.1, 8.1, and 10.1; Micropolitan: 4.0, 4.2, 5.0, 5.2, 6.0, and 6.1; Small town: 7.0, 7.2, 7.3, 7.4, 8.0, 8.2, 8.3, 8.4, 9.0, 9.1, 9.2; Rural: 10.0, 10.2, 10.3, 10.4, 10.5, and 10.6.

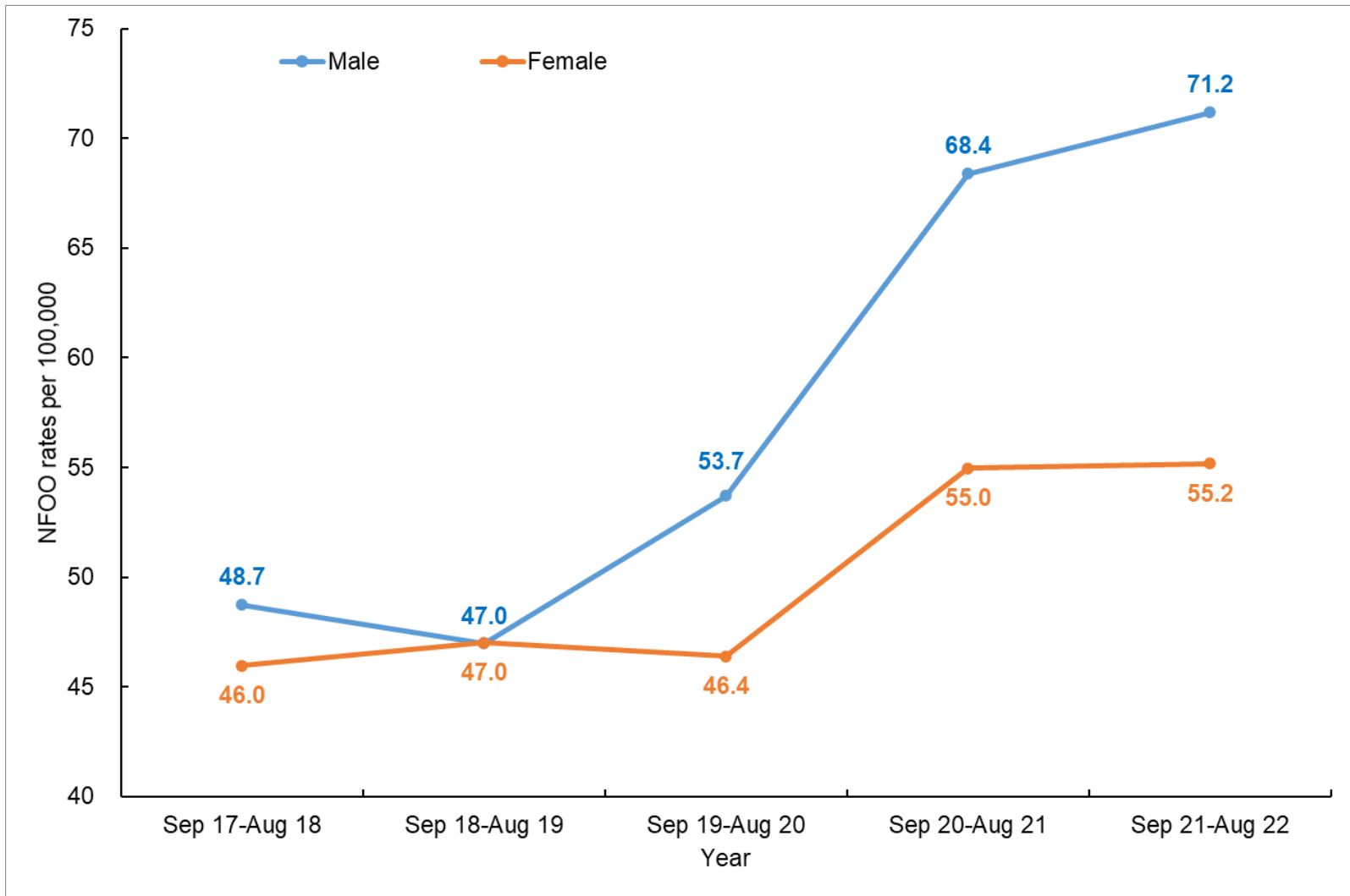
Figure 1. Numbers of suspected opioid overdose, impression of opioid overdose, symptom of opioid overdose, narrative of opioid overdose, naloxone given, and improved naloxone response, Nebraska, 2017–2022



\*Suppress all counts between 1 to 5.

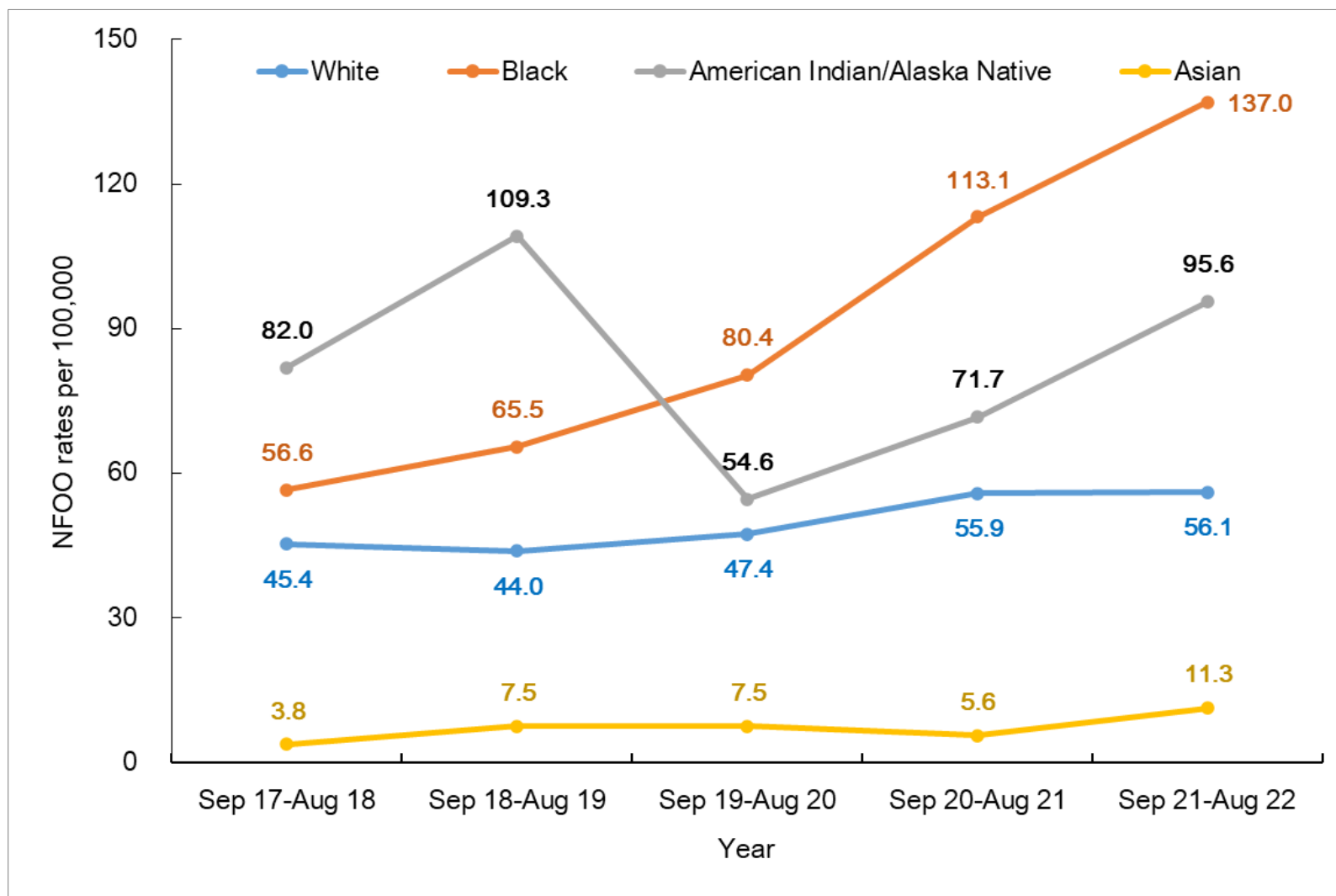


Figure 2. Nonfatal opioid-involved overdose rates by sex\*, Nebraska, 2017–2022



**Abbreviations:** NFOO = Nonfatal opioid-involved overdoses, which are suspected opioid-involved overdoses.  
\*Persons with unknown or missing sex were excluded.

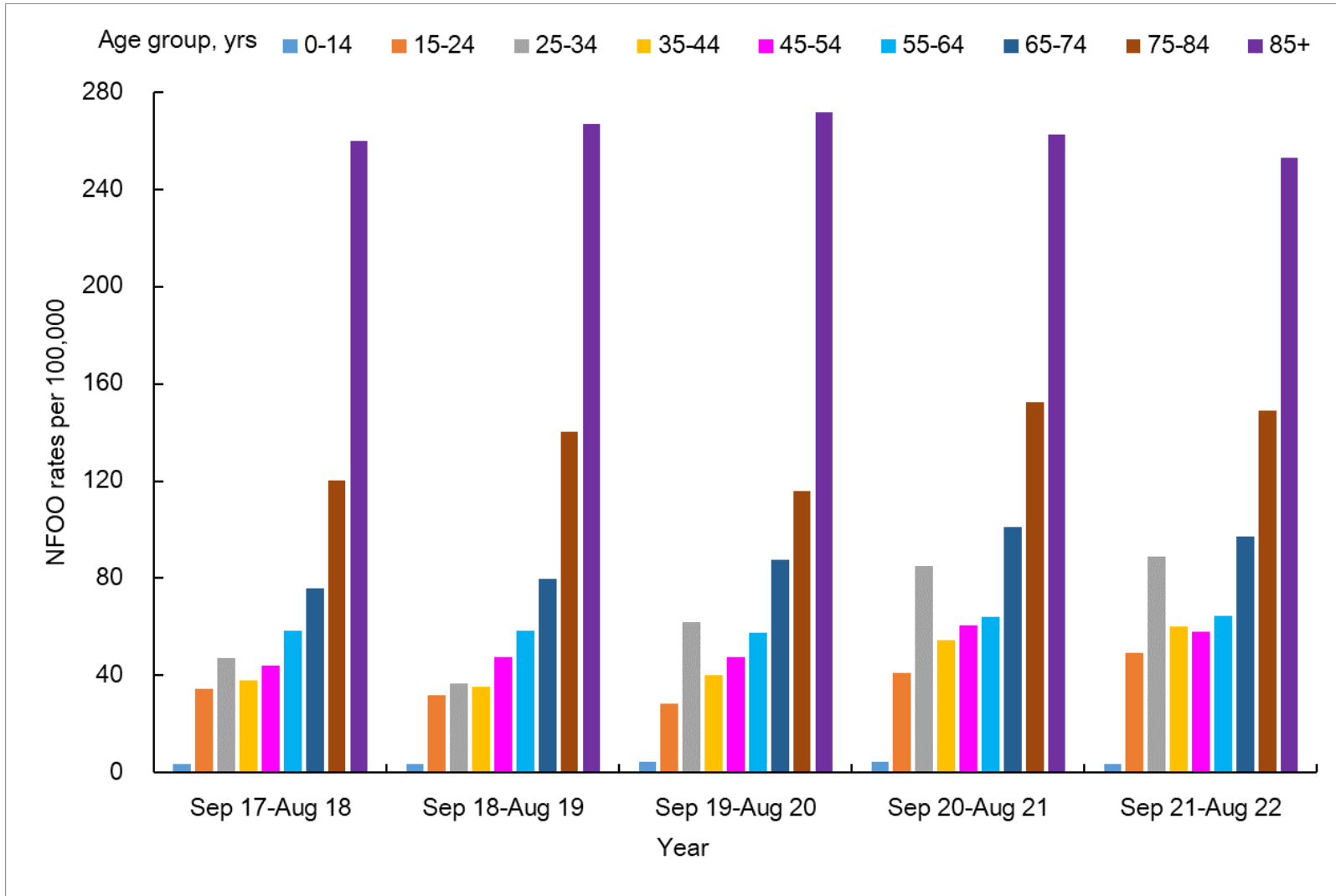
Figure 3. Nonfatal opioid-involved overdose rates by race\*, Nebraska, 2017–2022



**Abbreviations:** NFOO = Nonfatal opioid-involved overdose, which are suspected opioid-involved overdoses.

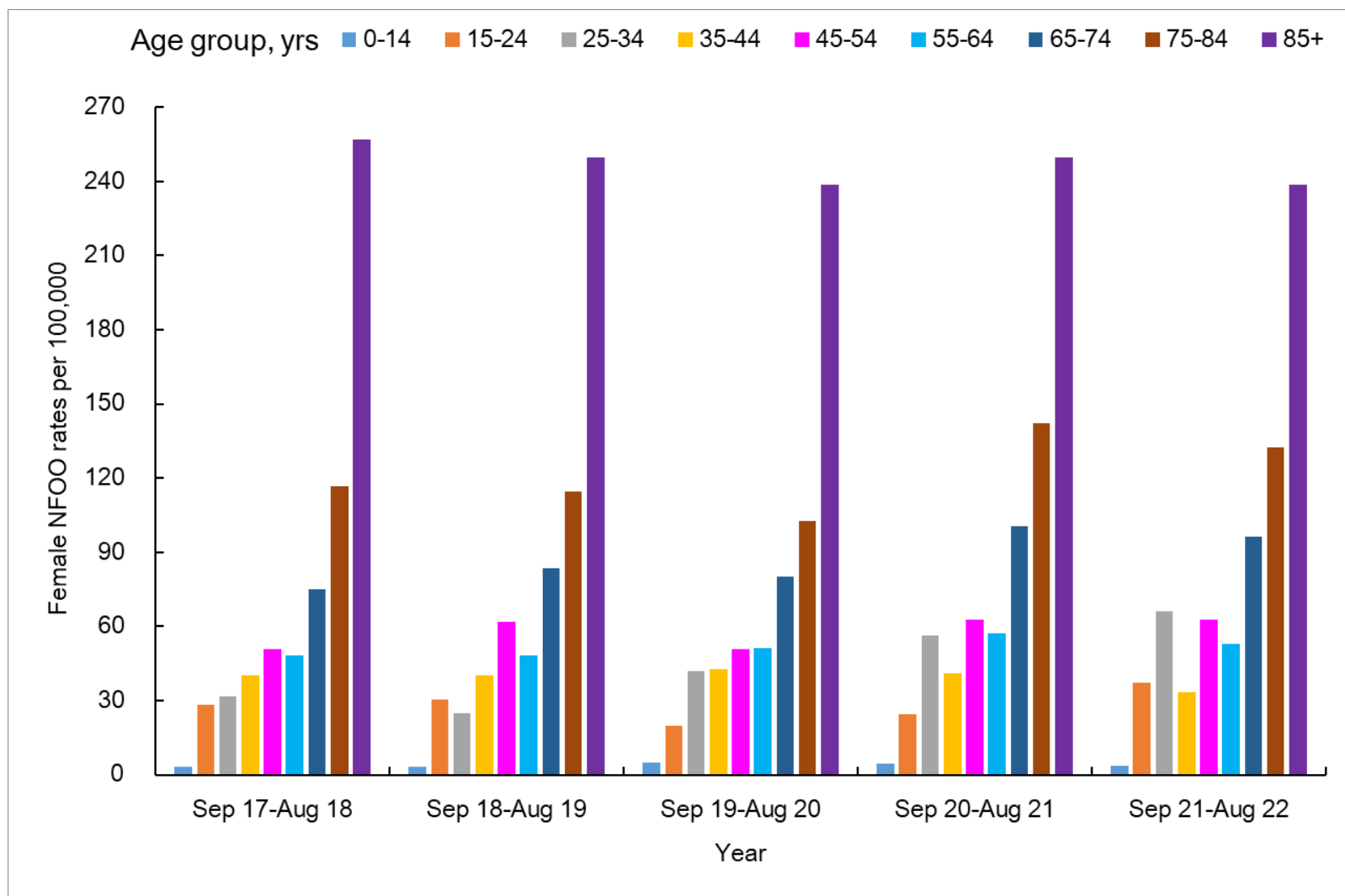
\*Persons with one race were included, while persons with two or more, other, unknown, or missing race were excluded. Rates among Asian may be unreliable due to the small NFOO number per year ( $\leq 6$ ).

Figure 4. Nonfatal opioid-involved overdose rates by age group\*, Nebraska, 2017–2022



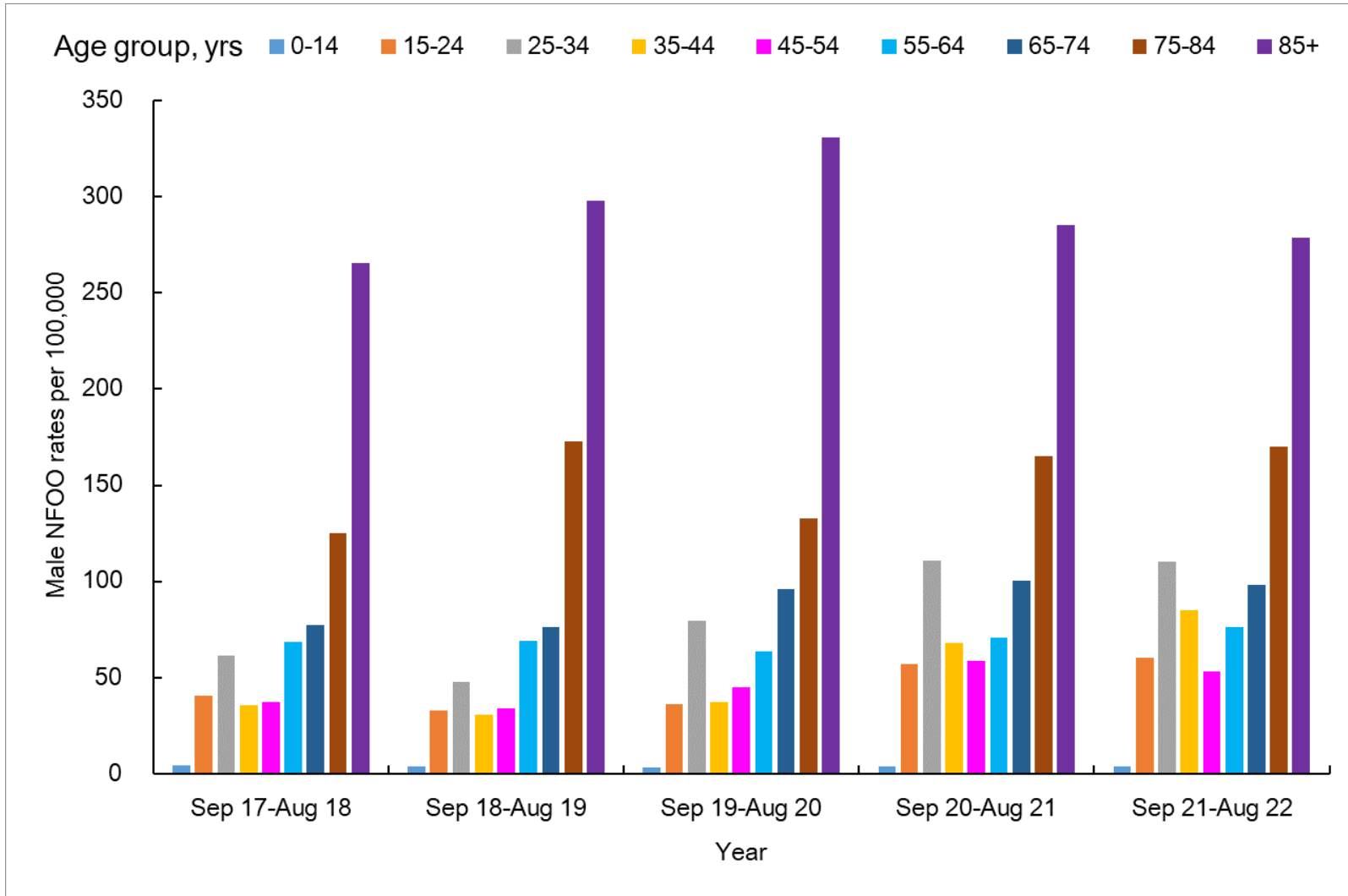
**Abbreviations:** NFOO = Nonfatal opioid-involved overdose, which are suspected opioid-involved overdoses.  
 \*Persons with unknown or missing age were excluded.

Figure 5.1. Nonfatal opioid-involved overdose rates by age group for females, Nebraska, 2017–2022



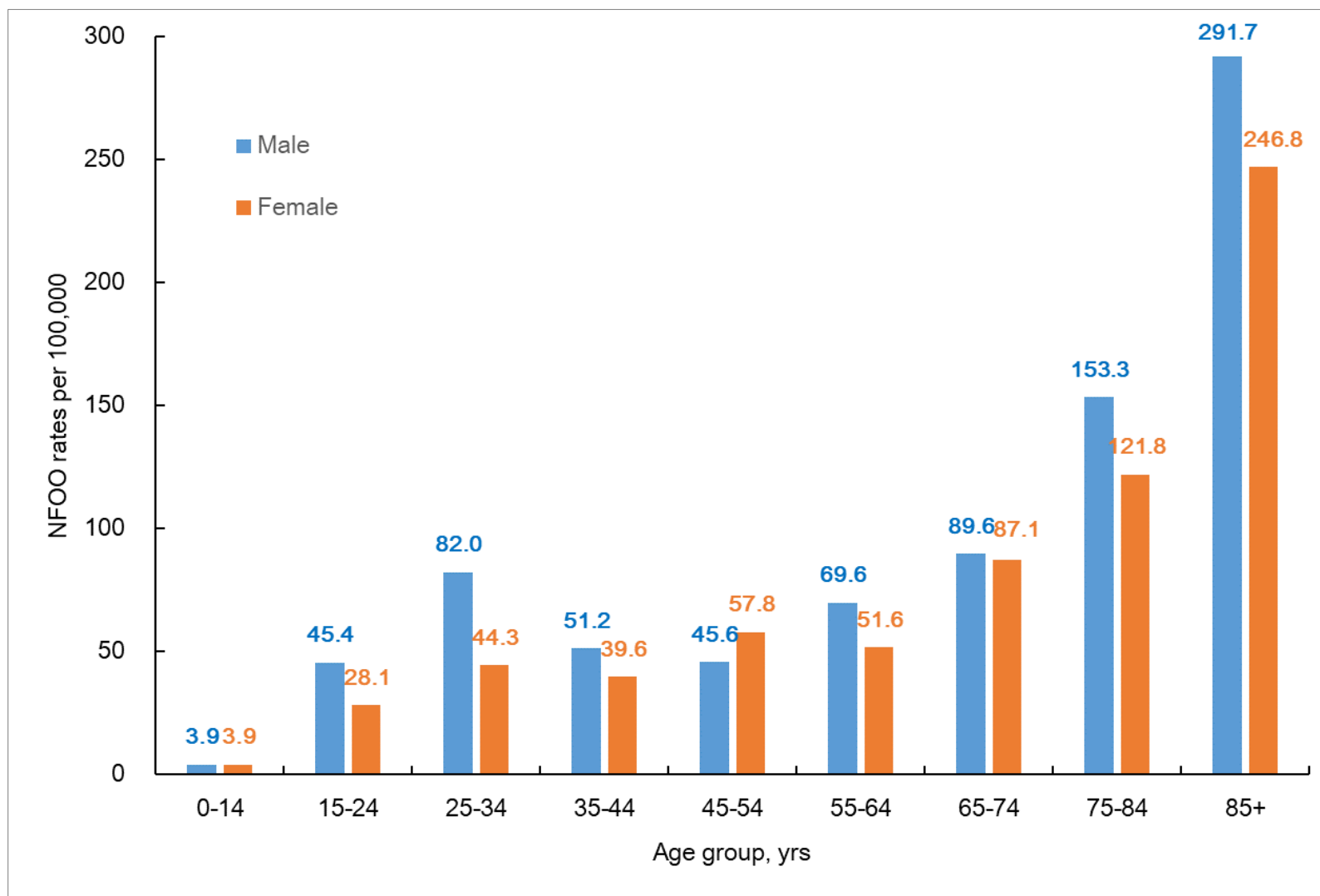
**Abbreviations:** NFOO = Nonfatal opioid-involved overdose, which are suspected opioid-involved overdoses.  
 \*Persons with unknown or missing age for females were excluded.

Figure 5.2. Nonfatal opioid-involved overdose rates by age group for males, Nebraska, 2017–2022



**Abbreviations:** NFOO = Nonfatal opioid-involved overdose, which are suspected opioid-involved overdoses.  
 \*Persons with unknown or missing age for males were excluded.

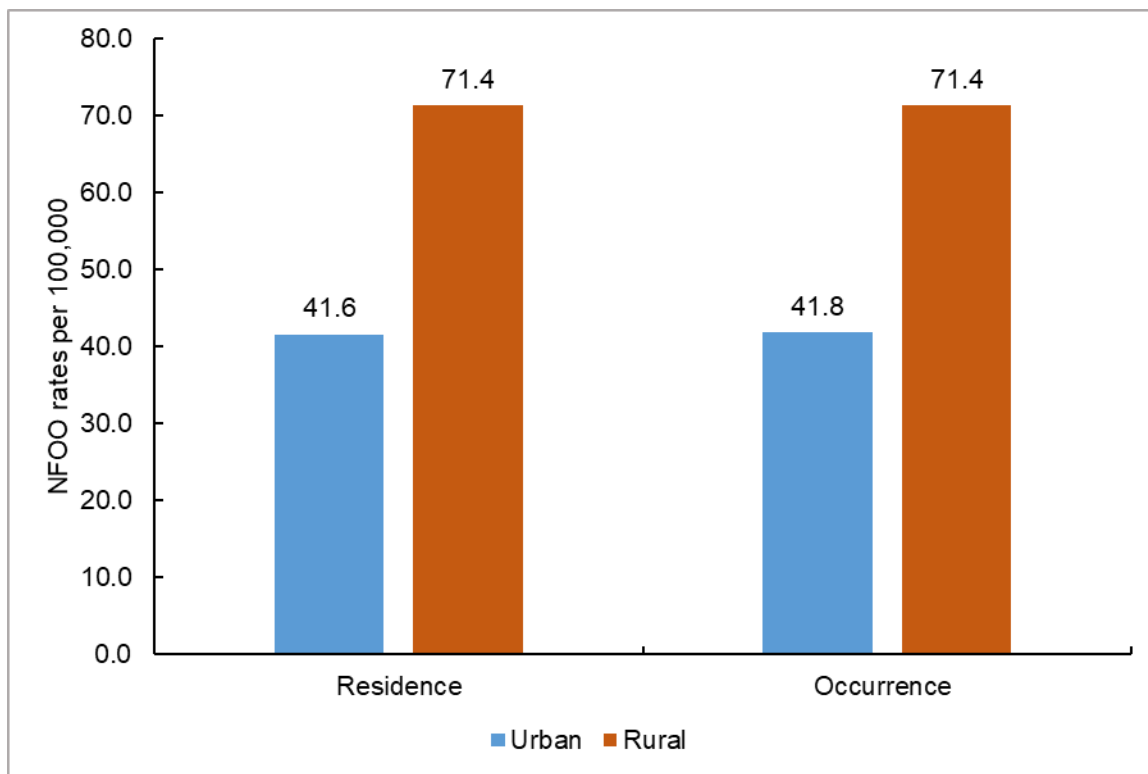
Figure 6. Average annual nonfatal opioid-involved overdose rates by age group and sex\*, Nebraska, 2017–2022



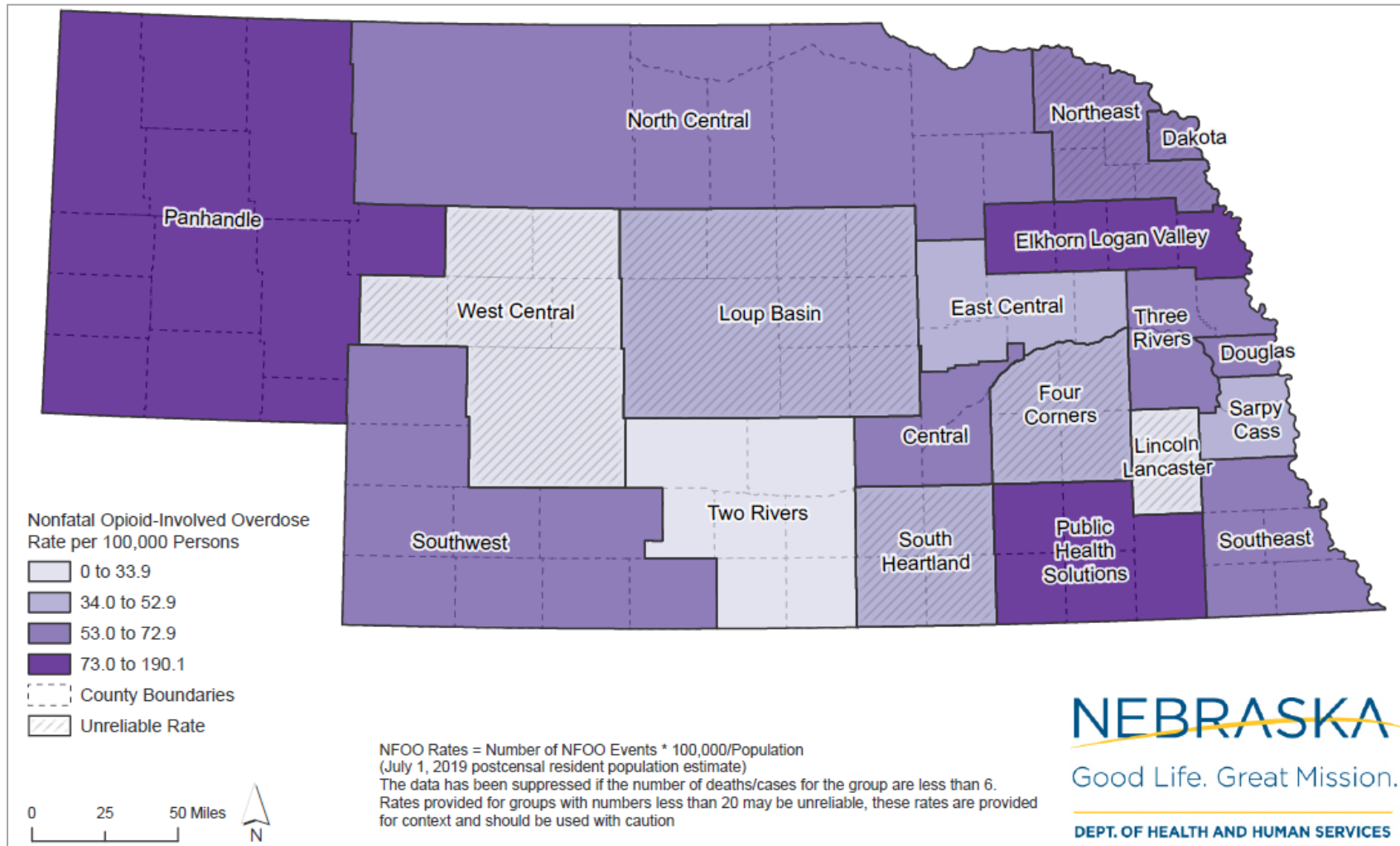
**Abbreviations:** NFOO = Nonfatal opioid-involved overdose, which are suspected opioid-involved overdoses.

\*Persons with unknown or missing sex or age group were excluded.

Figure 7. Average annual nonfatal opioid-involved overdose rates by residence and occurrence address, Nebraska, 2017–2022

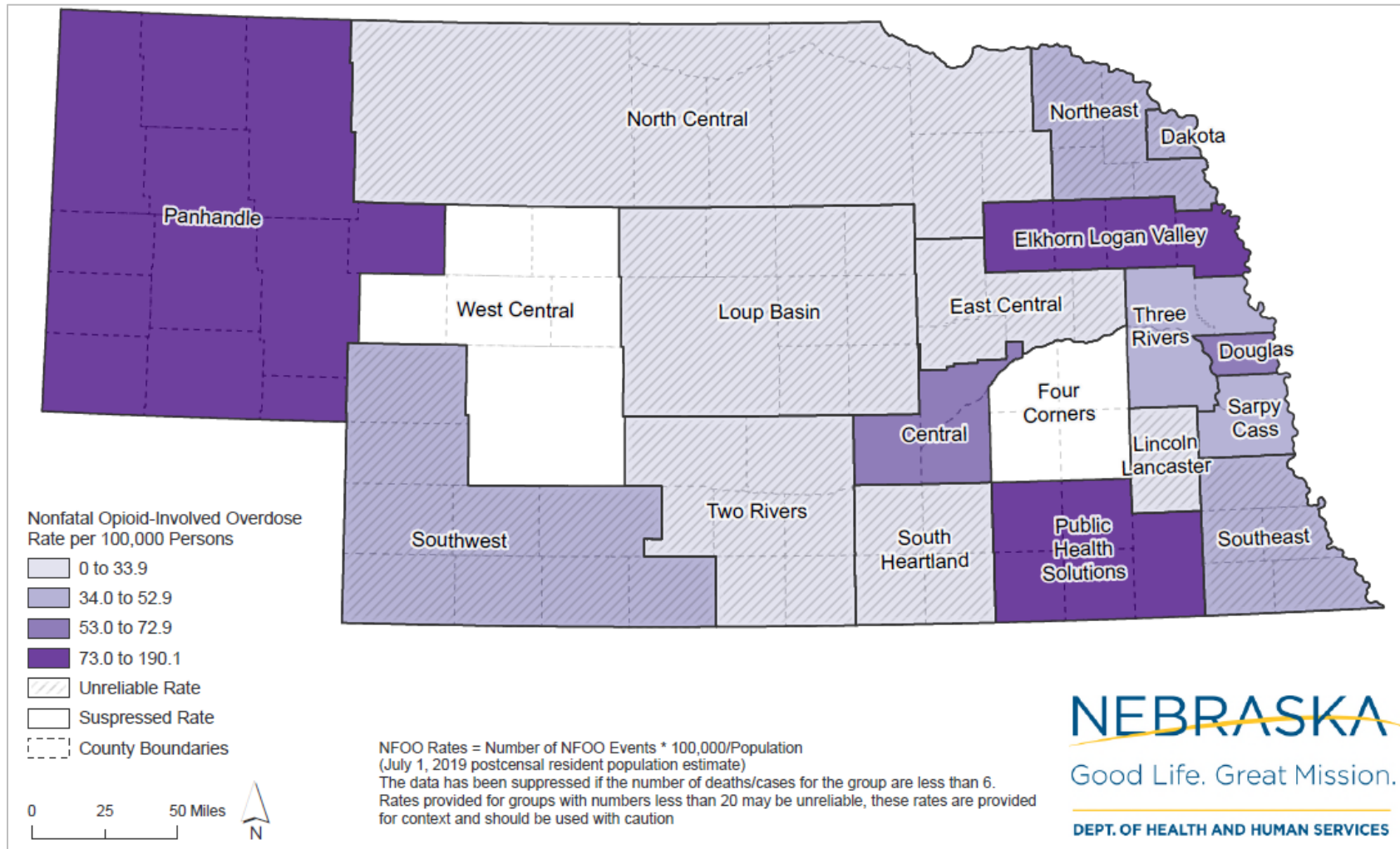


Map 1. Average annual suspected nonfatal opioid-involved overdose rates by local health district, Nebraska, Sep 2017– Aug 2022

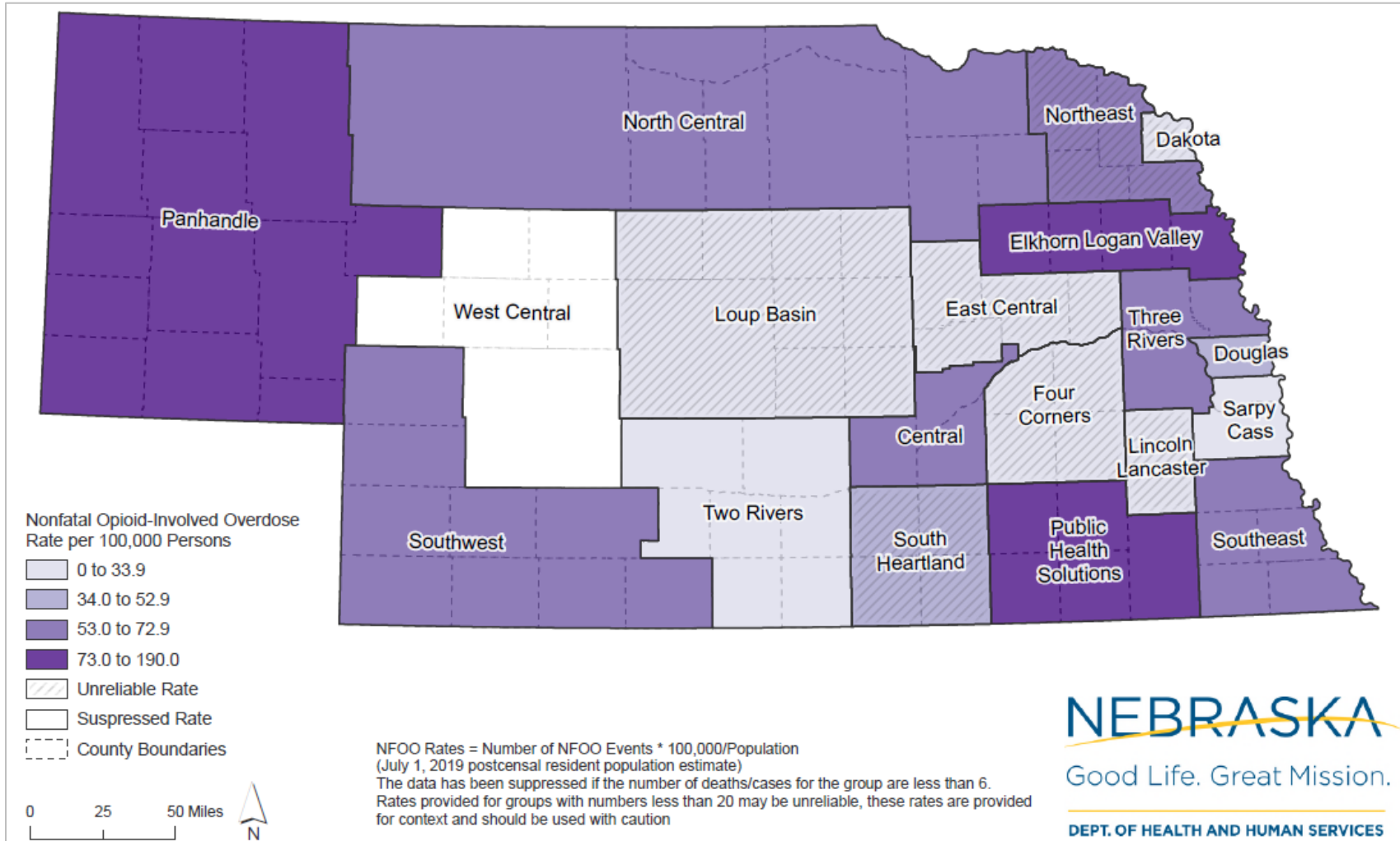




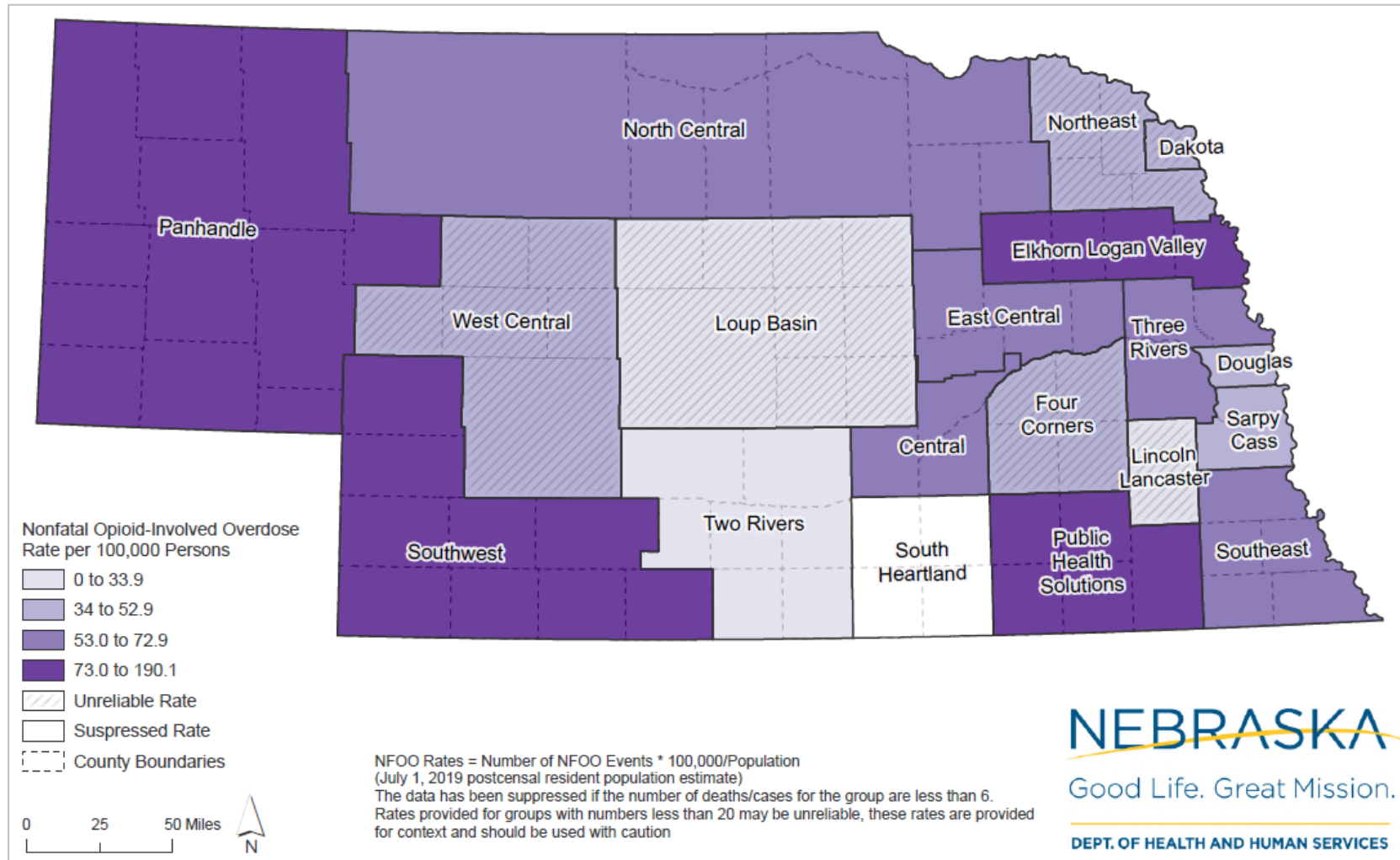
Map 2. Suspected nonfatal opioid-involved overdose rates by local health district, Nebraska, Sep 2017– Aug 2018



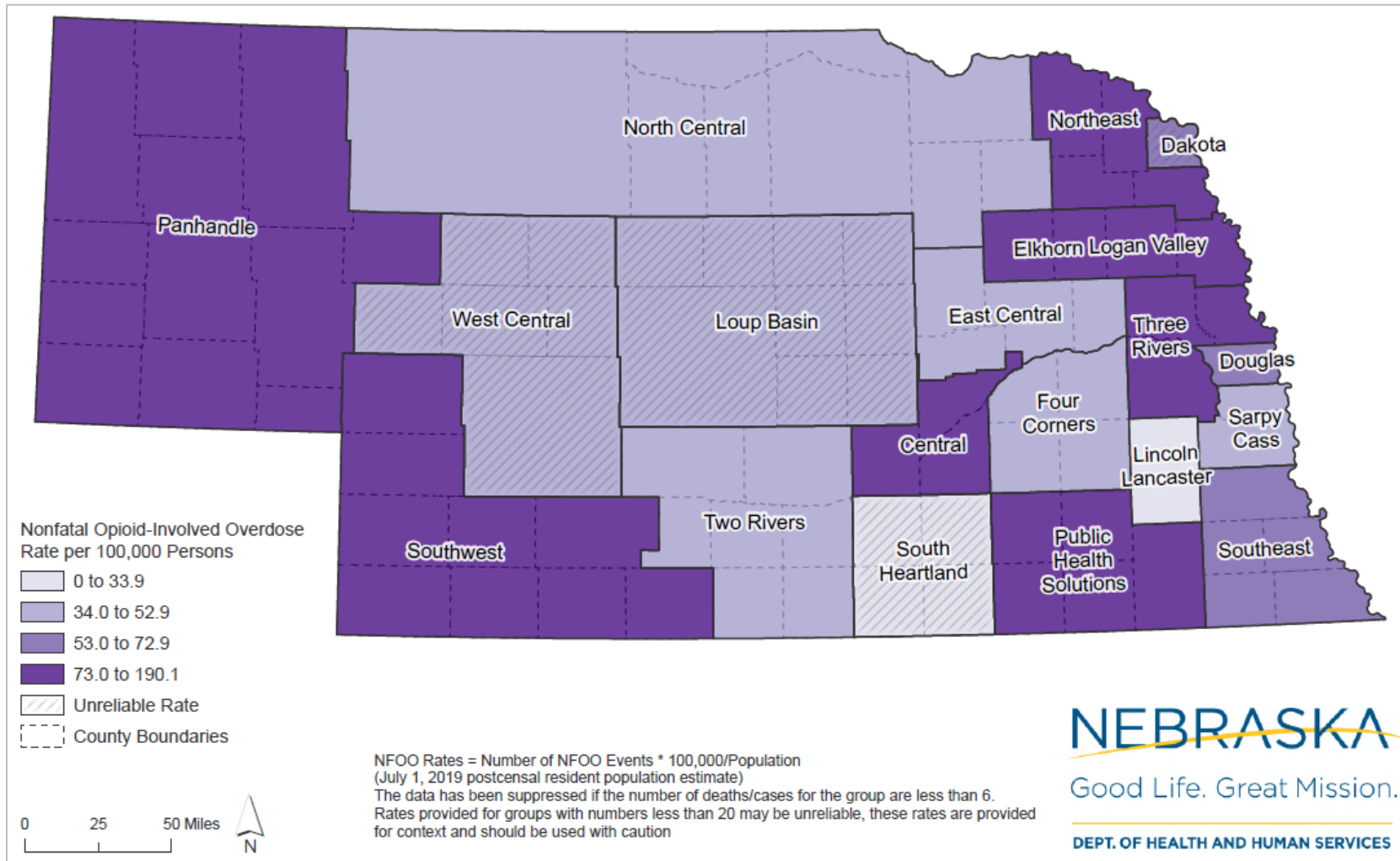
Map 3. Suspected nonfatal opioid-involved overdose rates by local health district, Nebraska, Sep 2018– Aug 2019



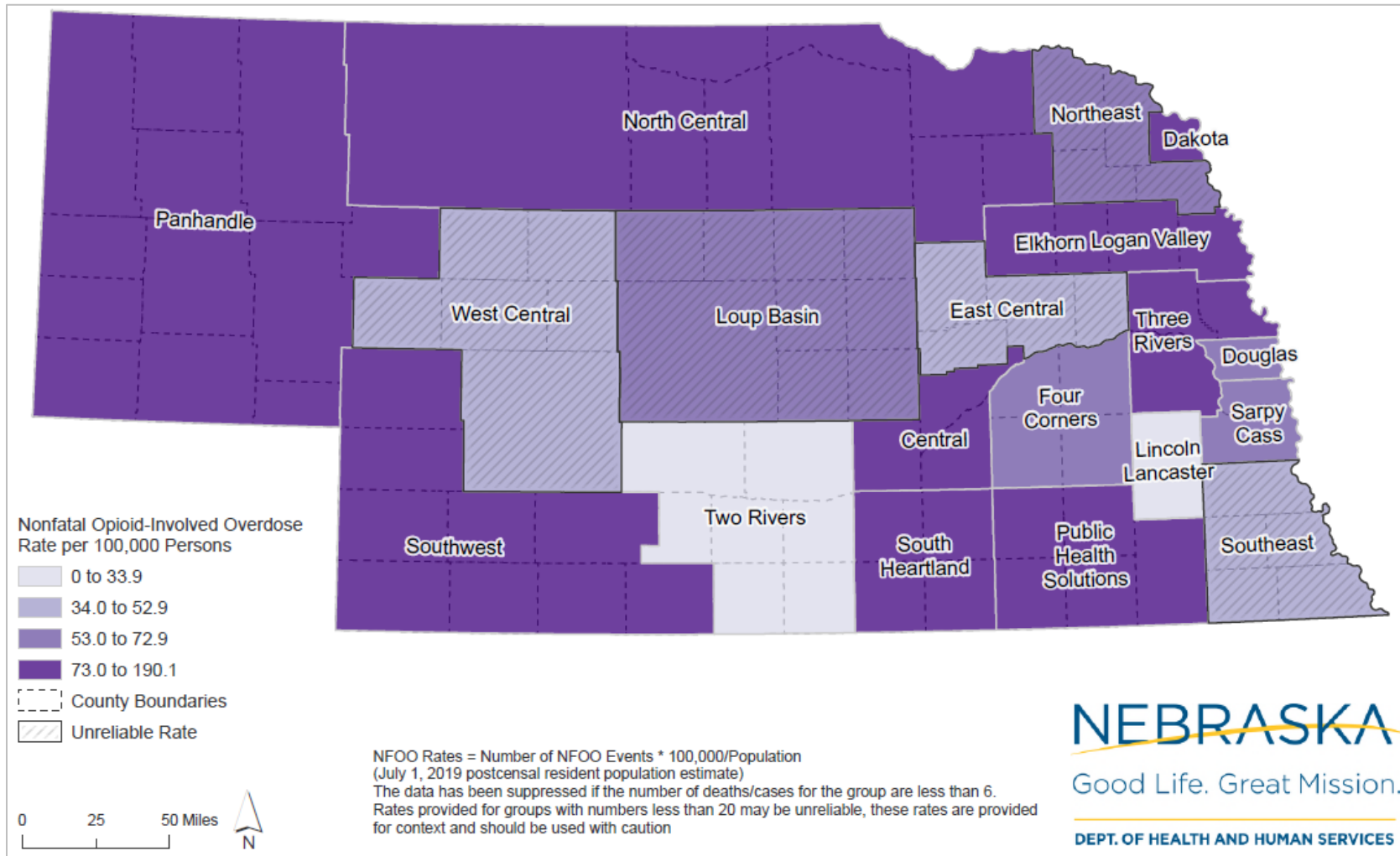
Map 4. Suspected nonfatal opioid-involved overdose rates by local health district, Nebraska, Sep 2019– Aug 2020



Map 5. Suspected nonfatal opioid-involved overdose rates by local health district, Nebraska, Sep 2020– Aug 2021



Map 6. Suspected nonfatal opioid-involved overdose rates by local health district, Nebraska, Sep 2021– Aug 2022



## Key Takeaways

- The EMS data are a complementary data source for Emergency Department (ED) syndromic data in suspected nonfatal opioid-involved overdoses (NFOO) surveillance and is a timely source for overdose analysis (2). Our findings illustrate that the EMS data are helpful in monitoring trends and spikes of suspected NFOO incidents.
- Overall, the number of the suspected NFOO increased significantly by 33.2% from 918 in 2017 to 1,223 in 2022, because all its four combined indicators including impression of opioid overdose, symptom of opioid-involved overdose, narrative of opioid overdose, and improved naloxone response were increasing (Figure 1 & Table 1). The impression of opioid-involved overdoses reported has increased by 168.1% from 94 in 2017 to 252 in 2022. The narrative of opioid-involved overdoses reported has increased by 24.7% from 582 in 2017 to 726 in 2022. The naloxone given has increased by 28.8% from 701 in 2017 to 903 in 2022, in which, improved naloxone response has increased by 30.0% from 327 in 2017 to 425 in 2022. Comparatively, the percentages of improvements remained stable in 2022 (47.1%) vs. 2017 (46.6%). Our findings provide evidence for concern that opioid-involved overdoses have been increasing and becoming severer in Nebraska in the past five years.
- Although the numbers of the symptoms of opioid-involved overdose increased from 1 case in 2017 to 28 cases in 2022, only a limited number of suspected opioid overdoses were identified by “Opioid Symptom” (Table 1). This result could be due to the poor documentation of EMS data. EMS providers should make more efforts to improve the quality of EMS documentation.
- The 'Patient Care Report Narrative' was able to identify more suspected opioid overdoses than the other three components, as seen in Figure 1 and Table 1. Overlooking this component in the tracking of NFOOs could potentially result in a substantial underestimation of the total NFOOs. Therefore, narratives should not be disregarded and should be incorporated into the process of tracking NFOOs using EMS data.
- The numbers of suspected NFOO, impression of opioid-involved overdose, symptom of opioid-involved overdose, narrative of opioid-involved overdose, naloxone given, and improved naloxone response varied by age, sex, race, residence, and incidence location. More NFOO patients live in urban rather than rural areas. And the majority of NFOO incidents occurred in urban areas. The number of opioid-involved overdoses increased with the urbanicity scale from 542 in rural areas to 2,353 in metropolitan areas (Table 2).
- From September 2017 to August 2022, suspected NFOO rates presented noticeable spatial disparities in Nebraska. The rates were actually higher in the rural than the urban areas no matter estimated by where people lived or where the events

happened (Figure 7); overall, the rates were higher in the western and eastern regions of the state compared to the central areas (Map 1). Over the course of the past five years, the rates of overdose have shown a year-on-year increase in most local health districts, with a notable surge particularly in central Nebraska (Maps 2 to 6). These spatial and temporal variations underscore the necessity for tailoring public health response and efforts to ensure implementation of equitable prevention and response services.

- Suspected NFOO rates were the highest among elders aged 65+ years for both sexes, specifically the highest in the 85+ age group and the lowest in the 0-14 age group (Figure 4, 5.1 & 5.2). Increases in rates were largest among the early adulthood aged 25-34 years for all persons, which increased by 89.2% from 47.0 per 100,000 persons per year in 2017 to 88.9 per 100,000 persons per year in 2022. For females, rates' increase was also largest in the 25-34 age group by increasing 110.3% from 31.5 per 100,000 persons in 2017 to 66.3 per 100,000 persons in 2022. The largest increase in rates for males was among middle-aged adults aged 35-44 years, which has increased by 138.6% from 35.5 per 100,000 persons in 2017 to 84.8 per 100,000 persons in 2022. Interestingly, the rate in females among the 35-44 age group has decreased significantly by 16.7% from 40.2 per 100,000 persons in 2017 to 33.5 per 100,000 persons in 2022. The NFOO rates were lower in females than males, and the discrepancy became larger over time (Figure 2). Rates were higher in males than females for all age groups except 45-54 years (Figure 6). Overall, rates increased for both sexes; male rates were higher among early adulthood aged 25-34 years than among children and adolescents aged 0-24 years, middle-aged adults aged 35-44 years, and late middle-aged adults aged 45-64 years.
- Suspected NFOO rates increased steadily in all racial groups except American Indian and Alaska Native (AI/AN) people (Figure 3). Increases in rates were higher among Black (142.1%) than White (23.7%) and AI/AN (16.7%), given rates among Asian may be unreliable due to the small NFOO number per year of less than 7.
- The analyses of NFOO trends highlight the need to increase overdose-involved services, including primary prevention, harm reduction, evidence-based treatment, and recovery support in all populations. It also highlights the importance of identifying characteristics of populations who are at high-risk of opioid overdose to help direct public health efforts to establish equitable overdose prevention and response services.

## References

1. Council of State and Territorial Epidemiologists (CSTE) Emergency Medical Services (EMS) Nonfatal Opioid Overdose Standard Guidance. May 2022.  
[https://cdn.ymaws.com/www.cste.org/resource/resmgr/opioidsurv/EMS\\_Nonfatal\\_Opioid\\_Overdose.pdf](https://cdn.ymaws.com/www.cste.org/resource/resmgr/opioidsurv/EMS_Nonfatal_Opioid_Overdose.pdf)
2. Slavova S, Rock P, Bush HM, Quesinberry D, Walsh SL. Signal of increased opioid overdose during COVID-19 from emergency medical services data. *Drug Alcohol Depend* 2020;214:108176.