



NarxCare User Manual

Information for Healthcare Professionals

November 2024
Version 2.0



Table of Contents

I	NarxCare	1
1.1	Introduction to NarxCare	1
1.2	Why NarxCare?.....	1
1.3	Who Can Access PDMP Data?.....	2
1.4	How Should NarxCare Be Used?	2
1.5	NarxCare Layout	2
2	NarxCare Tiles Overview	5
2.1	Header and Patient Identifying Information.....	5
2.2	Prescription Detail	6
2.3	Provider and Pharmacy Detail	6
2.4	Rx Summary and Rx Summary Expanded.....	7
2.5	Download Options	9
2.6	Other/Tools Metrics	9
2.7.1	Resources	9
3	State Indicators	12
4	Rx Graph	14
5	Narx Scores	16
5.1	Narx Scores Intended Use.....	16
5.2	Narx Score Calculations and Metrics	16
5.3	Narx Score Algorithm	18
4.3.1	Relative Scoring	18
4.3.2	Time Periods	19
4.3.3	Weighting	21
4.3.4	Score Computation	21
4.3.5	General Considerations for Narx Scores	23
4.3.6	Example Use Cases	23
6	ORS	25
4.4	ORS Intended Use	25
4.5	ORS Algorithm Development.....	26
4.5.1	Validation Statistics	26
4.5.2	Odds Ratios	26

4.5.3	Score Distributions.....	27
4.6	Additional External Validation	27
4.6.1	Validation Statistics.....	27
4.6.2	Odds Ratios	27
4.6.3	Score Distribution	28
4.7	ORS Data Inputs	28
6.1	Key Contributing Factors	30
6.2	Understanding ORS Inputs	32
4.8	Additional Information on the ORS Model	33
5	Document Information	35
5.3	Disclaimer	35
5.4	Change Log	35

I NarxCare

I.1 Introduction to NarxCare

NarxCare is a platform that provides a set of data, visualizations, and analytics to support prescribers' and dispensers'¹ review of controlled substance data from government managed and regulated Prescription Drug Monitoring Programs (PDMPs)².

Informed prescribing and dispensing practices are an important part of a multi-dimensional response to the ongoing opioid epidemic. NarxCare automatically analyzes PDMP data and delivers analytics, scores and visualizations of dispensation patterns in the form of tiles on a **Patient Report** based on PDMP data, to further enable informed prescribing and dispensing practices. NarxCare is user-friendly, can be easily integrated into a patient's electronic medical record, and is interoperable with other PDMPs. This document provides an overview of NarxCare, its data, visualizations, and analytics, and a breakdown of the **Patient Report** when NarxCare has been enabled by the applicable PDMP administrator.

Notes:

- A **Patient Report** contains the dispensation history for a patient based on information submitted to the PDMP by a pharmacist or pharmacy.
- A standard **Patient Report** contains patient information and report criteria, dispensation summaries, State Indicators, dispensation details, provider details, and pharmacy details.
- However, the information displayed to you on a **Patient Report** delivered alongside NarxCare may vary depending on the configurations established by your state's³ PDMP administrator. For additional information on which features are available, please reach out to your [PDMP administrator](#).

I.2 Why NarxCare?

NarxCare provides PDMP data in an interactive format to help prescribers and dispensers efficiently and easily access and evaluate data to aid in their controlled substance⁴ dispensing and prescribing.

NarxCare may be delivered within Electronic Health Records (EHRs) and Pharmacy Management Systems for those prescribers and dispensers who choose to access NarxCare through integrations within their healthcare IT system.

Furthermore, state law often requires prescribers or dispensers to check the PDMP prior to prescribing or dispensing controlled substances. In these instances, accessing PDMP data via NarxCare can be used to satisfy mandatory use requirements.

¹ Prescribers and dispensers must be authorized to access PDMP data under applicable law.

² When used in this document, unless the context requires otherwise, "PDMP" refers to the applicable state, territory, locality, or other government PDMP for the authorized user.

³ When used in the context of this document, the term "state" refers to the applicable state, territory, commonwealth or locality.

⁴ When used in this document, the term "controlled substance" refers to any federal or state-controlled substance, as well as any other PDMP-reportable drugs.

1.3 Who Can Access PDMP Data?

PDMP data is only accessible to state-authorized end users. The applicable PDMP administrator manages access to PDMP data, including PDMP data in **Patient Reports** with NarxCare available through the PMP AWARxE web portal or integrated electronic health systems.

Note: To register for a PMP AWARxE account, please refer to the [How to Register for a PMP AWARxE Account](#) help article.

1.4 How Should NarxCare Be Used?

NarxCare is intended to support prescribers and dispensers'-controlled substance dispensing and prescribing activities. Therefore, NarxCare provides full details as reported by the PDMP of dispensation information in a visual and interactive format. It also provides summaries and indicators that may be relevant to consider alongside both patient history and the details of the Patient Report.

NarxCare data, visualizations and analytics may be helpful in prompting consideration of strategies to mitigate risk of unintentional over-prescribing of controlled substances, based on the specific patient context and the prescriber's and/or dispenser's professional judgement. However, none of the information presented should be used as sole justification for providing or not providing medication(s).

CAUTION / IMPORTANT REMINDER: NarxCare is an application that provides a set of data, visualizations, and analytics to support prescribers' and dispensers' review of controlled substance data from government managed and regulated Prescription Drug Monitoring Programs (PDMPs). NarxCare is intended to aid, not replace, medical decision making. None of the information presented in NarxCare should be used as sole justification for providing or not providing medications.

1.5 NarxCare Layout

After NarxCare is enabled by your state's PDMP administrator, PDMP data displays in the form of tiles on a **Patient Report**. The following layout provides common tiles you may see, although they may not be in this order, on your **Patient Report**.

Note: For more information on how to run a Patient Request, please refer to the [Patient Requests & Patient Reports](#) help section in the [PMP AWARxE Support Center](#).

Header

[First Name] [Last Name], [Age] [Patient Sex] Contact the Bamboo Health Knowledge/Help Center
 Date of Birth: [00/00/0000] Recent Address: [Street Name, County, State, Zip Code] Status of State Queried: Error for 1 or more states [View Details](#) [View Linked Records \(1\)](#) Other Tools/Metrics

Analytics & Indicators

NarxCare®
 Report generated on 01/16/2023. Report Date Range: 01/16/2021 - 01/16/2023 PDF Report Export

UNINTENTIONAL OVERDOSE RISK SCORE MODEL

AVERAGE **400**

NARX SCORES

NARCOTICS ACTIVE RX	645	SEDATIVES ACTIVE RX	321	STIMULANTS ACTIVE RX	487
---------------------	-----	---------------------	-----	----------------------	-----

KEY CONTRIBUTING FACTORS TO OVERDOSE RISK SCORE MODEL

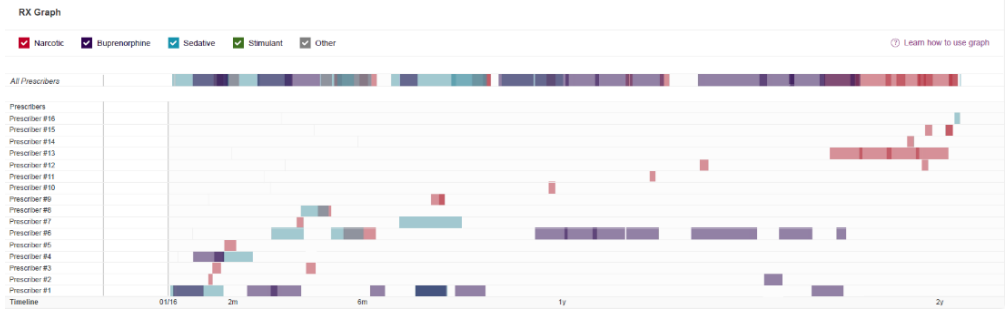
Greater than six dispensations	No
Benzo - Narcotics overlap	0 Days
Number of high risk scripts	0
Number of pharmacies where narcotics/meds/actives/stimulants filled	1
Total days supply of short-acting drugs	7

State Indicators (3)

- ≥ 4 opioid or sedative dispensing pharmacies in any 90 day period in the last 2 years
- ≥ 5 opioid or sedative providers in any year in the last 2 years
- >100 MME total and 40 MME/day average

[Details](#)

RX Graph



RX Summary

Buprenorphine (mg) Prescribed Over Time

Last 30 Days Last 60 Days Last 90 Days Last 1 Year Last 2 Years

26.42
mg Per Day Avg
20.10
Avg mg Per Rx

Lorazepam MgEq (LME) Prescribed Over Time

Last 30 Days Last 60 Days Last 90 Days Last 1 Year Last 2 Years

0.59
LME Per Day Avg
0.51
LME mg Per Rx

Morphine Milligram Equivalent Prescribed Over Time

Last 30 Days Last 60 Days Last 90 Days Last 1 Year Last 2 Years

11.07
MME per Day Avg
27.38
MME per Rx

RX Summary

Summary	Narcotics (excluding Buprenorphine)	Buprenorphine
Total Prescriptions	34	Current mg/day 0.00
Total Private Pay	14	30 Day Avg mg/day 0.00
Total Prescribers	5	30 Day Avg MME/day 86.40
Total Pharmacies	1	Current Qty 279

RX Summary Expanded

RX Summary Expanded

Narcotics (excluding Buprenorphine)		Buprenorphine		Sedatives		Stimulants	
Current MME/day	1440.00	Current mg/day	0.00	30 Day Avg LME/day	0.00	30 Day Avg mg/day	0.00
30 Day Avg MME/day	1440.00	30 Day Avg mg/day	0.00	90 Day Avg LME/day	2.67	90 Day Avg mg/day	0.00
90 Day Avg MME/day	1136.00	90 Day Avg mg/day	10.67	Rx Count/12 Months	1	Rx Count/12 Months	0
Rx Count/12 Months	1	Rx Count/12 Months	1	Prescriber #/6 Months	1	Prescriber #/6 Months	0
Prescriber #/6 Months	1	Pharmacy #/6 Months	1	Pharmacy #/6 Months	1	Pharmacy #/6 Months	0
Pharmacy #/6 Months	1	Pharmacy #/6 Months	1	Current Qty	0	Current Qty	0
Current Qty	218	Current Qty	0				

Prescriptions

Prescriptions

Total: 61 | Private Pay: 3

Showing 1-15 of 61 items | View 15 items | 1 of 5

Filed	Written	ID	Drug	QTY	Days	Prescriber	RX #	Dispenser	Refill	Daily Dose	Plan Type	PDMP
01/12/2023	11/19/2022	6	Suboxone 8 Mg-2 MG SL Film	75	30	Prescriber 1	3154863	Pharm 1	0	20.00 MG	Comm Ins	IN
01/11/2023	11/19/2022	6	Suboxone 8 Mg-2 MG SL Film	15	5	Prescriber 1	3154863	Pharm 1	0	24.00 MG	Comm Ins	IN
01/10/2023	11/19/2022	6	Clonazepam 0.25 MG Odt	30	30	Prescriber 1	3153834	Pharm 11	0	6.50 LME	Comm Ins	IN
12/28/2022	12/28/2022	2	Hydrocodone-Acetamin 5-325 MG	6	2	Prescriber 1	0700929	Pharm 4	0	15.00 MME	Medicare	IN
12/01/2022	12/01/2022	6	Hydrocodone-Acetamin 5-325 MG	10	7	Prescriber 1	1274761	Pharm 1	0	7.14 MME	Comm Ins	IN
12/16/2022	12/12/2022	2	Suboxone 8 Mg-2 MG SL Film	60	30	Prescriber 1	3136764	Pharm 7	0	15.00 MG	Comm Ins	IN
12/14/2022	11/19/2022	2	Clonazepam 0.25 MG Odt	30	30	Prescriber 1	3136749	Pharm 1	0	6.50 LME	Comm Ins	IN
12/14/2022	12/12/2022	2	Suboxone 8 Mg-2 MG SL Film	30	10	Prescriber 1	3136754	Pharm 1	0	24.00 MG	Comm Ins	IN
12/07/2022	12/07/2022	5	Oxycodone Hcl 10 MG Tablet	28	7	Prescriber 1	2103902	Pharm 8	0	60.00 MME	Comm Ins	IN
11/17/2022	11/19/2022	2	Suboxone 8 Mg-2 MG SL Film	60	30	Prescriber 1	3120667	Pharm 1	0	15.00 MG	Medicare	IN
11/17/2022	11/19/2022	2	Clonazepam 0.25 MG Odt	30	30	Prescriber 1	3120669	Pharm 1	0	6.50 LME	Medicare	IN
10/02/2022	10/19/2022	2	Suboxone 8 Mg-2 MG SL Film	75	30	Prescriber 3	1259713	Pharm 16	0	22.00 MG	Medicare	IN
10/19/2022	06/15/2022	2	Clonazepam 0.25 MG Odt	30	30	Prescriber 1	1259352	Pharm 1	0	6.50 LME	Medicare	IN
10/19/2022	10/19/2022	2	Suboxone 8 Mg-2 MG SL Film	15	5	Prescriber 2	1259713	Pharm 1	0	24.00 MG	Medicare	IN
09/25/2022	09/22/2022	2	Suboxone 8 Mg-2 MG SL Film	90	30	Prescriber 1	0347275	Pharm 2	0	24.00 MG	Comm Ins	IN

Disclaimer

Showing 1-15 of 61 items | View 15 items | 1 of 5

Providers

Providers

Total: 17

Showing 1-15 of 17 items | View 15 items | 1 of 2

Name	Address	City	State	Zipcode	Phone
Prescriber 1	Provider Address 1	Springfield	IN	40399	Phone 1
Prescriber 2	Provider Address 2	Springfield	IN	40376	Phone 2
Prescriber 3	Provider Address 3	Springfield	IN	40179	Phone 3
Prescriber 4	Provider Address 4	Springfield	IN	40329	Phone 4
Prescriber 5	Provider Address 5	Springfield	IN	40672	Phone 5
Prescriber 6	Provider Address 6	Springfield	IN	40607	Phone 6
Prescriber 7	Provider Address 7	Springfield	IN	40151	Phone 7
Prescriber 8	Provider Address 8	Springfield	IN	42345	Phone 8
Prescriber 9	Provider Address 9	Springfield	IN	44533	Phone 9
Prescriber 10	Provider Address 10	Springfield	IN	44533	Phone 10
Prescriber 11	Provider Address 11	Springfield	IN	40907	Phone 11
Prescriber 12	Provider Address 12	Springfield	IN	40376	Phone 12
Prescriber 13	Provider Address 13	Springfield	IN	44533	Phone 13
Prescriber 14	Provider Address 14	Springfield	IN	40907	Phone 14
Prescriber 15	Provider Address 15	Springfield	IN	40376	Phone 15

Showing 1-15 of 17 items | View 15 items | 1 of 2

Pharmacies

Pharmacies

Total: 17

Showing 1-15 of 17 items | View 15 items | 1 of 2

Name	Address	City	State	Zipcode	Phone
Pharmacy 1	Pharmacy Address 1	Springfield	IN	40329	
Pharmacy 2	Pharmacy Address 2	Springfield	IN	40672	
Pharmacy 3	Pharmacy Address 3	Springfield	IN	40907	
Pharmacy 4	Pharmacy Address 4	Springfield	IN	40151	
Pharmacy 5	Pharmacy Address 5	Springfield	IN	42345	
Pharmacy 6	Pharmacy Address 6	Springfield	IN	44533	
Pharmacy 7	Pharmacy Address 7	Springfield	IN	44533	
Pharmacy 8	Pharmacy Address 8	Springfield	IN	40376	
Pharmacy 9	Pharmacy Address 9	Springfield	IN	44533	
Pharmacy 10	Pharmacy Address 10	Springfield	IN	40907	
Pharmacy 11	Pharmacy Address 11	Springfield	IN	40376	
Pharmacy 12	Pharmacy Address 12	Springfield	IN	44533	
Pharmacy 13	Pharmacy Address 13	Springfield	IN	40376	
Pharmacy 14	Pharmacy Address 14	Springfield	IN	44533	
Pharmacy 15	Pharmacy Address 15	Springfield	IN	40907	

Showing 1-15 of 17 items | View 15 items | 1 of 2

Note: The tiles visible to you may differ from the above layout depending on the configurations established by your state's PDMP administrator. For example, the PDMP administrator may request the inclusion of additional tiles in the interface available as part of their PDMP that are not displayed above. An overview of these tiles can be found in the [NarxCare Tiles Overview](#) section of this document.

CAUTION / IMPORTANT REMINDER: NarxCare is an application that provides a set of data, visualizations, and analytics to support prescribers' and dispensers' review of controlled substance data from government managed and regulated Prescription Drug Monitoring Programs (PDMPs). NarxCare is intended to aid, not replace, medical decision making. None of the information presented in NarxCare should be used as sole justification for providing or not providing medications.

2 NarxCare Tiles Overview

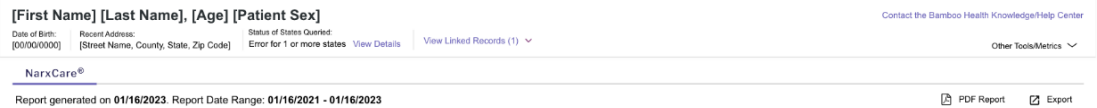
NarxCare was designed to provide an intuitive view of controlled substance dispensing information for a patient. This information is presented as tiles on a **Patient Report**, many of which are interactive, allowing the user to click or hover over links and graphs within a tile to access additional information.

Note: The **Patient Report** is configured by your state's PDMP administrator. The sections below outline the most commonly displayed tiles, including the [Rx Graph](#), [ORS](#) and [Narx Scores](#). Although your specific **Patient Report** may differ dependent upon PDMP report layout configuration, all available NarxCare analytics are described below.

2.1 Header and Patient Identifying Information

Note: The information described below may be configured by your state's PDMP administrator and presented to you on your Patient Report alongside NarxCare. This information is available to all PDMP authorized users, whether or not the user has access to NarxCare. It is described in this NarxCare User Manual for ease of reference by users who have access to NarxCare but is not a component of NarxCare.

The **Patient Report Header** contains patient identifying information in the first line above the tiles. Additional patient information, such as date of birth and address, can be found directly below the header. This information will remain visible at the top of your screen as you scroll through the **Patient Report**.



Note: The gender and age reported on the **Patient Header** is either:

a) the gender or age searched if they were included in the Patient Request. For additional information on how to perform a patient request, please refer to the [Performing a Patient Request](#) help article in our [PMP AWAARxE Support Center](#).

OR

b) if gender or age were not included in the Patient Request, the first result of the search located by the requesting system.

You can click [View Link Records](#) to display all PDMP records linked to the searched patient.

The screenshot shows the 'Linked Records' section of the NarxCare report. It features a table with the following columns: Name, DOB, ID, Gender, and Address. The table contains six rows of data, each representing a linked record. The table is highlighted with a red border. Below the table, there is a link to 'View Linked Records (6)'. At the bottom of the screenshot, there is a link to 'Contact the Bamboo Health Knowledge/Help Center' and a dropdown for 'Other Tools/Metrics'. At the bottom of the page, it says 'NarxCare®' and 'Report generated on 01/16/2023. Report Date Range: 01/16/2021 - 01/16/2023'. There are also icons for 'PDF Report' and 'Export'.

Report Criteria	Linked Records				
	Name	DOB	ID	Gender	Address
First Name: [First Name]	[First Name] [Last Name]	[00/00/0000]	1	[Gender]	[Street Name, County, State, Zip Code]
Last Name: [Last Name]	[First Name] [Last Name]	[00/00/0000]	2	[Gender]	[Street Name, County, State, Zip Code]
DOB: [00/00/0000]	[First Name] [Last Name]	[00/00/0000]	3	[Gender]	[Street Name, County, State, Zip Code]
	[First Name] [Last Name]	[00/00/0000]	4	[Gender]	[Street Name, County, State, Zip Code]
	[First Name] [Last Name]	[00/00/0000]	5	[Gender]	[Street Name, County, State, Zip Code]
	[First Name] [Last Name]	[00/00/0000]	6	[Gender]	[Street Name, County, State, Zip Code]

Note: The genders and/or ages displayed under the patient's **Linked Records** may vary, as this data is pulled from the patient's dispensation record(s) and reported by pharmacies.

2.2 Prescription Detail

Note: The information described below may be configured by your state’s PDMP administrator and presented to you on your Patient Report alongside NarxCare. This information is available to all PDMP authorized users, whether or not the user has access to NarxCare. It is described in this NarxCare User Manual for ease of reference by users who have access to NarxCare but is not a component of NarxCare.

Each prescription **dispensed** to a patient is presented in the **Prescriptions** tile. If desired, you can use the arrows next to each column header (↕) to sort the table by that column. You can also hover your cursor over a prescriber or dispenser to view additional information, such as the full name, address, and DEA number.

Prescriptions

Total: 61 | Private Pay: 3

Showing 1-15 of 61 Items | View 15 Items | 1 of 5

Filled	Written	ID	Drug	QTY	Days	Prescriber	RX #	Dispenser	Retfill	Daily Dose	Pymt Type	PMP
01/12/2023	11/10/2022	6	Suboxone 8 Mg-2 MG SL Film	75	30	Prescriber 1	3154683	Pharm 1	0	20.00 MG	Comen Ins	IN
01/11/2023	11/10/2022	6	Suboxone 8 Mg-2 MG SL Film	15	5	Prescriber 1	3154683	Pharm 1	0	24.00 MG	Comen Ins	IN
01/10/2023	11/10/2022	6	Clonazepam 0.25 MG Out	30	30	Prescriber 1	3153034	Pharm 11	0	0.50 LME	Comen Ins	IN
12/28/2022	12/28/2022	2	Hydrocodone-Acetamin 5-325 MG	6	2	Prescriber 1	0700020	Pharm 4	0	15.00 MME	Medicare	IN
12/12/2022	12/12/2022	6	Hydrocodone-Acetamin 5-325 MG	10	7	Prescriber 1	1274701	Pharm 1	0	7.14 MME	Comen Ins	IN
12/16/2022	12/12/2022	2	Suboxone 8 Mg-2 MG SL Film	60	30	Prescriber 1	3136764	Pharm 7	0	16.00 MG	Comen Ins	IN
12/14/2022	11/10/2022	2	Clonazepam 0.25 MG Out	30	30	Prescriber 1	3136749	Pharm 1	0	0.50 LME	Comen Ins	IN
12/14/2022	12/12/2022	2	Suboxone 8 Mg-2 MG SL Film	30	10	Prescriber 1	3136754	Pharm 1	0	24.00 MG	Comen Ins	IN
12/07/2022	12/07/2022	5	Oxycodone Hcl 10 MG Tablet	28	7	Prescriber 1	2105560	Pharm 8	0	60.00 MME	Comen Ins	IN
11/17/2022	11/10/2022	2	Suboxone 8 Mg-2 MG SL Film	60	30	Prescriber 1	3120667	Pharm 1	0	16.00 MG	Medicare	IN
11/17/2022	11/10/2022	2	Clonazepam 0.25 MG Out	30	30	Prescriber 1	3120666	Pharm 1	0	0.50 LME	Medicare	IN
10/25/2022	10/19/2022	2	Suboxone 8 Mg-2 MG SL Film	75	30	Prescriber 3	1259713	Pharm 16	0	20.00 MG	Medicare	IN
10/19/2022	06/19/2022	2	Clonazepam 0.25 MG Out	30	30	Prescriber 1	1259352	Pharm 1	0	0.50 LME	Medicare	IN
10/19/2022	10/19/2022	2	Suboxone 8 Mg-2 MG SL Film	15	5	Prescriber 2	1259713	Pharm 1	0	24.00 MG	Medicare	IN
06/25/2022	06/22/2022	2	Suboxone 8 Mg-2 MG SL Film	90	30	Prescriber 1	0347275	Pharm 2	0	24.00 MG	Comen Ins	IN

Disclaimer

Showing 1-15 of 61 Items | View 15 Items | 1 of 5

2.3 Provider and Pharmacy Detail

Note: The information described below may be configured by your state’s PDMP administrator and presented to you on your Patient Report alongside NarxCare. This information is available to all PDMP authorized users, whether or not the user has access to NarxCare. It is described in this NarxCare User Manual for ease of reference by users who have access to NarxCare but is not a component of NarxCare.

Prescriber and dispenser information, including full name, address, and DEA number, are presented in the **Providers** and **Pharmacies** tile.

Providers

Total: 17

Showing 1-15 of 17 Items | View 15 Items | 1 of 2

Name	Address	City	State	Zipcode	Phone
Prescriber 1	Provider Address 1	Springfield	IN	40399	Phone 1
Prescriber 2	Provider Address 2	Springfield	IN	40376	Phone 2
Prescriber 3	Provider Address 3	Springfield	IN	40178	Phone 3
Prescriber 4	Provider Address 4	Springfield	IN	40329	Phone 4
Prescriber 5	Provider Address 5	Springfield	IN	40672	Phone 5
Prescriber 6	Provider Address 6	Springfield	IN	49007	Phone 6
Prescriber 7	Provider Address 7	Springfield	IN	40151	Phone 7
Prescriber 8	Provider Address 8	Springfield	IN	42345	Phone 8
Prescriber 9	Provider Address 9	Springfield	IN	44533	Phone 9
Prescriber 10	Provider Address 10	Springfield	IN	44533	Phone 10
Prescriber 11	Provider Address 11	Springfield	IN	49007	Phone 11
Prescriber 12	Provider Address 12	Springfield	IN	40376	Phone 12
Prescriber 13	Provider Address 13	Springfield	IN	44533	Phone 13
Prescriber 14	Provider Address 14	Springfield	IN	49007	Phone 14
Prescriber 15	Provider Address 15	Springfield	IN	40376	Phone 15

Showing 1-15 of 17 Items | View 15 Items | 1 of 2

Pharmacies						
Total: 17						
Showing 1-15 of 17 items View: 15 items < 1 of 2 >						
Name	Address	City	State	Zipcode	Phone	
Pharmacy 1	Pharmacy Address 1	Springfield	IN	40329		
Pharmacy 2	Pharmacy Address 2	Springfield	IN	40672		
Pharmacy 3	Pharmacy Address 3	Springfield	IN	40607		
Pharmacy 4	Pharmacy Address 4	Springfield	IN	40151		
Pharmacy 5	Pharmacy Address 5	Springfield	IN	42345		
Pharmacy 6	Pharmacy Address 6	Springfield	IN	44533		
Pharmacy 7	Pharmacy Address 7	Springfield	IN	44533		
Pharmacy 8	Pharmacy Address 8	Springfield	IN	40376		
Pharmacy 9	Pharmacy Address 9	Springfield	IN	44533		
Pharmacy 10	Pharmacy Address 10	Springfield	IN	40607		
Pharmacy 11	Pharmacy Address 11	Springfield	IN	40376		
Pharmacy 12	Pharmacy Address 12	Springfield	IN	44533		
Pharmacy 13	Pharmacy Address 13	Springfield	IN	40376		
Pharmacy 14	Pharmacy Address 14	Springfield	IN	44533		
Pharmacy 15	Pharmacy Address 15	Springfield	IN	40607		

2.4 Rx Summary and Rx Summary Expanded

The Rx Summary function includes dosage summaries of controlled substances dispensed over time from the information contained in the PDMP. If configured by your state’s PDMP administrator, the **Rx Summary** and **Rx Summary Expanded** tiles may also be included on your **Patient Report**.

The **Rx Summary** tile includes:

- **Morphine Milligram Equivalent Prescribed Over Time**
MMEs are a standardized measure used to compare the potency of different opioids relative to morphine⁵.
- External Variables Used:**
- MME Conversion Factors
- PDMP Variables Used:**
- Dispensation Quantity
 - Dispensation Days’ Supply
 - Dispensation Strength

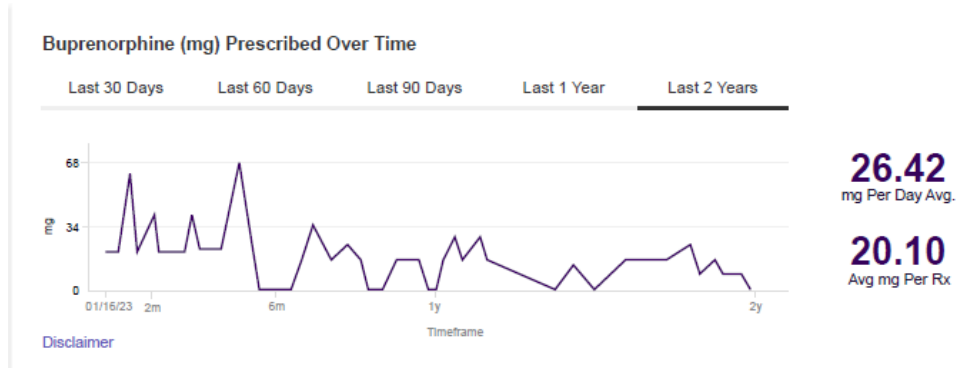
Equation:

$$Daily\ MME = \frac{(mme\ conversion\ factor)(strength)(quantity)}{day'\ supply}$$



⁵ https://archive.cdc.gov/www_cdc_gov/opioids/data-resources/index.html

- **Buprenorphine (mg) Prescribed Over Time**



- **Lorazepam MgEq (LME) Prescribed Over Time**

LMEs are a standardized measure used to compare the potency of different sedative/hypnotics relative to Lorazepam⁶.

External Variables Used:

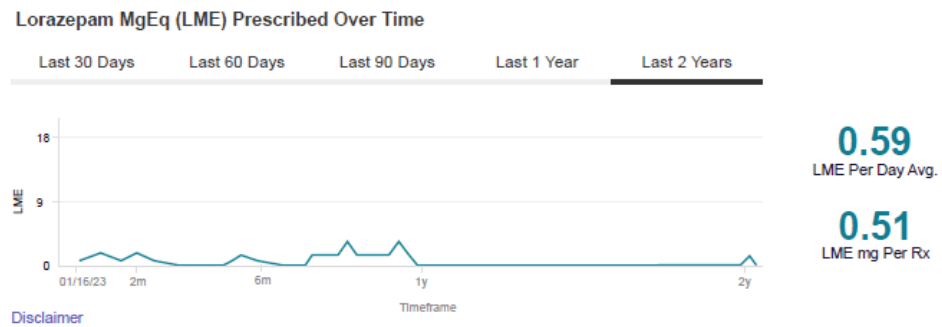
- Sedative/Hypnotic Conversion Factors

PDMP Variables Used:

- Dispensation Quantity
- Dispensation Days' Supply

Equation:

$$\text{Daily LME} = \frac{(\text{sedative/hypnotic conversion factor})(\text{quantity})}{\text{day's supply}}$$



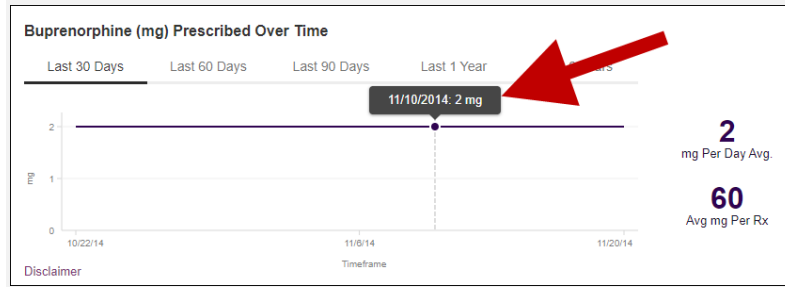
These tiles contain graphs that provide a longitudinal view of daily MME, buprenorphine, and LME.

Note: Abrupt changes in trends may be due to overlapping dispensations. Prescribers and dispensers can review detailed information on dispensations in the **Prescriptions, Providers, and Pharmacies** tiles.

You can customize the length of time for which you wish to view information by clicking **Last 30 Days** (displayed by default), **Last 60 Days**, **Last 90 Days**, **Last 1 Year**, or **Last 2 Years** at the top of each graph.

⁶ <https://physicians.utah.edu/documents/sedative-hypnotic-equivalency-chart>

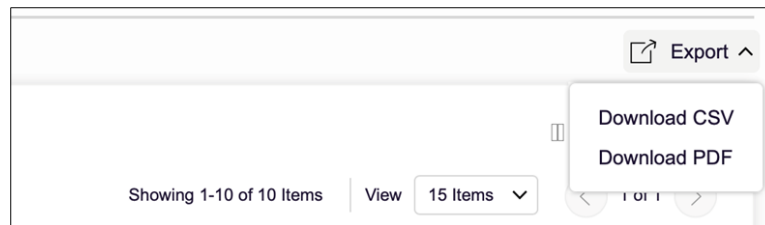
Note: You can hover over the timeline in any of these graphs to display information for a specific day.



2.5 Download Options

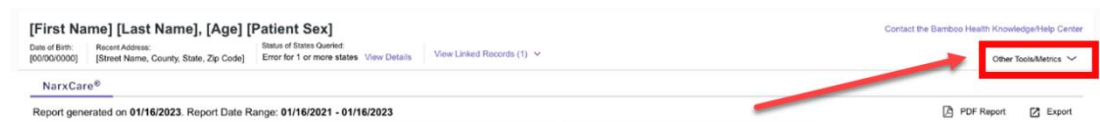
Note: The information described below may be configured by your state’s PDMP administrator and presented to you on your Patient Report alongside NarxCare. This information is available to all PDMP authorized users, whether or not the user has access to NarxCare. It is described in this NarxCare User Manual for ease of reference by users who have access to NarxCare but is not a component of NarxCare.

If you need to download a PDF or CSV version of the **Patient Report**, click the **Export** dropdown menu, then click **Download PDF** or **Download CSV**.



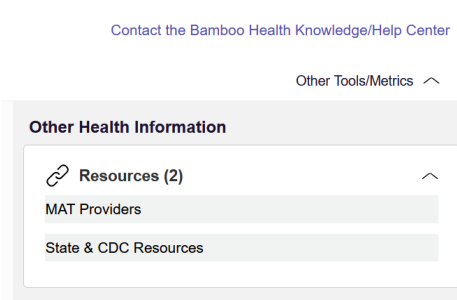
2.6 Other/Tools Metrics

To view the **Other/Tools Metrics** configured by your state’s PDMP administrator and available to you, click on the dropdown menu located at the top right-hand side of the page.



2.7.1 Resources

The **Resources** dropdown menu contains an easy access link to *Medication for Opioid Use Disorder (MOUD) Providers* and *PDMP & CDC Resources* that may be useful to coordinate care or review CDC guidelines.



MOUD Providers

The **MOUD Providers** pop-up window allows users to locate the 30 closest providers who are listed in the Substance Abuse and Mental Health Services Administration (SAMHSA) buprenorphine treatment locator database.

MAT Providers
✕

Find the 30 closest MAT providers for this patient. The patient's zip code is pre-populated if available.
[View more information about the treatment locator.](#)

Zip Code

Submit

The patient's zip code is pre-populated but can be edited. After entering the desired Zip Code, click *Submit* to generate a PDF that can be viewed and printed.

Note: These resources are provided by the Substance Abuse and Mental Health Services Administration (SAMHSA). View more information about the treatment locator [here](#).

PDMP & CDC Resources

The **State & CDC Resources** pop-up window provides a series of PDMP administrator configured PDMP & CDC documents pertaining to prescribers, dispensers, and/or patients.

Note: Your PDMP may not have additional resources available under the Resources link, as this is a supplemental feature. Please [contact your state's PDMP administrator](#) if you would like additional information on CDC resources.

State & CDC Resources

Click the associated link and print.
View more information about resources.



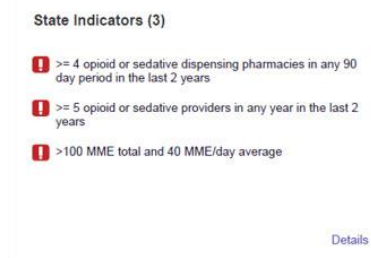
To assist prescribers and dispensers in educating their patients, printable pamphlets prepared by the CDC can also be accessed through NarxCare. In addition to resources provided from the CDC, resources from the Bureau of Substance Addiction Services ([BSAS](#)), and PDMP specific resources, such as education materials, as selected by the applicable state PDMP administrator, are also available. More information about CDC resources can be found [here](#).

Note: Additionally, NarxCare offers Care Notes, Communications Module, and a Resources Module. For more information on the Care Notes, Communications, or Resources Modules, please contact the appropriate state PDMP administrator.

3 State Indicators

Note: The indicators described below may be configured by your state's PDMP administrator and presented to you on your Patient Report alongside NarxCare. These indicators are available to all PDMP authorized users, whether or not the user has access to NarxCare. The indicators are described in this NarxCare User Manual for ease of reference by users who have access to NarxCare but are not a component of NarxCare.

Bamboo Health provides a series of indicators delivered alongside NarxCare that may be automatically returned to the PDMP authorized user.



The indicators that may display on a **Patient Report** alongside NarxCare are:

- **Additional Indicators** – These are configured by the applicable state PDMP administrator. They are used to identify when a patient has met or exceeded a threshold as selected by the PDMP administrator. The **Additional Indicators** display if **Patient Alerts** (discussed below) are not enabled by the PDMP administrator. However, Below Threshold Indicators and Custom State Indicators only display if enabled by the applicable state PDMP administrator regardless of other indicators that may be enabled. For additional information on State Indicators, please refer to the [State Indicators](#) help article in the [PMP AWAARxE Support Center](#).
- **Patient Alerts** – These are default indicators commonly referred to as “Clinical Alerts” that, if enabled by the state PDMP administrator, provide notifications and/or display on the **Patient Report** to indicate that a patient has met or exceeded a threshold as determined by the PDMP. There are 6 different types of **Patient Alerts** the PDMP may have enabled for their prescribers and dispensers. For additional information on State Indicators or Patient Alerts, please refer to the [State Indicators](#) or [Patient Alerts](#) help articles in the [PMP AWAARxE Support Center](#).
- **Below Threshold Indicators** – If enabled by the applicable state PDMP administrator, these indicators are presented on the **Patient Report** to indicate when a patient is below a Patient Alert threshold as determined by the PDMP. For additional information on State Indicators or Patient Alerts, please refer to the [State Indicators](#) or [Patient Alerts](#) help articles in the [PMP AWAARxE Support Center](#).
- **Custom State Indicators** – These are enabled by the applicable state PDMP administrator and may include flags for deceased patients, opioid antidote (naloxone) administrations, marijuana registration cards, opioid treatment, etc. For additional information on Custom State Indicators, please refer to the [Custom State Indicators](#) help article in the [PMP AWAARxE Support Center](#).

Note: The state indicators available to you, and any thresholds associated with them, are configured by your state's PDMP administrator. PDMP administrators can submit a request for additional

indicator types (e.g., death data). For questions on how state indicators are configured, please refer to your [PDMP administrator](#).

CAUTION / IMPORTANT REMINDER: Prescribers and dispenser use State Indicators to further review details in the patient's dispensation history while attending to their patients. State Indicators are intended to aid, not replace, medical decision-making. None of the information presented should be used as sole justification for providing or not providing medications.

4 Rx Graph

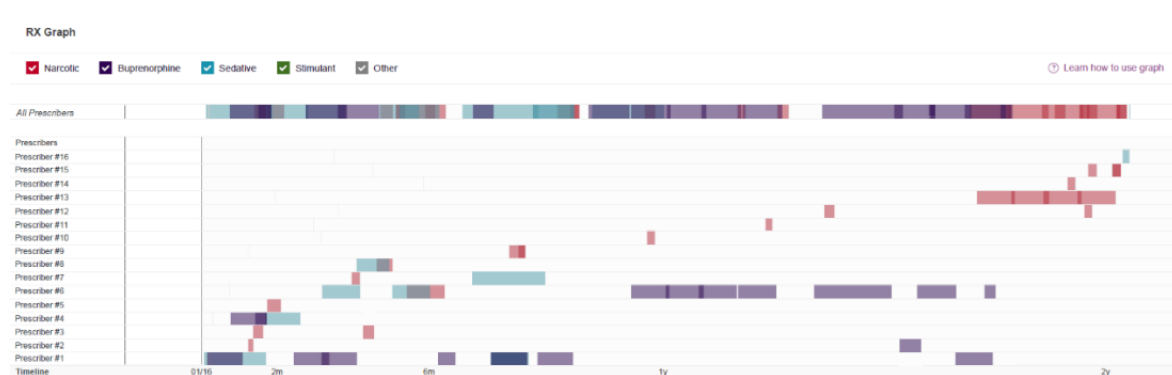
The **Rx Graph** tile parses the PDMP data into one interactive graph for prescribers and dispensers. The **Rx Graph** tile displays the dispensation information in a manner that allows you to see important patterns to aid in more informed medical decision-making.

The **Rx Graph** displays information in rows in reverse chronological order; meaning the most recent dispensations are displayed on the left side of the graph and the oldest are displayed on the right. The vertical axis displays the number of providers, with the most recent providers at the bottom of the graph.

The **Rx Graph** allows you to look further into a patient's Narx Scores and review the summation of factors that may have led to those scores.

Notes:

- *Dispensations filled by the same prescriber within the “early fill” timeframe will not show as overlapping dispensations on the **Rx Graph**. However, if a prescriber resides in the same practice as another prescriber, there may be a one- or two-day overlap.*
- *Overlapping for each medication type only pertains to dispensations prescribed by different prescribers (i.e., different DEA numbers).*



Note: The checkboxes at the top of the graph can be selected or deselected to alter what medications you would like displayed.

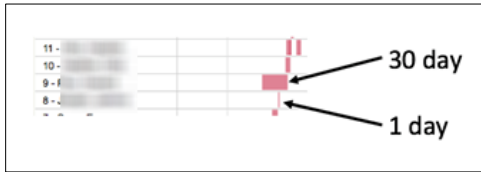
Dispensations are color-coded as follows:

- Narcotics (opioids) = red
- Buprenorphines = purple
- Sedatives (benzodiazepines, sleep aids, etc.) = blue
- Stimulants = green
- Other = grey*

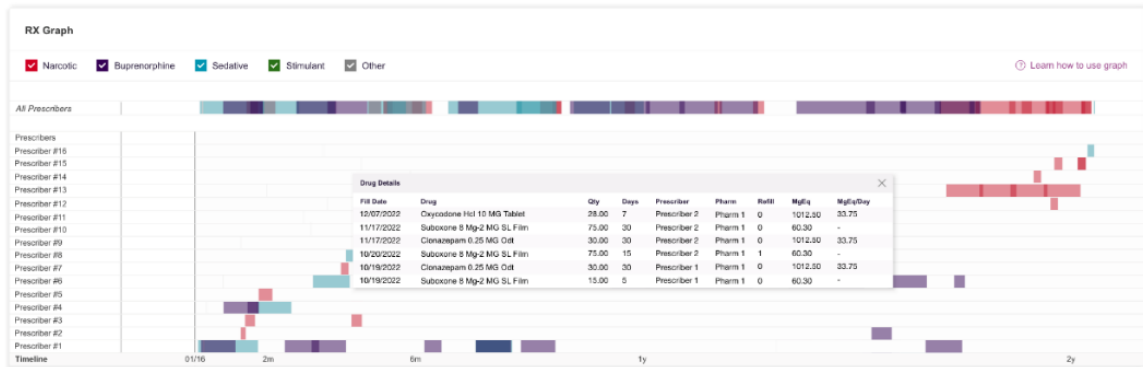
***Note:** When a report includes dispensations that are not part of the Narx Scores calculation, those dispensations are displayed in grey. Other dispensations can include anesthetics, cannabinoids, GI narcotics, steroids, and medications used to treat neuropain (e.g., gabapentin).

Each pixel in the graph represents one (1) day. Therefore, a 30-day dispensation is represented by a rectangle about 1 cm wide and a 1–3-day dispensation appears as a narrow vertical bar.

Furthermore, a single dispensation block is represented with a 50% opacity. Therefore, in areas where the colors are darker, multiple, overlapping dispensations are present.



The **Rx Graph** is interactive. You can click on a specific dispensation to view information, including the dispensing pharmacy, for that dispensation only, or you can click and drag over multiple dispensations to view information for all the selected dispensations.

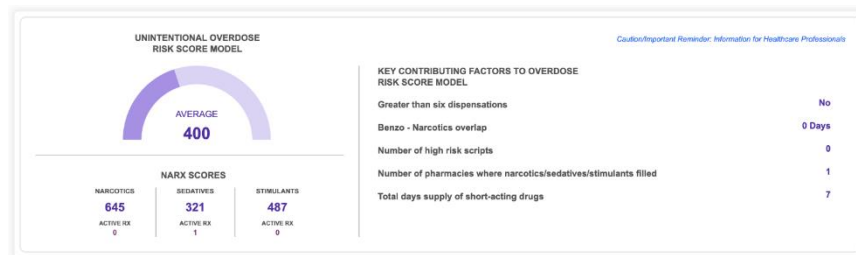


CAUTION / IMPORTANT REMINDER: Prescribers and dispensers use Rx Graph to further review details in the patient's dispensation history while attending to their patients. Rx Graph is intended to aid, not replace, medical decision-making. None of the information presented should be used as sole justification for providing or not providing medications.

5 Narx Scores

NarxCare provides three substance-specific (i.e., narcotics, sedatives, and stimulants) analytic exposure summary scores that may be automatically returned to the requesting system as it relates to a patient, collectively called Narx Scores. Narx Scores derive from a percentile-ranked descriptive statistics approach for controlled substance use (i.e., narcotics, sedatives, stimulants) comparing single patients to their home state's PDMP population.

Requesting systems receiving such data can choose to display Narx Scores within their native electronic health record (EHR) or pharmacy management system. However, many systems choose to display the Narx Scores on the **Patient Report**.



5.1 Narx Scores Intended Use

Narx Scores are intended to be automatically delivered into the clinical workflow and can easily be viewed on the **Patient Report**.

Note: Some systems (e.g., EHRs) may choose to display Narx Scores elsewhere in the **Patient Report**.

Narx Scores were designed to increase prescribers' and dispensers' awareness of a patient's controlled substance exposure. Thus, viewing these scores early during the patient encounter may enhance their informational utility for the prescriber or dispenser.

Note: Workflows may vary by organization. Please contact your organization's PDMP administrator for additional information.

5.2 Narx Score Calculations and Metrics

Each Narx Score has a numerical value based on a synthesis of key patient metrics derived from the PDMP.

Narx Scores are calculated for narcotics, sedatives, and stimulants and have the following characteristics:

1. Each score consists of three digits ranging from 000–999.
2. The first two digits of each score for a patient represent a relative scoring system for a given patient's exposure to a controlled substance compared to the rest of the patient's home state PDMP population (described in detail below).
3. The last digit of each score for a patient represents the number of active prescriptions of that type. For example, a Narcotic Narx Score of 504 indicates the patient has four active narcotic prescriptions according to information obtained from the PDMP on

dispensations. In the standard user interface tile, the number of active prescriptions is also shown, in written form, directly below the score for ease of reference.

4. The scores correspond to the prevalence and timing of literature-based exposures⁷ that exist within the PDMP data for that specific patient.

- There are four metrics used in Narx Score calculations. They are as follows:
 1. The number of controlled substance prescribers.
 2. The number of pharmacies where controlled substance prescriptions were filled.
 - 3a. The total dosage of dispensations (opioids and sedatives only).
 - 3b. The number of days supply for dispensations (stimulants only).
 4. The number of overlapping days for each drug type.

Note: *The number of overlapping days for each drug type only pertains to dispensations prescribed by different prescribers (i.e., different DEA numbers).*

- Each metric is tallied across 4 timeframes of reference:
 1. Most recent 2 months
 2. Most recent 6 months
 3. Most recent 1 year
 4. Most recent 2 years
5. The time elapsed for any literature-based exposures serves to decrease its contribution to the score. For example, 1,000 MME dispensed within the last month will elevate the score more than 1,000 MME dispensed one year ago.
 6. The distribution of Narx Scores for patients found in a PDMP is approximated as follows⁸:

- 78% score between 000 and 200
- 6.7% score between 200 and 299
- 5.3% score between 300 and 399
- 6.5% score between 400 and 499
- 3.4% score between 500 and 599
- ~1% score between 600 and 999

Note: *If one or more of these elements are not available for a patient, the Narx Scores are not calculated. Instead, “000” will be presented to prescribers and dispensers. This is not an indicator of the absence of exposure, but rather the absence of data necessary to deliver a score.*

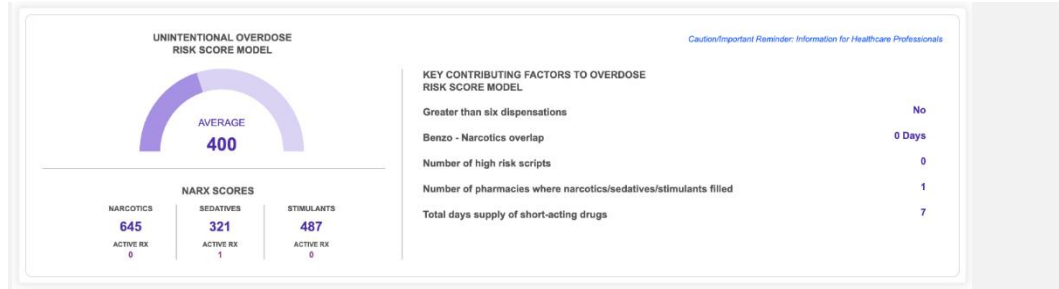
⁷ Hall AJ, Logan JE, Toblin RL, et al. Patterns of Abuse Among Unintentional Pharmaceutical Overdose Fatalities. *JAMA*. 2008;300(22): 2613–2620. doi:10.1001/jama.2008.802.

Yang Z, Wilsey B, Bohm M, et al. Defining Risk of Prescription Opioid Overdose: Pharmacy Shopping and Overlapping Prescriptions Among Long-Term Opioid Users in Medicaid. *The Journal of Pain*. 16(5): 445–453.

Paulozzi L, Kilbourne E, Shah N, et. al. A History of Being Prescribed Controlled Substances and Risk of Drug Overdose Death. *Pain Medicine*. 2012;13(1): 87–95. doi: 10.1111/j.1526-4637.2011.01260.x.

<https://www.ncbi.nlm.nih.gov/books/NBK458661/>

⁸ This distribution is based on data obtained from a single state between 2017 – 2023 and may vary slightly depending on a patient’s state of residence.



The Narx Scores were designed such that:

1. Patients who are exposed to small amounts of controlled substances with limited provider and pharmacy usage will have lower scores (e.g., scores below 199).
2. Patients who are exposed to large amounts of controlled substances in accordance with recommended guidelines⁹ (single provider, single pharmacy, etc.) will have mid-range scores (e.g., scores between 200 and 500).
3. Patients who are exposed to large amounts of controlled substances while using many prescribers and dispensers, and with frequently overlapping dispensations, will have higher scores (e.g., scores above 500).

5.3 Narx Score Algorithm

4.3.1 Relative Scoring

Narx Scores represent a relative scoring system for a specific patient’s exposure to a controlled substance compared to the rest of the patient’s home state PDMP population. The literature-based exposures listed above in the [Narx Scores Calculations & Metrics](#) section are quantified and then converted to a percentile ranked value, which ranges from 0–99. These percentile ranked values correlate with a percentile measurement of that exposure within the specified PDMP population for the four different, overlapping time periods.

A single point of measurement for total MME in the last 60 days can be used to illustrate this concept further using the following three patients:

• Patient A:	160 MME
• Patient B:	4,800 MME
• Patient C:	1,050 MME

If we were to place these three patients on a line representing relative exposure (e.g., based upon the presence of an increasing opioid dose), we could imagine a linear relationship based on MME, which could be depicted as follows:



⁹ <https://www.cdc.gov/mmwr/volumes/71/rr/rr7103a1.htm#Recommendation9>

This depiction has no boundaries to the left or right so these patients could also be drawn as follows:



The Narx Score algorithm establishes boundaries of exposure by converting all measured variables, such as 60-day MME, to a percentile ranked value between 0-99. This was done by evaluating each variable across each PDMP population and measuring the 60-day MME value for every patient with available data in the applicable PDMP.

This set of data was then used to create a reference table roughly equating to a percentile in the population. If we add the percentile rank to each example patient's 60-day MME, the result is:

	Raw Value	Percentile Rank
Patient A:	160 MME	20
Patient B:	4,800 MME	90
Patient C:	1,050 MME	65

If we apply these new percentile ranked values to our percentile-ranked diagram and create a left and right boundary of 0 and 99, the result is:



The percentile-ranked values indicate that Patient B and C are closer to each other than might otherwise be suspected. In this case, we can also say that Patient B has been dispensed more MME in the last 60 days than 90% of the rest of the PDMP population in the state where the patient resides.

4.3.2 Time Periods

The Narx Score algorithm evaluates a PDMP data record using four different, overlapping time periods. In each time period, the metric being evaluated is tabulated and then converted to a percentile-ranked value. These reference tables exist for all the metrics being evaluated and cover all four time periods. In general, as the raw value count (e.g., number of prescribers) increases, so does the percentile ranked value (up to 99 maximum). As the time period increases, the percentile ranked value decreases. Therefore, older dispensations contribute less to the score than more recent dispensations.

Example prescriber and dispenser reference tables are provided below.

Prescriber Count	2 mo Scaled	6 mo Scaled	1 yr Scaled	2 yr Scaled
0	0	0	0	0
1	19	12	8	6
2	36	22	16	11
3	51	32	23	16
4	64	41	30	21
5	75	49	37	26
6	85	57	43	30
#				

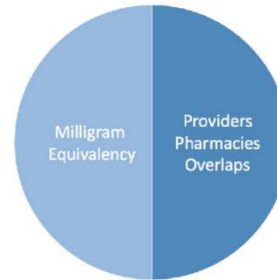
Pharmacy Count	2 mo Scaled	6 mo Scaled	1 yr Scaled	2 yr Scaled
0	0	0	0	0
1	25	16	13	10
2	45	31	25	19
3	63	44	35	27
4	78	56	45	35
5	90	67	54	42
6	99	76	62	49
#				

MME	2 mo Scaled	6 mo Scaled	1 yr Scaled	2 yr Scaled
0	0	0	0	0
1 - 20	4	6	8	10
21 - 40	8	10	15	18
41 - 50	10	12	18	21
51 - 90	20	22	24	27
91 - 120	23	24	27	30
120 or more	26	29	35	48

Overlap Days	2 mo Scaled	6 mo Scaled	1 yr Scaled	2 yr Scaled
0	0	0	0	0
1	3	2	1	1
2	6	4	3	2
3	9	5	4	3
4	11	7	6	4
5	14	9	7	5
6	16	10	8	6
#				

4.3.3 Weighting

A Narx Score is calculated as a weighted average of the percentile ranked values. A 50% weighting is applied to the milligram equivalencies with the remaining metrics making up the other 50%¹⁰.



This type of weighting results in several relationships. If we think of milligram equivalency as dispensation and the combination of prescribers, dispensers, and overlaps collectively as behaviors, we can create the following score categories.

	Dispensation	Behaviors	Narx Score
Patient A	Low	Low	Low
Patient B	Low	High	Mid
Patient C	High	Low	Mid
Patient D	High	High	High

It is important to understand that there are several different patterns that can result in the same score. Only by reviewing the actual PDMP data can the patterns that contributed to a specific patient's Narx Score be determined.

CAUTION / IMPORTANT REMINDER: Narx Scores can be used by prescribers and dispensers as indicators to guide further review of details in the patient's dispensation history while attending to their patients. Narx Scores are intended to inform medical decision-making and should not be used to replace prescribers' and dispensers' independent clinical judgment. None of the information presented should be used as sole justification for providing or not providing medications.

4.3.4 Score Computation

The following steps are involved in calculating a Narx Score:

1. Determine the raw values for all time periods for all variables.
2. Convert all raw values to percentile ranked values.
3. Average the percentile ranked values for each metric for all time periods.
4. Determine the weighted average.

Note: Dividing by the sum of the weights is necessary to normalize the weighted average. The weights used to calculate the average reflect the importance or significance of each

¹⁰ <https://www.ncbi.nlm.nih.gov/books/NBK45866/>

feature, but they may not necessarily add up to 1.0 or 100%. By dividing the sum of the weighted features by the sum of the weights, we are essentially calculating the weighted average as a percentage of the total weight. This normalization ensures that the resulting average is on a scale of 0 to 1, or 0% to 100%, which makes it easier to compare the average across different datasets or to interpret it in a meaningful way. Without normalization, the weighted average could be misleading, especially if the weights are not proportional to each other or if the sum of weights is significantly different from the expected value of 1.0 or 100%.

- Sum the number of active dispensations and then concatenate to the two-digit percentile score.

Using the sample patient for a hypothetical percentile ranked value to illustrate the calculation of a Narcotic score:

- Determine the raw values for all time periods for all variables.

	60 days	6 mos.	1 year	2 years
Prescribers	6	9	15	15
Pharmacies	4	4	6	6
MME	1640	5408	7358	7364
LME	0	0	0	0
Overlaps	17	55	65	65

- Convert all raw values to percentile ranked values.

	60 days	6 mos.	1 year	2 years
Prescribers	85	76	84	64
Pharmacies	78	56	62	49
MME	74	87	88	87
LME	0	0	0	0
Overlaps	41	70	64	52

- Average the percentile ranked value for each metric for all time periods.

	60 days	6 mos.	1 year	2 years	Avg
Prescribers	85	76	84	64	77
Pharmacies	78	56	62	49	61
MME	74	87	88	87	84
LME	0	0	0	0	0
Overlaps	41	70	64	52	57

- Calculate the weighted average.

	60 days	6 mos.	1 year	2 years	Avg	Wt.	
Prescribers	85	76	84	64	77	1	77
Pharmacies	78	56	62	49	61	1	61
MME	74	87	88	87	84	3	252
LME	0	0	0	0	0	1	0
Overlaps	41	70	64	52	56	2	114
Weighted Average (sum/8)							63

5. Sum the number of active prescriptions and then concatenate to the two-digit percentile score.

	60 days	6 mos.	1 year	2 years	Avg	Wt.		
Prescribers	85	76	84	64	77	1	77	
Pharmacies	78	56	62	49	61	1	61	
MME	74	87	88	87	84	3	252	
LME	0	0	0	0	0	1	0	
Overlaps	41	70	64	52	56	2	114	
Weighted Average (sum/8)								63
Number of Active Narcotic Prescriptions								2
Narcotic Score								632

4.3.5 General Considerations for Narx Scores

Just as there is no single blood pressure that can be considered normal for all people, there is no single Narx Score that is considered normal.

For example, a blood pressure of 120/80 can simultaneously be:

- Inappropriate for a 2-month-old infant
- Appropriate for a 20-year-old woman
- Inappropriate for an elderly patient with an average daily blood pressure of 200/100

Thus, a Narx Score must be evaluated by prescribers and dispensers in the context of the specific clinical scenario.

4.3.6 Example Use Cases¹¹

How Narx Scores, used in concert with additional information, can help to support discussions with patients:

- **Case A** – An 18-year-old male basketball player with no significant medical history presents with a severe ankle sprain. His Narx Scores are:

Narcotic	Sedative	Stimulant
000	000	000

Important consideration: If considered for a controlled substance due to the severity of injury, this may be the patient's first exposure to the effects of a controlled substance. Prescribers and dispensers would typically conduct a thorough review of the risks and benefits with the patient.

- **Case B** – An 81-year-old female presents with decreased level of consciousness following a fall where she suffered a closed head injury. Her Narx Scores are:

¹¹

[https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6917208/#:~:text=Similarly%2C%20the%20greatest%20share%20of,%E2%89%A565%20years%20\(34.6%25\)](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6917208/#:~:text=Similarly%2C%20the%20greatest%20share%20of,%E2%89%A565%20years%20(34.6%25))

Narcotic	Sedative	Stimulant
341	501	000

Important Consideration: Many elderly patients are on chronic opioids and benzodiazepines. The physician may want to consider whether this patient's use of opioids and benzodiazepines contributed to her fall. Alternatively, the physician may want to consider whether the patient may be taking too much medication and conduct additional investigation to determine whether the patient has developed anxiety seizures due to benzodiazepine withdrawal, complicating the patient's medical picture.

- **Case C** – A 36-year-old male patient with mild chronic back pain frequently treated with controlled substances presents for a medication refill. Upon review of the patient's PDMP record, the patient has been to 17 different prescribers in the last year. His Narx Scores are:

Narcotic	Sedative	Stimulant
671	240	000

Important Consideration: Many patients obtain medications through multiple different prescribers and dispensers. This can be due to the patient being seen in a clinic that is staffed by different prescribers and dispensers, or it can be due to access to care issues requiring visits to urgent care centers or emergency departments.

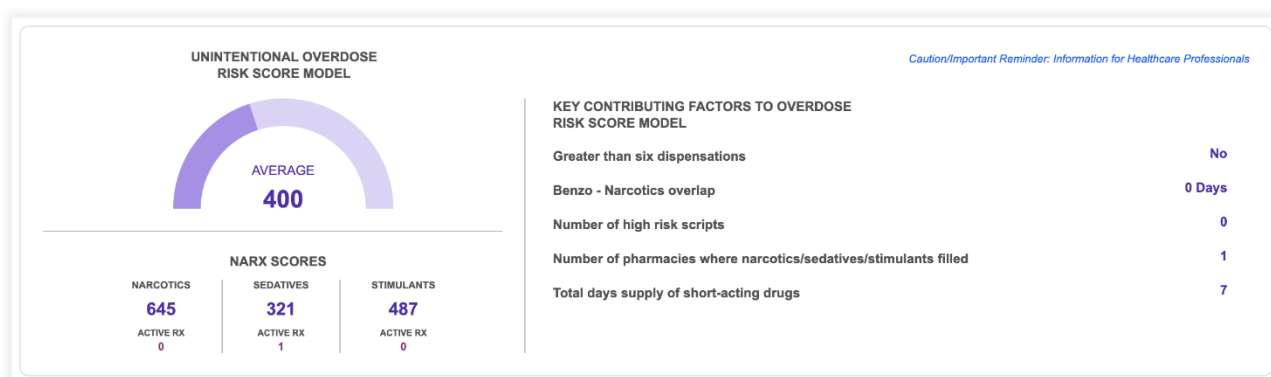
CAUTION / IMPORTANT REMINDER: Narx Scores can be used by prescribers and dispensers as indicators to guide further review of details in the patient's dispensation history while attending to their patients. Narx Scores are intended to inform medical decision-making and should not be used to replace prescribers' or dispensers' independent clinical judgment. None of the information presented should be used as sole justification for providing or not providing medications.

6 ORS

NarxCare also provides a relational summary score, called ORS, that is obtained from PDMP data. This three-digit score, ranging from 000 to 999, is derived from a logistic regression model that utilizes historical PDMP data to evaluate 10 different variables. ORS highlights key characteristics of a patient's dispensation history, gender, and age and makes a correlative assessment of an individual's exposure as compared to exposures of individuals who had an unintentional overdose death. With validated metrics demonstrating a precision of 73% and a recall of 75%, ORS helps promote patient safety and informed clinical decision making.

Note: ORS is referred to as the Overdose Risk Score in the current standard user interface tile, but users can anticipate updates to the tile.

Requesting systems receiving such data can choose to display ORS within their native electronic health record (EHR) or pharmacy management system. However, many systems choose to display ORS within NarxCare as tiles on the **Patient Report**.



4.4 ORS Intended Use

ORS was developed with a logistic regression model using PDMP data as an input and is intended to provide an indicator, along with other patient-centric metrics outlined below, for prescribers and dispensers to evaluate when making prescribing and dispensing decisions. ORS is intended to help enhance prescriber and dispenser awareness of potential patterns that may exist in their patient's PDMP data that may have similarities with other patients who have died from an unintentional overdose. Furthermore, ORS has [Key Contributing Factors](#) pertinent to a patient's score that are presented to prescribers and dispensers to further assist in their medical decision making.

ORS does not predict whether a patient will experience an unintentional overdose death now, or in the future, but rather provides a score and highlights characteristics of a patient and the patient's dispensation history that correlate with characteristics of individuals who experienced an unintentional overdose death. The ORS numeric value represents a measure of correlation or association between the dataset used to develop the ORS model and the characteristics of a patient and the patient's dispensation history identified in PDMP data.

Note: ORS is meant to aid in independent clinical decision-making by prescribers and dispensers and is not intended for use by law enforcement agencies or activities, or any other uses.

4.5 ORS Algorithm Development

The ORS algorithm was derived using a common machine learning model (i.e., logistic regression) with a case-control study design. The model was originally trained using data obtained from over 5,000 autopsy adjudicated unintentional overdose deaths, which were age- and gender-matched to 500,000 patients using prescribed controlled substances during the same time frame who did not experience an overdose death.

The training dataset was acquired from a state in the Midwest and spanned the years from 2013 to 2016. It included cases from both males (68%) and females (32%), with ages from 18 to 85, from both urban (94.38%) and rural (5.2%) demographics.

The training dataset produced the following validation statistics, odds ratios and score distribution.

4.5.1 Validation Statistics

- Precision (i.e., positive predictive value/true positive rate): 77%
- Recall (i.e., sensitivity): 71%
- Specificity (i.e., true negativity rate): 79%
- Negative predictive value: 73%

4.5.2 Odds Ratios

ORS	Number of Decedents	Number of Non-Decedents	Odds Ratio of Unintentional Overdose Death	Odds Ratio 95% Confidence Interval
000-199	100	170,501	1	ref
200-299	337	110,968	5.2	4.2-6.5
300-399	1,646	195,920	14.3	11.6-17.6
400-499	1,340	34,924	64.3	53.6-80.7
500-599	1,057	9,865	182.4	149.3-226.4
600-699	543	2,492	370.9	299.9-466.9
700-799	182	492	629.5	486.7-831.4
800-999	42	85	841.3	549.9-1,258.4

4.5.3 Score Distributions

- 000 – 199: 32.2%
- 200 – 299: 21%
- 300 – 399: 37.2%
- 400 – 499: 6.8%

- 500 – 599: 2.1%
- 600 – 999: 0.7%

4.6 Additional External Validation

Additional validation of the model has been completed using decedent data from a different state than the training data state. The additional validation dataset spanned the years from 2017 to 2023 and contained ~ 400 decedents and ~ 32,000 non-decedents¹² whose patient attributes were similar to those in the original training dataset. The validation data is a meaningfully smaller dataset, which can have a significant impact on the results in ORS bands with a small number of decedents. Thus, the smaller sample size resulted in a very small number of patients with a score \geq 500.

The additional validation dataset produced the following validation statistics, odds ratios and score distribution.

4.6.1 Validation Statistics

- Precision (i.e., positive predictive value/true positive rate): 73%
- Recall (i.e., sensitivity): 75%
- Specificity (i.e., true negativity rate): 73%
- Negative predictive value: 74%

4.6.2 Odds Ratios

Note: Numbers in each score category in the table below have been rounded to preserve the anonymity of the validation dataset and maintain the original odds ratios.

ORS	Number of Decedents	Number of Non-Decedents	Odds Ratio of Unintentional Overdose Death	Odds Ratio 95% Confidence Interval
000-199	20	5,500	1	ref
200-299	80	5,700	3.8	2.4-6.5
300-399	180	13,100	3.8	2.4-6.2
400-499	90	5,200	4.7	2.9-7.9
500-999	30	1,700	4.8	2.8-8.7

4.6.3 Score Distribution

- 000 – 199: 17.5%
- 200 – 299: 18.3%

¹² Rounded to the nearest 100

- 300 – 399: 42%
- 400 – 499: 16.7%
- 500 – 999: 5.5%

4.7 ORS Data Inputs

Data quality of ORS data inputs is maintained by having the PDMP data renormalized with the most up-to-date source data. ORS inputs the most current information available from the PDMP. Data quality is maintained by re-running a number of fields against the source files. To create labels for the training and validation data, decedent records were matched to PDMP data using a proprietary patient name matching system that connects dispensation records to each deceased patient.

The accuracy of any model is impacted by the data input. In the case of ORS, the data is pulled from government managed and regulated PDMPs. Therefore, the data inputs for ORS are the same as those a user can access by reviewing the details in the PDMP report. The data used in ORS is matched to the patient using the same processes employed throughout NarxCare.

The data inputs into the ORS algorithm are listed below and are all obtained from PDMP data. All data inputs are required for analysis, and are listed in order of their weighted relevance, with the top two having the highest relevance at approximately 49% total and the last three weighted less than 1% each.

Note: Each of the data inputs in the following table are based on literature as referenced in the footnotes section of this document.

	Key Contributing Factors	Weighted Relevance
1	History of Medication for Opioid Use Disorder (MOUDs) use (excluding Buprenorphine formulations for pain management) ¹³ ¹⁴	30.41%
2	Number of high-risk dispensations in the most recent year ¹⁵ <ol style="list-style-type: none"> Any OxyContin dispensation Fentanyl patches Methadone (if reported to PDMP) Buprenorphine (including dispensations for pain management)¹⁶ Morphine (i.e., extended-release formulations) Any opioid dispensation with a daily MME > 120 	18.92%
3	Male gender, as most frequently reported by pharmacies ¹⁷	15.82%
4	Number of pharmacies where opioids/sedatives were filled in the	10.10%

¹³ Designation made by the FDA

¹⁴ Williams AR, Samples H, Crystal S, Olfon M. Acute care, prescription opioid use, and overdose following discontinuation of long-term Buprenorphine treatment for opioid use disorder. *Am J Psychiatry*, 2019; 177(2): 117-24.

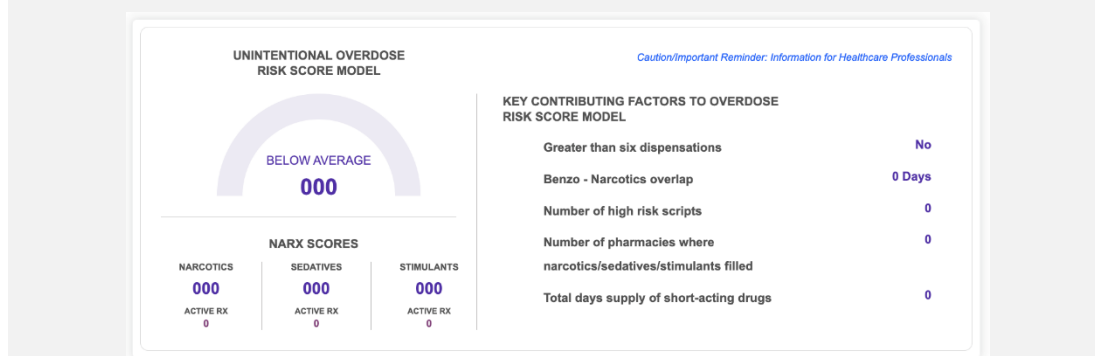
¹⁵ National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Health Sciences Policy; Committee on Pain Management and Regulatory Strategies to Address Prescription Opioid Abuse; Phillips JK, Ford MA, Bonnie RJ, editors. *Pain Management and the Opioid Epidemic: Balancing Societal and Individual Benefits and Risks of Prescription Opioid Use*. Washington (DC): National Academies Press (US); 2017 Jul 13.4. Trends in Opioid Use, Harms, and Treatment.

¹⁶ Designation made by the FDA

¹⁷ National Institute on Drug Abuse. Overdose Death Rates. National Institute on Drug Abuse. Published February 9, 2023. <https://nida.nih.gov/research-topics/trends-statistics/overdose-death-rates>

	most recent year ¹⁸	
5	Age, weighted based on age range most frequently reported by pharmacies ^{19,20}	<1 to 6.28%
6	Number of overlapping opioid/sedative dispensations in the most recent year ²¹	6.05%
7	Greater than 6 opioid dispensations in the most recent year ²²	4.92%
8	Number of overlapping opioid/benzodiazepine dispensations in the most recent year ²³	<1%
9	Total day's supply of short-acting opioid dispensations in the most recent year ²⁴	<1%
10	Pattern of chronic opioid use (negative association) ²⁵	<1%

Note: If one or more of these elements are not available for a patient, the ORS score is not calculated. Instead, a “000” score will be presented to prescribers and dispensers. This is not an indicator of the absence of correlation/association, but rather the absence of data necessary to deliver a score. Furthermore, stimulants are not included within the inputs.



¹⁸ Chua K, Brummet CM, Ng S, Bohnert ASB. Associate Between Receipt of Overlapping Opioid and Benzodiazepine Prescriptions From Multiple Prescribers and Overdose Risk. *JAMA Netw Open*. 2021;4(8):e2120353. doi:10.1001/jamanetworkopen.2021.20353

¹⁹ Products – Data Briefs – Number 457 – December 2022. www.cdc.gov Published December 21, 2022.

<https://www.cdc.gov/nchs/products/databriefs/db457.htm#:~:text=In%202020%20and%202021%2C%20rates%20were%20highest%20for%20adults>

²⁰ The weightings for age range follows an inverted u-shaped curve, where the lowest weighting is for the youngest and oldest age groups and highest weighting is for the middle age groups.

²¹ Cho J, Spence MM, Niu F, Hui RL, Gray P, Steinberg S. Risk of Overdose with Exposure to Prescription Opioids, Benzodiazepines, and Non-Benzodiazepine Sedative-Hypnotics in Adults: a Retrospective Cohort Study. *J Gen Intern Med*. 2020 Mar;35(3):696-703. doi: 10.1007/s11606-019-05545-y. Epub 2020 Jan 9. PMID: 31919729; PMCID: PMC7080944.

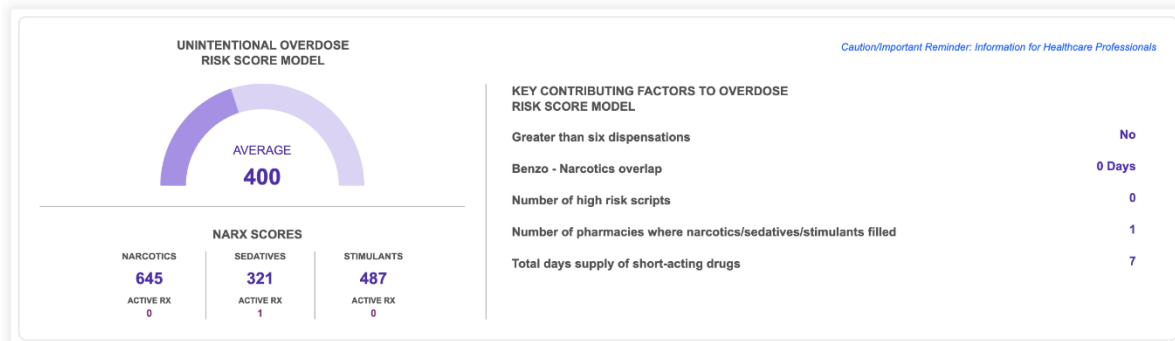
²² Deyo, R.A., Hallvik, S.E., Hildebran, C. et al. Association Between Initial Opioid Prescribing Patterns and Subsequent Long-Term Use Among Opioid-Naïve Patients: A Statewide Retrospective Cohort Study. *J GEN INTERN MED* 32, 21-27 (2017). <https://doi.org/10.1007/s11606-016-3810-3>

²³ Sun E C, Dixit A, Humphreys K, Darnall B D, Baker L C, Mackey S, et al. Association between concurrent use of prescription opioids and benzodiazepines and overdose: retrospective analysis *BMJ* 2017; 356:j760 doi:10.1136/bmj.j760

²⁴ Shah A, Hayes CJ, Martin BC. Characteristics of Initial Prescription Episodes and Likelihood of Long-Term Opioid Use – United States, 2006-2015. *MMWR Morb Mortal Wkly Rep* 2017;66:265-269. DOI: http://dx.doi.org/10.15585/mmwr.mm6610a1external_icon

²⁵ Busse JW, Craigie S, Juurlink DN, Buckley DN, Wang L, Couban RJ, Agoritsas T, Akl EA, Carrasco-Labra A, Cooper L, Cull C, da Costa BR, Frank JW, Grant G, Iorio A, Persuad N, Stern S, Tugwell P, Vandvik PO, Guyatt GH. Guideline for opioid therapy and chronic noncancer pain. *CMAJ*. 2017 May 8;189(18):E659-E666. doi: 10.1503/cmaj.170363. PMID: 28483845; PMCID: PMC5422149.

6.1 Key Contributing Factors



Note: The arc displayed above ORS is a visual indication of where the patient’s score falls on the 000-999 scale. The arc can be used by prescribers and dispensers as an indicator to guide further review of details in the patient’s dispensation history while attending to their patients. It should not be used as sole justification for providing or not providing medications.

Key Contributing Factors Displayed in the Standard User Interface ORS Tile	
History of MOUD use (excluding Buprenorphine dispensations for pain management ²⁶) (please refer to # 1 in the Data Inputs section of this document for additional information)	Displays a “yes” or “no” answer (e.g., “yes” if there is a history of MOUD use (excluding Buprenorphine dispensations for pain management) in the most recent year)
Number of high-risk dispensations in most recent year (please refer to #2 in the Data Inputs section of this document for additional information)	Displays a count of high-risk dispensations in the most recent year
Demographics (please refer to #3 and #5 in the Data Inputs section of this document for additional information)	Displays the patient’s most frequently reported age range, as well as the patient’s most frequently reported gender, as reported by pharmacies.
Number of pharmacies where narcotics/sedatives were filled in most recent year (please refer to #4 in the Data Inputs section of this document for additional information)	Displays a count of pharmacies in the most recent year
Benzo – Narcotics overlap (please refer to #8 in the Data Inputs section of this document for additional information)	Displays as “X” days of overlapping dispensations in the most recent year

²⁶ Designation made by the FDA

The “below average,” “average”, and “above average” text indicator for ORS within the tile is based on the distribution of scores obtained from a large PDMP patient population from a Mid-Atlantic state in 2020/2021 (i.e., the reference PDMP population) consisting of ~3 million patients with the following demographics:

Age	
Female	58.42%
Male	40.9%
Unknown	0.67%

Age Group	
0-18	4.74%
19-24	3.04%
25-34	7.67%
35-44	13.84%
45-54	15.58%
55-64	20.06%
65-74	18.6%
75+	16.46%

The below and above average thresholds currently represent the scores at the 25th and 75th percentiles from the reference PDMP population. For example, if a patient’s score is less than the score at the 25th percentile from the reference PDMP population, it is categorized as below average. If a patient’s score is greater than the score at the 75th percentile from the reference PDMP population, it is categorized as above average.

CAUTION / IMPORTANT REMINDER: ORS can be used by prescribers and dispensers as an indicator to guide further review of details in the patient’s dispensation history while attending to their patients. ORS is intended to inform medical decision-making and should not be used to replace prescribers’ and dispensers’ independent clinical judgment. Other patient-centric factors, such as mental health conditions (e.g., depression, anxiety, bipolar disorder, dementia), substance use conditions, respiratory conditions, hepatic and renal conditions, and history of overdose, may influence unintentional overdose death but are not incorporated in the PDMP data used to calculate the ORS. ORS does not provide a specific preventive, diagnostic, or treatment output or directive, is not intended to support time-critical decision-making, and should not be used as sole justification for providing or not providing medications.

6.2 Understanding ORS Inputs

The ORS model, used in concert with additional information, can help support discussions with patients. For example:

- **Case A:** A 33-year-old male with four benzodiazepine dispensations in the most recent two years displays an ORS of 380. Why is this patient's score higher than prescribers and dispensers may have expected?

Important Considerations: The ORS model is a logistic regression model that uses as inputs several PDMP-derived factors for which there is literature support for unintentional overdose death among individuals in our training data sets. It is intended to provide an indicator, along with other patient-centric factors outlined below, of the correlation of the characteristics of this patient and this patient's dispensation history to the characteristics of patients who experienced an unintentional overdose death. Below are the factors that are specific to this patient's score, along with their relative contribution to the overall score:

- Age: 33 (6.28%) *
- Male gender, as reported by pharmacies (15.82%) **
- Number of pharmacies visited: 2 (10.10%)

- **Case B:** A 56-year-old male with one testosterone dispensation in the most recent year displays an ORS of 320. Why is this patient's score higher than prescribers and dispensers may have expected?

Important consideration:

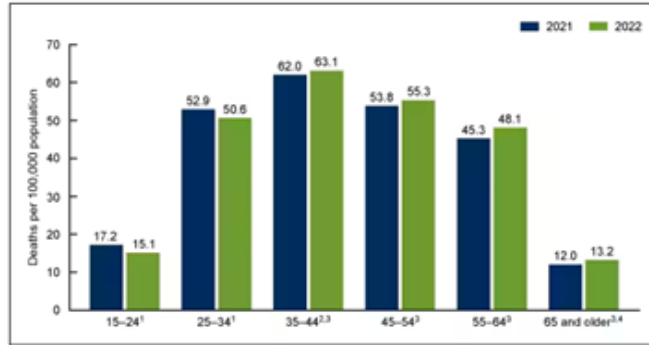
The ORS model is a logistic regression model that uses as inputs several PDMP-derived factors for which there is literature support for unintentional overdose death among individuals in our training data sets. It is intended to provide an indicator, along with other patient-centric factors outlined below, of the correlation of the characteristics of this patient and this patient's dispensation history to the characteristics of patients who experienced an unintentional overdose death. Below are the factors that are specific to this patient's score, along with their relative contribution to the overall score:

- Age: (6.28%) *
- Male gender, as reported by pharmacies (15.82%) **

* The weights for age groups in our training data, as well as what has been reported in the literature in terms of association with rate of overdose deaths (Figure 2 below), follow an inverted U-shaped curve. The derived weights in the ORS model for patients in the middle age group are the highest, which aligns with what has been reported in the literature.

** The weights for gender in our training data, as well as what has been reported in the literature in terms of association with rate of overdose deaths (Figure 3 below) are higher for males compared to females.

Figure 2. Rate of drug overdose deaths, by selected age groups 15 and older: United States, 2021 and 2022



¹Rate in 2022 significantly lower than the rate in 2021, $p < 0.05$.

²Group with highest rate in 2021 and 2022, $p < 0.05$.

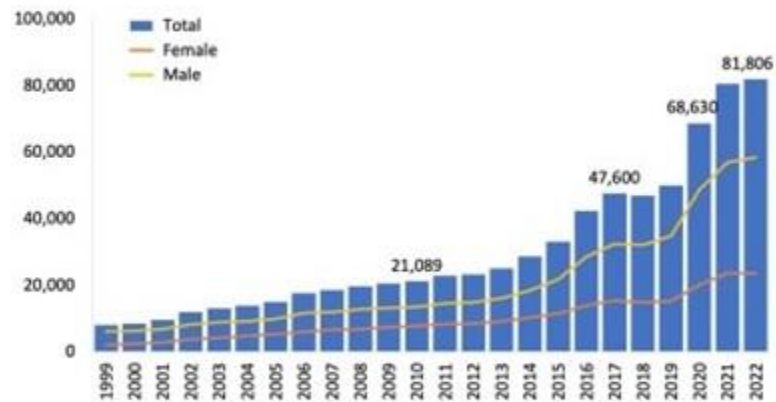
³Rate in 2022 significantly higher than the rate in 2021, $p < 0.05$.

⁴Age group with lowest rate in 2021 and 2022, $p < 0.05$.

NOTES: Drug overdose deaths were identified using *International Classification of Diseases, 10th Revision* underlying cause-of-death codes X40–X44, X60–X64, X85, and Y10–Y14. [Access data table for Figure 2](#).

SOURCE: National Center for Health Statistics, National Vital Statistics System, mortality data file.

Figure 3. National Overdose Deaths Involving Any Opioid*, Number Among All Ages, by Sex, 1999-2022



*Among deaths with drug overdose as the underlying cause, the "any opioid" subcategory was determined by the following ICD-10 multiple cause-of-death codes: natural and semi-synthetic opioids [T40.2], methadone [T40.3], other synthetic opioids (other than methadone) [T40.4], or heroin [T40.1]. Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2022 on CDC WONDER Online Database, released 4/2024.

4.8 Additional Information on the ORS Model

The ORS algorithm incorporates only data that is available in the PDMP. This aligns the clinical application of the index with other indicators based on PDMP data such as number of pharmacies visited in the last 90 days or daily morphine equivalent dose (MED).

CAUTION / IMPORTANT REMINDER: *ORS can be used by prescribers and dispensers as an indicator to guide further review of details in the patient's dispensation history while attending to their patients. ORS is intended to inform medical decision-making and should not be used to replace prescribers' and dispensers' independent clinical judgment. Other patient-centric factors, such as mental health conditions (e.g., depression, anxiety, bipolar disorder, dementia), substance use conditions, respiratory conditions, hepatic and renal conditions, and history of overdose, may influence unintentional overdose death but are not incorporated in the PDMP data used to calculate the ORS. ORS does not provide a specific preventive, diagnostic, or treatment output or directive, is not intended to support time-critical decision-making, and should not be used as sole justification for providing or not providing medications.*

5 Document Information

5.3 Disclaimer

Bamboo Health has made every effort to ensure the accuracy of the information in this document at the time of printing, However, information is subject to change.

5.4 Change Log

Version	Date	Chapter/Section	Change Made
1.0	09/14/2023	N/A	N/A; initial publication
1.1	12/19/2023	NarxScores Calculations and Metrics	Updated timeframe for metric tallying and the initial description of the metrics that are used for Narx Scores calculations
		General	Updated overview to reflect the newest ORS model
2.0	11/15/2024	General	Updated document to reflect new branding guidelines
		State Indicators	Updated section to include information on Custom State Indicators
		General	Updated disclaimers
		Understanding ORS Inputs	Added new section
		Narx Scores/Time Periods	Updated tables
		General	Updated images to be consistent with UI
		Rx Graph	Created new section for Rx Graph