Bamboo Health

NarxCare®

NarxCare Application Overview

September 2023
Version 1.0

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NarxCare Application

Introduction to NarxCare

NarxCare is an application that provides a set of tools to support clinicians' analysis of controlled substance data from government managed and regulated Prescription Drug Monitoring Programs (PDMPs)[1].

Informed prescribing practices must be part of a multi-dimensional response to the ongoing opioid epidemic. The NarxCare application automatically analyzes PDMP data and delivers scores and visualizations of usage patterns based on the data, to further enable informed prescribing and dispensing practices. The NarxCare application is user-friendly, easily integrated into a patient's electronic medical record, and interoperable with other PDMPs. This document provides an overview of the NarxCare application and a breakdown of the report and analytics tools.

Why NarxCare?

NarxCare offers a representation of PDMP data in an interactive format to help clinicians[2], and care teams quickly and easily access and interpret data to aid in their controlled substance[3] therapy management.

With the NarxCare application, healthcare providers have access to all the features and functions of NarxCare enabled by their PDMP Administrator with a consistent look and feel for all users who access the solution. Furthermore, NarxCare delivery is enabled within Electronic Health Records (EHR) and Pharmacy Management Systems for those prescribers and dispensers who choose to access NarxCare through integration within their healthcare IT system.

How Does NarxCare Work?

NarxCare aggregates historical and active PDMP data and presents color-coded, interactive, visual representations of the PDMP data. In addition, NarxCare has **Other Tools/Metrics** that contain a **Resources** dropdown menu where you can find Medications for Opioid Use Disorder (MOUDs) providers and CDC educational resources. These resources can be used by clinicians as an aid to help patients.

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[1] 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.
[2] When used in this document, the term "clinician" refers to any prescriber or dispenser authorized user.
[3] 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.

Who Has Access to NarxCare?

NarxCare is available to all authorized end users, whether they are accessing NarxCare via the web portal, an integrated EHR system, or pharmacy software.

How is NarxCare Used in Therapy Management?

The information provided in NarxCare is intended to support clinicians' controlled substance therapy management activities. For example, with respect to information provided in NarxCare that indicates increased overdose risk potential, the information may be helpful in prompting consideration of strategies to mitigate risk of an overdose, if warranted, based on the specific patient context and the clinician's professional judgement. However, none of the information presented should be used as sole justification for providing or refusing to provide medications.

NarxCare Layout

The NarxCare application displays PDMP data in the form of tiles. The following layout provides common tiles you may see in your interface.

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		Opioids* (excluding Buprenorphine)		Buprenorphine*	
Total Prescriptions	59	Current Qty	6	Current Qty	20
Total Private Pay	3	Current MME/day	15.00	Current mg/day	20.10
Total Prescribers	16	30 Day Avg MME/day	11.07	30 Day Avg mg/day	26.42
Total Pharmacies	12				

RX Summary Expanded

RX Summary Expanded

Narcotics (excluding Buprenorphine)		Buprenorphine		Sedatives		Stimulants	
30 Day Avg. MME	11.07	30 Day Avg. mg/day	20.00	30 Day Avg. LME	0.59	30 Day Avg. mg/day	0.00
90 Day Avg. MME	26.43	90 Day Avg. mg/day	20.57	90 Day Avg. LME	0.51	90 Day Avg. mg/day	0.00
Rx Count/12 Months	8	Rx Count/12 Months	13	Rx Count/12 Months	12	Rx Count/12 Months	0
Prescriber #/6 Months	5	Prescriber #/6 Months	2	Prescriber #/6 Months	4	Prescriber #/6 Months	0
Pharmacy #/6 Months	7	Pharmacy #/6 Months	5	Pharmacy #/6 Months	5	Pharmacy #/6 Months	0
Current Quantity	0	Current Quantity	90	Current Quantity	6	Current Quantity	0

Prescriptions

Prescriptions

Total: 61 | Private Pay: 3

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Filled	Written	ID	Drug	QTY	Days	Prescriber	RX #	Dispenser	Refill	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	Comm 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	Comm Ins	IN
01/10/2023	11/10/2022	6	Clonazepam 0.25 MG Odt	30	30	Prescriber 1	3153834	Pharm 11	0	0.50 LME	Comm Ins	IN
12/28/2022	12/28/2022	2	Hydrocodone-Acetamin 5-325 MG	6	2	Prescriber 1	0700920	Pharm 4	0	15.00 MME	Medicare	IN
12/21/2022	12/21/2022	6	Hydrocodone-Acetamin 5-325 MG	10	7	Prescriber 1	1274701	Pharm 1	0	7.14 MME	Comm Ins	IN
12/16/2022	12/12/2022	2	Suboxone 8 MG SL Film	60	30	Prescriber 1	3136764	Pharm 7	0	16.00 MG	Comm Ins	IN
12/14/2022	11/10/2022	2	Clonazepam 0.25 MG Odt	30	30	Prescriber 1	3136749	Pharm 1	0	0.50 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	2105960	Pharm 8	0	60.00 MME	Comm 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 Odt	30	30	Prescriber 1	3120666	Pharm 1	0	0.50 LME	Medicare	IN
10/20/2022	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	06/15/2022	2	Clonazepam 0.25 MG Odt	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
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

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Providers

Providers

Total: 17

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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	40907	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

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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 displayed to you may vary from the above layout depending on the configurations established by your PDMP administrator. For example, the PDMP administrator may request additional tiles for display in the interface for their PDMP that are not displayed in the above layout.*

An overview of each tile can be found in the NarxCare Overview section of this document.

CAUTION/IMPORTANT REMINDER: NarxCare is intended to aid, not replace, medical decision-making. None of the information presented should be used as sole justification for providing or refusing to provide medications.
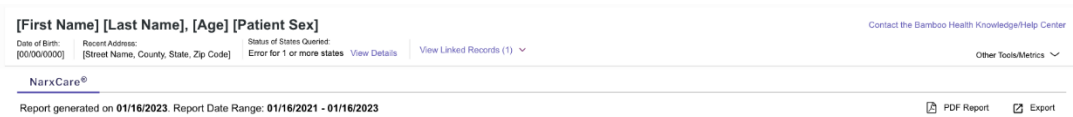
NarxCare Overview

NarxCare was designed to provide an intuitive view of dispensing information for a patient. This information is presented as tiles, 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 list of tiles described below is not comprehensive. This is a list of the most commonly activated tiles by PDMP administrators. You may not see all of the tiles described below and you may see additional tiles in your layout that are not described below. The tiles displayed to you are configured by your PDMP administrator.*

Header and Patient Identifying Information

The NarxCare 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 various tiles.

You can click **View Linked Records** to display all records linked to the selected patient.

Prescription Detail

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 pharmacy to view additional information, such as the prescriber or pharmacy's full name, address, and DEA number.

Prescriptions

Total: 61 | Private Pay: 3

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Filled ⌄	Written ⌃	ID ⌃	Drug ⌃	QTY ⌃	Days ⌃	Prescriber ⌃	RX # ⌃	Dispenser ⌃	Refill ⌃	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	Comm 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	Comm Ins	IN
01/10/2023	11/10/2022	6	Clonazepam 0.25 MG Odt	30	30	Prescriber 1	3153834	Pharm 11	0	0.50 LME	Comm Ins	IN
12/28/2022	12/28/2022	2	Hydrocodone-Acetamin 5-325 MG	6	2	Prescriber 1	0700920	Pharm 4	0	15.00 MME	Medicare	IN
12/21/2022	12/21/2022	6	Hydrocodone-Acetamin 5-325 MG	10	7	Prescriber 1	1274701	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	16.00 MG	Comm Ins	IN
12/14/2022	11/10/2022	2	Clonazepam 0.25 MG Odt	30	30	Prescriber 1	3136749	Pharm 1	0	0.50 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	2105980	Pharm 8	0	60.00 MME	Comm 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 Odt	30	30	Prescriber 1	3120666	Pharm 1	0	0.50 LME	Medicare	IN
10/20/2022	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	06/15/2022	2	Clonazepam 0.25 MG Odt	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 1	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

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Provider and Pharmacy Detail

Provider and pharmacy information, including full name, address, and DEA number (if applicable), is presented in the **Providers** and **Pharmacies** tiles.

Providers

Total: 17

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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
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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

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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	
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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	

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Rx Graph

The **Rx Graph** tile displays prescribing information and allows you to see important patterns and levels of use. The **Rx Graph** displays information in reverse chronological order; meaning the most recent prescriptions are displayed on the left side of the graph and the oldest are displayed on the right.
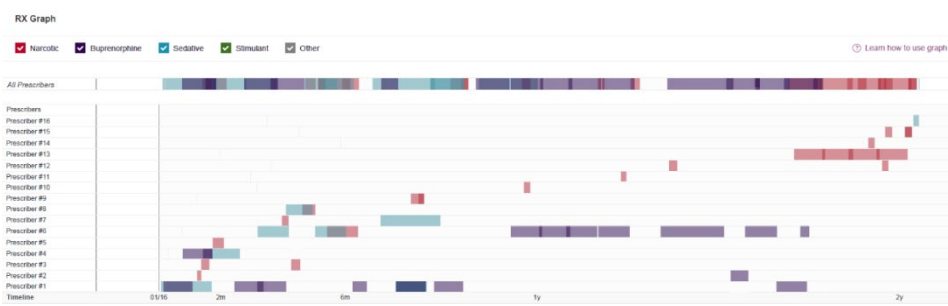
Prescriptions are color coded and can be selected or deselected at the top of the graph.

Color coding is as follows:

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

> *Note:* Other prescriptions can include anesthetics, cannabinoids, GI narcotics, steroids, and medications used to treat neuropain (e.g., gabapentin).

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

The **Rx Graph** is interactive. You can click on a prescription to view information for that prescription, or you can click and drag over multiple prescriptions to view information for the selected prescriptions.
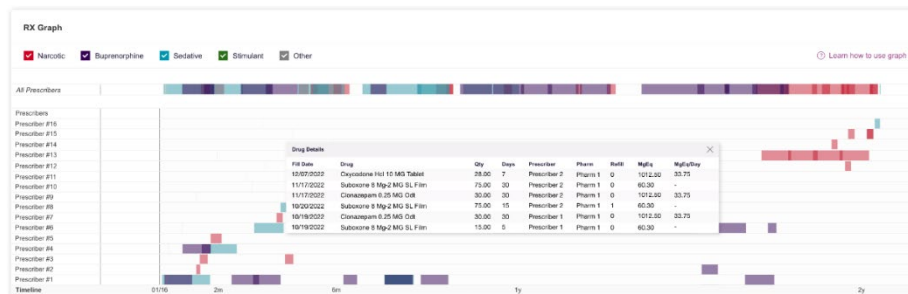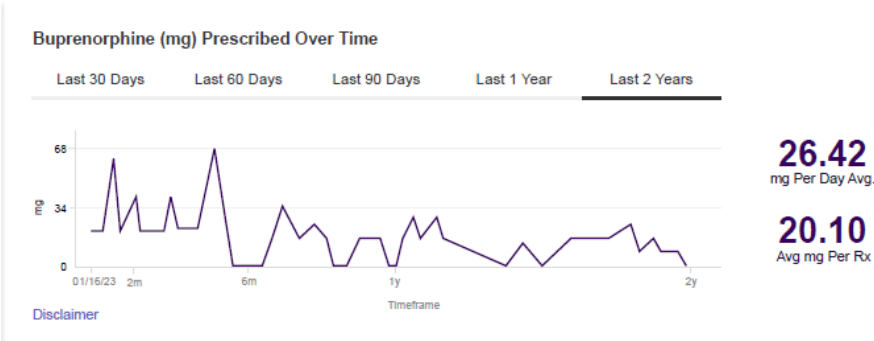

Other graphs

If configured by your PDMP administrator, the **Rx Summary and Rx Summary Expanded** tiles may also be included in your NarxCare interface. The **Rx Summary** tile includes:
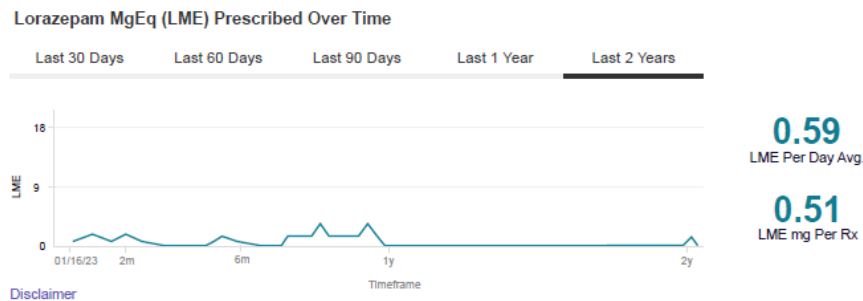
- **Morphine Milligram Equivalent Prescribed Over Time**

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

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

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 prescriptions. Clinicians can review detailed information on the prescriptions 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.

Note: You can hover over the timeline in any of these graphs to display information for a specific day.
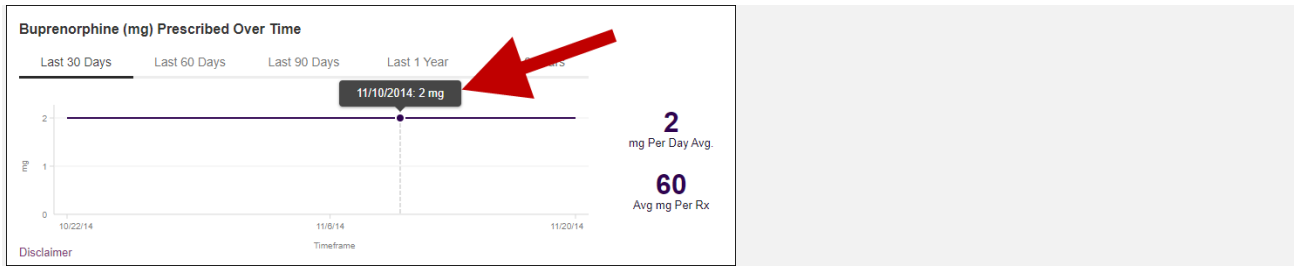
Download Options
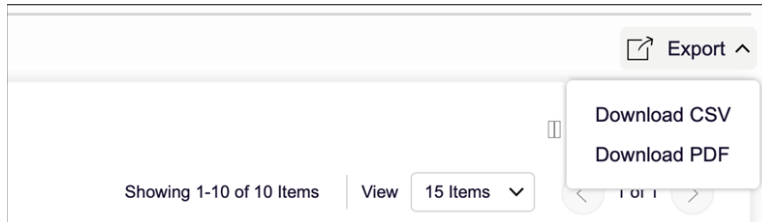
If you need to download a PDF or CSV version of the report, click the **Export** dropdown menu, then click **Download PDF** or **Download CSV**.

Other Tools/Metrics

To view **Other Tools/Metrics** available to you, click on the dropdown menu located on the top right-hand side of the page to display your additional options.

Resources

The **Resources** dropdown menu contains easy access links to *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

40212

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.*
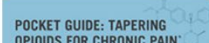
PDMP & CDC Resources

The **State & CDC Resources** pop-up window provides a series of PDMP & CDC documents pertaining to both providers and patients.

Note: *Your PDMP may not have additional resources available under the* **Resources** *link as this is a supplemental feature. Please contact your 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.

What You Need to Know	Opioids and Chronic Pain	Pregnancy and Opioids
Prescription Opioids: What You Need to Know (PDF)	Promoting Safer and More Effective Pain Management (PDF)	Pregnancy and Opioids Pain Management (PDF)
Pocket Guide: Tapering	**Fact Sheet**	**Checklist ***

To assist providers in educating their patients, printable pamphlets are also available from the CDC. In addition to CDC-provided resources, and in coordination with the *Bureau of Substance Addiction Services (BSAS)*, specific resources, as selected by the applicable PDMP administrator, are also available. More information about CDC resources can be found here.

Indicators and Scores

The NarxCare application includes a series of indicators and scores that may be automatically returned to the requesting system as discrete data. The indicators displayed will either be **Additional Indicators** or **Additional State Indicators**. Additional Indicators are the default indicators returned. These are replaced by Additional <u>State</u> Indicators if Additional State Indicators are configured by the applicable PDMP administrator. The scores returned are **Narx Scores** and **Overdose Risk Scores**. Requesting systems receiving such data can choose to display it within the native electronic health record (EHR) or pharmacy management system. However, many systems choose to display the data within the NarxCare application as tiles.

For additional information on Narx Scores and Overdose Risk Scores, please refer to the <u>Narx Scores</u> and <u>Overdose Risk Scores</u> respective sections in this document.
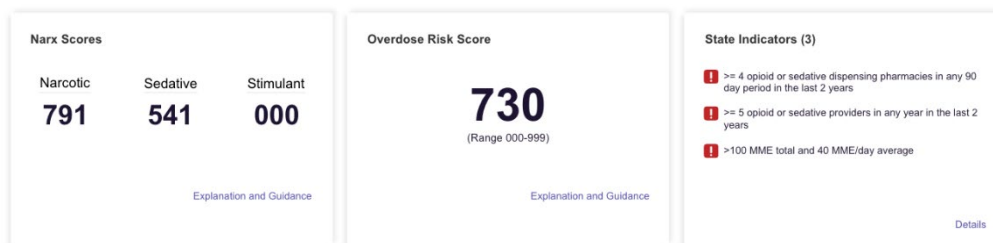
Additional Indicators

Additional Indicators will display automatically. This type of indicator is not configured by PDMP administrators. The **Additional Indicators** tile includes a set of three binary indicators formed from data aggregated from the PDMP.
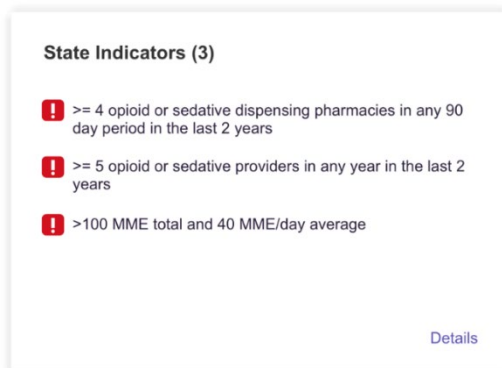
There are currently three standard **Additional Indicators**:

- More than 5 controlled substance providers in any 365-day period
- More than 4 pharmacies that dispense controlled substances in any 90-day period
- More than 40 MME average over the previous 2 years and having total prescription(s) for more than 100 MME at any time during the previous 2 years

These indicators are based on the following literature:

- **Provider Indicator:** 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.

- **Pharmacy Indicator:** 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.

- **40 MME Indicator:** 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.

*CAUTION / IMPORTANT REMINDER: Clinicians use standard PDMP-based **Additional Indicators** to further review details in the patient's prescription history while attending to their patients. **Additional Indicators** are intended to aid, not replace, medical decision-making. None of the information presented should be used as sole justification for providing or refusing to provide medications.*

Additional State Indicators

The **Additional State Indicators** feature delivers configurable indicators to clinicians to identify when patients meet or exceed PDMP-specified thresholds. These indicators are configured by PDMP administrators.

The list below outlines the most common configurable indicators PDMP administrators typically choose to enable for display in the NarxCare application under the **Additional State Indicators** section.

Additional State Indicator	Description
Prescriber & Dispenser Thresholds	Displays when the number of prescribers and dispensers specified by your PDMP Administrator is met or exceeded within a set time period.
Daily Active MME Threshold	Displays when the daily active morphine milligram equivalent (MME) is greater than or equal to the value specified by your PDMP Administrator.
Opioid & Benzodiazepine Threshold	Displays when opioids and benzodiazepines are prescribed within the time period set by your PDMP Administrator.
Daily Active Methadone Threshold	Displays when the daily active MME for methadone is greater than or equal to the value specified by your PDMP Administrator.
Opioid Consecutive Days Threshold	Displays when opioids have been received daily for longer than the time period set by your PDMP Administrator.

Note:

- *The **Additional State Indicators** available to you, and the thresholds associated with them, are configured by your PDMP administrator. PDMPs can submit a request for additional indicator types (e.g., death data) that are felt to espouse high correlations with adverse patient outcomes and are relevant to their jurisdiction's population. These additional indicators do not impact Narx Scores or Overdose Risk Scores.*

- *If any of the configurable **Additional State Indicators** are not activated by your PDMP administrator, the standard PDMP-based **Additional Indicators** tile will display. For additional information on the standard Additional Indicators tile, please refer to the [Additional Indicators](#) section of this document.*

You can view a detailed description of the **Additional State Indicators** displayed by clicking the **Details** link located at the bottom right-hand corner of the **Additional State Indicators** tile. Once you click this link, the **Additional Indicators** details modal is displayed as shown below.

*Note: If configured by your PDMP administrator, this modal may also display an **Explanation** section containing additional information, provided by the PDMP administrator, about why you are seeing this indicator.*

CAUTION / IMPORTANT REMINDER: Clinicians use Additional State Indicators to further review details in the patient's prescription history while attending to their patients. Additional 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 refusing to provide medications.

Narx Scores

The NarxCare application provides three substance-specific (i.e., Narcotics, Sedatives, Stimulants) exposure scores for prescribing and dispensing of controlled substances as it relates to a patient called Narx Scores.

How are Narx Scores Used?

Narx Scores are intended to be automatically delivered into the clinical workflow as discrete data and be easily viewable within a patient's record. Many systems choose to place Narx Scores in the patient header or alongside the patient's vital signs.

Narx Scores were designed to increase provider awareness of a patient's controlled substance exposure. Thus, in order for the provider to derive the greatest informational utility from the scores, we encourage their viewing early during the patient encounter.

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

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 represent a *relative scoring* system for a given patient's exposure to a controlled substance compared to the rest of the PDMP population (described in detail below).

3. The last digit of each score 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.

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

   - There are four metrics used in Narx Score calculations. They are as follows:
     - The number of controlled substance prescribers visited.
     - The number of pharmacies visited where controlled substance prescriptions were filled.

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[4] 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/)

o   The number of days supply for a prescription (stimulants only).
o   The number of overlapping days for each drug type.
- Each metric is tallied across 4 timeframes of reference:
  o   Most recent 2 months
  o   Most recent 6 months
  o   Most recent 180 days
  o   Most recent 365 days

5. The time elapsed for any literature-based risk factor 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 follows[5]:
   a. 78% score between 0 and 200
   b. 6.7% score between 200 and 299
   c. 5.3% score between 300 and 399
   d. 6.5% score between 400 and 499
   e. 3.4% score between 500 and 599
   f. ~1% score between 600 and 999

The Narx Scores were designed such that:

1. Patients who are exposed to small amounts of medication with limited provider and pharmacy usage will have **lower scores (e.g., scores below 199).**

2. Patients who are exposed to large amounts of medications in accordance with recommended guidelines[6] (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 medications while using many providers and pharmacies, and with frequently overlapping prescriptions, will have **higher scores (e.g., scores above 500).**

Narx Score Algorithm

Relative Scoring

Narx Scores represent a *relative scoring* system for a given patient's exposure to a controlled substance compared to the rest of the PDMP population. The literature-based risk factors listed above in the introduction of this section are quantified and then converted to a reference value, which ranges from 0–99. These reference values correlate with a percentile measurement of that exposure within the specified PDMP population.

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[5] 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.
[6] https://www.cdc.gov/mmwr/volumes/71/rr/rr7103a1.htm#Recommendation9

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 risk (e.g., based upon the presence of increasing opioid dose), we could imagine a linear relationship based on MME, which could be depicted as follows:

A   C   B

Lower Risk   Higher Risk

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

A   C   B

Lower Risk   Higher Risk

The Narx Score algorithm establishes boundaries of exposure by converting all measured variables, such as 60-day MME, to a scaled value between 0 and 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 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 scaled value to each example patient's 60-day MME, the result is:

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

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

A   C   B

0   20   65   90   99

Lower Risk   Higher Risk

The percentile-ranked scaled 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 used more MME in the last 60 days than 90% of the rest of the PDMP population in the PDMP where the patient resides.

Time Periods

The NarxCare algorithm evaluates a PDMP data record using four different, overlapping time periods. In each time period, the factor being evaluated is tabulated and then converted to a percentile-ranked scaled value. These reference tables exist for all the factors being evaluated and cover all four time periods. In general, as the raw value count (i.e., number of prescribers) increases, so does the reference value (up to 99 maximum). As the time period increases, the scaled value decreases, so older records contribute less to the score than more recent records with the same drug content.

Example provider reference tables are provided on the next page.

Prescriber Count	2mo Scaled	6mo Scaled	1 yr Scaled	2yr 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
And so on …				

Pharmacy Count	2mo Scaled	6mo Scaled	1 yr Scaled	2yr 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
And so on …				

Overlap Days	2mo Scaled	6mo Scaled	1 yr Scaled	2yr 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
And so on …				

Sedative LME	2mo Scaled	6mo Scaled	1 yr Scaled	2yr Scaled
0	0	0	0	0
1-4	4	6	8	10
5 - 9	8	10	13	16
10 - 14	10	12	16	19
15 - 19	20	20	23	26
20 - 24	23	23	26	29
25 - 29	24	23	26	30
And so on …				

Weighting

A Narx Score is calculated as a weighted average of the scaled values. A 50% weighting is applied to the milligram equivalencies with the remaining factors making up the other 50%.[7]
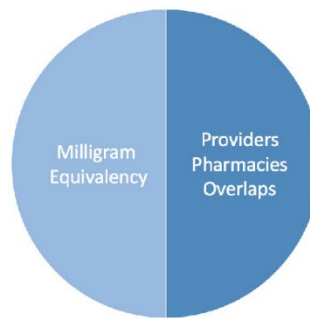
This type of weighting results in several relationships. If we think of milligram equivalency as *consumption* and the combination of providers, pharmacies, and overlaps collectively as *behaviors*, we can create the following score categories.

	Consumption	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 of use that can result in the same score. It is <u>always</u> necessary to look at the actual PDMP data to determine what use patterns exist that have resulted in the Narx Score presented.

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[7] https://www.ncbi.nlm.nih.gov/books/NBK458661/

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 scaled values.
3. Average the scaled values for each factor 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 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%.

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

Using a sample patient for a hypothetical scaled value to illustrate the calculation of a Narcotic Score:

1. 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

2. Convert all raw values to scaled 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

3. Average the scaled value for each factor 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**

4. 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**

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*. A Narx Score must be applied to the clinical scenario by the clinician. 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

Example Use Cases[8]

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 other significant 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 maybe the patient's first exposure to the effects of a controlled substance. The clinician would typically conduct a thorough review of the risks and benefits with the patient.

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[8]
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6917208/#:~:text=Similarly%2C%20the%20greatest%20share%20of,%E2%89%A565%20years%20(34.6%25)

- **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:

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 has potentially 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 providers. This can be due to the patient being seen in a clinic that is staffed by different providers, or it can be due to access to care issues requiring visits to urgent care centers or emergency departments.

- **Case D** – A 46-year-old female patient with chronic anxiety, frequently treated with benzodiazepines, presents for a medication refill. On review of the PDMP record, the attending physician notes that her Narcotic score is non-zero, yet her PDMP history does not show that narcotics were ever dispensed. Her Narx Scores are:

Narcotic	Sedative	Stimulant
30	30	000

  Important Consideration:

  - If a provider were to focus on the Narcotic score in isolation, this could lead to an incomplete view of a patient's current medication regimen. Therefore, with this type of patient in mind, Narx Scores incorporate an 'awareness value' for attending providers. For example, the literature is clear on the association between adverse events such as respiratory depression, sedation and drowsiness, central nervous system depression, as well as an increased risk of falls and injuries due to the concomitant use of narcotics and sedatives (which includes benzodiazepines).

  - Thus, patients who only use narcotics (i.e., opioids) will receive a Sedative score to increase provider awareness that prescribing the latter drug type might elevate the likelihood of an adverse event. Similarly, patients who only use sedatives receive a Narcotic score to increase provider awareness that prescribing controlled substances might elevate the likelihood of an adverse event.

  - Appropriate prescribing practices encourage this more holistic view.

CAUTION / IMPORTANT REMINDER: Clinicians use Narx Scores as indicators to further review details in the patient's prescription history while attending to their patients. Narx Scores are intended to aid, not replace, medical decision-making. None of the information presented should be used as sole justification for providing or refusing to provide medications.

Overdose Risk Score

The NarxCare application also provides a composite index of discrete data obtained from the PDMP called an **Overdose Risk Score (ORS)**. The ORS is comprised of three digits ranging from 000–999.

NOTICE REGARDING ORSv2: The below materials describe the generally available version of ORS ("v1"). If you are among the users who have access to the new ORS model (currently called ORS "v2"), please refer to the separate background materials for v2. v2 has been in development since 2021 and has been updated to include different variables and weighting as an indicator of unintentional overdose death risk in light of the evolving epidemic. Recent tests on a validation dataset confirmed increased performance of v2. We encourage users to inquire about changing models to v2.

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 factors outlined below, for clinicians of the likelihood of an unintentional overdose death.

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

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.

Validation Statistics

- Precision (i.e., positive predictive value/true positive rate): 75%
- Recall (i.e., sensitivity): 57%
- Specificity (i.e., true negative rate): 81%
- Negative predictive value: 66%.

Odds Ratios

ORS	Number of Decedents	Number of Non-Decedents	Odds Ratio of Unintentional Overdose Death	Odds Ratio 95% Confidence Interval
000-199	1,108	193,636	1	ref
200–299	1,669	258,183	1.1	1.1-1.2
300–399	938	47,698	3.4	3.2-3.8
400–499	702	16,357	7.5	6.8-8.3
500–599	438	6,200	12.4	11.0-13.8
600-699	259	2,347	19.3	16.7-22.2
700-799	101	634	27.9	22.3-34.5
800-999	32	192	29.3	19.7-42.2

Score Distribution

- 000-199: 36.7%
- 200-299: 48.9%
- 300-399: 9.2%
- 400-499: 3.2%
- 500-599: 1.3%
- 600-999: 0.7%

Additional ORS 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-decedents[9], 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 >= 700.

Unlike the training dataset, this dataset comes from the period of time during which there was widespread acceptance and use of medications for opioid use disorder (MOUDs) impacting ORS MME calculations, as described below, and death rates. During this time period, illicit opiates, which are not tracked in the PDMP (and therefore not included in the ORS model), became a much larger cause of overdose death. Therefore, ORS provides an indicator of the rare event of an unintentional overdose death (in the context of all patients in the PDMP) using data from controlled substances that are less likely to be involved in the event than when ORS was developed.

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[9] Rounded to the nearest 100.

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

Validation Statistics
- Precision (i.e., positive predictive value/true positive rate): 52%
- Recall (i.e., sensitivity): 63%
- Specificity (i.e., true negative rate): 41%
- Negative predictive value: 53%.

Note: We plan to update these metrics with additional data from other states with larger sample sizes.

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	210	21,000	1	ref
200–299	90	6,000	1.5	1.2-1.9
300–399	45	2,900	1.6	1.1-2.1
400–499	20	1,300	1.6	0.9-2.4
500–599	22	500	4.4	2.7-6.8
600-999	13	300	4.4	2.3-7.5

Score Distribution
- 000-199: 66.4%
- 200-299: 19.1%
- 300-399: 9.2%
- 400-499: 4.1%
- 500-599: 1.6%
- 600-999: 0.9%

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 PMDP. 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 predictive 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 input for ORS is the same data that 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 nine 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 first having the highest relevance at approximately 25-30% and the last three weighted the least at <1%:

1. Total Morphine Milligram Equivalent (MMEs) prescribed during the most recent 365 days (including MMEs from MOUDs when dispensed to the patient);
2. Number of pharmacies where narcotics and/or sedatives were filled in the last 2 years;
3. Total MMEs prescribed during in the last 2 years (including MMEs from MOUDs when dispensed to the patient);
4. Controlled substance prescriptions with daily MMEs >120 in the last 2 years (including MMEs from MOUDs);
5. Total dosage (milligrams) of sedatives prescribed during the last 2 years;
6. Number of prescribers where narcotics/sedatives were obtained in the last 2 years;
7. Total dosage (milligrams) of sedatives prescribed for 1 or more years prior to the current date;
8. Total MMEs prescribed for 1 or more years prior to the current date (including MMEs from MOUDs); and
9. Number of prescribers where narcotics/sedatives were obtained in the last 180 days.

NOTE: *If one or more of these elements is not available for a patient, the ORS score is not calculated and will not be presented to the healthcare provider. Stimulants are not included within the inputs. As stated above, MMEs from MOUDs are included in several inputs. MOUDs may have high MMEs relative to other controlled substances and thus have meaningful impact on the model results. Clinicians should be mindful of that impact and review the prescription details to further understand MOUD inputs.*

As noted above, the ORS takes multiple PDMP factors into consideration for risk of unintentional overdose death and is more predictive than any one factor.

Additional Information on ORS

ORS is intended to provide a multi-variable indicator of unintentional overdose death risk based on PDMP data. The ORS algorithm does not incorporate any data other than what is available in the PDMP. This aligns the clinical application of the score with other sources of overdose risk assessment based on PDMP data such as number of pharmacies visited in the last 90 days or daily morphine equivalent dose (MED).

Since the original release of ORS v1, prescribing patterns have evolved due to many factors. In particular, there has been increasing acceptance, and therefore, more widespread use of MOUDs. This change is reflected in the datasets. The prevalence of MOUD use in the original training dataset spanning 2013-2016 was 7% among decedents, whereas the prevalence of MOUD use among decedents in the validation dataset spanning 2017-2023, was 23%. This represents a non-trivial change in prescribing patterns over time and can significantly impact a patient's ORS, given that Buprenorphine formulations may have high MMEs, and MME is a component of several predictive features of the current ORS model.

CAUTION / IMPORTANT REMINDER: Clinicians use Overdose Risk Scores as indicators to further review details in the patient's prescription history while attending to their patients. Overdose Risk Scores are intended to aid, not replace, medical decision-making. Other patient-centric factors, such as mental health conditions[10] (e.g., depression, anxiety, bipolar disorder, dementia), substance use conditions[11], respiratory conditions[12], hepatic and renal conditions[13], and history of overdose,[14] may influence unintentional overdose death but are not incorporated in the PDMP data used to calculate the Overdose Risk Score. None of the information presented should be used as sole justification for providing or refusing to provide medications.

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[10] van Draanen J, Tsang C, Mitra S, Phuong V, Murakami A, Karamouzian M, Richardson L. Mental disorder and opioid overdose: a systematic review. Soc Psychiatry Psychiatr Epidemiol. 2022 Apr;57(4):647-671. doi: 10.1007/s00127-021-02199-2. Epub 2021 Nov 18. PMID: 34796369; PMCID: PMC8601097

[11] https://ajp.psychiatryonline.org/doi/10.1176/appi.ajp.2011.10101476#:~:text=Analyses%20suggest%20that%20individuals%20who,with%20individuals%20without%20these%20conditions

[12] Le TT, Park S, Choi M, *et al* Respiratory events associated with concomitant opioid and sedative use among Medicare beneficiaries with chronic obstructive pulmonary disease *BMJ Open Respiratory Research* 2020;**7:**e000483. doi: 10.1136/bmjresp-2019-000483

[13] Bohnert ASB, Valenstein M, Bair MJ, et al. Association Between Opioid Prescribing Patterns and Opioid Overdose-Related Deaths. *JAMA*. 2011;305(13):1315–1321. doi:10.1001/jama.2011.370

[14] Caudarella A, Dong H, Milloy MJ, Kerr T, Wood E, Hayashi K. Non-fatal overdose as a risk factor for subsequent fatal overdose among people who inject drugs. Drug Alcohol Depend. 2016 May 1;162:51-5. doi: 10.1016/j.drugalcdep.2016.02.024. Epub 2016 Feb 26. PMID: 26993373; PMCID: PMC4833586

Document Information

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.

Change Log

Version	Date	Chapter/Section	Change Made
1.0	9/14/2023	N/A	N/A; initial publication