

How to Utilize NarxCare

FEATURES

- Scores reflect past exposure to opioids, sedatives, stimulants.
- Scores help differentiate those patients with low to high exposure based on multiple prescribers, pharmacies and overlaps.

NarxScores and Risk Indicators



3rd digit = number of current dispensations

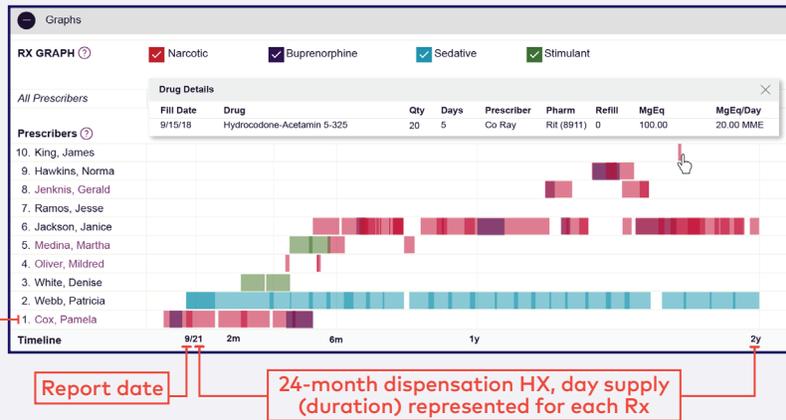
SCORE RANGE	RISK/COMPLEXITY	PATIENT POPULATION
0-199	Low exposure, low risk	75%
200-499	Moderate complexity	20%
>500	Multiple prescribers, pharmacies, overlaps	5%

BENEFITS

- Shows number of current prescriptions dispensed.
- Provides essential clinical alerts in the prescriber workflow.
- Notifies prescribers when further investigation may be warranted.

NarxCare PDMP Report: Dynamic Graphical Display of Dispensation History

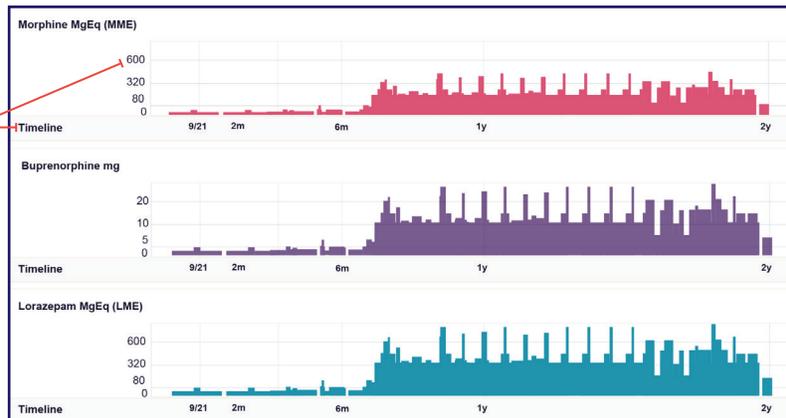
- Filter-able display of controlled substance history.
- Two-year timeline view by drug category and provider.
- Click chart for specific Rx details.



- Shows changes in prescription history.
- Offers visibility to medications prescribed by other providers.
- Identifies acute, episodic, and chronic treatment history.
- Differentiates between single encounters and longitudinal continuity of care.

Treatment Intensity

- Total Morphine Milligram Equivalents (MME) and Lorazepam Milligram Equivalents (LME) by day over a two-year timeline.



- Helps identify needs for frequent monitoring, dose taper and/or naloxone, to reduce risk of opioid-related harm.
- Provides data to help determine needs for medication changes.

Current and 30-Day Average

- Summary table of current and 30-day average.

Summary			
Summary	Narcotics* (excluding buprenorphine)	Sedatives*	Buprenorphine*
Total Prescriptions: 7	Current Qty: 108	Current Qty: 104	Current Qty: 320
Total Prescribers: 2	Current MME/day: 60.00	Current LME/day: 2.00	Current mg/day: 96.00
Total Pharmacies: 2	30 Day Avg MME/day: 8.00	30 Day Avg LME/day: 0.20	30 Day Avg mg/day: 7.47

- Comparison between current MME and 30-day MME/day average.

Appendix A: NarxCare

Introduction to NarxCare

NarxCare is a robust analytics tool and care management platform that helps prescribers and dispensers analyze real-time controlled substance data from prescription drug monitoring programs (PDMPs), which are the system's primary data source.

NarxCare automatically accesses the PDMP data, analyzes it, scores it, and generates an interactive, patient-centered report with visual enhancements that enable providers to quickly comprehend the patient's controlled substance use history.

The NarxCare platform is designed to accommodate additional, non-PDMP data sources such as claims data, registry data, continuity of care documentation, etc. As these data become available, they will be visually incorporated as additional risk indicators and eventually be included in existing and new algorithms.

Every Narx Report includes type-specific use scores for narcotics, sedatives, and stimulants. These scores are based on a complex algorithm with up to 20 time-weighted measurement points. The scores range from 000 to 999, with higher scores equating to higher numbers of prescribers, MME, pharmacies, and overlapping prescriptions.

An Overdose Risk Score, developed using advanced data science, is also included. This risk score ranges from 000–999 with higher scores equating to increased risk of unintentional overdose. Currently based on PDMP data, the score will become more holistic in nature as additional data sources are added to the algorithm.

Data visualization is enhanced with an interactive, color-coded graphical display of prescription data that allows for increased detail when desired.

A Resources section provides tools that enable providers to link patients with treatment and easily obtain information documents that may be helpful as reference material or patient handouts.

Application Interface Overview

The NarxCare report interface is a modular design with several collapsible segments.

Header

Scores and Indicators

Graphs

Full Prescription Detail

Menu
james e huizenga

RxSearch > Patient Request

STATE
DEPARTMENT OF HEALTH
Powered by NarxCare™

MICHELLE JORDAN, 76F

Narx Report
Resources

Date: 10/19/2017 Download PDF Download CSV

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Risk Indicators

NARX SCORES

Narcotic	Sedative	Stimulant
900	620	000

Explain these scores

OVERDOSE RISK SCORE

790

(range 0-999)

Explain this score

ADDITIONAL INDICATORS (1)

- ! Daily Active MME >= 345.6
- ! Below Opioid & Benzodiazepine Threshold
- ! Below Opioid Consecutive Day Threshold
- ! Below Prescriber & Dispensary Threshold

Explanation and Guidance

Graphs

RX GRAPH ? Narcotic Sedative Stimulant

All Prescribers

Prescribers

30 - Jeremy, Harper	
29 - Joshua, Stone	
28 - Rebecca, Graham	
27 - Patricia, Hart	
26 - Jacqueline, Allen	
25 - Phillip, Tucker	
24 - Ronald, Hudson	
23 - Martin, Sims	
22 - Mary, Ramos	
21 - Alice, Graham	
20 - Howard, Allen	
19 - Harry, Johnston	
18 - Jerry, Bennett	
17 - Steve, Jones	
16 - Chris, Holmes	
15 - Sharon, Lawson	
14 - Christina, Edward	
13 - Raymond, Welch	
12 - Norma, Gonzalez	
11 - Ortiz, Heather	
10 - Heather, Ortiz	
9 - Paul, Howard	
8 - Joseph, Jenkins	
7 - Sean, Evans	
6 - Joseph, Wilson	
5 - Kimberly, Chavez	
4 - Maria, Henderson	
3 - Samuel, Tucker	
2 - George, Hawkins	
1 - Clarence, Willima	

Morphine MeEq/day

Per CDC guidance, the conversion factors and associated daily morphine milligram equivalents for drugs prescribed as part of medication-assisted treatment for opioid use disorder should not be used to benchmark against dosage thresholds meant for opioids prescribed for pain.

Rx Data

PRESCRIPTIONS

Total Prescriptions: **76.00**

Active MME: **0.00**

Active MME/day: **0.00**

30 Day Avg. MME/day: **0.00**

Fill Date	ID	Drug	Qty	Days	Prescriber	Pharmacy	Refill	MgEq	MgEq/Day	Pymt Type	PMP
09/15/2017	1	LORAZEPAM 1 MG TABLET	60	20	WI CLA	KROGE(1119)	0	60.00	-	Medicare	IM
09/11/2017	1	OXYCODONE-ACETAMINOPHEN 5-325	120	7	HA GEO	WALMA(1111)	0	900.00	128.57	Comm Ins	IM
09/01/2017	1	OXYCODONE-ACETAMINOPHEN 10-325	30	7	TU SAM	KROGE(7120)	0	450.00	64.29	Comm Ins	IM
08/28/2017	1	OXYCODONE-ACETAMINOPHEN 5-325	20	5	HE MAR	WALMA(1111)	0	150.00	30.00	Medicare	IM

Narx Report Details

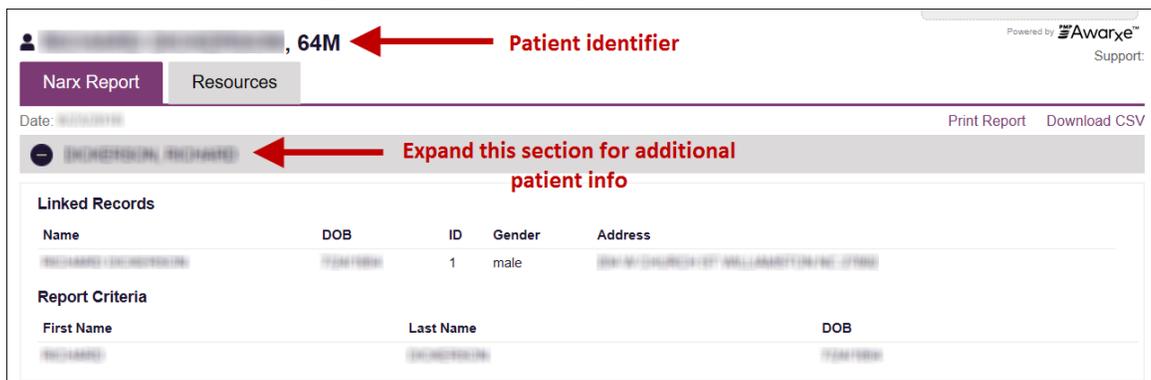
Report Header

The Narx Report page heading contains several report- and account-level controls:

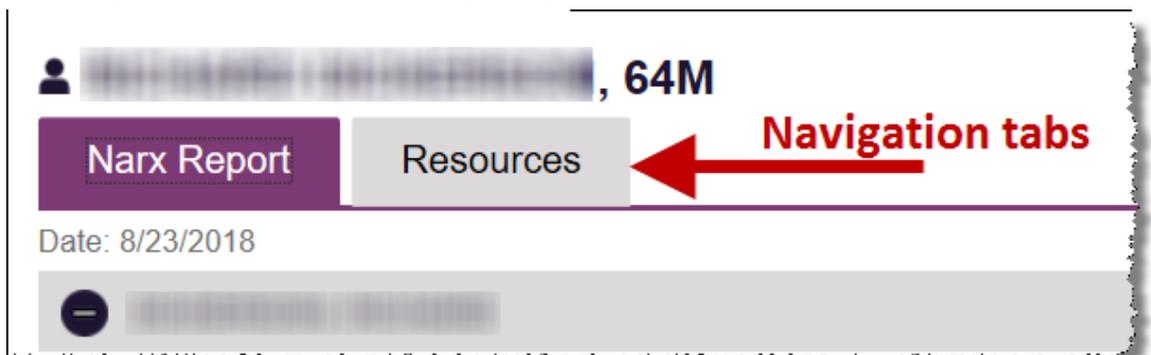
- **Drop-down menu bar:** Clicking **Menu** allows you to navigate to all functional areas of AWAxRE. For NarxCare users, the menu contains additional training links as well as a link to the NarxCare user guide. You can click your username for quick access to account management options such as **My Profile**, **Delegate Management**, and **Password Reset**.



- **Patient identifying information:** The patient’s name, age in years, and gender are displayed above the navigation tabs. Additional patient information, such as date of birth and address, can be found in the first segment of the Narx Report.



- **Navigation tabs:** There are two tabs beneath the patient’s name labeled **Narx Report** and **Resources**. The **Narx Report** tab is displayed by default. You can click on the **Resources** tab to display several treatment locators and document resources that may be useful in managing patient referrals or reviewing CDC guidelines.



- **Report download links:** If you need to download a PDF or CSV version of the report, click the **Download PDF** or **Download CSV** links located on the right side of the page below the state logo.



Report Body

The body of the Narx Report contains several functional areas aimed at rapidly raising awareness of risk and prescription use patterns, and when required, individual prescription detail.

- **Scores and additional indicators:** The Narx Report includes a series of type-specific use scores, Narx Scores, Overdose Risk Score, and Additional Indicators, which are located in the Risk Indicators section of the report. These scores and Clinical Alerts are often automatically returned to the requesting system as discrete data. Requesting systems receiving such data can choose to display the scores within the native electronic health record or pharmacy management system, and many systems choose to display these data in the patient header, face sheet, or alongside patient vital signs.

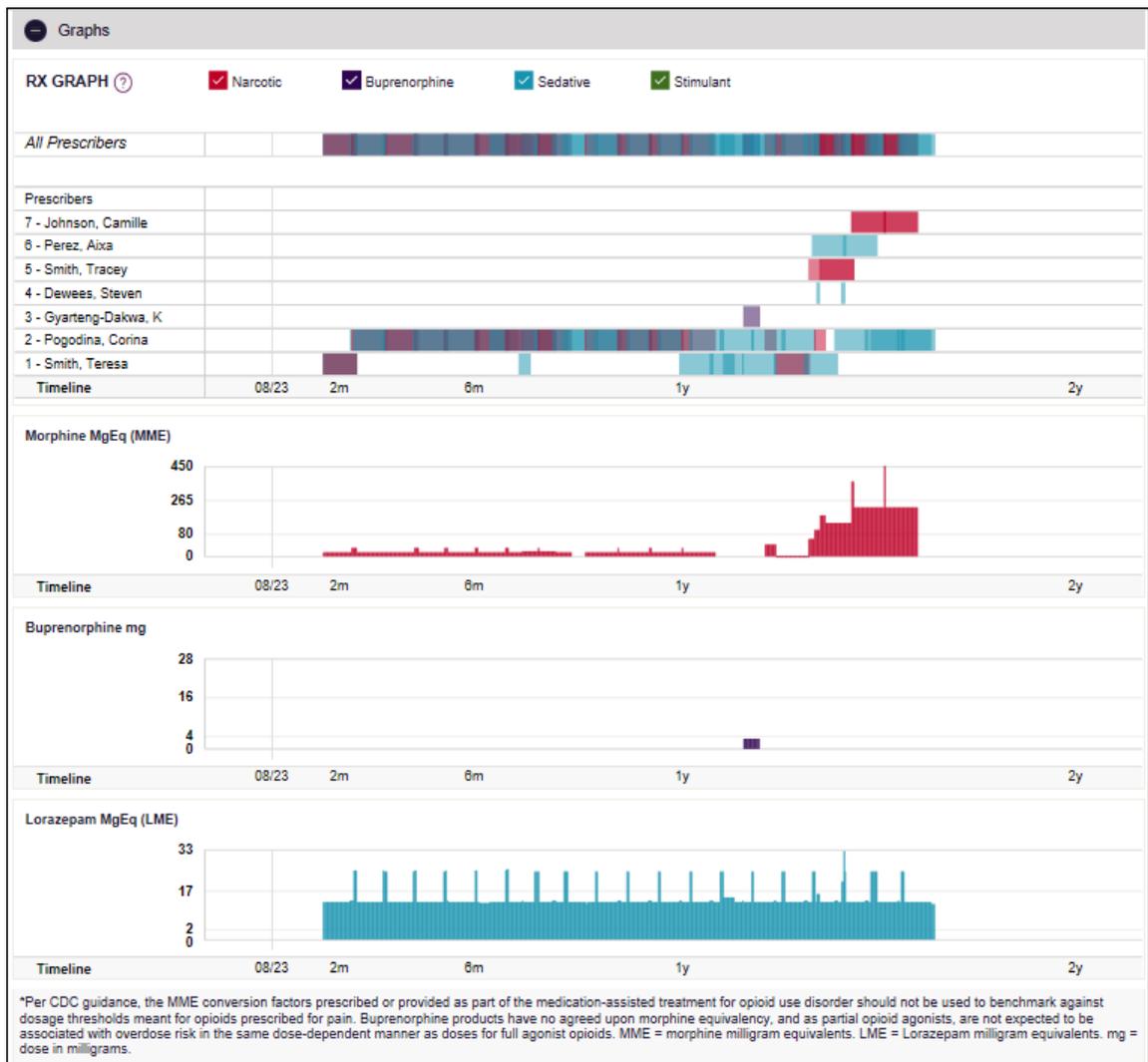
Note: Please refer to the [Narx Scores](#), [Overdose Risk Score](#), and [Additional Indicators](#) sections of this document for more information on those scores and alerts.

The screenshot displays the 'Risk Indicators' section of the report. It is divided into three columns:

- CS INSIGHTS SCORES:** Shows scores for Narcotic (391), Sedative (150), and Stimulant (000).
- OVERDOSE RISK SCORE:** Shows a score of 290 with a range of 000-999.
- ADDITIONAL INDICATORS (1):** Lists three indicators: 'Daily Active MME >= 345.6' (with a red warning icon), 'Below Opioid & Benzodiazepine Threshold', 'Below Opioid Consecutive Day Threshold', and 'Below Prescriber & Dispensary Threshold' (all with green downward arrow icons).

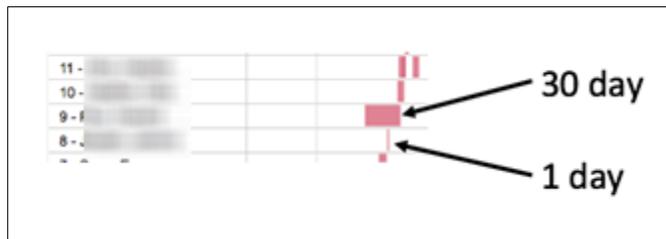
Each column has an 'Explanation and Guidance' link at the bottom. A disclaimer at the bottom of the section states: 'This CS Insights report is based on search criteria supplied and the data entered by the dispensing pharmacy. For more information about any prescription, please contact the dispensing pharmacy or the prescriber. CS Insights scores and reports 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. The information on this report is not warranted as accurate or complete.'

- **Rx Graph:** The Rx Graph, located in the Graphs section of the report, allows you to rapidly see important patterns and levels of use.

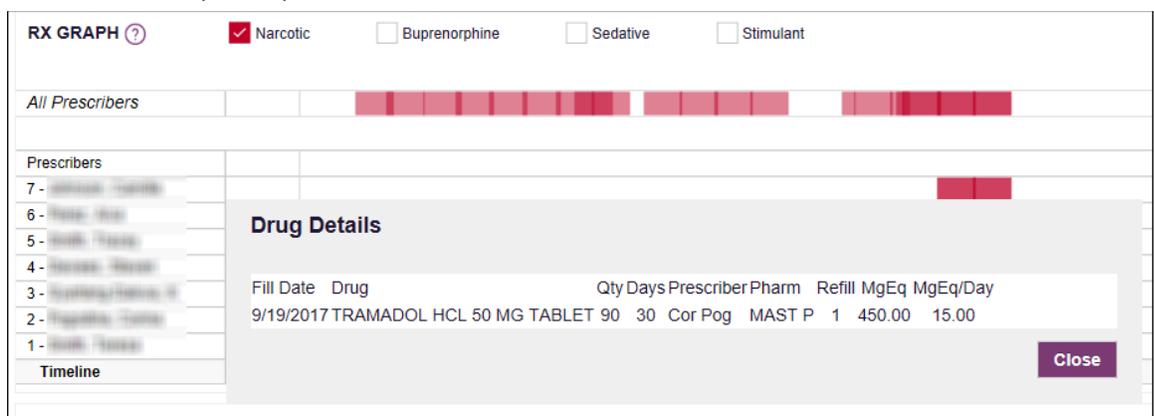


- Prescriptions are color coded and can be selected or deselected at the top of the graph.
 1. Narcotics (opioids) = **red**
 2. Buprenorphines = **purple**
 3. Sedatives (benzodiazepines, sleep aids, etc.) = **blue**
 4. Stimulants = **green**
 5. Other = **grey**
- The Rx Graph is reverse time ordered, meaning that the most recent prescriptions are displayed on the left side of the graph and the oldest are displayed on the right.

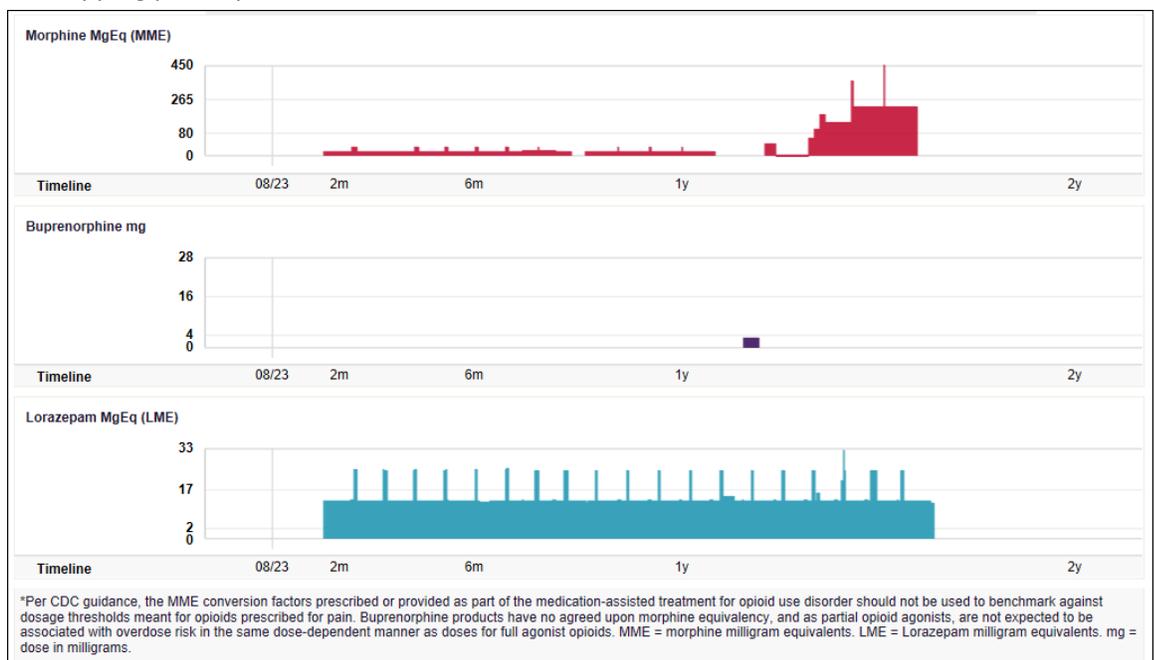
- Each pixel in the graph represents one day; therefore, a 30-day prescription is represented by a rectangle about 1 cm wide and a 1–3-day prescription appears as a narrow vertical bar.



- 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.



- Daily morphine milligram equivalency (MME), buprenorphine milligrams, and lorazepam milligram equivalency (LME) graphs are also provided for a quick longitudinal view of daily MME, buprenorphine, and LME. Abrupt changes in these factors are often due to overlapping prescriptions.



Prescription Detail

Each prescription dispensed to the patient is presented in the Prescriptions table, which is located in the Rx Data section of the report. 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 prescriber or pharmacy full name, address, and DEA number.

Rx Data												
PRESCRIPTIONS												
Total Prescriptions: 69												
Total Private Pay: 2												
Fill Date	ID	Written	Drug	Qty	Days	Prescriber	Rx #	Pharmacy	Refill	Daily Dose	Pymt Type	PMP
06/08/2018	1	05/16/2018	ALPRAZOLAM 2 MG TABLET	90	30	[Redacted]	[Redacted]	[Redacted]	0	12.00	LME Medicare	NC
06/08/2018	1	05/15/2018	ZOLPIDEM TARTRATE 10 MG TABLET	30	30	[Redacted]	[Redacted]	[Redacted]	1	0.50	LME Medicare	NC
06/08/2018	1	05/14/2018	TRAMADOL HCL 50 MG TABLET	90	30	[Redacted]	[Redacted]	[Redacted]	1	15.00	MME Medicare	NC
05/15/2018	1	05/15/2018	ZOLPIDEM TARTRATE 10 MG TABLET	30	30	[Redacted]	[Redacted]	[Redacted]	0	0.50	LME Medicare	NC
05/14/2018	1	05/14/2018	TRAMADOL HCL 50 MG TABLET	90	30	[Redacted]	[Redacted]	[Redacted]	0	15.00	MME Medicare	NC
05/12/2018	1	03/19/2018	ALPRAZOLAM 2 MG TABLET	90	30	[Redacted]	[Redacted]	[Redacted]	2	12.00	LME Medicare	NC
04/16/2018	1	03/19/2018	ALPRAZOLAM 2 MG TABLET	90	30	[Redacted]	[Redacted]	[Redacted]	1	12.00	LME Medicare	NC
04/16/2018	1	02/19/2018	ZOLPIDEM TARTRATE 10 MG TABLET	30	30	[Redacted]	[Redacted]	[Redacted]	2	0.50	LME Medicare	NC
04/14/2018	1	02/20/2018	TRAMADOL HCL 50 MG TABLET	90	30	[Redacted]	[Redacted]	[Redacted]	2	15.00	MME Medicare	NC
03/20/2018	1	03/19/2018	ALPRAZOLAM 2 MG TABLET	90	30	[Redacted]	[Redacted]	[Redacted]	0	12.00	LME Medicare	NC
03/19/2018	1	02/20/2018	TRAMADOL HCL 50 MG TABLET	90	30	[Redacted]	[Redacted]	[Redacted]	1	15.00	MME Medicare	NC
03/19/2018	1	02/19/2018	ZOLPIDEM TARTRATE 10 MG TABLET	30	30	[Redacted]	[Redacted]	[Redacted]	1	0.50	LME Medicare	NC
02/21/2018	1	12/13/2017	ALPRAZOLAM 2 MG TABLET	90	30	[Redacted]	[Redacted]	[Redacted]	2	12.00	LME Medicare	NC
02/20/2018	1	02/20/2018	TRAMADOL HCL 50 MG TABLET	90	30	[Redacted]	[Redacted]	[Redacted]	0	15.00	MME Medicare	NC

Provider and Pharmacy Detail

Provider and pharmacy information, including full name, address, and DEA number, is presented in the Providers and Pharmacies tables, located in the Rx Data section of the report.

PROVIDERS						
Total Providers: 7						
Name	Address	City	State	Zipcode	DEA	
[Redacted]	[Redacted]	WILLIAMSTON	NC	27892	[Redacted]	
[Redacted]	[Redacted]	DURHAM	NC	27704	[Redacted]	
[Redacted]	[Redacted]	GREENVILLE	NC	27834	[Redacted]	
[Redacted]	[Redacted]	WILLIAMSTON	NC	27892	[Redacted]	
[Redacted]	[Redacted]	WILLIAMSTON	NC	27892	[Redacted]	
[Redacted]	[Redacted]	WILLIAMSTON	NC	27892	[Redacted]	
[Redacted]	[Redacted]	GREENVILLE	NC	27834	[Redacted]	

PHARMACIES						
Total Pharmacies: 1						
Name	Address	City	State	Zipcode	DEA	
[Redacted]	[Redacted]	WILLIAMSTON	NC	27892	[Redacted]	

Resources Tab

The **Resources** tab provides easy access to treatment locators and CDC documents.

- **MAT locator:** The MAT locator, located in the Access to Treatment section of the **Resources** tab, quickly creates a list of the 30 closest providers who are listed in the Substance Abuse and Mental Health Administration (SAMHSA) buprenorphine treatment locator database.

Access to Treatment

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.](#)

Search for providers near:
Zip Code

Submit

The patient's zip code is pre-populated but can be edited. Click **Submit** to generate a PDF that can be viewed and printed.

- **CDC documents:** The Information Documents section of the **Resources** tab provides a series of CDC documents pertaining to both providers and patients that can be referenced quickly and printed, if desired.

Educational Resources

INFORMATIONAL DOCUMENTS
Click the associated link and print. [View more information about resources.](#)

What You Need to Know

PRESCRIPTION OPIOIDS: WHAT YOU NEED TO KNOW

Prescription opioids can be used to help relieve moderate to severe pain, and are often prescribed to help manage chronic pain in order to improve health and quality of life. These medications can also be used to help manage pain in patients with serious illness. It is important to use them with care and to follow the directions on the label. Do not take more than the prescribed dose, and do not take them with alcohol or other drugs that can increase the risk of side effects.

WHAT ARE THE RISKS AND SIDE EFFECTS OF OPIOID USE?

Prescription opioids carry a serious risk of addiction and overdose, especially with long-term use. The risk of addiction is higher when the dose is increased over time. The risk of overdose is higher when the dose is increased over time.

- Risk of addiction and dependence
- Risk of overdose and death
- Risk of respiratory depression
- Risk of constipation
- Risk of drowsiness
- Risk of impaired judgment
- Risk of impaired coordination
- Risk of impaired ability to drive or operate machinery
- Risk of impaired ability to make decisions
- Risk of impaired ability to concentrate
- Risk of impaired ability to remember things
- Risk of impaired ability to learn
- Risk of impaired ability to perform tasks
- Risk of impaired ability to work
- Risk of impaired ability to study
- Risk of impaired ability to play sports
- Risk of impaired ability to exercise
- Risk of impaired ability to perform physical tasks
- Risk of impaired ability to perform mental tasks
- Risk of impaired ability to perform social tasks
- Risk of impaired ability to perform emotional tasks
- Risk of impaired ability to perform cognitive tasks
- Risk of impaired ability to perform motor tasks
- Risk of impaired ability to perform sensory tasks
- Risk of impaired ability to perform perceptual tasks
- Risk of impaired ability to perform intellectual tasks
- Risk of impaired ability to perform artistic tasks
- Risk of impaired ability to perform athletic tasks
- Risk of impaired ability to perform musical tasks
- Risk of impaired ability to perform technical tasks
- Risk of impaired ability to perform scientific tasks
- Risk of impaired ability to perform medical tasks
- Risk of impaired ability to perform legal tasks
- Risk of impaired ability to perform business tasks
- Risk of impaired ability to perform government tasks
- Risk of impaired ability to perform religious tasks
- Risk of impaired ability to perform cultural tasks
- Risk of impaired ability to perform entertainment tasks
- Risk of impaired ability to perform education tasks
- Risk of impaired ability to perform communication tasks
- Risk of impaired ability to perform transportation tasks
- Risk of impaired ability to perform information tasks
- Risk of impaired ability to perform energy tasks
- Risk of impaired ability to perform material tasks
- Risk of impaired ability to perform financial tasks
- Risk of impaired ability to perform human resources tasks
- Risk of impaired ability to perform information technology tasks
- Risk of impaired ability to perform engineering tasks
- Risk of impaired ability to perform architecture tasks
- Risk of impaired ability to perform design tasks
- Risk of impaired ability to perform construction tasks
- Risk of impaired ability to perform manufacturing tasks
- Risk of impaired ability to perform distribution tasks
- Risk of impaired ability to perform retail tasks
- Risk of impaired ability to perform food and beverage tasks
- Risk of impaired ability to perform health care tasks
- Risk of impaired ability to perform education tasks
- Risk of impaired ability to perform government tasks
- Risk of impaired ability to perform religious tasks
- Risk of impaired ability to perform cultural tasks
- Risk of impaired ability to perform entertainment tasks
- Risk of impaired ability to perform education tasks
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- Risk of impaired ability to perform information tasks
- Risk of impaired ability to perform energy tasks
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- Risk of impaired ability to perform financial tasks
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- Risk of impaired ability to perform design tasks
- Risk of impaired ability to perform construction tasks
- Risk of impaired ability to perform manufacturing tasks
- Risk of impaired ability to perform distribution tasks
- Risk of impaired ability to perform retail tasks
- Risk of impaired ability to perform food and beverage tasks
- Risk of impaired ability to perform health care tasks

WHO ARE OPIOIDS MADE WITH?

- Morphine
- Oxycodone
- Hydrocodone
- Codeine
- Fentanyl
- Tramadol
- Propoxyphene
- Buprenorphine
- Naloxone
- Naltrexone
- Methadone
- Oxycodone/naloxone
- Oxycodone/hydrocodone
- Oxycodone/acetaminophen
- Oxycodone/ibuprofen
- Oxycodone/aspirin
- Oxycodone/paracetamol
- Oxycodone/diphenhydramine
- Oxycodone/clonidine
- Oxycodone/sertraline
- Oxycodone/venlafaxine
- Oxycodone/duloxetine
- Oxycodone/escitalopram
- Oxycodone/levamisole
- Oxycodone/phenylephrine
- Oxycodone/pseudoephedrine
- Oxycodone/xylometazoline
- Oxycodone/phenolamine
- Oxycodone/phenylephrine
- Oxycodone/pseudoephedrine
- Oxycodone/xylometazoline
- Oxycodone/phenolamine

Prescription Opioids: What You Need to Know (PDF)

Opioids and Chronic Pain

PROMOTING SAFER AND MORE EFFECTIVE PAIN MANAGEMENT

PROPHYLACTIC PRESCRIPTION OPIOIDS

Prescription opioids can be used to help relieve moderate to severe pain, and are often prescribed to help manage chronic pain in order to improve health and quality of life. These medications can also be used to help manage pain in patients with serious illness. It is important to use them with care and to follow the directions on the label. Do not take more than the prescribed dose, and do not take them with alcohol or other drugs that can increase the risk of side effects.

WHAT ARE THE RISKS AND SIDE EFFECTS OF OPIOID USE?

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1 in 4

OPPIOIDS AND CHRONIC PAIN

Chronic pain is a leading cause of disability in the United States. It is a complex condition that can be difficult to manage. Prescription opioids are often used to help manage chronic pain, but they can also be addictive and can cause side effects. It is important to use them with care and to follow the directions on the label. Do not take more than the prescribed dose, and do not take them with alcohol or other drugs that can increase the risk of side effects.

4.3

PRESCRIPTION OPIOID OVERDOSE IS AN EPIDEMIC IN THE US

Prescription opioid overdose is a leading cause of death in the United States. It is a complex condition that can be difficult to manage. Prescription opioids are often used to help manage chronic pain, but they can also be addictive and can cause side effects. It is important to use them with care and to follow the directions on the label. Do not take more than the prescribed dose, and do not take them with alcohol or other drugs that can increase the risk of side effects.

Promoting Safer and More Effective Pain Management (PDF)

Pregnancy and Opioids

PREGNANCY AND OPIOID PAIN MEDICATIONS

Women who take opioid pain medications should be aware of the possible risks during pregnancy. It is important to use them with care and to follow the directions on the label. Do not take more than the prescribed dose, and do not take them with alcohol or other drugs that can increase the risk of side effects.

ARE OPIOID PAIN MEDICATIONS SAFE FOR WOMEN WHO ARE PREGNANT OR PLANNING TO BECOME PREGNANT?

Women who take opioid pain medications should be aware of the possible risks during pregnancy. It is important to use them with care and to follow the directions on the label. Do not take more than the prescribed dose, and do not take them with alcohol or other drugs that can increase the risk of side effects.

Pregnancy and Opioid Pain Management (PDF)

Narx Scores

The NarxCare application delivers several elements of discrete data and a visually enhanced, interactive PDMP report. Contained on the report, and delivered as discrete data, are three type-specific *use* scores called Narx Scores. These Narx Scores numerically represent the PDMP data for a patient.

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

1. Each score consists of three digits ranging from 000–999.
2. The last digit of each score represents the number of active prescriptions of that type. For example, a Narx Score of 504 indicates the patient should have four active narcotic prescriptions according to dispensation information in the PDMP.
3. The scores correspond to the number of literature-based risk factors that exist within the PDMP data. These risk factors include:
 - a. The number of prescribers
 - b. The number of pharmacies
 - c. The amount of medication dispensed (often measured in milligram equivalencies)
 - d. The number of times prescriptions of a similar type overlap from different prescribers
4. The time elapsed for any risk factor serves to decrease its contribution to the score. For example, 1000 MME dispensed within the last month will elevate the score *more than* 1000 MME dispensed one year ago.
5. The distribution of Narx Scores for patients found in a PDMP is approximated as follows:
 - a. 75% score less than 200
 - b. 5% score more than 500
 - c. 1% score more than 650

The Narx Scores were designed such that:

1. Patients who use small amounts of medication with limited provider and pharmacy usage will have **low scores**.
2. Patients who use large amounts of medications in accordance with recommended guidelines (single provider, single pharmacy, etc.) will have **mid-range scores**.
3. Patients who use large amounts of medications while using many providers and pharmacies, and with frequently overlapping prescriptions, will have **high scores**.

Narx Score Algorithm

Relative Scoring

Narx Scores represent a *relative scoring* system wherein the risk factors representing use within a PDMP report are counted and then converted to a reference value that ranges from 0–99. These reference values correlate with a percentile measurement of that use within the PDMP population.

A single point measurement of 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: 4800 MME
- Patient C: 1050 MME

If we were to place these three patients on a line of relative risk, we could intuit a linear relationship based on MME, which could be depicted as follows:



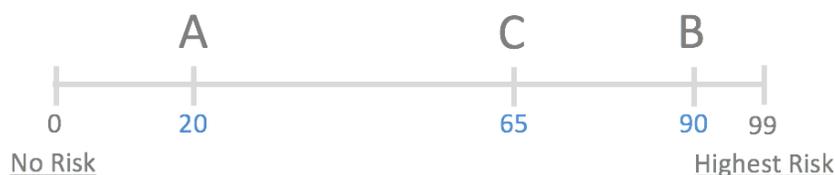
This depiction has no boundaries to the left or right so these patients could just as easily be drawn as follows:



The NarxCare algorithm uses a unique strategy to establish boundaries of use by converting all measured variables, such as 60-day MME, to a scaled value between 0 and 99. This was done by evaluating a large PDMP population and measuring the 60-day MME value for every patient. 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 we get:

- Patient A: 160 MME | 20
- Patient B: 4800 MME | 90
- Patient C: 1050 MME | 65

If we apply these new scaled values to our risk diagram and create a left and right boundary of 0 and 99, we get:



Interestingly, the population-based 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.

Time Periods

The NarxCare algorithm evaluates a PDMP record using four different, overlapping time periods. In each time period, the risk factor being evaluated is tabulated and then converted to a scaled value. An example provider reference table is provided below.

Prescribers	2mo Scaled	6mo Scaled	1yr 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 ...				

These reference tables exist for all the risk 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. Some examples are provided below.

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 ...				

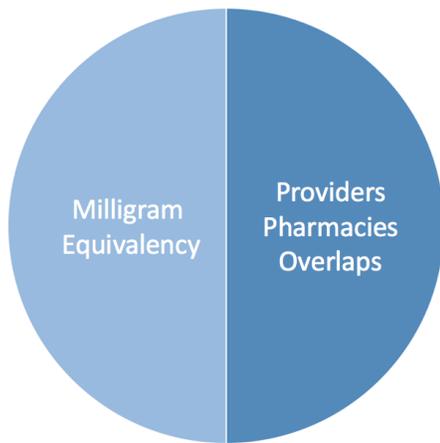
Pharmacy Count	2mo Scaled	6mo Scaled	1 yr Scaled	2yr Scaled
0	0	0	0	0
1	25	16	13	10
2	45	31	25	19
3	63	44	35	27
4	78	56	45	35
5	90	67	54	42
6	99	76	62	49
And so on ...				

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 ...				

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 ...				

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 risk factors making up the other 50%.



This type of weighting results in several reliable relationships. If we think of milligram equivalency as *consumption* and the combination of providers, pharmacies, and overlaps collectively as *behaviors*, we can intuit the following score categories.

	<u>Consumption</u>	<u>Behaviors</u>	<u>Narx Score</u>
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 always necessary to look at the actual PDMP data to determine what use patterns exist that have resulted in the Narx Score presented.

Algorithm and Score Computation

The following steps are involved with 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 risk factor for all time periods.
4. Determine the weighted average.
5. Add (concatenate) the number of active prescriptions.

Using a sample patient as an example 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
Morphine milligram eq	74	87	88	87
Lorazepam milligram eq	0	0	0	0
Overlaps	41	70	64	52

3. Average the scaled value for each risk 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. Add (concatenate) the number of active prescriptions

	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								<u>2</u>
Narcotic Score								<u>632</u>

Clinical Application

In-Workflow Use

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 the scores in the patient header or alongside the patient’s vital signs.

Narx Scores are best viewed at the beginning of a patient encounter, and as such, they should be obtained at or near the time a patient is registered.

General Considerations

- The primary purpose of providing Narx Scores is to raise provider awareness of the associated PDMP data available for review.
- Concerning Narx Scores are intended to trigger a *discussion*, **not a decision**. If a Narx Score raises concern, the recommended course of action is to evaluate the PDMP data, review any additional pertinent data, and discuss any concerns with the patient.
- Just as there is no single blood pressure that can be considered *normal* for all people, there is no Narx Score that is *normal*. A Narx Score must be applied to the clinical scenario before evaluating appropriateness. 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
- Narx Scores are distributed within the PDMP population as follows:
 - 75% of patients score below 200
 - 5% of patients score above 500
 - 1% of patients score above 650

Example Use Cases

Narx Scores can be used to great effect in certain clinical scenarios. Again, the recommended course of action is to seek additional information and discuss concerns with the patient.

- **Case A** – A 17-year-old male basketball player with other significant history presents with a severe ankle sprain. His Narx Scores are:

<u>Narcotic</u>	<u>Sedative</u>	<u>Stimulant</u>
000	000	000

Important consideration: If considered for an opioid due to the severity of injury, this may be the patient’s first exposure to the effects of an opioid. Recommend thorough review of the risks and benefits with the patient and consideration of an informed consent process.

- **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:

<u>Narcotic</u>	<u>Sedative</u>	<u>Stimulant</u>
341	501	000

Important Consideration: Many elderly patients are on chronic opioids and benzodiazepines. The use of opioids and benzodiazepines for this patient may have contributed to her fall. The patient may be taking enough medication to develop anxiety seizures due to benzodiazepine withdrawal, complicating the medical picture.

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

<u>Narcotic</u>	<u>Sedative</u>	<u>Stimulant</u>
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.

Score-Based Guidance

Score/Range	Notes	Recommendations*
000	This may be the first prescription of this type for the patient.	Discuss risks/benefits of using a controlled substance. Consider informed consent.
010–200	Approximately 75% of scores fall in this range. Occasionally, patients in this score range have a remote history of high usage (> 1 year ago).	Review use patterns for unsafe conditions. Discuss any concerns with patient. See guidance below. If previously high usage exists with recent abstinence, consider risk/benefits of new prescriptions.

Score/Range	Notes	Recommendations*
201–650	Approximately 24% of scores fall in this range.	Review use patterns for unsafe conditions. Discuss any concerns with patient. See guidance below.
> 650	<p>Approximately 1% of scores fall in this range.</p> <p>Some patient records may have a score in this range and <i>still be within prescriber expectations</i>.</p> <p>Many patient records include some level of multiple provider episodes, overlapping prescriptions, or elevated milligram equivalency.</p>	<p>Review use patterns for unsafe conditions.</p> <p>If multiple providers involved in unsafe prescribing, discuss concern with patient and consider contacting other providers directly.</p> <p>If multiple pharmacies involved in unsafe prescribing, discuss concern with patient and consider pharmacy lock-in program.</p> <p>If overlapping medications of same or different type, discuss concern with patient and consider taper to lower dose and/or discontinuation of potentiating medications.</p> <p>If patient has evidence of a substance use disorder, consider inpatient admit or referral for outpatient evaluation and treatment.</p>