

Needs Assessment Tool for Drug Overdose and Related Outcomes: Methodology and Recommendations

I. Background

In 2022, Governor Youngkin launched the behavior health transformation plan: *Right Help, Right Now: Transforming Behavioral Health Care for Virginians*, outlining a three-year plan that all Virginians will be able to access behavioral health care and prevention and management services, including substance use disorder treatment services. This tool was developed to support the *Right Help, Right Now* initiative.

II. Indicator selection and data source documentation

The Virginia Department of Health (VDH) compiled the methodology below to determine Virginia localities at higher need for drug overdose-related prevention and intervention strategies, such as comprehensive harm reduction program expansion, naloxone distribution, and fentanyl wastewater surveillance piloting through the *Right Help, Right Now* initiative. Indicators are used to assess whether a locality may have higher drug overdose and misuse burden and other infectious disease outcomes associated with drug use (e.g., hepatitis C and HIV) in their communities. Socioeconomic indicators (e.g., poverty and unemployment) are also included because these factors are related with a locality being at higher risk for drug overdose and misuse.^{1,2}

These indicators are listed below:

1. Counts and crude rates per 100,000 population of all-drug overdose deaths
2. Counts and crude rates per 10,000 emergency department visits of all-drug overdose emergency department visits
3. Counts and crude rates per 100,000 population of nonfatal all-drug overdose inpatient hospitalizations
4. Percent of population in poverty
5. Percent of population unemployed
6. Counts and crude rates per 100,000 population of people prescribed opioids (i.e., prescription opioid volume)
7. Counts and crude rates per 100,000 population of people prescribed buprenorphine (i.e., buprenorphine prescription volume; potential to provide medication-assisted treatment)

¹ <https://www.sciencedirect.com/science/article/abs/pii/S0376871618308408?via%3Dihub>

² <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6968850/>

8. Counts and crude rates per 100,000 population of newly reported hepatitis C cases among people aged 18-30 years
9. Counts and crude rates per 100,000 population of newly diagnosed HIV cases
10. Counts and crude rates per 100,000 population of new drug treatment admissions to publicly funded community service boards
11. Counts and crude rates per 100,000 population of arrestees for drug/narcotic-related arrests
12. Counts and crude rates per 10,000 emergency medical services incidents of patients receiving naloxone with positive responses

Selected Indicators and Relevant Notes

The following section includes the list of indicators with accompanying data sources and relevant notes.

1. Overdose Deaths

Description: All-drug overdose deaths by locality in calendar year 2021 (counts and rates per 100,000 population)

Data source: Death certificate data from the VDH Vital Event Statistics Program

Notes: Drug overdose deaths include all drugs and all intents (unintentional, suicide, homicide, or undetermined). Deaths are of Virginia residents only, including Virginia residents who died out of state. All-drug overdose deaths follow the [World Health Organization and Centers for Disease Control and Prevention definition](#) using the following underlying cause-of-death ICD-10 codes: X40-X44 (unintentional), X60-X64 (suicide), X85 (homicide), Y10-Y14 (undetermined).

Data are maintained by VDH Office of Information Management and analyzed by Injury and Violence Prevention epidemiology staff, VDH Division of Population Health Data, Office of Family Health Services. Data are produced and processed from sources believed to be reliable and accurate at that point of time.

2. Emergency Department Visits

Description: Emergency department visits due to all-drug overdoses by locality in calendar year 2021 (counts and rates per 10,000 emergency department visits)

Data source: Syndromic surveillance emergency department visit data from CDC ESSENCE

Notes: Syndromic surveillance data reporting to VDH by hospitals and freestanding emergency departments in Virginia of count and rate statistics for emergency department visits for unintentional drug overdose among Virginia residents. One hundred percent (100%) of hospital-based emergency departments report to ESSENCE.

[The all-drug case definition was updated in June 2022.](#)

[Data from the 2015-2023 Statistics file \(published on May 10, 2023\).](#)

Geographic location is assigned based on patient's residential zip code provided. A single zip code may span multiple localities in Virginia. If a patient resides in a spanning zip code, the visit is assigned to the locality where most of the population lives. Some localities were combined to calculate an overdose visit count and rate due to zip counts spanning multiple localities. Those localities are indicated in the report.

Rates per 10,000 emergency department visits equals the total number of emergency department visits among Virginia residents of a defined geographic area each month. The 2021 rate per 10,000 emergency department visits is based on the monthly average rate for calendar year 2021. This metric provides a consistent rate calculation across time when reporting by emergency departments change (increases or decreases) as compared to the rate per 100,000 population.

Data are maintained and analyzed by the VDH Enhanced Surveillance team, Division of Surveillance and Investigation, Office of Epidemiology.

3. Nonfatal Inpatient Hospitalizations

Description: Nonfatal inpatient hospitalizations due to all-drug overdoses by locality in calendar year 2021 (counts and rates per 100,000 population).

Data source: Virginia Health Information (VHI) inpatient hospitalization data.

Notes: Data are of nonfatal inpatient hospitalizations only and represent Virginia resident hospitalizations within Virginia. Virginia residents hospitalized outside of Virginia are excluded, which may cause potential underreporting of Virginia residents from bordering areas of the state who go out of state for care.

Hospitalization data are from 100% of Virginia-licensed hospitals and do not include federal entities, rehabilitative hospitals, or state psychiatric hospitals.

Indicator definitions come from the [Drug Overdose Indicator](#) from the Council of State and Territorial Epidemiologists (CSTE) Injury Surveillance toolkit. Data are produced and processed from sources believed to be reliable and accurate at that point of time. The city/county is based on the zip code of the patient's residence at time of hospitalization. Some Virginia zip codes may cross city/county boundaries. This may cause under- or over-reporting of hospitalizations at the city/county level for those localities with zip codes that cross boundaries.

Data are maintained by VDH Office of Information Management (OIM) and analyzed by Injury and Violence Prevention (IVP) epidemiology staff, VDH Division of Population Health Data, Office of Family Health Services.

4. Poverty estimates by locality

Description: Poverty estimates by locality in calendar year 2021; percentage of persons living in the locality below the poverty threshold (percentages)

Data source: United States (U.S.) Census Bureau: Small Area Income and Poverty Estimates

Notes: Poverty percentage estimates are based on all ages by locality in Virginia; see Methodology page for additional details on the model used to estimate poverty: <https://www.census.gov/programs-surveys/saipe/technical-documentation/methodology.html>. Data pulled on April 6, 2023 from the U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE) data dashboard: https://www.census.gov/data-tools/demo/saipe/#/?s_state=51&s_county=&s_district=&s_geography=county.

5. Unemployment estimates by locality

Description: Unemployment estimates by locality in calendar year 2021 (percentages)

Data source: U.S. Bureau of Labor Statistics Labor Force Data by County, 2021 Annual Averages: Local Area Unemployment Statistics

Notes: Data are as of March 1, 2023; labor force data by county, 2021 annual averages are from: <https://www.bls.gov/lau/tables.htm#cntyaa>. See Methodology page for additional details on the model used to estimate labor force and unemployment: <https://www.bls.gov/lau/laumthd.htm>.

6. Prescribed Opioid Volume by locality

Description: Persons prescribed prescription opioids by locality in calendar year 2021 (prescription opioid volume) (counts and rates per 100,000 population)

Data source: Virginia All-Payer Claims Database (APCD)

Notes: Opioid prescription claims are calculated using the All-Payer Claims Database and subset to the individual count of persons receiving prescription opioids in calendar year 2021. The Virginia APCD currently contains 100% Medicare, 100% Medicaid, and about 45-60% of the commercial population. The APCD collects paid medical and pharmacy claims for roughly 4-4.5 million Virginia residents. Most individuals not included are: federal employees, those that are active duty or have TRICARE, and the uninsured. The largest missing population are individuals with ERISA self-insured plans (big private employers), since those plans are not required to submit data to the APCD. Data are based on the patient's residence at time of pharmacy claim. More information can be found here: <https://www.vhi.org/apcd/>.

7. Persons prescribed buprenorphine by locality

Description: Persons prescribed buprenorphine by locality in calendar year 2021 (potential to treat opioid use disorder) (counts and rates per 100,000 population)

Data source: Virginia All-Payer Claims Database (APCD)

Notes: Buprenorphine prescription claims are calculated using the All-Payer Claims Database (APCD) for the individual count of persons receiving a prescription for buprenorphine in calendar year 2021. Claims for prescription drugs included were: Belbuca, Buprenex, buprenorphine, buprenorphine buccal, buprenorphine HCL, buprenorphine HCL/naloxone, buprenorphine hydrochloride, Butrans, Sublocade, Subutex, Suboxone, and Zubsolv. Virginia APCD currently contains 100% Medicare, 100% Medicaid, and about 45-60% of the commercial population. The APCD collects paid medical and pharmacy claims for roughly 4-4.5 million Virginia residents. Most individuals not included are: federal employees, those that are active duty or have TRICARE, and the uninsured. The largest missing population are individuals with ERISA self-insured plans (big private employers), since those plans are not required to submit data to the APCD. Data are based on the patient's residence at time of pharmacy claim. More information can be found here: <https://www.vhi.org/apcd/>.

8. Newly Reported Hepatitis C cases

Description: Newly reported hepatitis C cases among persons aged 18-30 years in calendar year 2021 (counts and rates per 100,000 population)

Data source: Virginia Electronic Disease Surveillance System (VEDSS)

Notes: Data included are probable and confirmed hepatitis C cases among Virginia residents aged 18-30 years. Data also include people who were incarcerated so localities containing correctional facilities which may show higher rates of newly identified cases. Injection drug use is the most common risk factor reported among newly identified confirmed-acute hepatitis C cases, and particularly among those aged 18-30 years. The denominator used to calculate rates per 100,000 population only include persons aged 18-30 years.

Data are maintained and analyzed by the VDH Division of Surveillance and Investigation, Office of Epidemiology.

9. Newly Diagnosed HIV Cases

Description: Newly diagnosed HIV cases in calendar year 2021 (counts and rates per 100,000 population)

Data source: Enhanced HIV/AIDS Reporting System (eHARS)

Notes: New HIV diagnoses are based on the date of diagnosis and the locality where the HIV case was residing at time of diagnosis. Data come from the [Annual HIV Report 2021](#) and were accessed in April 2023. The COVID-19 pandemic impacted access to HIV testing, HIV care services, and HIV case surveillance activities. Data in 2021 should be interpreted with caution, as 2021 totals are lower than expected.

Data are maintained and analyzed by the VDH Division of Disease Prevention, Office of Epidemiology.

10. New All Substance Use Disorder Admissions

Description: New all substance use disorder admissions to publicly funded community service boards in calendar year 2021 (counts and rates per 100,000 population)

Data source: Department of Behavioral Health and Developmental Services (DBHDS)

Notes: Data are of new admissions, not number of people, and based on patient's residence at time of admission. Some people may have more than one admission. Counts do not include new admissions from out-of-state residents or residents who are unhoused.

Data are maintained and analyzed by DBHDS.

11. Arrests

Description: Arrestees for drug/narcotic violations by locality in calendar year 2021 (counts and rates per 100,000 population)

Data source: Virginia State Police Virginia Crime Repository

Notes: Data were accessed in May 2023 and come from the Arrests by Jurisdiction report on the Virginia Crime Repository. Arrests include local agencies and Virginia State Police arrests. Arrests are a count by persons and not by charges lauded.

Data are maintained by Virginia State Police.

12. Naloxone Administrations

Description: Naloxone administrations with positive responses in calendar year 2021 (counts and rates per 10,000 emergency medical services incidents)

Data source: VDH Office of Emergency Medical Services ESO Pre-Hospital Data System

Notes: Data are as of April 17, 2023.

Inclusion Criteria:

- Unit Notified by Dispatch Date is between January 1, 2021 and December 31, 2021;

- Medication Given includes “Naloxone” or “Narcan”; and
- Response to Medication is equal to “Improved”.

Exclusion Criteria:

- Records that did not have a submission status of “passed” (for records with a date unit notified by dispatch between 5/18/2021 and 12/31/2022; historical records prior to 5/18/21 do not contain a value in the submission status field and therefore are unaffected by this exclusion criteria);
- Records with a Type of Service Requested equal to Mutual Aid, Public Assistance, or Standby; and
- Records with an Incident/Patient Disposition of Assist, Canceled, Standby, Non-Patient Transport, or Patient Treated, Transferred Care to Another EMS Unit.

The total doses of naloxone administered is more than the number of patients who received naloxone, as the same patient can receive multiple doses. Numbers do not reflect total number of naloxone administrations given in Virginia, as naloxone can be administered in other healthcare encounters. Accuracy of the data within ESO is limited by system performance and accuracy of data submissions from hospitals.

Data are maintained and analyzed by the VDH Office of Emergency Medical Services.

III. Methodology for locality determination

A state rate and a state average count (state total count divided by 133 localities) are calculated for Indicators 1-3 and 6-12 (except for Indicators 4 and 5, which are percentages). Crude rates are calculated as the total count per 100,000 population (Indicators 1, 3, 6-11), total count per 10,000 emergency department visits (Indicator 2), or total count per 10,000 emergency medical services incidents (Indicator 12). Rates are the total count divided by the specified population size and multiplied by 10,000 or 100,000. Rates help to compare groups of different population sizes as if they were the same size. Centers for Disease Control and Prevention National Center of Health Statistics (CDC NCHS) [2020 population estimates](#) are used to determine crude rates per 100,000 population.

Counts, crude rates, and percentages by locality are calculated. Counts and rates are provided for Indicators 1-3 and 6-12. Locality percentages are provided for Indicators 4 and 5. Localities are considered as having the indicator if the locality count, rate, or percentage for each indicator is above the state average count, state rate, or state percentage. If a count, rate, or percentage for a locality is above the state threshold, the locality receives one (1) point for that indicator. If a locality meets both the count and the rate for Indicators 1-3 and/or 6-12, that locality receives two (2) points for that indicator. If a count, rate, or percentage for a locality is equal to or under the state threshold, the locality receives zero (0) points for that indicator. The points that each locality receives from the 12 indicators are summed together to provide an overall indicator score for that locality. The minimum

score a locality can receive is zero (0), and the maximum score a locality can receive is 22. A state average indicator score is also calculated (total number of points for the state divided by 133 localities). The average state indicator score is 9. If the locality’s indicator score is above the state score (10-22), the locality is deemed as a priority locality.

IV. Results

Table 2 shows the list of all Virginia 133 localities with its associated VDH health district, and the locality’s assessment score. Fifty-six (56) localities were identified as higher need with an assessment score of ten (10) or higher. One locality (Roanoke City) received the highest score available. Those localities identified as higher need are indicated with an “X” in Table 2. Figure 1 is a map of all Virginia localities. Localities in dark gray (n=56) were identified as “higher need” with a score of 10-22, and localities in white (n=77) were identified as “lower need” with a score of 0-9.

Table 2. List of Assessment Scores by Virginia Locality

Locality	Health District	Assessment Score	Higher Need (X indicates a higher need locality)
Accomack County	Eastern Shore	9	
Albemarle County	Blue Ridge	5	
Alexandria City	Alexandria	7	
Alleghany County	Alleghany	7	
Amelia County	Piedmont	3	
Amherst County	Central Virginia	6	
Appomattox County	Central Virginia	7	
Arlington County	Arlington	11	X
Augusta County	Central Shenandoah	7	
Bath County	Central Shenandoah	5	
Bedford County	Central Virginia	13	X
Bland County	Mount Rogers	8	
Botetourt County	Alleghany	5	
Bristol City	Mount Rogers	12	X
Brunswick County	Southside	8	
Buchanan County	Cumberland Plateau	12	X
Buckingham County	Piedmont	7	
Buena Vista City	Central Shenandoah	7	
Campbell County	Central Virginia	4	
Caroline County	Rappahannock	8	
Carroll County	Mount Rogers	8	
Charles City County	Chickahominy	4	

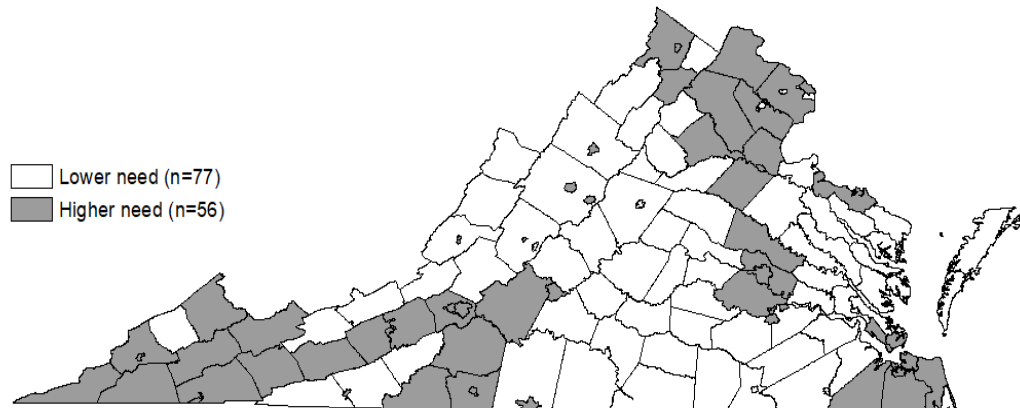
Charlotte County	Piedmont	7	
Charlottesville City	Blue Ridge	9	
Chesapeake City	Chesapeake	13	X
Chesterfield County	Chesterfield	16	X
Clarke County	Lord Fairfax	4	
Colonial Heights City	Chesterfield	13	X
Covington City	Alleghany	10	X
Craig County	Alleghany	4	
Culpeper County	Rappahannock-Rapidan	13	X
Cumberland County	Piedmont	6	
Danville City	Pittsylvania/Danville	16	X
Dickenson County	Cumberland Plateau	8	
Dinwiddie County	Crater	4	
Emporia City	Crater	8	
Essex County	Three Rivers	6	
Fairfax City	Fairfax	3	
Fairfax County	Fairfax	10	X
Falls Church City	Fairfax	2	
Fauquier County	Rappahannock-Rapidan	10	X
Floyd County	New River	5	
Fluvanna County	Blue Ridge	4	
Franklin City	Western Tidewater	9	
Franklin County	West Piedmont	13	X
Frederick County	Lord Fairfax	13	X
Fredericksburg City	Rappahannock	11	X
Galax City	Mount Rogers	10	X
Giles County	New River	9	
Gloucester County	Three Rivers	6	
Goochland County	Chickahominy	2	
Grayson County	Mount Rogers	6	
Greene County	Blue Ridge	5	
Greensville County	Crater	7	
Halifax County	Southside	6	
Hampton City	Hampton	16	X
Hanover County	Chickahominy	12	X
Harrisonburg City	Central Shenandoah	13	X
Henrico County	Henrico	17	X
Henry County	West Piedmont	18	X
Highland County	Central Shenandoah	2	
Hopewell City	Crater	12	X

Isle of Wight County	Western Tidewater	3	
James City County	Peninsula	9	
King and Queen County	Three Rivers	8	
King George County	Rappahannock	2	
King William County	Three Rivers	5	
Lancaster County	Three Rivers	5	
Lee County	Lenowisco	11	X
Lexington City	Central Shenandoah	4	
Loudoun County	Loudoun	10	X
Louisa County	Blue Ridge	7	
Lunenburg County	Piedmont	5	
Lynchburg City	Central Virginia	19	X
Madison County	Rappahannock-Rapidan	3	
Manassas City	Prince William	5	
Manassas Park City	Prince William	2	
Martinsville City	West Piedmont	17	X
Mathews County	Three Rivers	3	
Mecklenburg County	Southside	5	
Middlesex County	Three Rivers	8	
Montgomery County	New River	11	X
Nelson County	Blue Ridge	5	
New Kent County	Chickahominy	5	
Newport News City	Peninsula	18	X
Norfolk City	Norfolk	16	X
Northampton County	Eastern Shore	6	
Northumberland County	Three Rivers	6	
Norton City	Lenowisco	11	X
Nottoway County	Piedmont	8	
Orange County	Rappahannock-Rapidan	6	
Page County	Lord Fairfax	9	
Patrick County	West Piedmont	11	X
Petersburg City	Crater	16	X
Pittsylvania County	Pittsylvania/Danville	7	
Poquoson City	Peninsula	4	
Portsmouth City	Portsmouth	19	X
Powhatan County	Chesterfield	2	
Prince Edward County	Piedmont	6	
Prince George County	Crater	7	
Prince William County	Prince William	11	X
Pulaski County	New River	13	X

Radford City	New River	10	X
Rappahannock County	Rappahannock-Rapidan	3	
Richmond City	Richmond	20	X
Richmond County	Three Rivers	6	
Roanoke City	Roanoke	22	X
Roanoke County	Alleghany	17	X
Rockbridge County	Central Shenandoah	3	
Rockingham County	Central Shenandoah	7	
Russell County	Cumberland Plateau	10	X
Salem City	Alleghany	11	X
Scott County	Lenowisco	10	X
Shenandoah County	Lord Fairfax	8	
Smyth County	Mount Rogers	11	X
Southampton County	Western Tidewater	3	
Spotsylvania County	Rappahannock	16	X
Stafford County	Rappahannock	15	X
Staunton City	Central Shenandoah	10	X
Suffolk City	Western Tidewater	12	X
Surry County	Crater	3	
Sussex County	Crater	7	
Tazewell County	Cumberland Plateau	15	X
Virginia Beach City	Virginia Beach	11	X
Warren County	Lord Fairfax	12	X
Washington County	Mount Rogers	13	X
Waynesboro City	Central Shenandoah	11	X
Westmoreland County	Three Rivers	10	X
Williamsburg City	Peninsula	3	
Winchester City	Lord Fairfax	12	X
Wise County	Lenowisco	12	X
Wythe County	Mount Rogers	12	X
York County	Peninsula	3	

IV. Map

Figure 1: Needs Assessment Map by Locality



Summary

The map shows Virginia communities that may benefit from additional resources to address drug overdose-related outcomes and substance use. An assessment score for each Virginia locality (counties and independent cities) is compared to the state score of nine (9). If a locality received a score of 10 or higher, it is considered at higher need for drug overdose-related outcomes and substance use. Localities with higher need may benefit from additional resources and support for prevention and intervention services.

VI. Recommendations

VDH presents this tool to identify localities at higher need for drug overdose prevention and intervention strategies statewide. The methodology includes rates *and* counts when assessing localities that may be at higher risk for drug overdose and related outcomes. Although rates are most used for epidemiologic comparison between populations, rates may tend to underestimate burden in localities with larger population sizes. However, rates are used to compare equally across population sizes, thus allowing for smaller, and sometimes more rural, localities to be considered. Counts reflect higher morbidity (i.e., nonfatal drug overdose) and mortality (i.e., drug overdose death) in an area and should be considered when assessing potential burden, but counts are typically higher in larger population sizes (i.e., higher number of drug overdose deaths where there are more people living in a locality). This can result in smaller, and potentially more rural, localities to not be considered. Scoring methodology that uses counts and rates may more comprehensively identify localities at higher need, while still maintaining a selective approach based on available data.

However, it is important to note that this tool does not assess a locality's staff or resource capacity, readiness, or ability to reach the most highly impacted populations to develop and implement prevention and intervention strategies. These factors should also be considered when establishing, expanding, and sustaining drug overdose and substance use-related prevention initiatives. This overdose needs assessment tool should be considered as one of many available tools that can assess drug overdose prevention efforts.