

# Measuring Outcomes Associated with the Ongoing Opioid/Injection Drug Use Crisis: A County-level Burden Assessment of Overdose and Infectious Disease Outcomes, 2016-2017

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The ongoing opioid and injection drug use (opioid/IDU) crisis continues to result in increasing morbidity and mortality throughout North Carolina. Between 2010 and 2017, significant increases were observed in both fatal and non-fatal overdoses and infectious complications of drug use. The incidence of acute hepatitis C virus (HCV) infection increased by 350% during this period and increases were also seen in acute hepatitis B virus (HBV) infection and drug-associated endocarditis. In 2016, we conducted an initial vulnerability assessment (using data from 2010 to 2014) to identify counties experiencing the highest burden of these outcomes. We identified counties primarily in the western Appalachian region of the state and subsequently prioritized these areas for expanded testing and linkage to care programs. In 2019, we completed a follow-up assessment to identify county-level burden and understand the changing distributions of these outcomes across the state.

## Methods

Overdose and infectious disease indicators were used to assess the burden of opioid/IDU associated morbidity and mortality in all 100 counties in North Carolina. Count data from 2016 and 2017 were used to calculate county-level pooled rates for each indicator. Indicators included: acute HCV incidence, acute HBV incidence, newly reported chronic HCV (in individuals ages 18-40; 2017 only), opioid related overdose ED visits, drug-associated infective endocarditis hospitalizations, number of Buprenorphine patients, unintentional drug related deaths, and injection drug use related new HIV diagnoses. All variables were standardized into z-scores and summed to create an overall score with equal weight assigned to each indicator. The summed scores were then ranked in descending order

from 1 to 100 with lower rankings indicating higher burden. Rankings were divided into quartiles and stratified by the presence of syringe exchange programs (SEP).

## Results

Every county in North Carolina has experienced outcomes associated with the opioid/IDU crisis. The western Appalachian region of the state continues to experience a disproportionately high burden of the morbidity and mortality associated with this crisis (Table 1). However, new areas of the state have been identified in the highest quartile including counties in the southeast and central coastal region as well as a few rural counties in the central Piedmont region (Figure 1). Importantly, more than half of the counties in the top quartile (52%) are not currently serviced by an Syringe Exchange Program (SEP) (Figure 2).

## Conclusions

All counties in North Carolina continue to experience significant morbidity and mortality associated with the opioid epidemic. Most indicators, particularly the infectious outcomes, are continuing to increase statewide (data not shown). This assessment identified that the western Appalachian counties are continuing to experience the highest burden of overdose and infectious disease outcomes, but new regions of the state have been identified in the highest burden quartile. Expanding SEPs, particularly to all counties in the highest quartile, may reduce morbidity and mortality.

## Recommendations

Since nearly half of the counties identified in the highest quartile for overdose and infectious disease outcomes did not have an SEP servicing their county, expanding SEPs to these counties/regions is a priority (see <https://www.ncdhhs.gov/divisions/public-health/north-carolina-safer-syringe-initiative>).

Health departments in higher burden counties are encouraged to increase viral hepatitis and HIV testing among high risk patients, spread awareness about hepatitis C testing and treatment among providers, and connect providers to the Carolina Hepatitis C Academic Mentorship Program (<http://www.med.unc.edu/champ>).

**Table 1.** Overall county-level rankings (highest quartile, 1-25) and rankings among select indicators, 2016-2017, North Carolina.

Rank	Final Rank	Overdoses (NC DETECT <sup>1</sup> )		Acute HCV (NC EDSS <sup>2</sup> )		Acute HBV (NC EDSS <sup>2</sup> )		Endocarditis (SCHS <sup>3</sup> )		Buprenorphine Pts (CSRS <sup>4</sup> )	
<b>Avg.<sup>5</sup></b>		98/100,000		3/100,000		2/100,000		10/100,000		669/100,000	
1	Graham	Pamlico	349	Graham	41	Graham	23	Swain	77	Mitchell	2117
2	Swain	New Hanover	258	Swain	21	Cherokee	16	Cherokee	45	Swain	1871
3	Cherokee	Craven	215	Cherokee	13	Caldwell	15	Surry	40	Dare	1510
4	Wilkes	Swain	214	Caldwell	12	Anson	10	Wilkes	40	Person	1413
5	Mitchell	Stokes	183	Jackson	9	Vance	8	Burke	32	Wilkes	1383
6	Craven	Cabarrus	176	Brunswick	9	Gaston	8	Caldwell	29	Alexander	1347
7	Burke	Haywood	175	Clay	9	Warren	8	Graham	29	Carteret	1272
8	Caldwell	Gaston	171	Randolph	9	Lee	7	McDowell	29	Ashe	1247
9	Jones	Buncombe	168	Surry	9	Jackson	7	Randolph	25	Haywood	1206
10	New Hanover	Jones	156	Watauga	8	Madison	7	Person	24	Columbus	1166
11	Randolph	Rowan	156	Rutherford	8	Burke	7	Avery	20	Yancey	1151
12	Rowan	Lincoln	155	Macon	6	Stokes	5	Mitchell	20	Graham	1118
13	Pamlico	Stanly	152	Currituck	6	Brunswick	4	Craven	19	Brunswick	1105
14	Brunswick	Yadkin	151	Avery	6	Catawba	4	Yadkin	19	Beaufort	1022
15	Gaston	Lee	141	Wilkes	5	Wilkes	4	Davidson	18	Richmond	993
16	Haywood	Randolph	141	Polk	5	Davidson	4	Yancey	17	Avery	973
17	McDowell	Guilford	140	Greene	5	Rowan	4	Vance	17	Transylvania	940
18	Surry	Catawba	137	Alleghany	5	Swain	4	Haywood	16	New Hanover	936
19	Yancey	Robeson	135	Lenoir	4	Randolph	3	Catawba	16	Vance	921
20	Stokes	Carteret	134	Iredell	4	Harnett	3	Stokes	15	Gaston	911
21	Yadkin	Columbus	132	Stanly	4	Haywood	3	Martin	15	Lee	877
22	Lee	Davidson	129	Burke	4	Macon	3	Rutherford	15	Surry	820
23	Jackson	Vance	124	Rockingham	4	Columbus	3	Bladen	15	Burke	815
24	Vance	Burke	123	Catawba	4	Yadkin	3	Alexander	13	Pender	809
25	Greene	Graham	123	Harnett	4	Moore	3	Columbus	13	Montgomery	798

<sup>1</sup>Communicable Disease Branch—Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT).

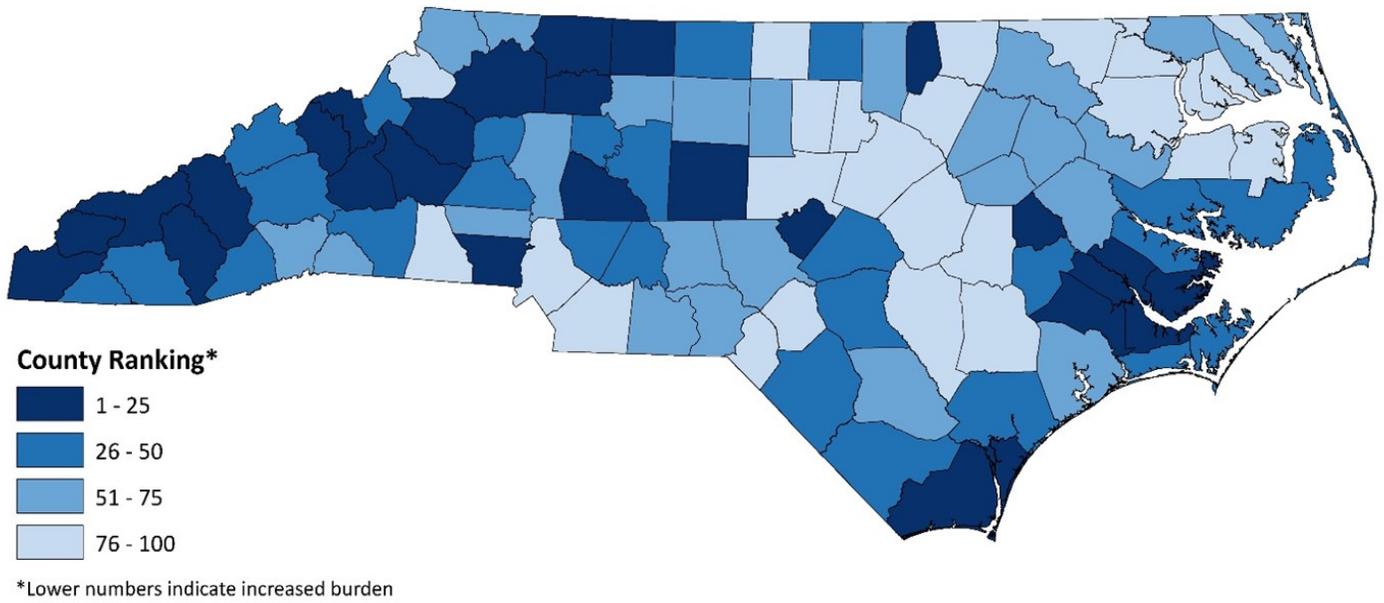
<sup>2</sup>Communicable Disease Branch—Electronic Disease Surveillance System (NC EDSS).

<sup>3</sup>State Center for Health Statistics—State Hospital Discharge Database.

<sup>4</sup>North Carolina Division of Mental Health—Controlled Substance Reporting System (CSRS)

<sup>5</sup>Statewide average rate.

**Figure 1.** Ranking of Counties into Quartiles of Overdose and Infectious Disease Burden, 2016-2017, North Carolina.



**Figure 2.** Ranking of Counties into Quartiles of Overdose and Infectious Disease Burden with Overlaid Syringe Service Programs, 2016-2017, North Carolina.

