Washington State Hepatitis C Vulnerability Assessment

Background

Hepatitis C (HCV) is increasing in the United States[1] and in Washington State.[2] Approximately 80% of acute HCV cases are among people who inject drugs (PWID),[3,4] a population disproportionately impacted by HCV. In 2015, there was an HIV outbreak among PWID in Scott County, Indiana that also had a high percentage of HCV co-infection (92%).[5] Following this outbreak, the US Centers for Disease Control and Prevention (CDC) conducted a study to identify indicator variables associated with injection drug use, in order to determine which US counties may be vulnerable to new or increasing rates of HIV or HCV among PWID.[6] In 2019, Washington State performed three similar analyses to identify counties that may be at risk of new or increasing 1) HCV or 2) HIV infections or 3) opioid overdose among PWID. This summary reports findings of the Washington State HCV vulnerability assessment.

Methods

We collected county-level data for 58 indicators from 2015 and 2016 that were identified in the CDC analysis,[5] in a subsequent vulnerability assessment Tennessee conducted,[6] or because of the Washington context. Asotin, Columbia, and Garfield were combined due to small numbers and data availability. We used 2015 data to fit and 2016 data to test our model. We summed acute HCV cases and chronic cases in people born after 1965 and then created a binary variable of cases that were lower than the median (≤11 cases) or higher (>11 cases). We used lasso regression to identify predictors of the outcome. Any predictor that was in ≥99% of the 100 lasso regression runs was included in an adjusted logistic regression. We performed logistic regression with the identified predictors for the 2015 data. We used the resulting coefficients to predict 2016 outcomes, compare them to actual counts, and rank counties.
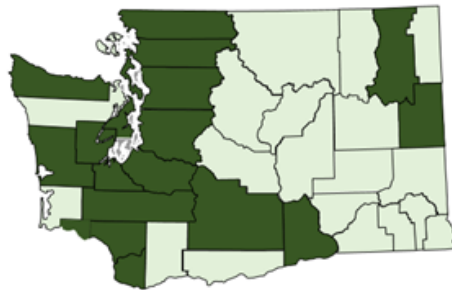
Office of Infectious Disease
Washington State Department of Health
sarah.deutsch@doh.wa.gov | 360-236-3642

Results

There were five variables that appeared in the lasso regression >90% of the runs: log of population per square mile, unemployment rate, drug trafficking hot zone (yes/no), number of patients with 5+ prescribers and 5+ opioid dispensers, and age-adjusted opioid hospitalizations. The model predicted counties that were above or below the median count of HCV cases 97% accurately for 2015 and 89% accurately for 2016. County-level results are shown below.

References

1. Centers for Disease Control and Prevention. CDC Estimates Nearly 2.4 Million Americans Living with Hepatitis C. 2018; https://www.cdc.gov/nchhstp/newsroom/2018/hepatitis-c-prevalence-estimates-press-release.html. Accessed December 15, 2018.
2. Washington Department of Health. *Washington State Communicable Disease Report 2017.* 2017.
3. Zibbell JE, Asher AK, Patel RC, Kupronis B, Iqbal K, Ward JW, Holtzman D. Increases in Acute Hepatitis C Virus Infection Related to a Growing Opioid Epidemic and Associated Injection Drug Use, United States, 2004 to 2014. Am J Public Health. 2018 Feb;108(2):175-181. doi: 10.2105/AJPH.2017.304132. Epub 2017 Dec 21. PubMed PMID: 29267061; PubMed Central PMCID: PMC5846578.
Washington State Department of Health. Viral Hepatitis C in Washington State. June 2016.
4. Peters PJ, Pontones P, Hoover KW, et al. HIV Infection Linked to Injection Use of Oxymorphone in Indiana, 2014-2015. *The New England journal of medicine.* 2016;375(3):229-239.
5. Van Handel MM, Rose CE, Hallisey EJ, et al. County-Level Vulnerability Assessment for Rapid Dissemination of HIV or HCV Infections Among Persons Who Inject Drugs, United States. *J Acquir Immune Defic Syndr.* 2016;73(3):323-331.

2015 Results   ## 2016 Results

- ☐ HCV count ≤ median
- ■ HCV count > median
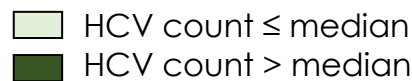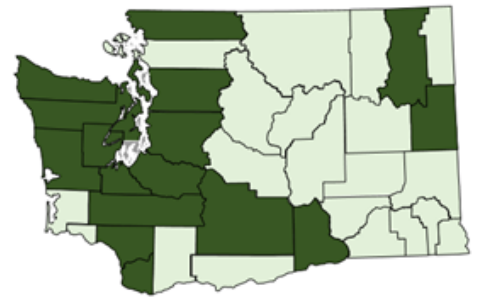
The model made 4 inaccurate predictions in 2016: Skagit and Grant were inaccurately predicted as below average and Stevens and Jefferson were inaccurately predicted as above average.

Next Steps

We identified predictors of having higher than average HCV counts in Washington State counties. These indicators can be tracked on the county level to inform HCV prevention efforts. Strategic interventions should be identified for counties with predicted higher HCV counts. Our models have limitations, including limited years of data. Future work will assess performance on 2017 and 2018 data.

October 2019