# Burden of Opioids in Snohomish Co.

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## Defining Common Terminology

**Opioid Use Disorder:** A substance use disorder involving an opioid

**Opioid Misuse:** Intermittent use of any of the following and not meeting the definition of opioid use disorder.

- An illicit opioid, like heroin
- Someone else's prescription opioid
- One's own prescription opioid other than as prescribed (e.g. higher dose, for different reason)

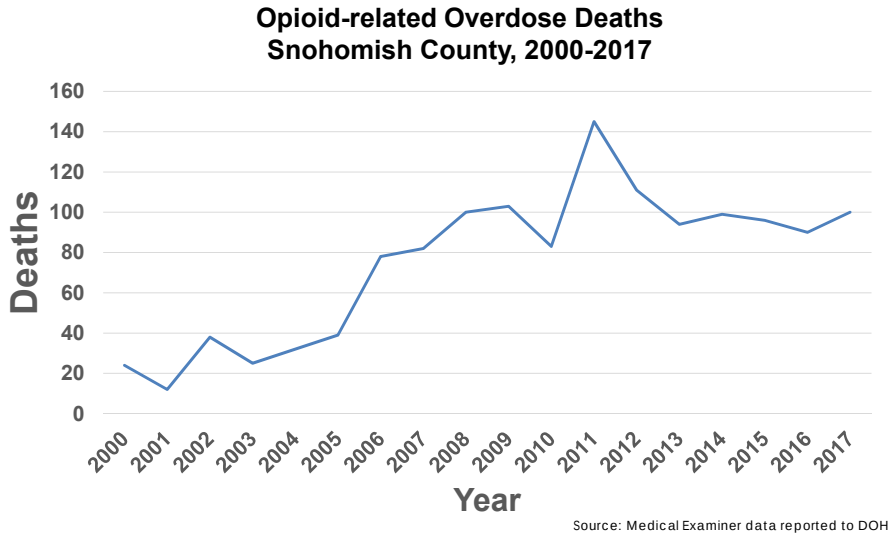
# Definitions: Opioid Use Disorder

*Diagnostic and Statistical Manual of Mental Disorders*, 5th ed. (DSM-5):

- The terms substance abuse/substance dependence have been abandoned
- Replaced by substance use disorder
  - Categorized as mild, moderate, or severe
  - Determined by the number of diagnostic criteria met

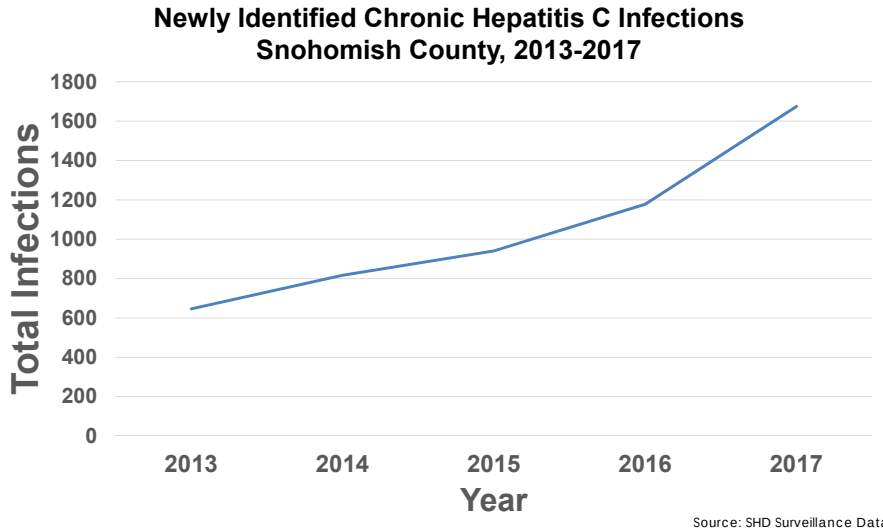


# Opioid-related Deaths Have Leveled Off




Source: Medical Examiner data reported to DOH

# Other Markers of Crisis are Increasing




Source: SHD Surveillance Data



# Surveillance vs. Disease Burden

## Surveillance

- Allows early identification of changes in trends to identify new changes
- Does not need to identify all cases to be effective

## Disease burden

- Seeks to identify all cases in a given geographic area or population
- Critical for needs assessment and access when disease incidence is increasing

## Disease Burden of Opioid Crisis

- Disease burden estimates are difficult in populations that are elusive
- More so, when the disease is not notifiable
- Published literature sparse
- Establishing surveillance for opioid events makes estimation of disease burden possible
- Additional method needed: Capture-Recapture

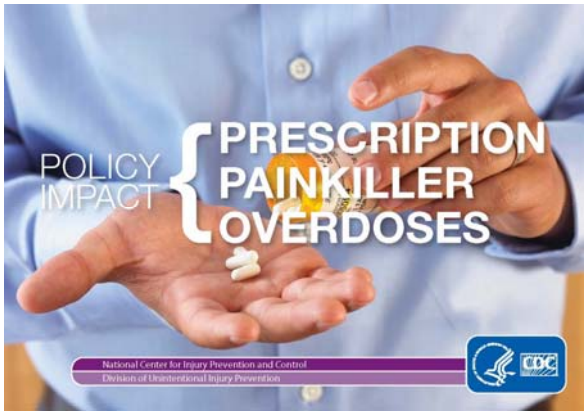


## Disease Burden

- Step 1: Identify model for disease burden estimate
- Step 2: Identify outcome to be used in the model
- Step 3: Special study to define best estimate input
- Step 4: Use model to calculate disease burden

# CDC Model

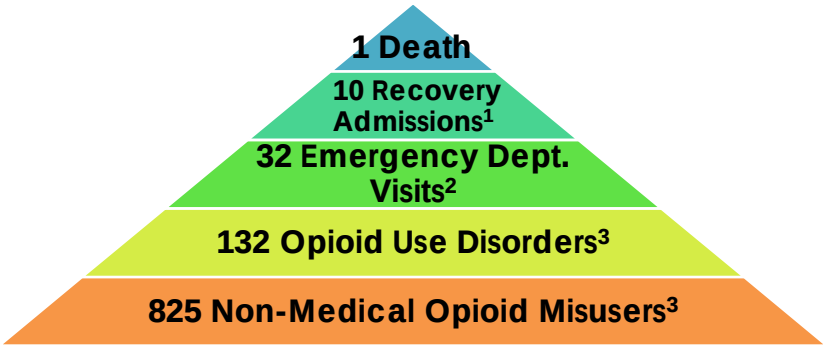
Published a diagram of the relationship between different opioid crisis outcome




Source: CDC. Policy Impact: Prescription Pain Killer Overdoses. Available at https://www.cdc.gov/drugoverdose/pdf/policyimpact-prescriptionpainkillerod-a.pdf



# Known Relation Between Health Outcomes for Persons who Overdose



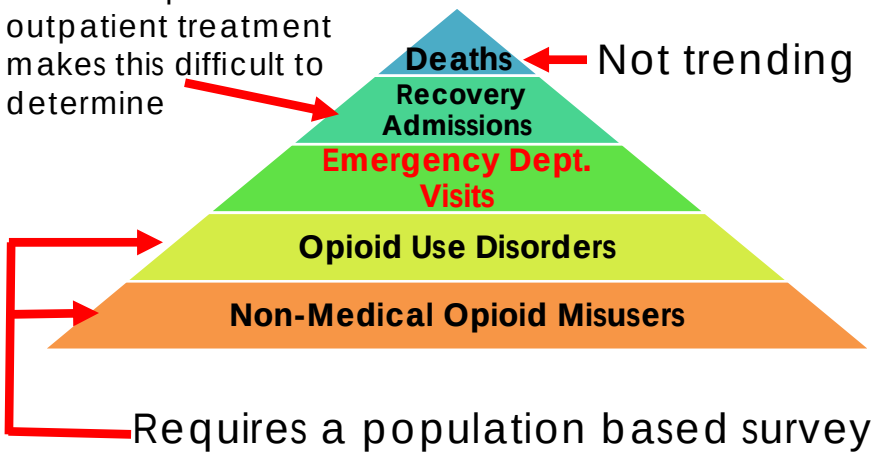

**Using results of different studies CDC reported these relationships between outcomes**

Source: CDC. Policy Impact: Prescription Pain Killer Overdoses. Available at https://www.cdc.gov/drugoverdose/pdf/policyimpact-prescriptionpainkillerod-a.pdf

References:
1 Addressing Prescription Drug Abuse in the US, Behavioral Health Coordinating Committee, DHHS. Available at https://www.cdc.gov/drugoverdose/pdf/hhs_ prescription drug_abuse_report_09.2013.pdf;
2 Seth P, Rudd RA, Noonan RK, Haegerich TM. Quantifying the Epidemic of Prescription Opioid Overdose Deaths. Am J Public Health. 2018;108(4):500-502. doi: 10.2105/AJPH.2017.304265.
3 Research Report Series: Prescription Drug Abuse. National Institute on Drug Abuse, NIH. Available at https://www.drugabuse.gov/sites/default/files/rrreportfinalprint.pdf

## Identify Outcome of Interest

Waivered providers & outpatient treatment makes this difficult to determine




Requires a population based survey

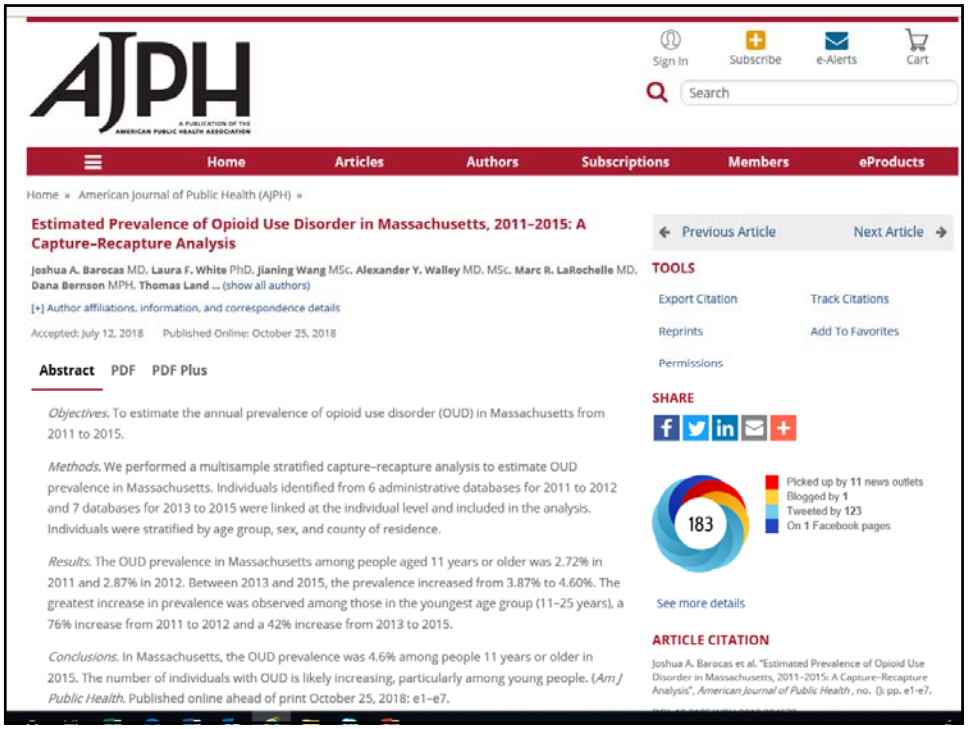
*Source: Prescription Pain Killer Overdoses, CDC



## Capture-Recapture: Methods

- Originally developed to estimate population size in wild life studies[1,2]
- Adapted to multiple studies of human conditions[3]
  - Not to persons afflicted by opioid use/misuse disorder
- Requires two overlapping and presumably incomplete but intersecting datasets[4]
- Some limitations, but particularly effective for estimations of elusive populations

1 **Fish & Wildlife Population Ecology 2008, http://www.webpages.uidaho.edu/wlf448/cap_recap.htm**
**2 D. G. Chapman. Some properties of the hypergeometric distribution with applications to zoological sample censuses. 1951 by University of California Press Berkeley.**
**3** Chartier M, Dart A, Tangri N, Komenda P, Walld R, Bogdanovic B, Burchill C, Koseva I, McGowan K-L, Rajotte L. *Care of Manitobans Living with Chronic Kidney Disease.* Winnipeg, MB: Manitoba Centre for Health Policy, 2015. [Report]
**4 Concept: Capture-Recapture Method of Estimating Population Size. http://mchp-appserv.cpe.umanitoba.ca/viewConcept.php?printer=Y&conceptID=1469**



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**Estimated Prevalence of Opioid Use Disorder in Massachusetts, 2011–2015: A Capture–Recapture Analysis**

Joshua A. Barocas MD, Laura F. White PhD, Jianing Wang MSc, Alexander Y. Walley MD, MSc, Marc R. LaRochelle MD, Dana Bernson MPH, Thomas Land ... (show all authors)

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Abstract PDF PDF Plus

*Objectives.* To estimate the annual prevalence of opioid use disorder (OUD) in Massachusetts from 2011 to 2015.

*Methods.* We performed a multisample stratified capture–recapture analysis to estimate OUD prevalence in Massachusetts. Individuals identified from 6 administrative databases for 2011 to 2012 and 7 databases for 2013 to 2015 were linked at the individual level and included in the analysis. Individuals were stratified by age group, sex, and county of residence.

*Results.* The OUD prevalence in Massachusetts among people aged 11 years or older was 2.72% in 2011 and 2.87% in 2012. Between 2013 and 2015, the prevalence increased from 3.87% to 4.60%. The greatest increase in prevalence was observed among those in the youngest age group (11–25 years), a 76% increase from 2011 to 2012 and a 42% increase from 2013 to 2015.

*Conclusions.* In Massachusetts, the OUD prevalence was 4.6% among people 11 years or older in 2015. The number of individuals with OUD is likely increasing, particularly among young people. (*Am J Public Health.* Published online ahead of print October 25, 2018: e1–e7.

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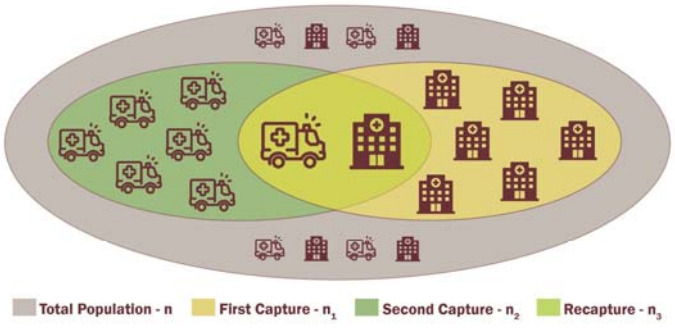
Joshua A. Barocas et al. "Estimated Prevalence of Opioid Use Disorder in Massachusetts, 2011-2015: A Capture-Recapture Analysis", *American Journal of Public Health*, no. (): pp. e1-e7.

# Capture - Recapture




Where:
n = Size of population
$n_1$ = Number tagged
$n_2$ = Number sampled
$n_3$ = Number tagged in the sample

$$n = \frac{n_1 \times n_2}{n_3}$$

# Surveillance of Opioid Crisis

Surveillance need addressed:

[1] *FirstWatch*

[2] CDC funded study

[3] ESO

[4] *ESSENCE*

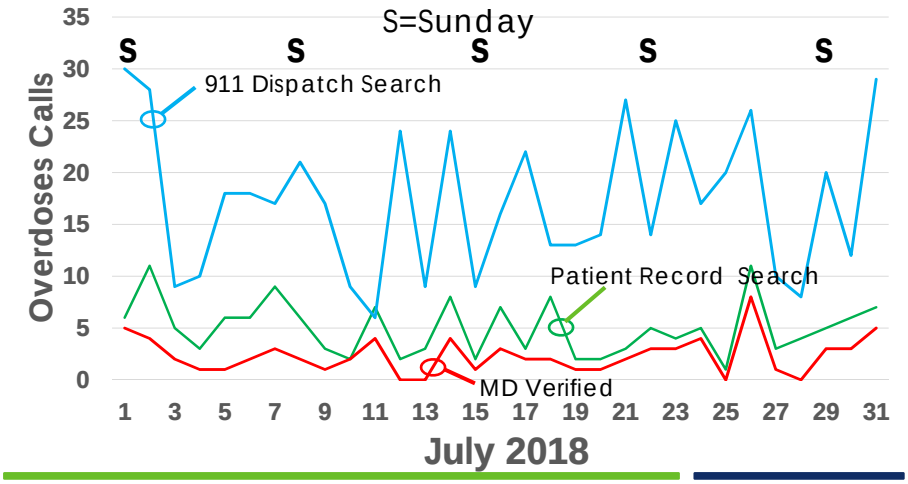
[5] OD Map



## *FirstWatch*

- Propriety record management system for EMS calls
- Able to alert users for sentinel events
- Currently set up to alert for opioid overdose calls through automated searches

## Comparison of Search Criteria of Opioid Calls, *FirstWatch*, July 2018

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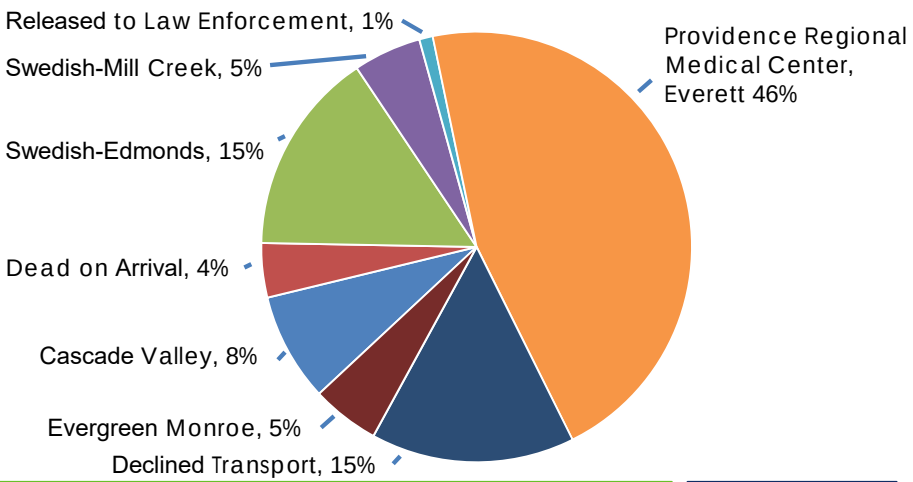
## *FirstWatch* MD Verified OD Records by Destination Percent, July 2018, n=73

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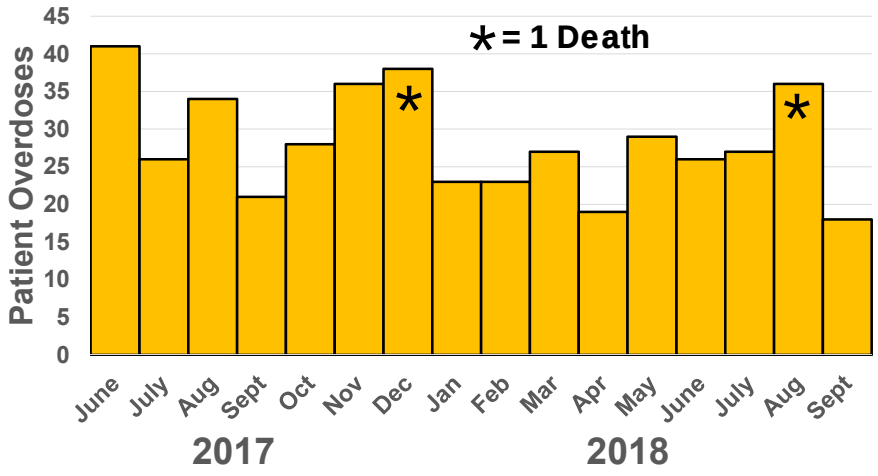
# CDC-funded Opioid-Overdose Outreach Program

- Funded by CDC through WA state
- Began June 2017 at PRMCE
  - Adding Swedish Edmonds and –Mill Creek soon
- ED staff nurse contacts patients
  - Discuss treatment resources
  - Follow-up planning
  - Demographic data-collection
- Follow-up for prescribers with patients that have overdosed
- Warning system for tainted street drugs



# Opioid-Overdose Emergency Visits PRMCE by Month, 2017-2018 (n=437)



## Capture-Recapture Using Opioid Overdose Events

Step 1: Obtain *FirstWatch* data as first "capture"

Step 2: Collect PRMCE ED data as "recapture"

Step 3: Look for patients in both databases to calculate the best estimate of overdoses in the county

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## Steps 1-3, Capture-Recapture Results, July 2018

- n1, Number cases in FirstWatch = 73
- n2, Number cases in PRMCE ED = 29
- n3, Number of matches = 18

$$N = \frac{n1 \times n2}{n3}$$

- N =118/month or 1416/year opioid overdoses requiring medical intervention

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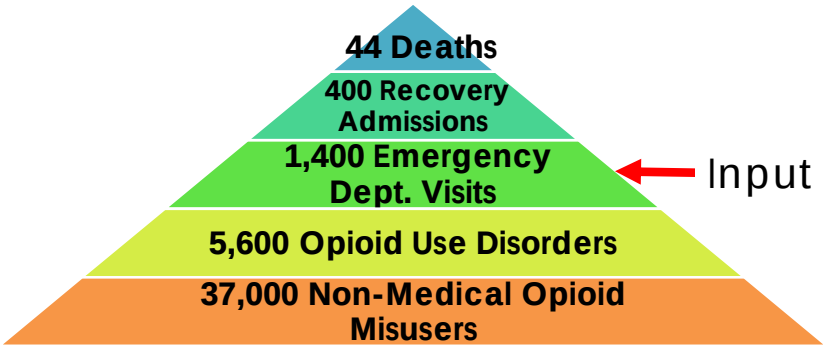
# Input the Capture-Recapture Results to Estimate Disease Burden



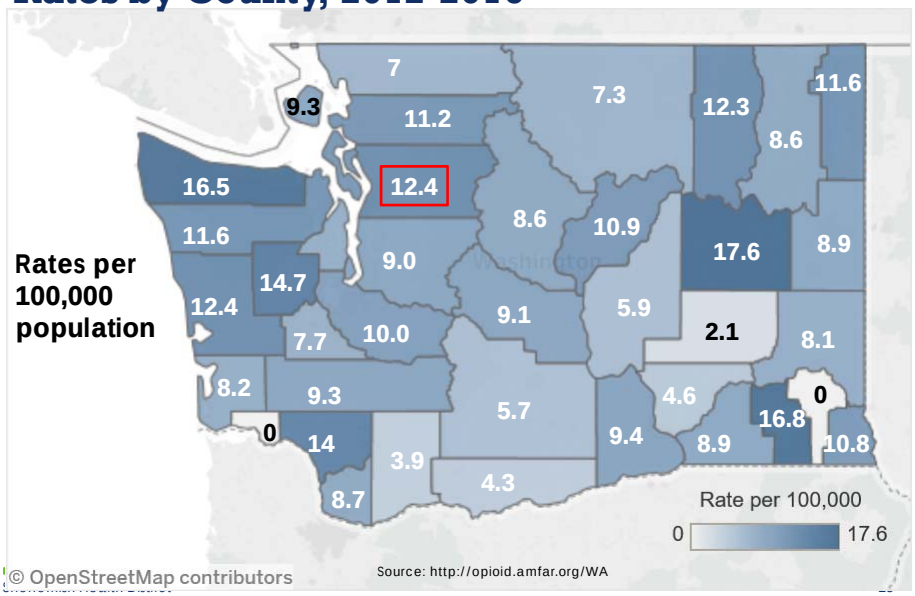

0.8% of Snohomish County population > 11 years of age abusing or dependent on opioids



# Validity of Results

| Dataset | Deaths | Recovery Admissions | Emergency Dept. Visits | Opioid Use Disorder | Opioid Misusers |
|---|---|---|---|---|---|
| **Burden of Disease with Capture-Recapture Method** | **44** | **400** | **1,400** | **5,600** | **37,000** |
| 2016 National Survey on Drug Use and Health | 41 | 400 | 1,300 | 5,400 | 34,000 |
| 2017 Washington Syringe Exchange Health Survey | 70 | 700 | 2,300 | 9,400 | 59,000 |
| 2017 Snohomish County Opioid-related Death Data | 100 | 1,000 | 3,000 | 13,000 | 83,000 |
| 2018 Point-in-Time Study | 90 | 900 | 3,000 | 12,000 | 80,000 |

# Age-Adjusted Opioid-Related Overdose Death Rates by County, 2012-2016




# Interest in Treatment

| Setting (n) | Interested | Not Interested | Refused to Answer | No Response Provided |
|---|---|---|---|---|
| Overdose patient transported to hospital (437) | 23% | 58% | 13% | 6% |
| Withdrawal watch in hospital emergency department (42) | 55% | 33% | 7% | 5% |
| Syringe exchange client (552) | 78% | 14% | - | 8% |

# Summary

- Capture-recapture method estimates 1,400 ED visits for opioid overdose
- CDC model estimates 5,600 residents have Opioid Use Disorders
- This model agrees with the NDUH population based survey (5,400)



# Summary

- Both methods underestimate deaths 40-44 expected deaths vs 100 actual
- Range of residents with OUD is Snohomish County is likely between 5,000-10,000 people
- Those who misuse opioids is likely in the range of 35,000 to 80,000 people.
- The percentages are likely comparable to other counties

## Next Steps

- Refined estimates of interest in entering treatment of any kind
- Determine availability of treatment
- Determine if a gap exists by comparing estimate to availability
- Explore whether case management +/- wrap-around services are needed

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# Discussion/ Questions

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