Hepatitis C

COLVILLE FOCUSED DIAGNOSIS, MANAGEMENT, TREATMENT
Background and affiliations

- BS (MIT); 3 years in international health (Mexico City and Honduras with Peace Corps); MS (Colorado State University); MD (University of Washington)

- Since 2015 affiliated with Providence Health Services, first at Sacred Heart and now Mount Carmel

- August 2018 will split time between Ferry County Hospital and Mount Carmel Hospital – hospital and ER primarily

- Starting in 2016 began treating patients with hepatitis C (HCV) in Colville; currently the primary hepatitis C provider in the tri-county area (since Dr. Lind passed away and Dr. Bacon moved on)
Chronic hepatitis – common causes

- **Viral hepatitis**
  - ~5%
  - B – chronic cause of hepatitis, becoming less common with vaccines
  - C – chronic and increasing cause of hepatitis, no vaccine
  - A and E – usually limited infection from foodborne illness

- **Autoimmune hepatitis**
  - 50%
  - Rare disease cause by the body attacking it’s own liver

- **Alcoholic hepatitis**
  - 25%
  - Chronic alcohol use leading to liver damage

- **Steatohepatitis (fatty liver)**
  - 10%
  - Fat invasion of the liver leading to inflammation, becoming common
Hepatitis C (HCV)
HCV – clinical course

*typically a 20 year process
HCV – epidemiology

Egypt has the highest prevalence of hepatitis C with more than 14% of people infected.

India’s hepatitis C epidemic is relatively mild thanks to a historically underdeveloped healthcare system.

Hepatitis C virus infects nearly 2% of the general population, but 90% of long-term injection drug users.

3-4M 12-15M 5-6M 30-40M ~100M .2-.3M
HCV – epidemiology

Blood transfusion screening begins

USPSTF screening guidelines introduced

Figure 1: Hepatitis C Incidence in United States, 1982-2014.
This graphic represents the estimated number of new hepatitis C infections per year.

Source: Division of Viral Hepatitis, Statistics and Surveillance
HCV – epidemiology

- New cases 2011: 16,500
- New cases 2014: 30,500
- In the US, HCV is the most common blood-borne infection.
- Data from NHANES do not include incarcerated, homeless, nursing home residents, active military, or recent immigrants.

### Hepatitis C is a Disease of the Marginalized

- Injection drug users > 10 yrs of use: 90%
- Injection drug users < 10 yrs of use: 50%
- Homeless persons: 35%
- Prisoners: 29%
- Severely mentally ill people: 19%
- Hospital patients: 17%
- African-American men 50-59 yrs: 14%
- US population: 2%

Hepatitis C disproportionately affects groups who are under-represented in health surveillance systems and underserved by the healthcare system. Percentage of each group testing positive for HCV infection.
Risk factors for HCV – IVDU (PWID)

- Injection Drug Use: 60%
- Sexual: 15%
- Transfusion (before screening): 10%
- Other: 10%
- Unknown: 5%

HCV Prevalence (%): 66.2, 87.6, 97.6, 98.7

Injection Drug Use Duration (Years): <10, 10-19, 20-29, ≥30
“The prototypical new heroin user initiates some type of substance abuse, such as alcohol or marijuana at about age 13, transitions to using oral opiates, most often oxycodone, around age 17, then eventually starts using cheaper and widely available heroin by about age 18.” - AASLD

- Meta-analysis of the highest risk IVDU
  - 24 or younger
  - white race
  - residence in non-urban areas
  - use of oral prescription opiates prior to using heroin

know anyone like this?
IVDU and opiates in Tri-County area

<table>
<thead>
<tr>
<th>County</th>
<th>3 yr count</th>
<th>Average annual rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clallam</td>
<td>25</td>
<td>11.7</td>
</tr>
<tr>
<td>Spokane</td>
<td>142</td>
<td>10.1</td>
</tr>
<tr>
<td>Cowlitz</td>
<td>28</td>
<td>9.2</td>
</tr>
<tr>
<td>Ferry-Pend Oreille-Stevens</td>
<td>16</td>
<td>8.5</td>
</tr>
<tr>
<td>Okanogan</td>
<td>10</td>
<td>8.2</td>
</tr>
<tr>
<td>Chelan-Douglas</td>
<td>27</td>
<td>8.2</td>
</tr>
<tr>
<td>Snohomish</td>
<td>166</td>
<td>8.0</td>
</tr>
<tr>
<td>Jefferson</td>
<td>7</td>
<td>7.9</td>
</tr>
<tr>
<td>Lewis</td>
<td>17</td>
<td>7.6</td>
</tr>
<tr>
<td>Grays Harbor</td>
<td>15</td>
<td>7.0</td>
</tr>
<tr>
<td>Mason</td>
<td>12</td>
<td>6.9</td>
</tr>
<tr>
<td>Whatcom</td>
<td>41</td>
<td>6.8</td>
</tr>
<tr>
<td>Pierce</td>
<td>156</td>
<td>6.5</td>
</tr>
<tr>
<td>Asotin-Columbia-Garfield</td>
<td>5</td>
<td>6.0</td>
</tr>
<tr>
<td>Grant</td>
<td>15</td>
<td>5.7</td>
</tr>
<tr>
<td>King</td>
<td>324</td>
<td>5.6</td>
</tr>
</tbody>
</table>
IVDU and opiates in Tri-County Area

2011-2013 data (per 100,000)

Stevens = 35.1, Ferry = 24, Pend Oreille = 12.7
Sexual transmission
  ▪ Among heterosexual partners, 1-5% per year

High risk sexual behavior
  ▪ Increased with MSM, rough sex, receptive anal sex and higher number of sexual partners.

Mother to child risk
  ▪ Mother to child risk 3-10%
Hepatitis C Screening

![Graph showing the prevalence of Hepatitis C by year of birth]

- The graph illustrates the prevalence of Hepatitis C among different birth years.
- There are two curves indicated:
  - 1999–2002

Key points:
- The peak prevalence occurred around the 1950s for both curves.
- The prevalence decreased significantly after the peak.
- The curves suggest a trend that peaked earlier for the 1988–1994 group compared to the 1999–2002 group.
## Hepatitis C Screening

### 2002 NIH Consensus Guidelines HCV High-Risk Testing Recommendations

<table>
<thead>
<tr>
<th>Persons who should be tested routinely for HCV infection if they are in the following high-risk groups:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• People who had transfusions of blood or blood products before routine blood screening began</td>
</tr>
<tr>
<td>• People receiving dialysis</td>
</tr>
<tr>
<td>• People who may have had intimate contact with anyone infected with hepatitis C</td>
</tr>
<tr>
<td>• Healthcare workers exposed to infected people</td>
</tr>
<tr>
<td>• Current or former injection-drug users*</td>
</tr>
<tr>
<td>• People with abnormal liver tests</td>
</tr>
<tr>
<td>• People who are HIV positive*</td>
</tr>
</tbody>
</table>

### AASLD/IDSA:

* Should have at least annual testing

All others ‘periodic’
Hepatitis C Screening

- **Lab blood draw**
  - Highly sensitive, requires confirmation after 6 months

- **OraQuick**
  - Point of care venous or fingerstick assay, 20-40min result.
  - If positive should obtain confirmation
HCV – Now what?

- Primary doctor can workup and treat
- HCV positive verified, can repeat in six months
- Refer to local rural HCV provider to workup and treat
- Send to Spokane to workup and treat (extra time and $$ costs)
HCV – treatment history

1960s - HAV and HBV treatment of bed rest, healthy diet and steroids – no real help

1986 - Interferon alpha (IFN) x 12-24 weeks trialed for NANBH, SVR ~5-10% with major side effects

1998 - IFN with Ribavirin (RBV) for 48 weeks extended SVR to 42%

2001 - Pegylated IFN (PEG) extends IFN half life and reduced infection frequency with SVR stable at 40-55% with RBV

2011 - Direct acting antivirals (DAAs) introduced to target specific parts of HCV lifecycle with extended SVR ~90%

2014 - Once daily Harvoni approved by FDA with SVR ~94%

Present - Multiple daily 8-12 week regimens, treatment response rates 90-98%
8-12 weeks daily medication

$20,000 - $100,000 (actual cost unknown)
Treatment regimens

Cure rates 95-98%
Cure Reduces Overall Mortality

Simmons B, Clinical Infectious Disease 2015

- General Cohort: 1.98%
- Cirrhotic Cohort: 4.90% (SVR), 15.88% (non-SVR)
- HIV Coinfected Cohort: 1.49% (SVR), 11.44% (non-SVR)
HCV in BHT Region

Acute HCV cases

Payer breakdown for HCV

Figure 2. Rate of diagnosis of chronic hepatitis C infection in the BHT region, 2000–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)

Figure 5. Primary payer for hospitalizations with a primary diagnosis of hepatitis C in the BHT region, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System
HCV system costs in BHT region

- 2010-2014 data
  - Hospitalizations 283
  - Hospital days 5.4 average
  - Average cost per hospitalization $43,723
  - 85% were Spokane County however many were referrals from the Tri-County area
HCV – epidemiology

- NETCHD
  - 358 cases (WA DOH 2012-2016)
  - Prevalence is 130.7/100,000 – statewide 87.0/100,000
  - Total *hospital* cost $2,055,874

- Estimated 650-760 case in NETCHD (WA DOH 2016)
  - 520 chronic HCV
  - 156 will develop cirrhosis
  - 3-11 will develop ESLD and HCC

Annual healthcare costs are ~$23,000/year for cirrhotic patients and $60,000/year for ESLD
HCV – epidemiology

- Stevens county
  - 331 cases (WA DOH 2015)
  - Prevalence is 80/100,000 – on par with state average
  - Total *hospital* cost $760,000

- Estimated 450-600 cases
  - 320 chronic HCV
  - 100 will develop cirrhosis
  - 4-8 will develop ESLD and HCC

Annual healthcare costs are ~$23,000/year for cirrhotic patients and $60,000/year for ESLD

Stevens County cirrhosis estimate $2.3 million/year
Stevens County ESLD estimate $360,000/year
HCV – epidemiology

- Ferry county
  - 54 cases (WA DOH 2012-2016)
  - Prevalence is 166.0/100,000
    - statewide 87.0/100,000
  - Total hospital cost $265,306

- Estimated 77-95 (WA DOH 2016)
  - 62-76 chronic HCV
  - 18-23 will develop cirrhosis
  - 1-2 will develop ESLD and HCC
HCV – epidemiology

- Pend Oreille county
  - 83 cases (WA DOH 2012-2016)
  - Prevalence is 125.5/100,000 – statewide 87.0/100,000
  - Total hospital cost $1,024,663

- Estimated 133-163 (WA DOH 2016)
  - 106-130 chronic HCV
  - 32-39 will develop cirrhosis
  - 2-3 will develop ESLD and HCC
Hepatitis C and Our Communities

Northeast Tri County Health District
Preserve • Promote • Prevent
3 Public health actions:

1. Identify people with HCV infections
   ▪ Link them to care
   ▪ Treat them to achieve cures.

2. Prevent new HCV infections

3. Strengthen data systems and increase data use around HCV infections.
   ▪ The goal was to achieve specific outcomes:
     ▪ Increased percentage of people with HCV virus infections who know their status.
     ▪ Increased percentage of people with HCV who receive treatment.
     ▪ Increased percentage of people who are cured.
     ▪ Decreased number of new HCV infections.
     ▪ Decreased HCV-related morbidity.
     ▪ Decreased number of HCV-related deaths.
5 Year Trends in Ferry, Pend Oreille and Stevens County
5 Year Trend

Hepatitis C in Northeast Tri County 5 year Trend

- Stevens
- Ferry
- PO
Born after 1970

HCV cases under 48 years old 5 year Trend

Stevens
Ferry
PO
% of Cases Born After 1970 for NETCHD

HCV cases under 48 years old 5 year Trend

Stevens
Ferry
PO
State View

- Acute Hepatitis C 2009-2016, 333% increase statewide, 75% cite injection drug use
## Diagnosed Chronic Hepatitis C Cases in NE Tri-Counties and Washington State, 2012-2016

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>5-year rate*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferry</td>
<td>13</td>
<td>3</td>
<td>12</td>
<td>16</td>
<td>10</td>
<td>166.0</td>
</tr>
<tr>
<td>Stevens</td>
<td>51</td>
<td>27</td>
<td>55</td>
<td>46</td>
<td>42</td>
<td>100.7</td>
</tr>
<tr>
<td>Pend Oreille</td>
<td>10</td>
<td>5</td>
<td>22</td>
<td>22</td>
<td>24</td>
<td>125.5</td>
</tr>
<tr>
<td>NE Tri-County Total</td>
<td>74</td>
<td>35</td>
<td>89</td>
<td>84</td>
<td>76</td>
<td>130.7</td>
</tr>
<tr>
<td>Statewide total</td>
<td>4,865</td>
<td>4,438</td>
<td>5,995</td>
<td>7,085</td>
<td>8,118</td>
<td>87.0</td>
</tr>
</tbody>
</table>

*per 100,000 residents; if the case count for a given year is <5 the rate is not calculated for that year
December 21, 2017 CDC Press Release:

- Steep increases in opioid use and hepatitis C infections among young people, whites and women
- Among 18- to 29-year-olds, there was a:
  - 400 percent increase in acute hepatitis C;
  - 817 percent increase in admissions for injection of prescription opioids; and
  - 600 percent increase in admissions for heroin injection.
- Among 30- to 39-year-olds, there was a:
  - 325 percent increase in acute hepatitis C;
  - 169 percent increase in admissions for injection of prescription opioids; and
  - 77 percent increase in admissions for heroin injection.
Changes in who is starting to inject drugs

Percent of new PWID by race suggests fewer blacks, and more whites, are starting to inject drugs.

<table>
<thead>
<tr>
<th>Year</th>
<th>White</th>
<th>Hispanic/Latino</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>38%</td>
<td>19%</td>
<td>38%</td>
</tr>
<tr>
<td>2009</td>
<td>44%</td>
<td>21%</td>
<td>29%</td>
</tr>
<tr>
<td>2012</td>
<td>44%</td>
<td>21%</td>
<td>28%</td>
</tr>
<tr>
<td>2015</td>
<td>54%</td>
<td>21%</td>
<td>19%</td>
</tr>
</tbody>
</table>

60% Heroin use has increased more than 60% (114% in whites) in recent years. The heroin and prescription opioid epidemics could lead to new HIV outbreaks.


SOURCE: National Survey on Drug Use and Health, 2002-2013
What is the CDC Recommending

▪ Dual epidemics demand an integrated response
▪ Support drug treatment and recovery services
  ▪ Syringe Services Programs: More than a needle exchange
  ▪ Medication-assisted treatment
  ▪ Improve access to medical care
▪ Provide a range of testing, treatment and prevention services for hepatitis C and infectious diseases, including hepatitis B, syphilis and HIV
Looking to the future

- Syringe Services Programs:
  - Comprehensive risk reduction counseling
  - HIV and viral hepatitis screening and referral for treatment
  - Referral to substance abuse treatment options
  - Referral for medical and mental health care
The drug does not cause HCV it is the hygienic practice with the use of injectable drugs.

▪ Counseling:
  ▪ Stop or reduce frequency of use
  ▪ Link to care
  ▪ Receive treatment
  ▪ If going to continue to use
    ▪ ALWAYS use new, sterile needles and syringes
    ▪ Safely dispose of needles
    ▪ Do not share other injection materials
Community Benefits of SSP

- **Community Safety**
  - Proper disposable of needles
  - HCV can survive for 3 weeks in syringes
  - Lower number of contaminated needles in the community

- Increased access to drug treatment referral services
  - Research shows those who use SSP programs are 5x more likely to seek treatment

- Increased access to testing and diagnostic services

- Reduced drug-related behavior

- Reduced sexual-risk behavior

- Prevents spread of diseases

- Reaches marginalized populations
Financial Benefit of SSP

- Every $1 invested in syringe exchange saves $3-7 in HIV treatment costs
- Annually Hepatitis treatment costs $25,000 to $100,000 per person
  - An Australian study showed with SEP the Australian government avoided 21,000 hepatitis C infections and saved approximately $738 million in total lifetime hepatitis C treatment costs between 1991-2000
- Estimated average cost of syringe through the DOH $6.99 per 100 or $0.07ea
- Estimated average cost of SSP annually is $3,000 to $50,000
- Estimated average cost of SSP is to be $23-$71 per person per year
  - 1 Hospitalization for hepatitis C ~$43,000
  - 1 cirrhosis patients averages ~$23,000 per year
    - If hospitalized ~$44,000 per admit
  - 1 ESLD patient averages ~$60,000 per year
  - Liver transplant $350,000
- Recognized as one of the most cost-effective public health interventions ever funded
Financial Cost of HCV/Cirrhosis/ESLD/SSP

- ESLD: $60,000
- HCV Hospitalization: $43,000
- Treatment HCV: $30,000
- 1 Cirrhosis Patient: $23,000
- SSP per person
<table>
<thead>
<tr>
<th>HCV-associated hospital costs, 2010-2014</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferry</td>
<td>$265,306</td>
</tr>
<tr>
<td>Pend Oreille</td>
<td>$1,024,663</td>
</tr>
<tr>
<td>Stevens</td>
<td>$765,905</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$2,055,874</strong></td>
</tr>
</tbody>
</table>
Supportive Research

- Tomas Kerr et al. (2010) Vancouver experienced a 40% decline in syringe borrowing and lending.

- Hurley et al. (1997) comparison of 29 cities with SSP to 52 cities without SSP found, those with SSP HIV infections fell by 5.8%, compared to a 5.9% annual increase in those without SSP.

- Hagan et al (1995) study of IVDU in Tacoma, those who did not use SSP were 6-7 times greater risk of hepatitis B and C infections.

- Kwon et al (2012) estimated that among IVDU SEP’s in Australia reduced HIV and HCV cases by 34-70% and 15-43%

- Ruiz et al (2016) when the ban on municipal funding of SEP’s in DC was lifted, the number of HIV cases among IVDU fell 70%

- Hagan et al (2000) exchange users were five times more likely to enter treatment and ex-exchangers were 60% more likely to remain in treatment for over the 1-year study period
Benefits of SSP

▪ Reduce used needles in the community
▪ Increase access to social services
▪ Reduce infection disease associated with reusing needles
▪ Possibly reduce drug related behavior
▪ SSP are designed to provide a cost savings of $35 per syringe exchanged
  ▪ BHT 85% of HCV-associated hospital costs primary payer is Medicare/Medicaid/Charity Care
  ▪ Northeast Tri Counties annual inpatient hospital costs:
    ▪ Ferry estimated annual HCV-associated hospital costs: $265,000
    ▪ Pend Oreille estimated annual HCV-associated hospital costs: $1,024,663
    ▪ Stevens estimated annual HCV-associated hospital costs: $765,905
▪ Achieve deliverables for Medicaid Transformation Project
Thank-you
Questions