Addressing Viral Hepatitis and HIV Outbreaks Among Persons Who Inject Drugs in Allegheny County: A Community Response Plan Proposal

by

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Abstract

Background: In 2015, Scott County, Indiana experienced a significant outbreak of HIV and hepatitis C associated with intravenous drug use. The outbreak prompted the Centers for Disease Control and Prevention (CDC) to identify other communities in the U.S. at risk for similar outbreaks. Based on the results from the CDC's report, The Pennsylvania Department of Health (PADOH), created a vulnerability index identifying counties most at risk for an outbreak like that of the 2015 Indiana outbreak. The PADOH identified Allegheny County as a "more vulnerable" county with specific communities at an increased risk of viral hepatitis and HIV outbreaks. Historically, hepatitis A has been excluded from other CRPs surrounding IDU; however, given that outbreaks of hepatitis A are increasing in the U.S., particularly among PWID, this indicates a need for the inclusion of hepatitis A in future prevention planning efforts.

Recommendations: As viral hepatitis A, B, and C and HIV cases are on the rise in Allegheny County, a comprehensive CRP is critical to prevent and prepare for outbreaks of PWID in Allegheny County. The creation of a CRP must consider the sociocultural and legal barriers to health access for PWID such as criminalization of bloodborne infections and IDU, illegalization of harm reduction practices, negative encounters with law enforcement, unstable housing, lack or inadequate insurance coverage, economic instability, homelessness, poor mental health, and stigma and discrimination. Further, the Allegheny County Health Department (ACHD) must operate within its legal authority to effectuate appropriate community prevention, immediate and

intermediate response, recovery, and sustained response. It is recommended that the ACHD implement a CRP addressing viral hepatitis A, B, and C and HIV among PWID in Allegheny County.

Public Health Significance: Viral hepatitis A, B, and C and human immunodeficiency (HIV) cases are increasing among persons who inject drugs (PWID) on a national and local level. PWID are a vulnerable, extremely stigmatized population that is often overlooked in public health interventions. The implementation of a community response plan (CRP) in Allegheny County to address viral hepatitis A, B, and C and HIV among PWID is critical for outbreak prevention, preparation, and response.

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Preface

I would like to give my supervisor and essay reader, Jennifer Fiddner, MPH CIC, a special thank you for her support in identifying a topic for my essay as well as her mentorship and guidance through my work at the Allegheny County Health Department. I would also like to thank my essay advisor, Dr. Catherine L. Haggerty, PhD, MPH and my essay reader, Professor Tina Batra Hershey, JD, MPH for their insights on my essay. Thank you to my academic advisor, Dr. Glynn, for her support and guidance throughout my graduate school career.

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1.0 Introduction

1.1 Biology of Viral Hepatitis A, B, and C and HIV

1.1.1 Stages of Infection and Clinical Manifestations

1.1.1.1 Hepatitis A, B, and C

Hepatitis A, B, and C are infections of the liver caused by the hepatitis A virus (HAV), hepatitis B virus (HBV), and hepatitis C virus (HCV), respectively. Viral hepatitis infections can be subclinical or symptomatic. Signs and symptoms of viral hepatitis include jaundice, loss of appetite and other digestive issues, fever, darkened urine, light-colored stools, arthralgia, and fatigue.[1–3]

Individuals infected with HAV typically develop symptoms approximately two to seven weeks after infection, although some cases are completely asymptomatic throughout the duration of their infection. Hepatitis A does not progress into a chronic infection with symptoms typically resolving in less than two months, although some cases may persist for six months. Rarely, hepatitis A can lead to liver failure and death.[1]

Unlike hepatitis A, hepatitis B and C can manifest as acute and chronic infections. Most individuals with acute hepatitis B and C are asymptomatic. However, those who are symptomatic develop symptoms anywhere between a few weeks to months after exposure. Most chronic cases of hepatitis B and C are asymptomatic for decades with many individuals being unaware of their infection until the onset of acute-like symptoms or symptoms associated with progressed liver disease.[2,3]

1.1.1.2 HIV

Human immunodeficiency virus (HIV) is a virus that targets an infected individual's immune system. There are three stages of HIV: acute HIV infection, chronic HIV infection, and acquired immunodeficiency syndrome (AIDS).[4]

Acute HIV symptoms may present approximately two-four weeks after infection as viral load increases and cluster of differentiation 4 (CD4) cell counts decrease. As CD4 cell counts decline, the immune system is compromised, leaving an individual susceptible to opportunistic infections. Acute signs and symptoms mimic those of influenza and include fever, chills, rash, night sweats, myalgia, sore throat, fatigue, swollen lymph nodes, and ulcers of the mouth. Some individuals living with acute HIV infections are asymptomatic.[4]

Acute HIV infection can progress into chronic HIV infection if left untreated. Those with chronic HIV infections are typically asymptomatic and in a state of clinical latency. Chronic HIV infections can last for years. Immediately before progressing into AIDS, HIV viral load increases and CD4 cell count continues to decrease.[4]

Without medical intervention, chronic HIV infection progresses into AIDS, the final and most critical stage of HIV infection. In this stage of infection, CD4 cell count plummets, severely limiting immune function and placing affected individuals at an increased risk of opportunistic infections. Prognosis of AIDS without treatment is poor, with most individuals surviving only three years after AIDS onset.[4]

1.1.2 Testing

1.1.2.1 Hepatitis A, B, and C Testing

Viral hepatitis is diagnosed using multiple laboratory screenings. Viral hepatitis A, B, and C infection or vaccination imparts long-term immunity via antibodies that develop weeks to months after exposure. Therefore, multiple laboratory diagnostic measures are typically necessary to ascertain whether an infection is currently active.[5]

Hepatitis A is typically tested via antibody tests, otherwise known as anti-HAV tests. A positive anti-HAV test indicates that an individual has been vaccinated against HAV, is currently infected with HAV, or has been previously infected by HAV.[5] Because hepatitis A infections self-resolve within six months, administration of HAV ribonucleic acid (RNA) assays, or confirmatory tests that detect viral load, are rare and typically restricted to research laboratory use.[1,6]

Detection of hepatitis B infection requires three tests: a hepatitis B surface antigen test, a hepatitis B core antibody test, and a hepatitis B surface antibody test. The surface antigen test identifies if an infection is currently active and therefore, transmissible. If positive, further testing is needed to ascertain whether the infection is acute or chronic. The surface antibody test determines if the person is immune to HBV indicating that an individual is vaccinated against HBV or has developed antibodies from current or prior hepatitis B infection. The core antibody test identifies infection status. All three tests are typically needed to fully understand an individual's infection status.[5]

Hepatitis C infection is diagnosed via an anti-HCV test and an RNA confirmatory test. The anti-HCV test detects HCV antibodies. However, a positive anti-HCV test cannot discern between chronic carriers of HCV, which account for approximately 75-85% of all positive anti-HCV tests,

a resolved infection; or, in rare cases, a recently infected acute case. An RNA confirmatory test is necessary to determine if the infection is current.[5]

At-home testing is an option for screening hepatitis B and C infections with comparable sensitivities and specificities to laboratory diagnostics.[7] At-home test kit costs vary by the number of hepatitis types tested. Many hepatitis B test kits only test for HBV surface antigens, and at-home hepatitis C test kits only identify HCV antibodies. Although at-home tests improve accessibility to hepatitis B and C testing, it is imperative that abnormal at-home test results only be used in conjunction with professional confirmatory testing and healthcare consultations.[8,9]

1.1.2.2 HIV Testing

There are three tests used to diagnose HIV: nucleic acid amplification tests (NAAT), antigen/antibody tests, and antibody tests. No HIV test is capable of detecting the virus immediately after exposure. Depending on the test, HIV may be detected weeks to months after exposure.[10] All testing methods used to detect HIV boast high sensitivities and specificities.[11]

NAATs are able to detect HIV virus 10-33 days after exposure, the earliest of any of the tests. However, NAATs are expensive and are used only in cases of high-risk exposures or exposures with early onset of symptoms.[10]

Antigen/antibody tests detect HIV antibodies and p24 antigens. P24 antigens can be detected before antibody development. Antigen/antibody tests are commonly used in the U.S. and can identify HIV infections 18-45 days after exposure. A rapid antigen/antibody test is available and can detect HIV infection 18-90 days after exposure using a finger prick rather than a full blood sample.[10]

Antibody tests identify antibodies from blood or oral fluid samples 23-90 days after exposure. Most rapid HIV tests, and the only U.S. Food and Drug Administration (FDA)-approved

self-administered HIV test, are HIV antibody tests. Tests using a full blood sample are capable of detecting HIV infection sooner than finger pricks used in rapid testing.[10]

Initial HIV screenings are typically an antigen/antibody or antibody test. Abnormal test results should be supplemented with additional testing and consultation with a healthcare provider to ensure correct diagnosis and identify next steps.[10]

1.1.3 Treatment

1.1.3.1 Hepatitis A, B, and C Treatment

Treatment for viral hepatitis varies depending on the type of hepatitis, stage of infection, and time after exposure. Hepatitis A rarely requires medical intervention and typically resolves within six months with no long-term liver damage.[12]

If an individual is aware of their exposure status to hepatitis B within 12 hours, an immunoglobulin injection can be administered in combination with the hepatitis B vaccine to provide short and long-term protection. Acute hepatitis B may or may not require treatment. For severe infections, antiviral drugs and hospitalization may be required. Chronic hepatitis B infections necessitate lifelong treatment to prevent progression of liver disease and transmission. Antiviral medications and interferon injections are effective treatment options available for chronic hepatitis B infection. Individuals with severely diseased livers due to hepatitis B infection may require a liver transplant.[13]

Although hepatitis C treatments have been available since the early 1990s, hepatitis C antiviral medications with high cure rates were not created until 2014 and 2015. Prior to 2014, hepatitis C medications had significant deleterious side effects and lower cure rates.[14,15] "Direct acting" antiviral medications are extremely effective in treating hepatitis C infections with a goal

of complete elimination of HCV 12 weeks after completion of treatment. For those with severe liver complications caused by chronic hepatitis C infection, a liver transplant may be necessary.[16]

Methods of treatment for viral hepatitis vary by disease severity, age, pregnancy status, and other factors that may influence medication adherence. Treatment options are limited for pregnant people and requires unique disease management and intervention.[13,16]

1.1.3.2 HIV Treatment

There is no recognized cure available for HIV, but consistent treatment with antiretroviral therapy (ART) can decrease viral load and improve CD4 cell count, effectively reducing transmission and progression of HIV. ART is recommended for persons living with HIV (PLWH) at all stages of infection. Once there are fewer than 200 copies of HIV per milliliter of blood, an infection is classified as reaching viral suppression. Some virally suppressed cases achieve an undetectable viral load that cannot be detected by HIV diagnostic tests. Poor adherence to ART can lead to drug resistant HIV and an increased risk of transmission and disease progression.[17]

1.2 Epidemiology of Viral Hepatitis A, B, and C and HIV

1.2.1 Transmission

1.2.1.1 Hepatitis A, B, and C Transmission

Hepatitis A, B, and C are highly contagious infections that are predominantly spread via person-to-person contact. In the U.S., viral hepatitis is most commonly spread through sexual contact, contact with bodily fluids, and shared injection devices among PWID.[1–3] Viral hepatitis

can live outside of the human body for hours to days depending on the type, increasing risk of transmission through shared injection devices.[18] HAV can also be transmitted through the ingestion of contaminated food or beverages, and HBV and HCV can be spread perinatally.[1–3]

Transmission of HAV is most common one to two weeks prior to onset of symptoms, although viral shedding can persist for one to three weeks.[19] HBV can be transmitted one to two months before onset of symptoms and any time that HBV antigens are present in the blood.[20] HCV transmission can occur one or more weeks before onset of symptoms and indefinitely throughout the chronic stage of infection.[21]

1.2.1.2 HIV Transmission

HIV is transmitted via person-to-person contact or contact with infected bodily fluids. HIV is most commonly spread through anal and vaginal sexual contact and sharing of injection devices. HIV may also be transmitted during birth, accidental injection with an infected needle, oral sexual contact, blood transfusions with infected blood, or contact with infected bodily fluids through broken skin or mucous membranes.[22]

Transmission of HIV is dependent on stage of infection and viral load. Those with untreated acute HIV infection or AIDS generally have high viral loads and are at an increased risk of transmitting the virus to sexual or injection partners compared to those with untreated chronic HIV infections. Proper adherence to ART greatly reduces transmission of HIV regardless of stage of infection.[22]

1.2.2 Risk Factors

There is considerable overlap in risk factors associated with the acquisition and transmission of hepatitis A, B, and C and HIV. Some of the most common risk factors include IDU and sharing of injection devices; unprotected male-to-male sexual contact; multiple sexual partners; casual sex; sex work; homelessness; low socioeconomic status; comorbidities such as diabetes, cardiovascular disease, and liver disease; and co-infection with other types of hepatitis, HIV, and infection with other STIs such as gonorrhea and chlamydia.[23–25]

1.2.3 National Rates and Patterns of Distribution

1.2.3.1 Hepatitis A National Rates and Patterns of Distribution

In 2019, there were 18,846 cases, or 0.4 cases per 100,000 population, of acute hepatitis A reported in the U.S., an increase from previous years.[26,27] Estimates adjusting for under-ascertainment and under-reporting are closer to 37,700 cases, or 5.7 cases per 100,000 population. Rates were similar by sex but were more common among adults 20 years of age and older. There are significant differences in antibody positivity prevalence by race and ethnicity. Antibody positivity prevalence was highest among Hispanics/Latines, followed by non-Hispanic/Latine Blacks, and lowest among non-Hispanic/Latine Whites. Hospitalizations and deaths were most common among older adults and those with other comorbidities.[18] Approximately 74% of adults in the U.S. are currently susceptible to hepatitis A infection.[28]

In 2017, states with hepatitis A outbreaks reported that infections were most common among persons experiencing homelessness, intravenous drug use (IDU), and non-intravenous drug use.[29] Between August of 2016 and January of 2021, 35 states reported 37,000 outbreak cases.[18]

1.2.3.2 Hepatitis B National Rates and Patterns of Distribution

In 2019, there were 3,192 acute cases, or 1.0 cases per 100,000 population, of hepatitis B reported in the U.S.[27] Reported cases of hepatitis B have declined by 90% in the U.S. since 1982 due to widespread hepatitis B vaccination recommendations.[20] In addition, underreporting of cases may be responsible for some artifactual decline, and adjustments to counteract for under-reporting and under-ascertainment indicate that the actual number of incident acute hepatitis B cases reported in 2019 was likely closer to 20,700 cases. Providers struggle with reporting hepatitis B cases as required by law due to lack of knowledge on reporting requirements. Under-ascertainment of highly stigmatized infections such as hepatitis B are not uncommon in the U.S. due to barriers in accessing testing. Incidence of acute cases is highest among adults ages 30-59 years and non-Hispanic/Latine Whites.[27] Between 2009 and 2013, states most impacted by acute hepatitis B infections reported a drastic increase in cases associated with IDU.[20]

Currently, there are an estimated 850,000 to 2.2 million cases of chronic hepatitis B infection in the U.S. Prevalence of chronic hepatitis B cases is highest among immigrants from endemic countries and PWID. An estimated 3.5-20% of all PWID live with chronic hepatitis B infection and 22.6% of all PWID have been previously infected with hepatitis B.[20]

Chronic cases of hepatitis B are highest among non-Hispanic/Latine Asians (21.1%), followed by non-Hispanic/Latine Blacks (10.8%) and Hispanics/Latines (3.8%), and lowest among non-Hispanic/Latine Whites (2.1%). Prevalence for overall hepatitis B infections was higher among immigrants from endemic countries compared to U.S. born individuals.[30]

In 2019, 1,427 patients infected with acute hepatitis B were hospitalized, and 0.42 deaths per 100,000 population were attributed to hepatitis B in the U.S.[27]

1.2.3.3 Hepatitis C National Rates and Patterns of Distribution

In 2019, there were 4,136 acute cases, or 1.3 cases per 100,000 population, of hepatitis C reported in the U.S. After adjusting for under-reporting and under-ascertainment, estimates indicate that acute cases of hepatitis C were closer to 57,500. Acute cases were highest among adults ages 20-39 years.[27] Between 2003 and 2018, acute hepatitis C cases were highest among Indigenous and Inuit persons, followed by Non-Hispanic/Latine Whites, and lowest among Non-Hispanic/Latine Asians and Pacific Islanders. Rates for non-Hispanic/Latine Blacks and Hispanics/Latines were comparable and slightly higher than that of Asian and Pacific Islanders.[31]

Between 2009 through 2018, rates of acute hepatitis C by 100,000 population increased threefold.[32] In 2019, at least 47% of cases had an identified risk factor with 67% of those cases reporting IDU.[27,31] In 2019, Pennsylvania was fifth among states with the highest number of acute hepatitis C cases reported.[33]

123,312 incident cases, or 56.7 cases per 100,000 population, of hepatitis C were reported in the U.S. in 2019. Adults aged 30-39 and 50-59 years were most impacted.[19] Chronic hepatitis C cases are more common among males (63.1%) compared to females (36.9%).[27,32] Currently, an estimated 2.7-3.9 million persons in the U.S. are living with chronic hepatitis C.[33]

60% of all hepatitis C cases are among PWID. Within two years of IDU, 20-30% of PWID will become infected with HCV. This number increases to 50% at the five-year mark. Since 2002, cases of hepatitis C among PWID who are younger than 30 years and white have markedly increased, particularly within the central Appalachian region.[33]

In 2019, 1,041 patients infected with acute hepatitis C were hospitalized, and 3.33 deaths per 100,000 population were attributed to hepatitis C in the U.S.[27]

1.2.3.4 HIV National Rates and Patterns of Distribution

In 2019, 36,801 incident cases of HIV were reported in the U.S. contributing to an estimated prevalence of 1,189,700 cases of HIV infection among individuals 13 years of age and older. An estimated 158,500 of these cases are undiagnosed infections. Pennsylvania was ninth among states with the highest number of HIV cases reported in 2019.[34] Non-Hispanic/Latine Blacks, especially Black men who have sex with men (MSM) are disproportionately impacted by HIV infections. In 2018, 42% of HIV diagnoses were attributed to Non-Hispanic/Latine Blacks despite making up only 13% of the population. Male-to-male sexual contact was the leading cause of transmission of HIV in 2019 followed by IDU, and 15,815 deaths occurred among individuals diagnosed with HIV in the U.S., although specific causes are unknown.[35]

1.2.4 Allegheny County Rates and Patterns of Distribution

1.2.4.1 Hepatitis A Allegheny County Rates and Patterns of Distribution

Between 2008-2017, fewer than ten cases of hepatitis A were reported each year in Allegheny County with incident cases highest among individuals aged 20-39 years and individuals 80 years and older as seen in **Figure 1**.[36] In Allegheny County, universal hepatitis A vaccination for children was implemented in 2006, reducing acute cases among youth. Of cases with available hospitalization data, 55% were admitted due to complications associated with hepatitis A. Foreign travel and potential food contamination were the two leading risk factors contributing to Allegheny County cases.[36] As of February 12, 2020, Allegheny County received more reports than usual of acute hepatitis A cases, 25% of which were among PWID.[37]

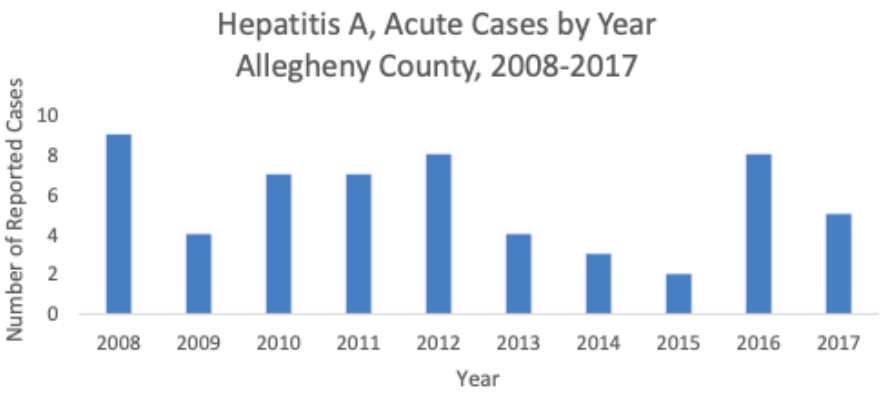

Figure 1 Hepatitis A, Acute Cases by Year Allegheny County, 2008-2017

1.2.4.2 Hepatitis B Allegheny County Rates and Patterns of Distribution

116 acute cases of hepatitis B were reported in Allegheny County between 2008 and 2017 as seen in **Figure 2.**[36] Rates were highest among individuals aged 30-49 years. Males were more affected (63%) compared to females. Similar to hepatitis A, 55% of those with acute hepatitis B with available hospitalization status were admitted due to complications associated with acute hepatitis B. IDU was the leading risk factor associated with cases reported in Allegheny County during this time period.[36]

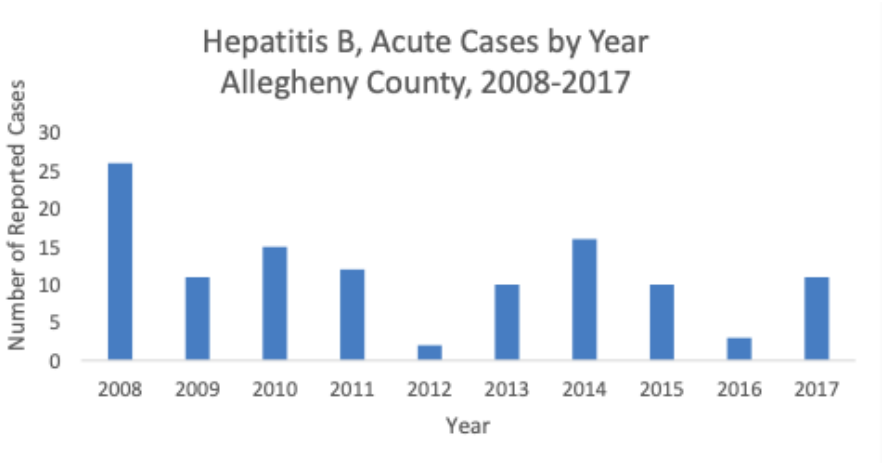

Figure 2 Hepatitis B, Acute Cases by Year Allegheny County, 2008-2017

Between 2008-2017, 980 cases of chronic hepatitis B were reported in Allegheny County as seen in **Figure 3**.[36] Cases were highest among males (56%) and individuals aged 30-34 years. Of cases with known race data, most were non-Hispanic/Latine Whites closely followed by non-Hispanic/Latine Asians.[36]

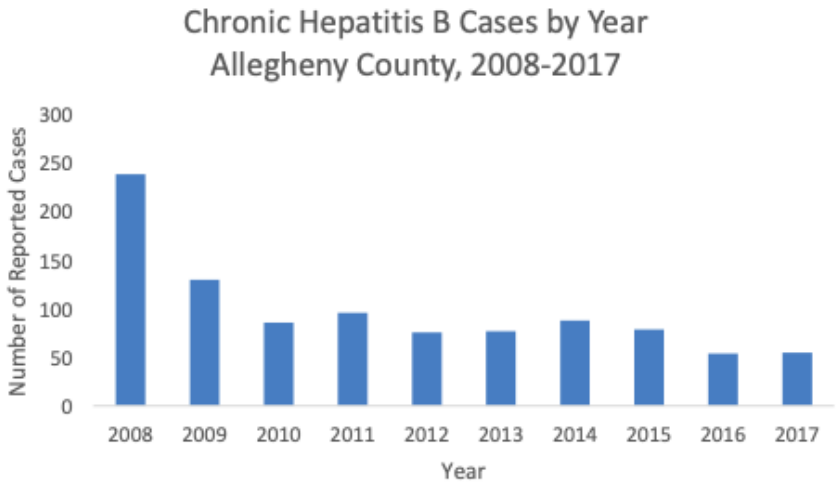

Figure 3 Chronic Hepatitis B Cases by Year Allegheny County, 2008-2017

1.2.4.3 Hepatitis C Allegheny County Rates and Patterns of Distribution

In 2017, 3,622 cases of hepatitis C were reported in Allegheny County, an increase from the average number of cases between 2008 and 2015 as seen in **Figure 4**.[36] Of the 3,622 cases of hepatitis C reported, 1,748 were classified as confirmed chronic cases, and 1,524 were classified as probable chronic cases. 56% of these cases were among males and 25-39 and 50-64 year old individuals were most impacted.[36]

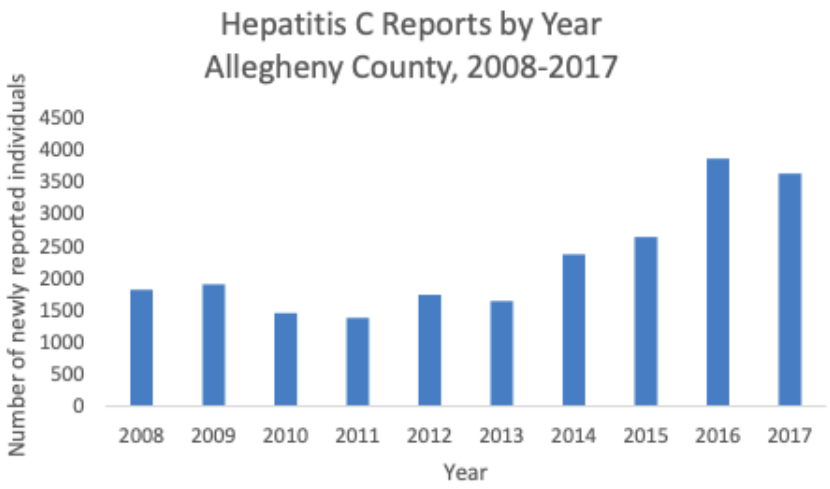

Figure 4 Hepatitis C Reports by Year Allegheny County, 2008-2017

Acute cases of hepatitis C are particularly difficult to identify, as most cases are asymptomatic and require clinical diagnosis. Further, few providers are reporting acute cases, risk factor data, and relevant clinical information,[38] Initiation of enhanced surveillance efforts in 2015 led to the identification of 25 cases of acute hepatitis C. In the prior seven years, only 1 acute case had been identified. In 2016 and 2017, an additional 24 acute cases were identified. Case investigations of acute cases were conducted with 34 acute cases successfully contacted. 68% of those contacted reported a history of IDU. Confirmed, probable, and suspected chronic cases between 2008-2017 can be seen in **Figure 5**.[36]

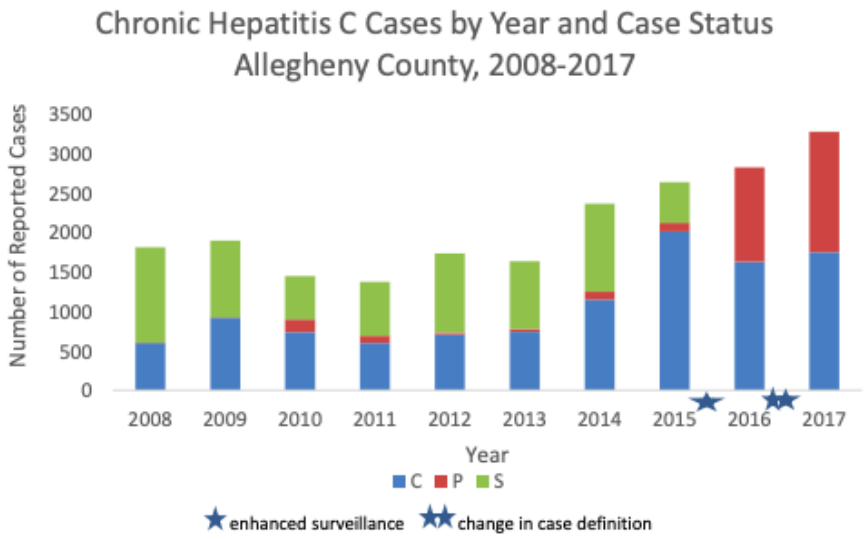

Figure 5 Chronic Hepatitis C Cases by Year and Case Status Allegheny County, 2008-2017

1.2.4.4 HIV Allegheny County Rates and Patterns of Distribution

Between 1981 and 2018, 4,983 HIV cases were reported in Allegheny County. In 2018, 85 incident cases of HIV were reported in Allegheny County. Eighty-seven percent of these cases were among males and cases were twice as high among Non-Hispanic/Latine Blacks compared to Non-Hispanic/Latine Whites. Sixty-one percent of incident infections were among MSM, and the second leading risk factor associated with incident cases in 2018 was IDU.[39]

Thirty cases of AIDS were reported in Allegheny County in 2018. Most cases were among males (83%) and non-Hispanic/Latine Blacks (67%). As of 2018, the prevalence of AIDS in Allegheny County was 3,180 cases.[39]

1.2.5 Harm Reduction and Preventative Measures

Vaccines are available for hepatitis A and B and are some of the most effective prevention tools against HAV and HBV. Currently, there is no vaccine that protects against HCV. The single-

dose hepatitis A and B vaccines are administered in a series of two-four doses depending on manufacturer. Receiving the full series of either vaccine provides long term protection against HAV and HBV. There is also a conjugate vaccine that protects against both HAV and HBV. Hepatitis A and B vaccines are recommended for all infants, children, and those who have not previously received the vaccine as well as those who are at an increased risk of contracting HAV and HBV including PWID, MSM, people experiencing homelessness, and those with co-infection of another type of viral hepatitis and/or HIV.[1,2]

Although there is no vaccine that protects against HIV, individuals at an increased risk of HIV infection can take pre-exposure prophylaxis, better known as PrEP. When taken as prescribed, PrEP is 99% and 74% effective in reducing risk of HIV transmission via sexual contact and IDU, respectively.[40,41] Additionally, there is evidence that PrEP can provide protection against the acquisition of HBV with one study quantifying this risk reduction at 89%.[42] Post-exposure prophylaxis, or PEP, is another HIV preventative measure that can be administered within 72 hours of high-risk HIV exposure to protect against HIV seroconversion, the point of infection when HIV antibodies become detectable.[43] For those with current HIV infection or AIDS, proper adherence to ART is highly effective in achieving an undetectable viral load that prevents HIV transmission via sex or sharing of injection devices.[17]

Other high-impact prevention efforts for viral hepatitis and HIV include safe sex practices including the use of barrier contraceptive, and access to clean syringes. Provision of many of the aforementioned preventative resources and services are available at syringe service programs (SSPs). SSPs are cost-effective, evidence-based harm reduction programs used to ameliorate adverse health outcomes associated with IDU in communities. SSPs do not promote illicit drug use or crime but instead reduce overdoses and bloodborne infections, improve access to

bloodborne infection testing and treatment, and facilitate substance use treatment. New clients of community based SSPs are five times more likely to enter drug treatment and three time more likely to cease drug use compared to those who do not access SSPs. Considering the increase in hepatitis C cases attributed to IDU and the lack of prevention measures for HCV in comparison to HAV, HBV, and HIV, SSPs play a critical role in the prevention of acquiring and transmitting HCV. A metanalysis concluded that SSPs have contributed to a 50% reduction in incident hepatitis C and HIV cases.[44]

Although there are no sanctioned supervised consumption sites (SCS) in the U.S., SCSs are another effective means of reducing the acquisition and transmission of viral hepatitis and HIV among PWID. SCSs reduce overdose deaths by administering sterile syringes and other drug preparatory equipment, offering naloxone and naloxone trainings; providing safe disposal of used drug equipment, reducing public injections, connecting clients with supportive services, and facilitating linkage to testing and treatment for bloodborne infections and substance use disorder (SUD). Despite the supporting evidence that SCSs improve health outcomes and do not promote illicit drug use nor criminal behavior, there are significant barriers to sanctioning SCSs in the U.S., including legal barriers, social stigma, and public and political opposition.[45]

1.3 Public Health Significance

Viral hepatitis A, B, and C and HIV cases are increasing among PWID on a national and local level. Typically, the U.S. experiences an estimated 3,000 cases of hepatitis A per year; however, in less than five years, 35 states in the U.S. reported 37,000 cases of acute hepatitis A, with IDU contributing to many of these cases.[18] Although hepatitis B infections have since

decreased in part due to widespread vaccination efforts, an estimated 3.5-20% of PWID currently live with chronic hepatitis B infections and 22.6% of PWID have been infected with hepatitis B.[18] Currently, hepatitis C cases are increasing exponentially across the nation with most cases attributed to IDU.[27,31] Additionally, Pennsylvania ranked ninth among all states in 2019 for the highest number of HIV cases reported with IDU being the second leading cause of transmission.[34]

In Allegheny County, viral hepatitis A, B, and C and HIV cases are rising among PWID. PWID are a vulnerable, extremely stigmatized population that are often overlooked in public health interventions and face many barriers in accessing education, testing, treatment, and preventative resources.[36,37]

Untreated and poorly treated hepatitis can lead to severe and potentially irreparable liver damage, hospitalization, liver transplantation, and even death.[1–3] Lack of adequate HIV treatment can promote disease progression to AIDS, compromising infected individuals' immune systems and making them susceptible to opportunistic infections. Untreated AIDS has a poor prognosis with many surviving only three years after onset of AIDS.[4]

Considering the increase in hepatitis A, B, and C and HIV cases among PWID in Allegheny County compounded by the health inequities experienced by this population when accessing care, the implementation of a CRP in Allegheny County to address viral hepatitis A, B, and C and HIV among PWID is critical for outbreak prevention, preparation, and response.

2.0 Objective

The objective of this essay is to support the creation and implementation of a CRP addressing viral hepatitis A, B, and C and HIV among people who inject drugs in Allegheny County.

3.0 Methods

Manual search techniques were used to identify appropriate literature. Search terms included, but were not limited to hepatitis A, hepatitis B, hepatitis C, HIV, epidemiology, biology, treatment, testing, risk factors, community response, emergency preparedness, outbreak, or a combination of terms. Interviews with public health professionals were conducted to identify resources including similar community response activities, vulnerability indexes, sociocultural barriers to accessing testing and treatment for bloodborne infections, current surveillance efforts, disease reporting and investigation procedures, and current resources to support the implementation of a CRP in Allegheny County. The Policy Surveillance Program at Temple University was utilized to identify legal and political authority and barriers to community response planning in Allegheny County. The proposed CRP was adapted from similar community response planning activities in other jurisdictions.

4.0 Community Response Activities

In 2015, an outbreak of HIV and hepatitis C occurred in Scott County, Indiana. IDU and sharing of syringes was a key contributor to the outbreak prompting Governor Pence to declare a public health emergency and authorize a temporary SSP. The SSP garnered a large clientele with 277 total enrollees and over 99,000 syringes provided within six months, effectively decreasing rates of HIV infection in Scott County.[46]

Since the outbreak, Congress overturned a ban preventing the provision of federal funding for SSPs, the then director of the CDC encouraged states to implement SSPs, and states began passing legislation promoting syringe exchange. Despite the anticipated response to Scott County's outbreak, epidemiologists, legislators and policy makers, advocates, and other public health professionals are still working to implement harm reduction practices and CRPs.[46]

CRPs "...integrate key elements of communicable disease control and prevention with emergency management concepts and community resource mobilization."[47] An effective CRP will guide outbreak prevention, response, and recovery with the understanding that public health emergencies may warrant amendments to the plan to best fit a community's needs. A CRP is a working document and should be updated regularly to reflect current public health practices. The creation of a CRP should include perspectives of community members and partners, subject matter experts, and relevant stakeholders.[47]

Prior to the formal development and implementation of a CRP, tabletop exercises should be conducted. Tabletop exercises are discussion-based educational sessions that enable participants to discuss their roles in and reactions to public health emergencies.[48]

5.0 Pennsylvania Department of Health Vulnerability Index

After the Scott County, Indiana outbreak, the Pennsylvania Department of Health (PADOH) conducted a vulnerability assessment using census tract data to identify in-state counties that are at risk for outbreaks of bloodborne infections related to IDU. Among Pennsylvania counties, Allegheny County had the third highest 2017 crude overdose death rate of 695 deaths per 100,000 population. Allegheny County ranked 38th of all counties in Pennsylvania for hepatitis C crude rates with 205.5 cases per 100,000 population under 40 years of age from 2017 through 2018. Adults 40 years of age and older were excluded from hepatitis C analyses to identify incident HCV infections more accurately. Certain census tracts at an increased risk for overdose deaths in Allegheny County are also at a greater risk of bloodborne infections. These communities are known as "hot spots."[49]

At a county-level analysis, Allegheny County is considered "more vulnerable;" however, census tract analyses indicate variance in vulnerability by specific communities within Allegheny County. Rather than implementing county-wide interventions, targeted community-level interventions in overdose hot spots are likely to prove more beneficial.[49]

6.0 Barriers to Viral Hepatitis A, B, and C and HIV Community Response Planning

6.1 Sociocultural Barriers to Prevention, Testing, and Care

To create and implement a successful CRP, it is critical to understand the sociocultural and systemic barriers PWID experience when accessing viral hepatitis A, B, and C and HIV testing, treatment, and prevention. PWID are a vulnerable population that are at an increased risk of experiencing criminalization and negative encounters with law enforcement, unstable housing, lack or inadequate insurance coverage, economic instability, homelessness, poor mental health, and stigma and discrimination both at a macro and individual level.[50]

Although each of these sociocultural factors impose barriers for PWID accessing care, social stigma and discrimination are being recognized as an increasingly severe public health issue.[51] The intersection of IDU with viral hepatitis A, B, and C and/or HIV infection and other marginalized identities further ostracizes PWID.[50] Healthcare providers are not immune to perpetuating stigma against PWID. Stigma is a considerable deterrent in seeking care and supportive service access for PWID. Studies found an association between bloodborne infection and reinfection and risky health behaviors among PWID due to provider discrimination.[52]

Social and structural stigma against PWID, particularly those infected with bloodborne infections, is so engrained within society that it has contributed to the implementation of policies and laws that negatively impact PWID and access to care.[51]

6.2 Legal Barriers to Viral Hepatitis A, B, and C and HIV Prevention

6.2.1 Pennsylvania

6.2.1.1 Possession of Drug Paraphernalia and Syringe Exchange

35 P.S. § 780-113(a)(32), better known as the Possession of Drug Paraphernalia Act, uses the term "drug paraphernalia" broadly to include any item remotely relevant to drugs. 35 P.S. § 780-102 explicitly defines "paraphernalia" as:

> "...all equipment, products and materials of any kind which are used, intended for use or designed for use in planting, propagating, cultivating, growing, harvesting, manufacturing, compounding, converting, producing, processing, preparing, testing, analyzing, packaging, repackaging, storing, containing, concealing, injecting, ingesting, inhaling or otherwise introducing into the human body a controlled substance in violation of this act."[53]

Violation of 35 P.S. § 780-113(a)(32) is a misdemeanor punishable by a maximum jail sentence of one year and/or a $2,500 fine. Even everyday items that contain traces of drugs or are within close proximity of drugs, can be considered drug paraphernalia.[53]

The criminalization of drug paraphernalia poses a significant barrier to the provision of sterile syringes for PWID. Even syringes administered through SSPs are not exempt under the Possession of Drug Paraphernalia Act, effectively illegalizing syringe exchange practices in Pennsylvania.[53]

6.2.1.2 HIV Criminalization

Pennsylvania is one of 35 states in the U.S. that criminalizes HIV exposure meaning that an HIV-positive individual who does not disclose their HIV status can face charges and fines.

Pennsylvania does not have HIV-specific criminal law but instead uses general criminal laws to criminalize HIV transmission among incarcerated individuals and sex workers in 18 Pa. Cons. Stat. § 2703 and 18 Pa. Cons. Stat. § 5902, respectively.[54,55]

18 Pa. Cons. Stat. § 2703-2704 criminalizes HIV exposure if an HIV-positive incarcerated individual or HIV-positive life incarcerated individual "intentionally or knowingly, commits an assault upon another with a deadly weapon or instrument, or by any means or force likely to produce serious bodily injury." The statute expands upon this definition:

> "A person is guilty of this offense if he intentionally or knowingly causes another to come into contact with blood, seminal fluid, saliva, urine or feces by throwing, tossing, spitting or expelling such fluid or material when, at the time of the offense, the person knew, had reason to know, should have known or believed such fluid or material to have been obtained from an individual, including the person charged under this section, infected by a communicable disease, including, but not limited to, human immunodeficiency virus (HIV or hepatitis B."[55]

Violation of 18 Pa. Cons. Stat. § 2703-2704 is either classified as a 2nd degree felony punishable by a maximum jail sentence of ten years and/or a $5,000-$25,000 fine or 2nd degree murder punishable by life imprisonment.[55]

18 Pa. Cons. Stat. § 5902 criminalizes HIV-positive sex workers "if the person who committed the offense knew that he or she was human immunodeficiency virus (HIV) positive or manifesting acquired immune deficiency syndrome (AIDS)."[55] Violation of 18 Pa. Cons. Stat. § 5902 is classified as a 3rd degree felony punishable by a maximum jail sentence of seven years and/or a $2,500-$15,000 fine.[55]

Considering PWID's increased risk of incarceration and sex work, HIV criminalization regulations in Pennsylvania impact PWID through the perpetuation of stigma and discriminatory practices against those infected with HIV.[56,57] HIV criminalization laws, even those in Pennsylvania that specify a person must "intentionally or knowingly" expose an individual to the virus without inclusion of the nuance of viral load levels and risk of transmission; barriers to testing, treatment, and prevention experienced by incarcerated individuals and sex workers; stigma and discrimination; and other sociocultural barriers to understanding disease status and transmission disproportionately disadvantage and criminalize PWID.[54]

6.2.2 Federal

6.2.2.1 Controlled Substances and Supervised Consumption Sites

21 U.S.C. § 856(a), otherwise known as the Controlled Substances Act, prohibits the sanctioning of supervised consumption sites in the U.S. Under 21 U.S.C. § 856(a), it is illegal to "knowingly open, lease, rent, use, or maintain any place, whether permanently or temporarily, for the purpose of manufacturing, distributing, or using any controlled substance." 21 U.S.C. § 856(a) also prohibits managing or controlling any such establishment in any form.[58] Violation of 21 U.S.C. § 856(a) is punishable by a maximum jail sentence of 20 years and/or a $500,000 fine. For persons other than an individual, fines may reach $2,000,000.[58]

21 U.S.C. § 856(a) is commonly used to argue against the sanctioning of SCSs. In February 2019, the U.S. Attorney for the Eastern District of Pennsylvania filed a civil lawsuit challenging Safehouse, an unsanctioned SCS based in Philadelphia. After a tumultuous legal battle, in a 2-1 split, the Third Circuit Court of Appeals ruled against Safehouse on January 12th, 2021, upholding the barrier to sanctioning SCSs.[59]

7.0 Legal Authority to Effectuate Community Prevention and Response Activities

It is critical to consider the laws and codes that govern the Allegheny County Health Department (ACHD) and public health activities in the creation and implementation of a CRP.

7.1 Allegheny County

7.1.1 Syringe Exchange

AC Chapter § 851 is an Allegheny County ordinance regulating SSPs in Allegheny County despite statewide illegalization. Under the ordinance, SSPs are allowed to operate within Allegheny County so long as they abide by the provisions delineated within AC Chapter § 851: they must document client visits and maintain records of unique client visits for at least three years, offer HIV and hepatitis B or C screenings at a client's initial visit, encourage PWID with clinical symptoms of HIV or hepatitis B or C to contact the Allegheny County Health Department (ACHD) or their primary care provider, counsel PWID on safe sexual practices, offer referrals to SUD treatment and counseling services, submit semiannual reports of disease status of clients, as well as other requirements. SSPs are subject to loss of authorization to operate if they violate any section of AC Chapter § 851.[60]

7.2 Pennsylvania

7.2.1 Disaster Emergency Declaration

35 Pa.C.S. § 7102 grants authority to the governor of Pennsylvania to declare a "disaster emergency" in cases of man-made, natural, or war-caused disaster. During a disaster emergency, the governor is granted emergency powers outlined in 35 Pa.C.S. § 7301(f)(1-9). 35 Pa.C.S. § 7501 grants authority to chief executives of local governing bodies to declare disaster emergencies within their localities. Local disaster emergencies continue only for seven days without approval for renewal from governing bodies.[61] As of May 18, 2021, the Pennsylvania General Assembly can extend or discontinue the governor's emergency declaration with a majority vote. The governor is unable to veto this resolution.[62] Additionally, an emergency declaration in Pennsylvania is limited to 21 days unless the legislature votes to extend this timeline and pass laws to guide the management of disaster emergencies.[63]

7.2.2 Public Health Emergency

35 P.S. § 2140.301 grants authority to the governor and the Secretary of Health to collaboratively issue orders to prevent and reduce disease transmission via imposition of quarantine or isolation during "an actual or suspected outbreak of a contagious disease or epidemic due to an actual or suspected bioterrorist or biohazardous event." Public health emergency orders are subject to review, and a petition for a court hearing must be filed within 24 hours.[61]

7.2.3 Nuisance Abatement

The PADOH and Department of Environmental Protection (DEP) are granted the power under 71 P.S. § 1403-1404, 510-517, and 1340.505 to protect the wellbeing and health of the public from nuisances, or activities that negatively impact the "security of life and health in any locality." Both departments have the power to abate, eliminate, and investigate the nuisance of concern. Local authorities have similar powers granted to them under 53 P.S. § 14611, 24562, and 6111.[61]

7.2.4 Disease Control Procedures

28 Pa. Code § 27.60-68, and 27.71-77 grants the PADOH the authority to conduct surveillance, quarantine, or isolate an individual or animal with a communicable disease. Local health departments and health authorities can carry out the same public health measures upon receipt of approval from the PADOH.[61]

7.2.5 Outbreak Investigative Authority

Under Pa. Code § 27.152, the PADOH and local health departments and health authorities can investigate disease outbreaks determined to be a public health threat. Additionally, the authorized representative of the PADOH or local health department or health authority can confidentially review medical records as it pertains to the outbreak investigation.[61]

7.3 Federal

7.3.1 Disaster Relief and Emergency Assistance

The Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988, PL 93-288, better known as the Stafford Act, "...authorizes the delivery of federal technical, financial, logistical, and other assistance to states and localities during declared major disasters or emergencies." The Federal Emergency Management Agency (FEMA) provides assistance to states and localities if emergencies exceed the capabilities of the state and localities combined. Resources provided by FEMA include individual assistance, hazard mitigation, public assistance, pandemic coverage, mutual aid agreement reimbursement, and immunity and liability issues. Communicable diseases and public health emergencies are included within the Stafford Act.[64]

7.3.2 Public Health Service Act

Section 319 of the Public Health Service Act (PHSA) gives the Department of Health and Human Services (HHS) Secretary the legal authority to determine the existence of a public health emergency, including outbreaks of communicable diseases, and respond to public health emergencies. The determination of a public health emergency by the HHS Secretary grants federal emergency powers that enable the HHS Secretary to respond to the public health emergency and assist state and local governments via grant creation, contracting, and disease investigation.[65]

8.0 Community Response Plan

Based on the vulnerability index published by the PADOH, Allegheny County is considered a "more vulnerable" county, with particular communities, or hotspots, at an increased risk of an outbreak similar to that of Scott County, Indiana's 2015 HIV and HCV outbreak.[49] In response, a multifaceted CRP in Allegheny County outlining viral hepatitis and HIV prevention, response, and recovery strategies is necessary to preemptively address outbreaks among PWID.

In all community response planning initiatives, ACHD must operate within its legal authority as outlined in **Section 7.0.** The chief executive of Allegheny County may declare a disaster emergency as outlined in 35 Pa.C.S. § 7501 or be granted additional powers if permitted by the PADOH under 28 Pa. Code § 27.60-68 and 27.71-77 if deemed necessary to adequately respond to public health emergencies. Under 53 P.S. § 14611, 24562, and 6111, local authorities are granted powers to address nuisances that can negatively impact Allegheny County residents' health. ACHD staff are granted authority to confidentially review medical records to support outbreak investigations as outlined in Pa. Code § 27.152.[61] At the federal level, the Stafford Act and PHSA provide assistance to localities experiencing severe public health emergencies beyond their capacities and grant powers to local governments to investigate outbreaks, respectively.

Further, ACHD must acknowledge and strive to mitigate sociocultural and legal barriers to implementing an effective CRP. Unstable housing, lack or inadequate insurance coverage, economic instability, homelessness, poor mental health, and stigma and discrimination are considerable barriers for PWID to access testing, treatment, and prevention of SUD or bloodborne infections.[50] Additionally, Pennsylvania has unique legal barriers that inhibit effective harm reduction practices. 35 P.S. § 780-113(a)(32) illegalizes SSPs.[53] 18 Pa. Cons. Stat. § 2703 and 18

Pa. Cons. Stat. § 5902 criminalize HIV transmission among incarcerated individuals and sex workers, respectively, perpetuating stigmatization against marginalized populations who may distrust health officials and face barriers to accessing testing and treatment.[54-57] 21 U.S.C. § 856(a) prohibits SCSs from operating.[58] The Third Circuit Court of Appeals upheld this barrier to SCS sanctioning in Pennsylvania.[59] Prevention and response efforts must center PWID experiences and advocate against the outlined legal barriers to improve health outcomes among PWID.

Proposed steps for a CRP outlined in sections **8.1** through **8.4.3** have been adapted from similar CRPs and current outbreak response measures and is meant to serve as a guide and working document for community response planning initiatives in Allegheny County.[47,66,67] It is important to note that the steps and information delineated below are not in sequential order, as many steps may be executed simultaneously or in varying orders as needed by the community.

8.1 Community Prevention

8.1.1 Community Outreach and Partnerships

Community stakeholders should be identified and engaged to establish community partnerships and the creation of an interdisciplinary team to holistically respond to viral hepatitis and HIV infections among PWID. Inclusion of stakeholders will ensure varying community perspectives are included in community response planning activities. Effective community collaboration will facilitate engagement of target populations, maximize outreach and educational efforts, eliminate information inconsistencies, identify and fill gaps in accessing care, destigmatize

bloodborne infections associated with IDU, destigmatize harm reduction efforts, and ultimately improve health outcomes among PWID in Allegheny County.

Stakeholders to be considered include:

1) Community members and at-risk populations including PWID and their sexual partners, injection partners, and other close contacts
2) Healthcare providers, community health staff, pharmacists, and other health/public health professionals and students
3) Law enforcement and correctional facility staff
4) Emergency medical services (EMS) and other first responders
5) Community organizations, initiatives, and advocacy groups such as Hep C Free Allegheny (HCFA) and AIDS Free Pittsburgh
6) Elected officials and local governmental entities

8.1.2 Community Education

Community education is a critical component to preventing outbreaks of viral hepatitis and HIV among PWID. All educational outreach efforts should prioritize targeted efforts towards hotspots identified by the ACHD, establish education meeting schedules, destigmatize IDU and bloodborne infections, and track and evaluate the impact of educational and outreach efforts. Objectives and strategies for the ACHD to effectively engage the community in educational outreach and prevention efforts are outlined below:

1) Educate residents on evidence-based substance misuse and abuse prevention strategies to mitigate stigma and discrimination against PWID.

a) Identify relevant evidence-based practices through the Substance Abuse and Mental Health Services Administration (SAMHSA) Resource Center.[68]

b) Partner with substance misuse and abuse advocacy and prevention organizations, initiatives, and other relevant groups.

i) Targeted Populations:

(1) Youth, parents, and teachers:

(a) Allegheny Link; Allegheny County Office of Children, Youth, and Families; K-12 school-based education; youth group faith leaders; etc.

(2) Young adults ages 18-30 years:

(a) University and community college education, vocational/technical school outreach, occupational-targeted education, service and faith-based education, and community outreach

(3) Adults ages 30-45 years:

(a) Occupational-targeted education, service and faith-based education, and community outreach

(4) Adults ages 45 years and older:

(a) Occupational-targeted education, service and faith-based education, community outreach, and age-relevant groups including American Association of Retired Persons (AARP) and senior centers

2) Educate groups at an increased risk for viral hepatitis and HIV infections associated with IDU (including their sexual partners, injection partners, and other close contacts):

a) Identify and create health literate educational materials and curricula for PWID on bloodborne infections associated with IDU; prevention of transmission to sexual partners,

injection partners, and other close contacts; and importance of testing and treatment for bloodborne infections and SUD

b) Compile a resource list to facilitate linkage to testing and treatment for PWID, their sexual partners, injections partners, and other close contacts

c) Partner with organizations, initiatives, clinics, and groups that serve PWID including, but not limited to, SSPs, drug and alcohol treatment facilities, federally qualified health centers (FQHC), preventive medicine and community health (PMCH) centers, HIV clinics, homeless shelters and organizations, and relevant non-profit organizations to maximize outreach efforts to PWID

3) Educate healthcare providers, community health staff, and healthcare students on:

a) Evidence-based harm reduction practices related to SUD and bloodborne infections among PWID including responsible opioid prescribing guidelines

b) Rates of viral hepatitis and HIV in Allegheny County and relevant training opportunities and resources in Allegheny County

c) Indicators associated with IDU and appropriate next steps i.e., administration of resources and education, testing for bloodborne pathogens associated with IDU, linkage to care, etc.

d) Methods to protect against accidental needlesticks and other occupational hazards to bloodborne pathogens

e) Advocate for local medical, nursing, and other professional health schools to educate students on harm reduction efforts to reduce bloodborne infections associated with IDU

f) Partner with Community Liver Alliance (CLA) to facilitate viral hepatitis treatment education for primary care providers

4) Educate pharmacists and pharmacy students:

a) Educate on evidence-based harm reduction practices related to SUD and bloodborne infections among PWID including the selling of sterile hypodermic needles and syringes as outlined in Pennsylvania State Board of Pharmacy Regulation Section 27.18(s)
    i) Pennsylvania State Board of Pharmacy Regulation Section 27.18(s) was amended and took effect on September 12th, 2009 enabling pharmacies in Pennsylvania to sell hypodermic needles and syringes without a prescription under the direct supervision of a pharmacist[69]
    ii) Create educational materials on viral hepatitis, HIV, and safe syringe disposal and encourage pharmacists to disseminate materials to those purchasing hypodermic needles and syringes
b) Advocate for local pharmacy schools to educate students on hypodermic needle and syringe sales to reduce bloodborne infections among PWID and other harm reduction efforts

5) Educate law enforcement, EMS, and other first responders on:
    a) Evidence-based harm reduction practices related to SUD and bloodborne infections among PWID
    b) Rates of viral hepatitis and HIV in Allegheny County and relevant training opportunities and resources in Allegheny County
    c) Indicators associated with IDU and appropriate next steps i.e., connection to care, resources, and education
    d) Methods to protect against accidental needlesticks and other occupational hazards to bloodborne pathogens

e) Overdose prevention, including the administration of Naloxone to first responders through the ACHD's Overdose Prevention Program's educational outreach efforts

6) Educate Allegheny County Jail staff, probation officers, and incarcerated/recently released individuals:
   a) Educate staff on the importance of and advocate for screening of viral hepatitis and HIV for inmates
   b) Promote education for staff and inmates on substance misuse and abuse and harm reduction practices to reduce bloodborne infections associated with IDU
   c) Educate inmates in re-entry programs and recently released individuals in rehabilitation and re-integration programs about viral hepatitis and HIV associated with IDU

8.1.3 Volunteer Utilization

The recruitment of volunteers to provide support in the implementation and execution of public health interventions is a key component of CRPs. Medical and non-medical volunteers in Allegheny County are recruited through the Medical Reserve Corps (MRC), a federal initiative to assist public health efforts. The MRC is overseen by the ACHD which is ultimately responsible for recruitment, training, and deployment of MRC volunteers within 13 counties in Western Pennsylvania. Robust recruitment efforts of volunteers from a variety of backgrounds and skillsets can aid in the prevention of, response to, and recovery from public health emergencies.[70]

Volunteers include both support/administrative volunteers and front-line/direct-service volunteers. Support/administrative volunteers are community members from any background whereas front-line/direct-service volunteers are trained public health and medical professionals

such as physicians, nurses, pharmacists, infectious disease specialists, health educators, and other public health and health workers.[71]

8.2 Community Response

Community response to outbreaks of viral hepatitis and HIV among PWID can be compartmentalized into immediate response and intermediate response. Immediate response involves the prioritization of current cases while intermediate response focuses on transmission from current cases to sexual partners, injection partners, and other close contacts. Immediate response is initiated after the notification of a potential outbreak is reported to the ACHD. Intermediate response is initiated upon completion of immediate response activities.

8.2.1 Immediate Response

8.2.1.1 Allegheny County Health Department Response

Once notified of a potential outbreak, ACHD staff should immediately abide by outbreak investigation protocols provided by the PADOH. An overview of these procedures is outlined below:

1) Determine the existence of a viral hepatitis and/or HIV outbreak:
    a) Review reported data in Pennsylvania-National Electronic Disease Surveillance System (PA-NEDSS) and from other reporting entities to determine if the reported outbreak is true or artifactual

2) If an outbreak investigation is warranted, identify an investigation team and create/identify case investigation questionnaires
3) Routinely conduct case investigations and identify potential exposures:
    a) Prioritize cases based on transmission risk and other factors that can contribute to exacerbation of the outbreak
    b) Disease investigators and other public health professionals conducting investigations review available information and conduct case investigation(s) to identify and/or confirm demographic information, diagnosis/disease status, pregnancy status, risk factors including IDU, geographic location, temporality, current treatment and prophylaxis methods used by cases, occupation and/or healthcare appointments in environments that may pose a threat for transmission, and potential exposures and contact information of close contacts
    c) Field visits may be initiated for unresponsive HIV cases
    d) Provide cases with guidelines and next steps
4) Formulate an outbreak case definition
    a) Create an epidemiologic curve and conduct analyses to calculate descriptive statistics
    b) Develop outbreak case definitions based on laboratory diagnostic criteria, geographical criteria, symptoms onset date ranges, symptoms, and exposure
5) Disseminate information and notify appropriate public health colleagues, departments, and jurisdictions at local and state levels affected by the outbreak
6) Identify individuals at risk of infection and execute a case finding strategy via:
    a) Case reporting
    b) Call logs
    c) Contact tracing

d) Databases

e) Outreach to health providers and laboratories to ensure reporting of incident cases

f) Media outreach to public

8.2.1.2 Community Outreach and Education

In addition to internal outbreak investigation procedures, community outreach and education must be prioritized during the immediate community response stage of a CRP to ensure that community members and healthcare workers are aware of the outbreak and collaborating with ACHD staff. These efforts may include the following:

1) Focus efforts on viral hepatitis and HIV testing and linkage to treatment for:
    a) Reported cases
    b) PWID
    c) Potential exposures including sexual partners, injection partners, and other close contacts
2) Notify healthcare providers and community health clinics of outbreak:
    a) Encourage screening of viral hepatitis A, B, and C and HIV for individuals diagnosed with at least one of the targeted bloodborne infections; ensure individuals with positive diagnoses are referred for sustainable treatment
    b) Encourage routine screening for high-risk populations and establish a routine testing schedule and resources for those with continuing risk factors
    c) Promote provision of preventative resources such as condoms, PrEP, PEP, hepatitis A and B vaccines
3) Collaborate with community partners serving high volumes of PWID:
    a) Ensure ongoing assessments and referrals of PWID to testing and treatment and administer resources for SUD treatment during appointments/contacts

b) Refer new SUD patients to testing of bloodborne infections and resources for prevention of viral hepatitis and HIV transmission and acquisition such as condoms, PrEP, PEP, hepatitis A and B vaccines

c) Public health and healthcare professionals will support patients/clients with intersecting identities that put them at an increased risk of bloodborne infection acquisition to adopt and maintain sustainable risk-reduction strategies

i) Train public health and healthcare professionals in conjunction with local healthcare systems and educational centers in: motivational interviewing; the screening, brief intervention, and referral to treatment (SBIRT) model; and other counseling strategies to holistically navigate the health management and risk reduction behaviors of PWID and other at-risk populations

4) Target education, risk reduction practices, and resources towards PWID in collaboration with SSPs and other relevant community health centers and clinics:

a) Assess readiness of clients to enter SUD treatment

b) Refer and connect PWID to SUD treatment and behavioral health services

c) Counsel PWID on risk reduction behaviors such as safe injection practices, safe sex practices, and other prevention measures

d) Refer and connect PWID to preventative resources, testing, and treatment for viral hepatitis and HIV

e) Provide sterile syringes and other drug equipment and safe disposal sites for used syringes and other drug equipment

f) Provide barrier contraceptives

g) Provide naloxone and facilitate trainings to PWID, close contacts, and individuals who are prescribed opiates on indicators of opioid overdose, health risks associated with opioid overdose, reversal of opioid overdose via naloxone administration, and ways to access naloxone

h) Facilitate connection to comprehensive resources based on clients' needs including stable housing, food security, transportation access, family planning, and other supportive services

i) Encourage routine screening for PWID and establish a routine testing schedule for those with continuing risk factors

5) Continue other educational outreach efforts as outlined in Section 8.1.2 to mitigate potential worsening of the outbreak
6) Continue monitoring reports for incident cases
7) Identify community outreach centers based on Scott County, Indiana's "One-Stop Shops"

8.2.2 Intermediate Response

8.2.2.1 Secondary Prevention

After priority outbreak cases are investigated and immediate community response activities are completed, secondary prevention efforts must be targeted towards vulnerable populations, including PWID, to prevent exacerbation of the outbreak:

1) Prioritize prevention of further bloodborne infections among PWID:
   a) Continue to target harm reduction interventions towards PWID and close contacts to reduce further transmission of viral hepatitis and HIV

b) Integrate risk-reduction interventions into SSPs, drug and alcohol treatment facilities, FQHCs, PMCH centers, HIV clinics, homeless shelters and organizations, relevant non-profit organizations and other points of contact frequented by PWID

i) Promote interventions via social networking

8.2.2.2 Community Outreach and Education

Community outreach and education efforts are to be maintained throughout the intermediate response to an outbreak. Healthcare providers will be educated and trained in identifying potential cases or those at risk of infection as well as harm reduction strategies to reduce the risk of incident cases. Community outreach and education objectives and strategies include:

1) Address vertical transmission and neonatal abstinence syndrome (NAS):
   a) Educate OB/GYNs and other healthcare providers that work with pregnant people on treatment options for and management of SUD/IDU and bloodborne infections among pregnant people
   a) Train OB/GYNs and other healthcare providers that work with pregnant people using the SBIRT model to universally screen pregnant people for SUD and provide warm referrals to SUD treatment
   b) Screen at-risk pregnant people for viral hepatitis and HIV
      i) Educate at-risk pregnant people on vertical transmission, treatment and disease management options during and post-pregnancy, and the importance of infant screening and treatment
2) Continue collaboration with healthcare providers and community partners serving high volumes of PWID:

a) Train staff in motivational interviewing and SBIRT to engage PWID and other at-risk populations in SUD and bloodborne infection testing, treatment, and prevention
b) Conduct resource mapping to ensure healthcare providers and community partners have access to training and educational materials and resources to promote SUD and bloodborne infection testing, treatment, and prevention

3) Continue community outreach and partnership facilitation to raise awareness of viral hepatitis and HIV outbreaks associated with IDU
4) Notify health facilities and other institutional settings about:
    a) Prevalence and incidence of cases
    b) Outbreak risk assessment
    c) Viral hepatitis and HIV testing and interpretation of results
    d) Viral hepatitis and HIV treatment
    e) Bloodborne infection control guidance
    f) Risk reduction strategies
    g) Identification and creation of a task force of subject matter experts and other providers capable of administering treatment for viral hepatitis and HIV in Allegheny County
        i) Compile a list of supportive services and resources to aid in costs associated with and access for testing and treatment of viral hepatitis and HIV
5) Collaborate with community health workers that are trained phlebotomists to administer near-patient testing for viral hepatitis C and HIV
    a) Other health and public health professionals will provide technical assistance to community health workers as needed

6) Improve access to sterile syringes and drug equipment as well as proper disposal of used syringes and drug equipment
    a) Continue education of PWID on risk reduction practices and link PWID to SSPs
    b) Advocate for improved access to SSPs

8.2.2.3 Public Outreach

Intermediate outbreak response should continue public education efforts to reduce social stigma and ensure that residents are actively engaged in risk reduction strategies to promote healthier communities. Public outreach may be targeted towards the general public as well as hotspot communities at risk of experiencing outbreaks of viral hepatitis A, B, and C and HIV:

1) Conduct public outreach:
    a) Notify the public with targeted outreach towards hotspot communities identified by the ACHD and the PADOH of the outbreak and administer education and resources via printed materials such as flyers and posters, social media posts, website postings, and community forums
    b) Provide healthcare and public health professionals resources and training to respond to concerned residents, patients, and clients regarding the outbreak

8.3 Community Recovery

Community recovery may be initiated once incident case levels return to pre-outbreak levels, cases and transmission are contained with no reports of secondary cases, and/or there are sufficient resources to manage and treat the outbreak of viral hepatitis and/or HIV cases.

Immediate community recovery includes demobilization of incident resources, return to normal operations and tasks within the ACHD, and completion of outbreak reports, field epidemiology reports, and after-action reviews (AAR). Final reports are compiled and disseminated to evaluate response activities and guide future prevention and outbreak response efforts.

8.4 Sustained Response

After the conclusion of immediate community recovery efforts, community response efforts should target sustained response to prevent future outbreaks of viral hepatitis and HIV among PWID via targeted education and prevention measures, improved access to testing, linkage to care, and advocacy to expand legislation surrounding harm reduction practices.

8.4.1 Communication

Communication must be prioritized during community recovery efforts to promote educational materials and resources surrounding viral hepatitis A, B, and C and HIV prevention, testing, and treatment. Communication efforts should focus on the implementation and/or expansion of an already existing multimedia communications framework:

1) Create a multimedia communications framework centered around health literacy and cultural sensitivity:
    a) Use appropriate media to engage priority populations

b) Ensure that messaging follows health literacy guidelines, centers cultural sensitivity, and uses age-appropriate, evidence-based messaging
c) Create awareness campaigns regarding viral hepatitis and HIV testing, treatment, and prevention
d) Create social media campaigns to aid in the destigmatization of SUD and bloodborne infections

2) Broaden current communication efforts to maximize outreach to populations and communities at risk for viral hepatitis and/or HIV outbreaks associated with IDU

8.4.2 Community Education, Prevention, and Advocacy

Community educational outreach, prevention, and advocacy efforts to improve health outcomes for PWID must be sustainable. Efforts must prioritize sustainable approaches to prevent future outbreaks from occurring via community empowerment and expanded harm reduction policies and legislation. Objectives and strategies to promote sustainable public health changes surrounding viral hepatitis A, B, and C and HIV elimination among PWID include the following:

1) Continue education, prevention, and advocacy efforts to improve health outcomes and reduce criminalization for PWID at risk of viral hepatitis and HIV:
    a) Educate PWID on viral hepatitis and HIV transmission and prevention
    b) Promote awareness of testing and treatment for viral hepatitis and HIV transmission and SUD
    c) Inform PWID of additional support services to holistically improve health outcomes
    d) Create a testing schedule for PWID who have continuing risk of exposure to viral hepatitis and HIV according to CDC guidance

e) Advocate for statewide syringe exchange legislation and support local authorization of additional SSPs and activities as outlined in AC Chapter § 851

f) Advocate for the exclusion of SCSs from 21 U.S.C. § 856(a)

g) Advocate for sterile syringes and other drug equipment administered through recognized SSPs to be exempt from paraphernalia defined in 35 P.S. § 780-102

h) Advocate for the reformation of 18 Pa. Cons. Stat. § 2703 and 18 Pa. Cons. Stat. § 5902 to decriminalize HIV among incarcerated individuals and sex workers in Pennsylvania

2) Support the implementation of universal testing for bloodborne infections, education on viral hepatitis and HIV transmission, and linkage to resources to support risk reduction behaviors for youth and adults involved in the court system for drug-related offenses

8.4.3 Improving Access to Testing, Treatment, and Prevention

Barriers to testing, treatment, and prevention must be identified and mitigated to prevent future outbreaks among PWID. Sustainable care options for PWID at risk or currently affected by viral hepatitis A, B, and C and HIV must be holistic and address all social determinants that negatively impact the health of PWID:

1) Identify barriers to testing, treatment, and prevention of bloodborne infections among PWID as well as ways to ameliorate and eliminate identified barriers:

a) Conduct community health assessments and review current literature to identify and address barriers to testing, treatment, and prevention

b) Improve transportation to testing and treatment for SUD and bloodborne infections

c) Improve access to childcare for PWID seeking treatment for SUD and/or bloodborne infections

d) Improve access to stable housing

e) Improve access to insurance, insurance applications, and resources to assist in medical costs accrued from SUD and bloodborne infection testing and treatment

f) Increase the number of X-waivered and SUD treatment providers and providers that can treat viral hepatitis and HIV in Allegheny County

g) Plan recovery meetings in accessible locations and promote meeting details to the public to ensure public participation in community recovery and sustained response efforts

2) Enhance current community resources and partnerships to address public health impact and consequences of SUD:

a) Continue to administer naloxone and provide education to law enforcement and first responders in conjunction with the Overdose Prevention Program's educational outreach efforts

b) Create a multidisciplinary team to address SUD in Allegheny County

c) Continue to educate community partners on the importance of harm reduction efforts

d) Continue to educate healthcare providers and other professionals on SUD and bloodborne infection testing, treatment, and prevention

e) Surveille viral hepatitis and HIV rates and evaluate community resource effectiveness in reducing viral hepatitis and HIV rates

3) Advocate for the integration of comprehensive harm reduction strategies in health and wellness settings:

a) Ensure providers are assessing the specific and unique health needs of PWID and other at-risk populations

b) Encourage widespread adoption and management of harm-reduction practices

c) Train behavioral health providers, SUD treatment providers, and X-waivered providers on bloodborne infection counseling and prevention
d) Conduct continuous readiness assessments using motivational interviewing to ascertain PWID's willingness to undertake risk-reduction habits and/or start SUD treatment during each appointment/point of contact

8.5 Surveillance

Surveillance efforts should be a continuous effort during all community planning activity phases including prevention, immediate response, intermediate response, immediate community recovery, and sustained response.

8.5.1 Passive Surveillance

ACHD utilizes PA-NEDSS to collect reports of notifiable diseases and other investigative findings from healthcare facilities, clinical laboratories, and other reporting entities.

Both acute and chronic hepatitis A, B, and C infections as well as HIV are reportable in Allegheny County. Viral hepatitis infections must be reported within five days of disease diagnosis to PA-NEDDS. HIV must also be reported within five days of diagnosis; however, to report HIV, reporting entities are instructed to call a direct line to a public health administrator at ACHD.[72]

Upon receiving a report of viral hepatitis and HIV, surveillance coordinators and other disease investigators conduct a case investigation with both healthcare providers and cases to solicit additional information to guide appropriate public health response including:

1) Contact information of potential exposures including sexual partners, injection partners, and other close contacts exposed 12 months prior to specimen collection and date of the case interview
    a) Surveillance coordinators, disease investigators, and contact tracers conduct outreach to exposed contacts, counsel contacts on testing and prevention, and provide contacts with supportive services as needed
2) Occupation and/or recent healthcare visits in environments that may pose a threat for transmission including long-term care facilities, congregate living facilities and shelters, blood and plasma donation centers, dialysis facilities, and other medical and dental visits
3) Field visits are conducted for non-responsive HIV cases by the ACHD HIV Surveillance Coordinator to boost response rates

8.5.1.1 Syndromic Surveillance

ACHD utilizes Pennsylvania Syndromic Surveillance System (PA-EpiCenter), a surveillance system that passively collects electronic health record data from hospital emergency departments (ED). ED staff can include diagnosis codes and triage notes to improve sensitivity. Syndromic data can be used to predict cases and outbreaks of viral hepatitis and HIV prior to laboratory diagnosis via the monitoring of symptoms and abnormal trends.[73]

8.5.2 Active and Enhanced Surveillance

Surveillance coordinators, disease investigators, and other staff routinely conduct outreach to reporting entities in Allegheny County to ensure healthcare providers and laboratories are

regularly submitting hepatitis A, B, and C and HIV reports including laboratory diagnosis, risk factors, close contacts and potential exposures, and other clinical case notes.

Enhanced surveillance efforts were implemented at ACHD in 2015 to identify acute hepatitis C cases. Most acute hepatitis C cases are reported by laboratories and do not contain supplemental information such as risk factor data or relevant clinical information. Healthcare providers were identified through positive reports from laboratories and were faxed questionnaires to acquire patient contact information, clinical information, and risk factor data. A similar approach can be used during viral hepatitis A, B, and C and HIV outbreaks to improve data when staff and resources are low.

8.5.3 Analysis and Dissemination of Data

All surveillance data are compiled, reviewed, and analyzed by ACHD staff to create reports, which are made available online through the ACHD website and are regularly updated by ACHD staff to provide the most updated information about hepatitis A, B, and C and HIV. Reports show temporal trends, include rates by demographic such as age and race, and discuss risk factor data to provide a comprehensive snapshot of disease status in Allegheny County. Reports are disseminated to other public health entities, community partners, and the public to raise awareness and aid in intervention implementation.

9.0 Ability to Implement Community Response Plan in Allegheny County

Allegheny County provides a prime landscape for community response planning surrounding bloodborne infections associated with IDU. Community response planning initiatives can be housed within the ACHD. ACHD staff have a variety of academic disciplines and backgrounds and are well trained and experienced in outbreak response and case investigation, prevention planning, surveillance, educational outreach, facilitation of community partnerships, and participation in initiatives to maximize Allegheny County residents' health.

One such initiative housed within ACHD is HCFA "a county wide collective dedicated to improving the continuum of hepatitis C prevention, diagnosis, care, and treatment with the goal of eliminating hepatitis C in Allegheny County."[74] HCFA is comprised of over 90 active members from a variety of backgrounds, skillsets, and organizations. Members include epidemiologists and other public health professionals, clinical practitioners, mental health providers, harm reduction strategists, advocates, and other health professionals from the University Pittsburgh Medical Center, Allegheny Health Network, Allies for Health+Wellbeing, CLA, Prevention Point Pittsburgh (PPP), and more. Members participate in five workgroups: Surveillance; Treatment Expansion; Testing and Linkage to Care; Education, Prevention, and Advocacy; and Perinatal. Although HCFA prioritizes hepatitis C elimination, there is cross-collaboration with internal ACHD staff and external stakeholders and partners that work with other bloodborne infections, including other types of hepatitis and HIV.[74]

Aside from collaboration with other public health and health agencies, HCFA, ACHD, and community partners also conduct education and outreach to law enforcement and first responders, healthcare providers, and community members regarding SUD and overdose prevention, harm

reduction, and testing for and treating bloodborne infections associated with IDU. Leveraging the network and connections of HCFA, current ACHD outreach activities, and established educational efforts of community partners to integrate and establish a CRP addressing viral hepatitis A, B, and C and HIV among PWID would prove advantageous.

Because of HCFA and ACHD's diverse membership and partnerships, community members at risk of hepatitis C or currently affected by hepatitis C are strategically linked to testing, treatment, prevention, and supportive services and resources. Other PWID at risk of or currently infected/co-infected with hepatitis A, B and HIV are also able to be referred to services and care via the extensive network fostered through HCFA and ACHD.

One such referral for PWID is PPP, a SSP serving Allegheny County. Despite the legal barriers to SSPs in Pennsylvania, Allegheny County's local ordinance enabling syringe exchange within the county has been key in viral hepatitis A, B, and C and HIV reduction among PWID. PPP, a close partner of HCFA and ACHD, serves five hard-hit communities and provides a multitude of confidential services to over 5,000 PWID via the administration of sterile drug equipment and naloxone, bloodborne infection testing and linkage to treatment, referrals to SUD treatment, education on risk reduction behaviors, and other supportive services.[75] PPP will be helpful in engaging PWID at risk or currently affected by bloodborne infections in community response planning initiatives.

Although Allegheny County has an already existing framework to serve PWID at risk or currently affected by bloodborne infections, there are opportunities for improvement and a need for a CRP that unites all the moving pieces of hepatitis A, B, and C and HIV testing, treatment, prevention, and elimination efforts among PWID in Allegheny County.

10.0 Conclusion

In response to the 2015 Scott County, Indiana HIV outbreak and the national increase in bloodborne infections associated with IDU, various states and localities have implemented CRPs to prevent and prepare for similar outbreaks. Based on the PADOH vulnerability index, Allegheny County is considered a "more vulnerable" county for outbreaks of bloodborne infections associated with IDU. Allegheny County is ranked third in the state for overdose deaths.[49] As overdoses and overdose deaths increase, cases of viral hepatitis A, B, and C and HIV are continuing to increase in Allegheny County, particularly among PWID.[36,37,39] Currently, Allegheny County does not have a CRP to mitigate viral hepatitis A, B, and C and HIV among PWID.

To prevent a similar outbreak to Scott County, Indiana's 2015 HIV outbreak, there is a dire need for targeted community response and preparedness in Allegheny County. A successful CRP in Allegheny County must abide by the legal authority granted to the ACHD outlined in **Section 7.0** while prioritizing a multifaceted approach to community preparedness to ensure that the sociocultural barriers PWID experience when accessing care and treatment are ameliorated while maximizing health outcomes of PWID. Additionally, it is imperative that community response planning initiatives prioritize sustainable change via advocacy efforts to reform or implement legislation to improve health outcomes, decriminalize HIV, and support PWID in undertaking risk reduction behaviors.

The proposed CRP provides guidance on viral hepatitis A, B, and C and HIV community prevention, response, recovery, and sustained response. Tabletop exercises and community forums should be facilitated to engage the public and professionals from a multitude of backgrounds. The

lessons learned from the tabletop exercises and community forums, in conjunction with the information delineated in this essay, can aid in the creation of a CRP for Allegheny County. ACHD should spearhead the creation of a CRP addressing viral hepatitis A, B, and C and HIV among PWID in collaboration with community partners and other stakeholders. The rise in viral hepatitis A, B, and C and HIV among PWID in Allegheny County is a significant public health issue that deserves immediate attention.

Appendix A Acronym Dictionary

AAR: After-action review

AARP: American Association of Retired Persons

ACHD: Allegheny County Health Department

AIDS: Acquired immunodeficiency syndrome

ART: Anti-retroviral therapy

CD4: Cluster of differentiation 4

CDC: U.S. Center for Disease Control and Prevention

CLA: Community Liver Alliance

CRP: Community response plan

DEP: PA Department of Environmental Protection

ED: Emergency department

EMS: Emergency medical services

FDA: U.S. Food and Drug Administration

FEMA: Federal Emergency Management Agency

FQHC: Federally qualified health center

HAV: Hepatitis A virus

HBV: Hepatitis B virus

HCFA: Hep C Free Allegheny

HCV: Hepatitis C virus

HHS: U.S. Department of Health and Human Services

HIV: Human immunodeficiency virus

IDU: Intravenous drug use

MSM: Men who have sex with men

MRC: Medical Reserve Corps

NAAT: Nucleic acid amplification tests

PADOH: Pennsylvania Department of Health

PA-NEDSS: Pennsylvania-National Electronic Disease Surveillance System

PHSA: Public Health Service Act

PMCH: Preventive medicine and community health

PPP: Prevention Point Pittsburgh

PrEP: Pre-exposure prophylaxis

PEP: Post-exposure prophylaxis

PWID: Persons who inject drugs

RNA: Ribonucleic acid

SAMHSA: Substance Abuse and Mental Health Services Administration

SBIRT: Screening, brief intervention, referral to treatment

SCS: Supervised consumption site

SSP: Syringe service program

SUD: Substance use disorder

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