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Association Between Hepatitis C Virus Knowledge And Drug Use Risk Behaviors Among People Who Inject Drugs, Ciudad Juárez, Chihuahua, 2012

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ASSOCIATION BETWEEN HEPATITIS C VIRUS KNOWLEDGE AND DRUG USE RISK
BEHAVIORS AMONG PEOPLE WHO INJECT DRUGS,
CIUDAD JUÁREZ, CHIHUAHUA, 2012.

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Leah Nicole Morgan

2014

DEDICATION

I would like to dedicate this work to my family and friends for supporting me throughout these past few years and especially to my son for inspiring me. I would like to also thank Stephanie Ramos for helping me out numerous of times with my son while I worked on my Thesis. Your support and love have gotten me where I am today. Thank you and I love you dearly.

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by

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THESIS

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ABSTRACT

BACKGROUND: Needle sharing during injection drug use is the most common mode of transmission for the Hepatitis C Virus (HCV) in the U.S. The scientific literature on the relationship between knowledge and risk behaviors for HCV transmission among people who inject drugs (PWID) is minimal. Evidence-based and harm reduction programs (e.g., needle exchange programs; reducing needle and works sharing) exist to reduce the risks of HCV and other blood-borne pathogens, however these programs are not widely available. Solutions to reduce HCV transmission in the general population involve changes at the individual level as well as at the policy level. On the U.S.-Mexico border region, where drug trafficking, violence, and other structural factors have led to an increase in local drug consumption, residents are vulnerable for injection drug use, works and needle sharing, and thus HCV. **AIMS:** The study aims are to determine the: (1) level of HCV knowledge; (2) prevalence of HCV risk behaviors including needle and works sharing; and (3) association between HCV knowledge measures and HCV risk behaviors among HCV PWID living in Cd. Juárez, CHIH. **METHODS:** This study is a secondary data analysis from a cross-sectional study conducted in collaboration with Programa Compañeros, A.C. to assess the prevalence of HCV and HIV and risk behaviors among PWID and their non-injecting sex partners. Face to face interviews were conducted between March – May 2012. Measures collected include socio-demographic characteristics, drug use, needle and works sharing, HCV knowledge, and other HCV risk behaviors among 48 PWID who were HCV positive and living in Cd. Juárez. There are five outcome measures for HCV transmission risk behaviors: 1) injecting with others; 2) receptive syringe sharing; 3) receptive works sharing; 4) use of bleach water to clean the syringes; and 5) use of used water to clean syringes. The association between the HCV transmission risk behaviors (binary outcomes) and knowledge of HCV transmission and other measures will be determined using the Pearson Chi-Square Tests for categorical variables, t-tests for continuous variables,

and non-parametric equivalent tests as needed. **RESULTS:** Overall, this was a sample of 48 PWID who were HCV reactive were primarily males (68.8%) with mean age 38 years of age, and injected an average of 65 times per month. The only factor statistically significantly associated with injecting with others was the belief in that they were at risk for becoming infected with HCV (p-value=0.027). For receptive syringe sharing, there were significant differences in frequency of distributive needle sharing after injecting (p-value=0.010); the mean number of new syringes used (p-value=0.031); the percent of new syringes used (p-value=0.011); the frequency of injection partner using rinse water or liquids to clean syringe by injection partner (p-value=0.010); and injection drug use in jail (p-value=0.048). The factors statistically significantly associated with the use of used bleach water to clean syringe were the use of used water by injection partner (reduce risk to others) (p-value=0.008) and the belief that someone can still be infected with HCV even though they don't have yellow skin or eyeballs (p-value=0.029). The use of used water to clean syringe before use is statistically significantly different for partners use of same rinse or liquids to clean the syringe (p-value=0.003) and the belief that a person who has HCV is also be at risk for HIV (p-value=0.034). **DISCUSSION:** Study findings indicate there are no significant associations between the HCV risk behavior outcomes and HCV transmission knowledge measures. However, there was indication that harm reduction messages have reached certain populations based on their needle sharing behaviors. In addition to the ongoing needle sharing HCV risk reduction and harm reduction efforts, there is a need to increase the emphasis on the risks of works sharing and address the structural factors, such as the lack of evidence based policy, that are fueling the epidemic.

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INTRODUCTION

Hepatitis C Virus (HCV) has been a public health problem in long before it was first documented in the late 1980's. HCV is prevalent among all ethnicities, ages, and genders but there are clear risk groups and behaviors identified. HCV can have detrimental to human health, particularly for the liver and for those with a compromised immune system and not receiving care². Due to the absence of literature on knowledge and behavior prompted by the growing significance of this problem, this study will address the association of knowledge and risk behaviors among people who inject drugs (PWID) living with HCV. PWID are at risk for HCV transmission when sharing needles and works with others. Studies on to risk behaviors that put PWID and others at risk can inform the implementation of prevention methods and strategies necessary and appropriate to a given region.

CHAPTER 1: BACKGROUND AND SIGNIFICANCE

1.1 *Hepatitis C Virus (HCV)*

HCV is identified as an acute and chronic infection. An individual with acute HCV has been exposed to the HCV infection within the past six months. It can be considered a short-term illness if the individual is seeing a doctor and receives proper treatment. Some people with acute HCV may not show any symptoms, while others may start having symptoms similar to someone who has chronic HCV¹². Acute symptoms may include jaundice, abdominal pain, fatigue, loss of appetite, unexplained weight loss, nausea and vomiting, pale skin, dark urine, and skin rash¹. People who have chronic HCV have a long-term infection that can cause severe liver problems. Some individuals living with chronic HCV infection may need a liver transplant or experience a progression to liver cancer. In the United States, there were over 3,000 reported cases of acute HCV in 2000, with a rapid decrease in cases in 2002. Between the year 2007 and 2011, there was a 44.7% increase in acute HCV cases reported in the United States². As of 2009, there were an estimated 16,000 people infected with acute HCV in the United States¹². Symptoms can range from mild to severe within two weeks to six months after an individual has been infected¹.

Transmission

HCV is a blood borne infection that can be transmitted through blood-to-blood contact with an HCV infected person, and likely via needle sharing or open wounds³. Engaging in certain behaviors can increase an individual's risk of contracting HCV. A multitude of factors should be considered when researching the transmission of HCV, including sexual transmission, tattoos and piercings, risk behavior during drug use, and receiving blood products (e.g., blood transfusions, plasma). The first part of this section will discuss how transmission can occur. The second part will discuss risky sexual transmissions of HCV, followed by a description of vulnerable populations to HCV such as PWID, men who have sex

with men (MSM), female sex workers (FSWs). Lastly, this section ends with a description of other risks for HCV.

People Who Inject Drugs (PWID)

PWID are one of the most populated affected by HCV. Rates of HCV are much higher for PWID who share their needles and syringes, compared to those who do not⁴. PWID have a prevalence of 50%-90% HCV infection⁵. Currently, many studies are now also considering transmission of HCV through used works sharing. Works include material or tools used to inject drugs including cookers, filters, and rinse water⁶. Works sharing is also an important risk factor given that HCV infected blood can contaminate the works and drug and thus, HCV can be transmitted. HCV can be transmitted to any individual using a contaminated needle. HCV is widely spread among PWID because users first look to detect veins prior to injection of the drug. Back loading is also risky because this is when mixed drugs are being shared and used with other PWID. Once they have found a vein, individuals release the illicit drug, along with the blood they had drawn from the needle, into their blood system¹⁰. This is a dangerous process for the individuals involved, especially when sharing needles without proper cleaning. It is important when splitting the drug to use a clean syringe and cooker. When PWID split drugs with a used syringe there is a chance blood can still be in the used syringe. Methods to reduce transmission have been documented. One example is the use of low dead-space syringes, which significantly reduce the amount of blood that enters the syringe after use. A study examined the prevention of HIV transmission by programs using low dead-space syringes⁷. This research highlighted the cost of low dead-space syringes and the necessary steps needed to transition from high to low dead-space syringes⁷. Hagans et. al. (1999) found that educating PWID on the advantages and disadvantages of using low versus high dead-space syringes will help reduce their risky behaviors if they use these

needles⁷. Different gauge needles were employed to determine the amount of blood transference occurring in needles of varying sizes³.

HCV transmission rates are not the same across subgroups of the population. For example, Hispanic PWID are infected more by blood borne pathogens compared to Caucasians⁸. The Hispanic ethnicity is on the rise among the U.S. population and therefore are at risk for having higher numbers of HCV⁸, and thus, need for care. This study is focusing on Hispanic persons living on the border region that are engaging in risky behaviors (e.g., drug use) that can lead to severe health problems and showed the Hispanics were more likely to inject and share syringes with others compared to Caucasians⁸. Sexual intercourse is important to address as modes of transmission for HCV and some risk factors.

Sexual Transmission

Sexually transmitted infection often contributes to the spread of viral infections and studies have shown that HCV can be acquired through sexual activity. HCV is not commonly spread during sexual intercourse or sharing personal household items with an infected HCV individual, although these are potential routes of transmission⁹. Risk for transmission is increased by various sexual behaviors (e.g., unprotected sexual intercourse, anal sex, fisting, sex workers and condom negotiation). There are many other negative consequences associated with risky behaviors, including HIV and STIs. Minimal literature addresses sexual intercourse or sexual activity, as a mode of transmission for HCV, despite the fact that unprotected sex is a known mode of transmission. Although heterosexual transmission of HCV has been documented, HCV infection is largest amongst homosexual males¹⁰. There has been a general absence of studies exploring the link between HCV and sexual transmission among heterosexual and homosexual couples; however, there are some groundbreaking studies in sexual transmission of HCV that are noteworthy. More research has been focused on the transmission of HCV among MSM.

Tohme, Holmberg et al. (2010) discussed sexual transmission for HCV¹¹. They showed that individuals who had multiple sexual partners were twice more likely to acquire HCV than people who were monogamous with one person. These individuals were considered risky in their sexual behavior, which was further complicated by not knowing a sex partner's HCV status when engaging in oral, anal, or vaginal sex¹¹.

Another, mode of transmission not commonly assessed in HCV studies is mucosal damage, primarily occurring among males who have sex with other males during anal sex and fisting¹². Anal sex is more common among men who have sex with men, and less common among men who have sex with women¹². Regardless, anal sex is considered a mode of transmission because during penetration, bleeding can occur from tearing of the anus¹³. Similarly, another mode of transmission that causes tearing of the anus is fisting. Fisting, which has also been prominently found among homosexual men, occurs when the active male will force their fist into the passive partner's anus. This form of sexual activity is dangerous because when the fist is forced into the anus, bleeding can occur due to tearing. People who engage in risky sexual activities like fisting are also at a higher risk for being infected with HCV. A study by Turner et al. (2006) showed that among the homosexual men 7 out of 17 of the men were positive for HCV¹³. In a study conducted in London between 1999 and 2000, among men having sex with men and having unprotected sex (e.g., fisting), studies showed that more research was needed to see which forms of sexual transmission were putting individuals at greatest risk¹². Unfortunately, many women who have been sexually abused, through the act of fisting¹⁴ have died due to rectal perforation¹⁵ which occurs due to disruption of the intestine¹⁶. Another risky behavior that some women engage in is female sex workers.

Female Sex Workers

Sex workers are a vulnerable population for HCV. On the U.S.-Mexico border, we have two neighboring countries and cities with different policies for sex work, hence female sex worker on each side face different risks and challenges. In the U.S., all states but Nevada, are illegal¹⁷. Local governments regulate sex work in the border cities of Tijuana and Ciudad Juárez, Mexico¹⁸. A study conducted among female sex workers (FSWs) from 2004 to 2006, in these two cities, showed an increase in condom use and a decrease in HCV, sexually transmitted infection (STI), and human immunodeficiency virus (HIV) risky behaviors¹⁸. This study found that female sex workers PWID were engaging in high-risk behaviors at a higher rate than non-injection drug user FSWs. FSWs are not primarily at risk for sex work, but at risk because of their vulnerability to drug use. FSWs who inject drugs reported that half of the clients used drugs and one fifth had shared needles¹⁹.

Another study that assessed risk behaviors among female sex workers, PWID, and other sexually active individuals in Chiang Mai, Thailand in 1996 revealed that 85% of participants were HCV positive²⁰. HCV is shown to be more prominent among non-monogamous partners than people who are actively monogamous²¹. A study reports that sex workers in Mexico are paid up to 23% more by their clients if they engage in risky behaviors such as having sex without a condom²². This increase in pay could be taken by the sex worker because of their socioeconomic status and need for the money, even though it is putting themselves at risk. Also cause of higher rates of drug use and could be at risk due to sexual transmission that been minimally studied.

Sexual transmission of HCV, while the most understudied risk factor, is not the dominant means by which HCV is contracted.

Other Risks

Risk for HCV transmission occurs in health care settings, from mother to child, and during medical procedures. In the hospital care setting, there are many different ways in which HCV

transmission can occur. HCV transmission can result from contact between patient-to-provider, patient-to-patient, and provider-to-patient. There is a reduced risk of this form of transmission when safety protocols are applied in place at almost all hospital settings²³. One way to lower this risk is through the implementation of Standard Universal Precautions and Exposure Avoidance in all health care settings²³. In the health care setting, it is also important to recognize the risk of mother to child transmission of HCV.

Perinatal Transmission

In the United States, there is an estimated 4.1 million annual births, while almost 40,000 to 80,000 women have had a history of HCV²⁴. Prenatal testing is important to reduce the transmission of HCV from mother-to-infant²⁵. Pregnant women who are infected with HCV and also inject drugs are at risk for complications during pregnancy²⁴. Women who are pregnant and tested usually do not know they are HCV positive; therefore they can begin early treatment once they are made aware²⁴. Women who practice risky behaviors should have a routine HCV testing that is consistent with their prenatal testing²⁵. Children with HCV were predominately infected by their mother when they were born²⁶. Blood borne infections within healthcare settings are not limited to contact between patient and provider and childbirth, however there are other methods to consider.

Blood Transfusion/ Transplant

Before 1992 there was no systematic screening of blood borne infections within donated blood used in blood transfusions and organ transplants because of the lack of testing²⁷. Due to the lack of testing, “baby boomers,” people who were born between the years 1945-1965 who received transfusions or transplants, are at a potential risk for HCV due to this lack of screening. Making up 27% of U.S. population,²⁷ “baby boomers” are likely to be infected with HCV. This is five times higher than any generation or age group. Thus, “baby boomers” should be tested for HCV and advocate that others do

so as well²⁷. Outside of blood transmission via medical settings, needle sharing and syringe use are other dominant modes of transmission of HCV among this population. HCV is a virus that can lead to many health concerns.

Disease Progression

When someone is HCV positive it is possible that they not have any symptoms or severe symptoms depending on their immune system. An individual that is positive for HCV can suffer from cirrhosis of the liver, which can ultimately require a liver transplant or even lead to death due to liver failure²⁸. This can also occur to individuals that have been drinking alcohol for a long period of time that can progress to liver scarring and then cirrhosis of the liver. Sixty to seventy of every 100 individual's infected with HCV will develop chronic liver disease¹. In 2011 in the United States, it was reported that 715 individuals died and 822 were hospitalized for HCV². When individuals do not know they have HCV or do not receive treatment, HCV may progress to liver scarring which can then progress to liver failure². Approximately 5-20% of HCV infected individuals develop cirrhosis of the liver in a 20 – 30 year time frame¹. HCV is known to be the leading cause of liver cancer⁹. Unfortunately, one to five percent of HCV positive individuals will die from cirrhosis or liver cancer¹. Early HCV testing is critical in preventing the spread of HCV in all genders, races and age groups. Hispanics that know their current status will be more aware of preventing the spread of HCV to other people that they come in contact with²⁹. People receiving early diagnosis will also help detect if they are positive for HCV; they can start treatment for their prognosis and help increase their life expectancy. People that have a late prognosis of HCV may miss opportunities for their HCV and also have an increase in cost of care²⁹.

Prevention

When discussing HCV and the effects that it can have on an individual it is important to discuss prevention methods that protect individuals as well as those around them are relevant or tailored for each

of the risk groups. For example, a Massachusetts study among Latina women assessed their ability to negotiate safer sex practices with their partners. The study revealed that women who had more power in the relationship were five times more likely to negotiate condom use than women who had less power. Thus, women should employ better protection measures in order to prevent HCV, HIV, and other STIs. Viral infections can be avoided by allowing partners negotiating safer sex methods and by establishing a comfort level in which safer sexual behavior can be freely discussed³⁰. There are cultural and ethnic differences in relation to condom use and prevention method negotiation (e.g., intimate partner violence, family culture views)³⁰. A 1994-1995 Miami study found that Black and Hispanic women (15-17%) were more likely to consistently use condoms than White women (4%)³¹. Approaches to protect and reduce risk to self and others from HCV will be further discussed.

Intervention programs that offer prevention methods and communicational tools to discuss sexual behavior with their sex partner will help reduce the transmission of infections³¹. Intervention programs designed to promote prevention methods and ways that partners can openly discuss this sensitive subject will also help reduce transmission³¹. The U.S. currently does not fund evidence based harm reduction programs, such as needle exchange program, which make prevention methods tailored to drug users difficult in the border region.

In El Paso, health facilities, such as the Texas Health Department, can address health disparities by conducting education programs for the at-risk population. With funding sources decreasing in many states, HCV has become particularly problematic for Hispanics, who are considered an at-risk group commonly residing in low-income areas³². If more clinics provided HCV specific free educational materials, prevention education, testing, counseling, and outreach programs, early detection and treatment could improve. Given that bicultural and bilingual Hispanic population in the region, there will need to be materials in Spanish and using relevant regional language.

It is important for governmental agencies to start funding more programs that outreach to drug users and other at-risk communities. Funding will be needed for assistance in health care, medications, counseling and any assistance they may need. Health organizations that aim to increase awareness of safe sex practices can provide informative presentations in the community, offer free counseling, and can dedicate various other resources to the border community.

1.2 U.S.-Mexico Border

Mexico border cities

In 2012, the U.S. population consisted of 313,873,685 people. Texas alone accounts for 26,060,796 people or 12% of the U.S. population. In El Paso County, TX the population has reached 827,398 people³³. The La Paz Agreement has been in place since 1983 and is apart of the U.S.-Mexico border region, which circumferences 100 kilometers north and south. The U.S.-Mexico border has four U.S. states that include California, New Mexico, Texas, and Arizona and 44 counties and is 1,969 miles long. There are six Mexican states and 80 municipalities. Today there is an estimated 13 million people living on the border. With people crossing back and forth across the border, experts estimate the population will double by 2025. Three of the ten poorest counties reside along the border region³⁴. Twenty-one out of 44 counties along the border are economically distressed³⁴. People from Mexico cross the border into the U.S. in order to work or study temporarily, among other reasons³⁵. It's also estimated that 65,000 immigrants from Mexico become permanent residents annually³⁵.

El Paso, TX and Cd. Juárez, CHIH are considered twin cities for multiple reasons. For many people living on the border, the two cities are seen as one region. People cross daily between the two cities for work, school, family ties, and other reasons. There are three international bridges that connect the two cities, they operate 24 hours a day and 7 days a week³⁶. Crossings from El Paso into Mexico in 2011 consisted of more than 3.6 million passenger vehicles, 4.2 million pedestrians and 300, 000

commercial vehicles. In 2013, the City of El Paso produced a report for all three international bridges to illustrate the magnitude mobility community between these two cities³⁶.

Various factors have become challenges when living along the U.S.-Mexico Border because of different health care systems and options for prevention. This illustrates that people cross at large amounts daily across all three bridges and this is a concern because HCV can easily be carried amongst individuals that do not even know they are carrying the virus. This can be hard to keep in contact with patients and get them the care they need. Not only are diseases being crossed between the border region. Mobility between the twin cities needs to be addressed daily because the problems will keep progressing as the population increases. Mobility also needs to be understood better so that we can face the different challenges a community is faced with.

Within a study conducted between February to April of 2005, Moyer et al. (2008) found that there were missed opportunities to discuss testing for people who inject drugs in Tijuana and Ciudad, Juárez, two of the largest cities in the U.S.-Mexico Border region. Both cities had a result of 65% missed opportunities for being tested for HIV, HCV, and sexually transmitted disease²⁹.

Incidenc, Prevalence, and other Rates

According to a 2011 CDC report, 1,229 individuals in the U.S. are infected with HCV and in 2007 of which only 849 were diagnosed. In Texas, there were 37 individuals positive for acute HCV in 2011, which increased to 44 cases in 2012². In the U.S. during 2010, HCV was common among individuals between the age groups of 45-54 and 55-64². Reports show that 11,871 men and 4,846 women have been diagnosed with HCV in 2011. In 2012, The City of El Paso Department of Public Health before 2012 had been documenting only HCV acute cases as a notifiable condition and not HCV chronic cases. The El Paso Department of Public Health accounted in 2013 for HCV chronic as a notifiable condition and by August 2013 they had 348 diagnosed with HCV for year to date³⁷.

Border cities have been the focus of HCV research because of the high rates of drug use on these drug trafficking and migration routes. Weidel et. al. (2008) report on the effects of immigration on women by correlating a lack of condom use to increased risk of HIV infection and violent partner relationships³⁸. Some Hispanics are also at risk because they are scared to talk to someone about their partner violence because some individuals could have an undocumented status³⁸. There are other cultural factors that put individuals at risk for transmission of HCV.

Cultural Context

In addition to sexual risk behaviors, in the border context, we need to consider risks that are specific to predominantly Mexican culture in the region. Among heterosexual relationships, women can be victims of gender-based power from their male partner³⁹. A study in South-Central Texas, among Mexican American women, indicated that another major concern is that some Mexican American women's power for condom negotiation is limited by gender and cultural norms⁴⁰. Mexican American women can be victims of partner violence when their partner is under the influence and the women suggest condoms being used during intercourse⁴⁰. Davila (2002) study found that the Mexican American women did not hold a position to negotiate decision with their sexual relationship.

Ciudad Juárez, Chihuahua

Drug trafficking is a reality on the U.S.-Mexico border⁴¹. Tijuana and Ciudad Juárez are known to be on the drug trafficking routes from Mexico to the U.S. border. In 1969, "Operation Intercept" by U.S. President Nixon, aimed to reduce drugs being crossed over⁴². The U.S.-Mexico border sees a large number of people entering and leaving between cities, particularly with the North American Free Trade Agreement⁴³. Since terrorist attacks of 2001, the border has had an increase in law enforcement, border patrol, and military presence on both sides of the border⁴³. As a result, smugglers had to learn new

routes and ways to bring drugs across. Despite these efforts, drug trafficking patterns have not changed, and perhaps increased, as well as the high demand for illicit drugs in the U.S.⁴⁴.

Unfortunately, there has not been a decrease in drug trafficking between U.S over the past few years⁴³. Drug traffickers have changed their strategies to move drugs into the U.S. without being caught by law enforcement⁴³. There seems to be resistance between the Mexican administrations on drug policies and the money being allotted to prevent drug trafficking⁴⁴. In spite of the illegal consequences, drug trafficking is no longer stigmatized and is a form of survival and easy money for individuals⁴⁵. With the high demand of drugs in the U.S. and supply primarily through international smuggling, drugs become easier for people to access and cross over⁴³. Many individuals in El Paso can make more money by transporting drugs across the border⁴⁵. Some drug smugglers that traffic the drugs by foot are not paid by cash, but by drugs⁴¹. Although drug trafficking is a major problem in the region, it is not being addressed much in our local newspaper (e.g., El Paso Times)⁴⁵.

In Mexico, illegal drug use has been increasing among teens ages of 12-17, because the drugs are cheaper and more easily accessible⁴⁴. Many youth start selling illicit drugs to for economic survival and for status or acceptance amongst their peers⁴⁶. The Mexicans that used illicit drugs said their main drug of choice was heroin at 73%, while 19% of the PWID used a dirty needle⁴². In Cd. Juárez they ranked second in consuming drugs and there was an estimated 6,000 PWIDs⁴⁷. Therefore, in Mexico as in other countries, there is a lack of information, access to care, and stigma towards PWID and persons with blood borne infections⁴². Personal drug use is legal in Mexico, and currently PWID can legally access syringes in Mexico⁴². Barriers to clean needles have been documented on the border region. Among 627 PWID in Tijuana, Mexico between 2006-2007, 16% were denied purchase for over-the-counter syringes despite it was legal⁴⁸. Due to inconsistent policies and practices in Tijuana, Mexico this makes accessing new syringes difficult or impossible for PWID. As a follow-up, in Tijuana, Mexico during

2006-2007, “mystery shoppers” went to see if policies were being followed, and found that only 28.4% were able to purchase new syringes.⁴⁹ A study among PWID in Tijuana, Baja California (N=222) and Cd. Juárez Chihuahua (N=206) indicated that even though personal drug use is legal in Mexico, police had arrested 48% of the participants were arrested for carrying unused syringes and 57% for carrying used syringes on them⁵⁰ and in a similar study 32% reported they had been rushed to inject their drug, were afraid of police and had affected their drug use⁵¹. All these are factors led to risky injection behaviors that are promoted by police practices. A study by Beletsky et. al (2005) discussed how they go by “law on the streets” and 14 officers were misinformed about the law on legalized syringes for possessing and purchasing and the police officers believed that PWID chose their poor life of using.⁵² There is a need for police training that can address and break the misconceptions that are happening toward PWID. Police also need to be educated on the importance of harm reduction programs and reducing the negative attitudes toward PWID⁵². There is a need to reduce police violence that can lead to psychological and physical abuse among PWID⁵³. Instead of isolating PWID, we need to help them seek treatment, care, and harm reduction programs to reduce health risks within the community⁵³. If policies are not put in place and regulated then it could affect PWID, because if shooting galleries are closed then PWID will use used syringes in the networks they are shooting up in⁴². In Cd. Juárez in 2011 there was 75 shooting galleries for PWID⁵⁴. Moreover, mobility and homelessness contribute to high rates of needle sharing among PWID due to a lack of safe environment to live or use⁵⁵. Individuals that are HCV positive have lifestyle changes, such as eating healthier, sleeping, and taking medications regularly, which are practically impossible for homeless or people who cannot alter their lifestyle⁵⁶. Homeless shelters usually have drug free policies and homeless individuals usually can not carry or hold on to their needles, which means they use needles they find or from other PWID once they leave the shelters⁵⁷.

Another drug problem on the border region is trafficking prescription medication coming from Mexico to the U.S.⁵⁸. With health disparities and medical care cost rising, the demand for prescription drugs in the U.S. is on the rise⁵⁸. Additionally, demand is rising due to prescription drugs are on a rise also because of the low cost and easy access in Mexico compared to the U.S.⁵⁸. A local organization in Cd. Juárez assists PWID with resources and counseling called the Programa Compañeros.

The Programa Compañeros are a non-governmental organization that has been in place since 1986 in Ciudad Juárez. They have been advocates for individuals seeking prevention care, education and research, HIV/AIDS, Sexually Transmitted Infections (STIs), IDU addiction and violence resources. They also advocate in the community by providing, implementing, and evaluating programs and projects to the people they see. The programs they use are all evidence-based programs. Programa Compañeros are a great resource for both cities because they are able to mobilize within both communities and gain the trust from set population groups. They have also been a great strength in partnership for the UTEP faculty because they are able to mobilize and conduct the studies with the population they have formed relationships with. The PWID trust the Programa Compañeros and are able to bring others to come get information or participate in research studies that are being done.

Barriers to Healthcare among PWID

Access to health care is becoming a growing problem around the U.S. due to lack of insurance³⁴. In the past, it has been documented that access along the U.S.-Mexico border is a major concern. Mobility is a factor for people crossing between the regions of El Paso and Ciudad Juárez that affects the continuity of care. Border cities have considerable poverty and are more likely to be an uninsured population³⁴. Undocumented residents are going to be less likely to have insurance than other populations. We do not know how all this will change with the Affordable Care Act. There are barriers that are limiting PWID from receiving health care for treatment and care. Concern has been raised for

having treatment made available for PWID, because, even after treatment, they are at risk of HCV reinfection from continual needle and works sharing⁵⁹. However, Martin et al. (2012) study showed that there was no difference in treatment cost for HCV for PWID compared to persons who do not or no longer inject drugs. Health care costs to pay for peginterferon and ribavirin for persons who do not or no longer inject drugs showed to be a cost effective treatment⁶⁰.

HCV Treatment for PWID

HCV tests can usually detect cases through blood within 1-3 weeks of infection³. If someone wanted to be tested, the procedure would involve blood being drawn from a clinic center or provider. Options for HCV testing are the rapid tests, appropriate during outreach in the community. Sensitivity for the rapid test is 98%, which means the people that tested positive are confirmed positive with a follow up test. Specificity is 99% accurate, which means when an individual tests negative the test confirms they are negative for HCV⁶¹. If someone is positive then they can have a confirmatory test performed with a new blood sample and for extreme cases to check antibodies there are three tests that can be performed include Western Blots (WB), line immunoassays (LIA) and immunofluorescent antibody assay (IFA). These tests are more expensive and also take more time to get the results compared to the rapid test⁶². The provider would send the blood to be tested for antibodies and they would receive results in one week. Then, if the antibody test is positive for an individual, they would need to do a follow up RNA blood test⁹. Unfortunately, many individuals find out the antibody test is positive and never go back for the RNA follow up test⁹. According to various studies, there are few studies published in the health literature on treatment programs available for PWID who are infected with HCV. A study by Doab et. al. (2005) conducted in Sydney, Australia during May and July 2003 was advocating for communicating with PWID on treatment and prevention programs within the

population⁶³. The study found that participants were not aware of the treatment programs and what they consisted of.

Younossi, Zobair et al.'s (2007) study discusses the primary treatments that can be made available for chronic HCV individuals⁶⁴. These chemotherapy treatments include pegylated interferon, inosine 5' monophosphate dehydrogenase inhibitor and ribavirin⁶⁴. The ultimate goal of these treatments is to be able to sustain virologic response⁶⁴. These treatment programs are very intense and a failure to enroll in the treatments can significantly alter an individual's quality of life. This is made all the more difficult given that many individual do not have the access to HCV treatment programs because of lack of insurance, money, and documentation. Treatment symptoms will be cumbersome and require medical attention irrespective of the treatment itself.

Various treatment programs are not available for people infected with HCV, and it is hard for PWID to receive treatment in light of their risky behaviors. Hellard, Margaret et al. (2009) discusses difficulties in finding studies that are targeting PWID wanting HCV treatment⁶⁵. PWID tend to place themselves back into risky drug use and become reinfected again⁵. Even though the PWID were receiving treatment, other factors need to be addressed as well, such as drug use, addiction, and mental health care for the individuals. Hellard, Margaret et al. (2009) further contend that in addition to receiving treatment, PWID should receive drug addiction and mental health care to supplement the HCV treatment.

There are two support groups that are located here in El Paso that can assist those with HCV. The two groups provide resources, discussions, treatment options, medicine side effects, and answer question that individuals may have. One program is the Texas Tech Support group and the other is the Church of St. Clement. One of the places for HCV testing and treatment in Cd. Juárez is the Center for

HIV and STI Prevention and Treatment [Centro Ambulatorio de Prevención y Atención en SIDA e ITS] (CAPASITS)⁶⁶.

Eligibility of treatment for a positive HCV person among the PWID population of PWID can have a difficult time to be assessed for treatment. A review analyzed different studies that suggest PWID will not be truthful regarding their drug use behavior because they don't want to be denied treatment⁶⁷. A study evaluating the needle exchange program in Seattle, Washington, from June 1994 until January 1996, showed that there was a higher incidence of HCV among people who inject drugs that were 24 years or younger compared to 25 to 34 years. The results of the study concluded no association between needle exchange program benefited at reducing the risk of infection for HCV and Hepatitis B Virus (HBV)³.

PWID who want to be assessed for treatment eligibility for HCV should be assessed and monitored by a doctor to further assess risks and benefits of drug use and how to monitor their treatment care⁶⁸. Treatment programs may have as a requirement that PWID be drug free for 6-12 months before being considered for HCV treatment⁶⁹. Positive HCV patients that are considering treatment should get a liver biopsy to outweigh if treatment will benefit their health or not⁶⁸. For patients discussing their HCV status to providers it is vital to reduce the risk of reinfection after treatment⁶⁸.

1.3 People who inject drugs (PWID)

PWID face many other challenges, health outcomes, and risks factors beyond HCV. PWID range in age, socioeconomic status, gender, and ethnicity. Some PWID started at younger ages compared to others who began using when they were at a different age of their life⁷⁰.

Health Outcomes affecting PWID

Engaging in risky sexual behaviors with an individual or PWID decreases ones health outcome and can be detrimental to their quality of life. Miller et al. (2002), during May 1996 there were 1,437

PWID participants in Vancouver, this vulnerable population showed that there is a small window to discuss prevention and education to reduce the transmission of HCV, and that many participants had previously been incarcerated, had a large number of sex partners, sex trade work and inject drugs with others⁴. PWID are at risk for blood borne pathogens (e.g., HCV and HIV) which can progress to cirrhosis, liver cancer, liver disease and death⁷¹. PWID that are sexually active among positive HCV/HIV individuals can increase the spread of co-infection of other STIs⁷².

1.4 Hepatitis C Virus among PWID

HCV is commonly found among PWID who share their needles and syringes⁶⁵. It is important to discuss with the PWID about whether they used a needle after someone else who had previously used the needle and their knowledge on this risky behavior⁶.

1.5 Drug Injection Risk Behaviors for HCV

Various studies have focused upon needle sharing as a high-risk behavior for the transmission of HCV. Pouget et al. (2012) published findings between January 1989 and December 2006 from the HCV Synthesis Project, which was reviewing potential risk behaviors related to sharing drug preparation and injection equipment in HCV incidence studies. The meta analyses revealed that individuals were sharing syringes, drug preparation equipment, and back-loading that can transmit HCV. There is a similarity of PWID sharing needles and sharing drug equipment among HCV⁷³. Blood pathogens can be also found in the cooker equipment or a swab that they may use with other drug users.

The correlation between sharing of drug equipment to HCV transmission risks of HCV has not been studied to the same degree as other risk factors, even though it has been shown to be a notable mode of transmission. PWID are at risk when sharing their drug equipment's with others⁷⁴. Doerrbecker et al. (2013) study was conducted in Germany in 2011 assessed how the sharing of IDU paraphernalia, such as water containers, filters, and bottle caps used on the street could harbor the HCV virus for up to

three weeks; cookers have been found to be the most shared drug equipment between fellow PWID⁶.

1.6 HCV knowledge among PWID

There is a lack of studies assessing the relationship between HCV transmission knowledge and risk behaviors among PWID, including an understanding how transmission can occur and knowledge of the infectious disease progression. A study, conducted between 2000-2001 among people under 30 years old in San Francisco, tested an intervention to reduce transmission of HCV⁴. The study acknowledged that participants falsely believed that since they cannot see any blood during needle or syringe sharing that there must be no blood pathogen there⁴. This study concluded that one half of the young injectors that participated in the study were HCV negative and that there is a short period of time that education and prevention can be done to this vulnerable population. There is also an absence in literature along the border region in regards to PWID knowledge in association of risk factors for HCV. There is, however, literature outside the U.S. and border region in regards to knowledge of risk factors among PWID that are at risk for HCV. A cross sectional study conducted among 149 PWID in New South Wales, Australia in 2004 assessing their understanding of HCV found that 19% reported that they were not able to infect others with the virus and 35% believed that they were immune to the virus⁷⁵. A later cross sectional study in New South Wales, Australia in 2008, among 997 PWID to assess factors associated with their HCV knowledge found 407 or 41% participants were HCV positive through injecting drug use⁶³. This study revealed that HCV knowledge was poor among the PWID⁶³.

Knowledge of risk to self and others

It is important to know the attitudes that PWID have toward HCV infection, alongside how the disease can be spread among others. With minimal studies on knowledge, more literature needs to discuss PWID knowledge on HCV and how often they get tested. A study assessed their beliefs on drug

use and the chance of passing HCV to other users⁷⁶. In addition to educational measures for PWID, needle exchange programs are also effective measures to reduce the spread of the disease.

Needle exchange programs (NEPs) are harm-reduction approach that aim to reduce the spread of blood-borne infections and help promote injection drug users access to a safe environment, while not being denied access to clean syringes and works sharing⁵⁶. Despite the intentions of these programs, there has been considerable controversy surrounding NEPs. U.S. Congress has a federal ban to fund NEPs on the basis that they give PWID permission to use drugs⁷⁷. People in the U.S. need to stick to a “zero tolerance” and keep fighting the “war on drugs”, and the NEPs will be promoting the use of injecting drugs¹⁹. NEPs are limited since funding is scarce and their efforts rely on the community’s ability to keep these programs funded and afloat⁷⁷.

Another notable advantage of these programs is that NEPs are now educating PWID on sterilizing not only their needles, but also the equipment they use i.e., cotton, spoons, water, and tourniquets⁷⁷. Since 2003, Vancouver WA, has maintained a program called Insite, which is an injection site programs that helps to educate PWID and link them to health care service and other treatment options⁷⁸. With NEPs in the U.S. it would help decrease the number of used needles that are being circulated in the injection communities. NEPs could have an affect in bridging drug-abuse treatment and seeking help given that during most models of outreach, persons are linked to care and services¹⁹. NEPs have been considered a conflict of interest within the Mexican government⁴². In spite of NEPs being a conflict of interest for the Mexican government, an NGO in Cd. Juárez, Programa Compañeros, has built a level of trust with it’s community and it’s drug-using community⁴². Programa Compañeros assists in providing prevention information for the drug using community in terms of the need to clean their syringes every time they use and educate on the variety health risks⁴².

HCV Status

Knowing one's health status should be an important part of an individual's everyday life as well as having the knowledge to understand the risks that come with HCV. Access to this knowledge varies dramatically by access to healthcare. Kwiatkowski et al. (2002) study among 197 in Denver, Colorado in 1998-1999 reported 69% of the participants in the study were HCV positive, of which, 61% didn't know they were positive for HCV. The study also had found that, among PWID, 50% of them used a needle with another drug user, 41% said they had let someone else use a needle after them, and 63% shared drug equipment⁷⁶. This study addresses the lack of knowledge or practices among PWID concerning the consequences of needle sharing and works sharing, which needs to be addressed further to prevent the spread of HCV. People's quality of life has regressed over the past few years and developments of health indicators were put in place to improve people's health.

CHAPTER 2: STRATEGIC FRAMEWORKS

Several frameworks have been developed and structured in health settings to plan set standards to a targeted audience. In order to optimize and improve people's health there are two strategy frameworks that are targeting the general public and then the second framework is targeting the U.S.-Mexico Border. Healthy People 2020 is condensed into several science-based objectives for the following next 10 years. It is science-based looking at improving the health of all Americans in the nation. Healthy People 2020 work with a wide variety within the community; including socioeconomic statuses, ethnic backgrounds, genders, and statuses. Healthy People 2020 ultimate goal is to improve the quality of life and try to improve healthier lives of the people, and to try an eliminate disparities over a period of time. Healthy People 2020 have established various objectives that are major concerns to the American people and that need to be addressed to improve health in the community or society. Healthy People 2020 are providing a 10-year agenda to improve the Nation's health by providing multiple objectives. The objective that relates to this studies goal is to reduce substance abuse to protect the health, safety, and quality of life for all, especially children. Substance abuse objective 7 is targeting to increase the number of admissions to substance abuse treatment for injection drug use.

The U.S.-Mexico Border Health Commission focusing not only the U.S., but Mexico border as well. The U.S.-Mexico Border Health Commission was established in July of 2000 that was addressing the border health challenges that needed to be identified and improved upon. This framework is by the Department of Health and Social Services of the U.S. and the Secretary of Mexico. Unfortunately, the focus area in the U.S. does not account for reducing the rates on HCV. They are only targeting HIV, HBV, HAV, and tuberculosis. For Mexico the objective is focused on all forms of Hepatitis and wanting to reduce incidence by 50%.

CHAPTER 3: GOALS AND OBJECTIVES

The goal of this study is to inform and improve future HCV risk reduction interventions among people who inject drugs along the U.S.-Mexico Border.

The first objective is to provide harm reduction and HCV transmission information to people who inject drugs. The second objective of this study is to bridge the gap in literature along the border region regarding HCV knowledge and risk behaviors among people who inject drugs.

CHAPTER 4: STUDY AIMS AND HYPOTHESES

4.1 *Aims*

The aim of this study is to determine the relationship between knowledge and risk behaviors for HCV (including works and needle sharing) to improve harm reduction material provided in the community. The study aims are to:

- (1) report the prevalence of HCV transmission knowledge measures
- (2) report the prevalence of HCV transmission risk behavior outcomes including distributive and receptive syringe and works sharing.
- (3) determine the association between HCV knowledge measures and HCV risk behaviors.

4.2 *Hypotheses*

The third aim will require hypothesis testing to determine if having HCV transmission knowledge will be associated with HCV transmission risk behavior outcomes in the last 30 days, including 1) injecting with others (risk factor); 2) receptive syringe sharing (risk factor); 3) receptive works sharing (risk factor); 4) use of bleach water to clean the syringe (risk reduction); and 5) use of used water to clean syringes (risk factor). Risk factors are associated with an increased risk of a communicable disease while protective factors are mitigating the chance to transmit a communicable disease.

CHAPTER 5: METHODS

5.1 *Parent Study*

The parent study, entitled “Correlates of Hepatitis C Virus among Sex Partners and Injection Partners of People who inject drugs (PWID) in Ciudad Juárez, Chihuahua,” was a cross-sectional paired study conducted in Cd. Juárez targeting 50 couples including people who inject drugs and their non-injecting sex partners who were 18 years or older, provided informed consent. To be eligible, the participants who were PWID had to have injected a drug in the past 30 days, had been sexually active with their partner 2 months ago or prior, and refrained from alcohol or drugs an hour prior before signing their informed consent. Eligible sex partner participants had to have never injected drugs and reported having been sexually active with their IDU partner two months ago or prior. The workers in Cd. Juárez used both a convenience sampling and snowball sampling recruiting the participants through an HIV street outreach program. Potential participants were screened to meet the eligibility criteria in order to participate in the study. The participants were also tested for HIV and HCV. There were face-to-face interviews discussing possible risks and discomforts and the participants were able to leave the study at any time. The informed consent was described through a printed PowerPoint presentation to improve readability. During the process of obtaining informed consent, the participants were told about the finger stick procedure that would be happening to test their current HIV and HCV status. The face-to-face questionnaire lasted 45-90 minutes and assessed current information for the measures collected. The Mexican International Review Board and the University of Texas at El Paso Review Board approved the study.

5.2 *Study Participants/ Sample Population*

The participants in this study included PWID. The eligibility criteria for the PWID to participate in this study was: PWID had to have injected drugs in the past 30 days, tested positive for

HCV, they had to be over the age of 18, provide informed consent, refrain from alcohol and drugs one hour before signing the informed consent and living in Cd. Juárez.

5.3 Sample size

The sample size is 48 participants.

5.4 Study Design

This study is a secondary data analysis that follows the study design of the parent study however using a subset of data for PWID without the paired aspect of the design.

5.5 Measures

Of the measures collected the parent study, this study will include socio-demographic characteristics, HCV transmission risk behaviors (e.g., injection drug use, syringe and works sharing, and other risks), HCV transmission risk reduction, and HCV transmission knowledge in the analysis.

These measures are described in more detail:

5.5.1 Socio-Demographic Characteristics

In terms of socio-demographic characteristics, participants were asked their age (years); sex or current gender (male, female, female/male, male to female, queer, other); sex assigned at birth (male, female); race/ethnicity (Black, White, Hispanic, Asian/ Pacific Islander, American Indian/Alaskan native, other); highest level of education completed (none, elementary school, middle school, high school, technical school, and University); marital status (never married/single, married/common law, separated, divorced, widowed); reasons for living in Juárez (born here, deported, work in the *maquilas*, looking for work, family, a relationship, other); and the city where they live most often (Juárez, El Paso, Other city in Mexico, other city in U.S., other).

5.5.2 HCV Transmission Risk Behaviors

Injection Drug Use

Participants were asked about their injection drug use in the last 30 days, including if they had injected drugs (yes, no); the number of times they injected drugs, number of syringes used; and what drug(s) they injected (heroin alone, cocaine, methamphetamine, heroin & cocaine, crystal & heroin, crystal & cocaine, tranquilizers, pain killers, barbiturates, other drugs alone, other combinations).

Needle Sharing

To assess needle sharing in the previous 30 days, participants were asked if they used new syringes (yes, no) and if so how many they had used, as well as the source of their syringes (Pharmacy with prescription, Pharmacy without prescription, directly from needle and syringe program, from someone who got them from a needle and syringe program, from someone else who is not diabetic, from someone diabetic, other); and how they gained access to them most often. They were asked if they had problems getting brand new, never used syringes (yes, no) and if they injected drugs with other people (yes, no). To assess risk to self, the frequency receptive needle sharing or injecting with the syringe after injection partners had used them already (never, sometimes, about half the time, most of the time, every time), and the frequency of washing the syringes with bleach and water after injection partner used them before injecting (protective). To assess risk to partner distributive needle sharing with the frequency of injection partners injecting with syringes after they had been used already and washing the syringes with bleach and water before injecting, but after the injection drug user had used them (protective).

Works Sharing

To assess receptive works sharing in past 30 days, participants were asked how often they (never, sometimes, about half the time, most of the time, every time) used the same injection equipment (e.g., cookers, spoons, cans, or cottons, filters to mix the drug) or same rinse water or liquids to clean the syringe after injection partner had used it already. To assess distributive works sharing among the

injection partners that had used the same injection equipment or rinse water or liquids to clean the syringe.

Other Risks

In term of other risks for HCV, participants were asked if they had ever (yes, no) been in jail, injected drugs in jail, shared syringes in jail, had tattoos, had piercings, received a blood transfusion or plasma, and received an organ or tissue transplant.

5.5.3 HCV Transmission Risk Reduction

Participants were asked questions on their risk reduction behaviors, HCV testing, and services. They were asked if, prior to this study, they had been tested for HCV (yes, no) and if so, when was the first time and what was the result (Negative, Positive). They were also asked if they had been contacted by someone in the community providing them with information and/or provision of effects related to Hepatitis C prevention (yes, no); Regarding risk reduction they were asked if they had done anything to reduce the transmission of Hepatitis C Virus (yes, no); and if so, what (reduce injection drug use, reduce sharing needles, cleaned needles with bleach more often, reduced number of sex partners, used condoms more often, other); and which did they do most often.

5.5.4 HCV Transmission Knowledge

Participants were asked if they agree, disagree or weren't sure about the followings statements regarding HCV Transmission Knowledge: (a) I believe that I am at risk for becoming infected with HCV; (b) getting HCV would be the worst thing that could happen to me; sharing syringes or needles when I shoot up increases my risk of getting HCV; (c) sharing cookers/ spoons/ cans or cottons/ filters when I shoot up increases my risk of getting HCV; (d) sharing water or other liquid when I shoot up increases my risk of getting HCV; (e) if I clean my injection site right before shooting up, I have less chance of catching HCV; (f) if I cover my injection site immediately after I shoot up, I should have less

chance of catching HCV; and (g) if I get syringes or needles from a syringe exchange or pharmacy, I have less chance of getting HCV.

HCV Transmission Knowledge was assessed further by asking participants if they agree (true, false, or don't know) with the following: (a) HCV can cause liver cancer; (b) HIV is easier to spread than HCV; (c) can prevent the spread of HCV by covering the skin where you just injected, washing your hands, your injection site, and the surface where you prepare your shot are other ways to protect yourself from HCV; (d) people can still be infected with HCV though they don't have yellow skin or eyeballs; (e) you can tell whether or not someone is infected with HCV by the way they look; (f) drinking alcohol makes HCV worse; (g) there is a vaccine to prevent HCV, most people who get infected with HCV totally recover from it; (h) can get HCV from contaminated food; (i) HCV is easily spread both by sex and by dirty needles; and (j) a person who has HCV, could also be at risk for HIV.

5.6 Data Collection

Data was collected through interviews conducted by Programa Compañeros, who have well trained staff with experience working with the PWID population in Cd. Juárez. The interviewers presented the informed consent to participants, conducted a finger stick rapid test for HCV (OraQuick® HCV Rapid Antibody Text, OraSure Technologies, Inc.), provided pre- and post- HCV test counseling, and conducted the questionnaire. Participants were given a \$15 compensation for participating in the study. If the participants tested positive for HCV, they were referred to the Cd. Juárez Center for HIV and STI Prevention and Treatment [Centro Ambulatorio de Prevención y Atención en SIDA e ITS] (CAPASITS) for confirmation test and eligibility for treatment.

Analysis Plan

5.7.1 Database Managing

The secondary data analyze will be conducted using Statistical Product and Service Solutions (IBM SPSS Statistics v.22.0). Data will be subset to PWID who tested reactive for HCV. The following variables will be created regarding injection in last 30 days: percent of new syringes used (i.e., number of new syringes divided by total number of syringes used) and the percent injections with new syringes (i.e., number of new syringes divided by number of injections). The levels for the HCV Knowledge measures will be recoded: levels for the knowledge variables with responses (true, false, don't know) will be recoded to (true and false/don't know). Those with responses (agree, don't agree, and not sure) will be recoded to (agree and not agree). HCV Transmission Risk Behavior Outcomes will be recoded. Levels for using dirty syringe will be recoded from (never, sometimes, about half the time, most of the time, every time) to (ever and never); levels for using bleach water to clean the needles will be recoded from (never, sometimes, about half the time, most of the time, every time) to (ever and never). Levels for used works sharing will be recoded from (never, sometimes, about half the time, most of the time, every time) to (ever, never). Lastly, levels for using used water will be recoded from (never, sometimes, about half the time, most of the time, every time) to (ever, never). Also, the variable have they injected with others will be recoded from (yes, no, don't know) to (yes, no/don't know).

5.7.2 Statistical Analysis

Univariate Analysis

To assess first and second aims, descriptive statistics were conducted for all measures including HCV transmission knowledge and HCV transmission risk behaviors (e.g., needle sharing). The descriptive statistics include sample size (n), mean, and standard deviation for continuous variables and n, frequencies, and percents for categorical variables.

Outcomes

The outcomes of this study are five binary measures for HCV transmission risk behavior: 1)

inject with others; 2) receptive syringe sharing; 3) receptive works sharing; 4) use of bleach water to clean the syringes; and 5) use of used water to clean syringes. The first outcome, injecting with others, was asked of all participants and the remaining outcome measures were asked only of participants who answered yes to the first outcome.

Bivariate Associations

To test hypotheses for these five outcomes, differences in proportions for categorical variables were tested using Pearson Chi-Square Tests or, if low expected cell count, Fisher Exact Test or Likelihood Ratio Test. For continuous test variables, difference in means were tested using a two-sample t- test or non-parametric equivalent, Mann-Whitney Rank Sum Test. Statistical significance for all tests will be determined with a $p\text{-value} < 0.05$ and marginally significance was determined by $p\text{-value} < 0.10$.

5.8 IRB approval

The University of Texas at El Paso IRB parent study was approved on January 20, 2012 and closed on January 20, 2013. The title of this study was, “Correlates of Hepatitis C Virus among Sex Partners and Injection Partners of Injection Drug Users in Ciudad Juárez, Chihuahua.” The IRB approval reference number is 257773-1 under the Principal Investigator Leilani Attilio and Co-Principal Investigator Dr. Oralia Loza. The UTEP IRB study was approved on April 8, 2014. The IRB approval reference number is 594766-1 under the Principal Investigator Leah Morgan and Co-Principal Investigator Dr. Oralia Loza.

CHAPTER 6: RESULTS

Univariate Analysis

A total of 48 participants were interviewed. All participants reported they had injected drugs, were 18 years or older, lived in Juárez most often, were married or in common law and of the Mexican decent and living often in Juárez, CHIH.

Socio-Demographic Characteristics

Participants' mean age was 38.3 (SD=8.5) years old. The majority were males (68.8%), had an elementary education level (62.5%), and most were born in Juárez (79.2%).

Injection Drug Use (Past 30 Days)

Heroin was the most common injected drug reported (95.8%). The mean number of times participants injected drugs in the past 30 days was 65.4 (SD=44.9), approximately twice a day.

Needle Sharing (Past 30 Days)

In terms of receptive needle sharing participants reported ever sharing a needle 62.5% and distributive of a needle (87.1%). In regards to the needle sharing, participants reported using a mean of 24.1 (SD=22.1) syringes in the past 30 days and, of those, the mean number of syringes that were new were 20.2 (SD=22.5) (i.e., 80.1% of syringes were new). The majority of participants obtained new syringes from needle and syringe programs (66.7%) and the participants reported the most frequent source was from needle exchange programs (62.5%). No one reported obtaining syringes from the pharmacy with a prescription or someone who is diabetic or not diabetic. Seventy five percent of participants reported they did not have a problem obtaining new syringes. Participants reported 66.7% of the time injecting with others in the past 30 days. The percent of receptive (e.g., after their injection partner) and distributive needle sharing (e.g., other used needle after injecting) was 62.5% and 87.1%, respectively.

Works Sharing (Past 30 Days)

Participants reported high rates of never using bleach and water to clean syringe after their injection partner had used them (62.5%) and to washing the syringes with bleach and water after they had used them (56.7%). The majority of participants reported ever engaging in receptive works sharing (after their injection partner) (93.3%) and having an injection partner use the same injection equipment after they had used it already (93.8%). The majority of participants also reported ever using rinse water or liquids to clean syringe after their injection partner (84.4%) and injection partners using the same rinse water or liquids to clean their syringe after they had used it already (87.1%).

Other Risks

A majority of participants reported ever having been in jail (87.5%) and, of those (59.5%) reported injecting drugs in jail. Of these, almost all reported sharing syringes in jail (92.3%). Also, 85.4% participants reported getting tattoos while in jail. Among all participants, there was a low percentage of participants getting piercings (37.5%) or received blood transfusion/plasma (4.2%).

HCV Transmission Risk Reduction

Among those who had ever been tested for HCV (39.6%), 25% recalled they were reactive. Most participants reported ever being contacted by someone providing them with information related to HCV prevention (83.3%) but never tried to reduce their risk for HCV transmission (70.8%) and, of those, 85.7% had never taken action to reduce transmission of HCV or reduced their injecting drug use to prevent transmission of HCV (64.3%).

HCV Transmission Knowledge

Most participants knew they were at risk for becoming infected with HCV (77.1%) and almost all the participants agreed that sharing cookers/spoons/cans or cottons/filters (93.8%) or water or other liquid (87.5%) when shooting up increased their risk of getting HCV. However, most thought that

getting HCV would be the worst thing that could happen to them (83.3%). Participants believed that if they clean their injection site right before shooting up, less chance of catching HCV (85.4%) and believed that if they covered the injection site immediately after they injected the drug, there was less chance of catching HCV (75.0%). Almost all the participants believed if they get syringes or needles from a syringe exchange or pharmacy, less chance of getting HCV (95.8%). Participants did know that HCV can cause liver cancer (87.5%) and they could prevent the spread of HCV by covering the skin where they had just injected (56.3%). Participants erroneously believed HIV is easier to spread than HCV (52.1%) and washing their hands, their injection site, and the surface where they prepare their shot and other ways to protect themselves from HCV (68.8%). A majority of participants accurately responded that people can be infected with HCV though they don't have yellow skin or eyeballs (72.9%), HCV is easily spread both by sex and by dirty needles (95.8%), and a person who has HCV can also be at risk for HIV (83.3%). Participants falsely believed that they can tell whether or not someone is infected with HCV by the way they look (54.2%), drinking alcohol makes HCV worse (62.5%) and they can get HCV from contaminated food (58.3%). Participants had the misconception that there is a vaccine to prevent HCV (68.8%) and most people who get infected with HCV totally recover from it (72.9%).

Bivariate Analysis

Outcome 1: Injecting with Others

Socio-Demographic Characteristics

There were marginally significant differences in mean age for those who injected with others (36.8 (SD=8.4)) compared to those who do not inject with others (41.3(SD=8.2); p-value=0.086). There were no significant differences for gender, living in Juárez and sex at birth by injecting with others. There was a marginally significant difference in education level (p-value=0.077).

Injection Drug Use (Past 30 Days)

There were marginally significant differences in number of times injected drugs for those who injected with others (74.3 (SD=45.8) compared to those who do not inject with others (47.5 (SD=38.3); p -value=0.050). There was no significant difference in drugs injected most often.

Needle Sharing (Past 30 Days)

There were no significant differences for any of the needle sharing measures in the past 30 days.

Works Sharing (Past 30 Days)

All participants who indicated they injected with others, indicated that they had engaged all the works sharing measures in the past 30 days. Hence, analysis could not be performed.

Other Risks

There were marginally significant differences in the proportion distribution for injected drugs in jail (p -value=0.092). There were no significant differences for participants been in jail, shared syringes in jail, tattoos, piercings, and received blood transfusion/plasma.

HCV Transmission Risk Reduction

There were no significant differences in rates for ever being tested for HCV or HCV test result, ever being contacted by someone who gave information related to HCV prevention, or any of the measures to reduce the transmission of HCV.

HCV Transmission Knowledge

The proportion of those who inject with others is statistically significantly different for those who believe they are at risk for becoming infected with HCV (75.7%) compared to those who do not (36.4%) (p -value=0.027). There were no significant differences for the remaining HCV transmission knowledge measures.

For the following four-outcome measure for HCV risk behaviors, the sample size decreases from

48 to 32 because these were asked only of those participants who answered yes to injecting with others.

Outcome 2: Receptive Syringe Sharing

Socio-Demographic Characteristics

There were marginally significant differences in the proportion of receptive needle sharing by gender (p-value=0.062) and sex at birth (p-value=0.050). There were no significant differences by age, living in Juárez, and education level.

Injection Drug Use (Past 30 Days)

There were no significant differences in receptive needle sharing for any of the injection drug use measures in the past 30 days.

Needle Sharing (Past 30 Days)

There were significant differences in the mean number of new syringes used (15.1 (SD=17.1) vs. 34.3 (SD=31.0); p-value=0.031) and the percent of new syringes used (67.3 (SD=34.7) vs. 95.6; (SD=10.8); p-value=0.011), and the proportion of distributive needles sharing (74.1% vs. 25.9%; p-value=0.010) (by receptive syringe sharing). There were no significant differences on the remaining needle sharing measures in the past 30 days.

Works Sharing (Past 30 Days)

There were significant differences in the proportion of participants who were using the same rinse water or liquids to clean the syringe after their injection partner had used it already (receptive use) (70.4% vs. 20.0%; p-value=0.053) and for those who let their injection partners use their used water (distributive use) (74.1% vs. 0.0%; p-value=0.010) by receptive syringe sharing. There were no significant differences for the remaining works sharing measures in the past 30 days.

Other Risks

The proportion of those engaging in receptive needle sharing was statistically significantly different for those who had ever injected drugs in jail (75.0%) versus those who had not (33.3%) (p-value=0.048). There were no significant differences for ever having been in jail, shared syringes in jail, having tattoos or piercings, and received blood transfusion/plasma. There were no significant differences in receptive needle sharing for any HCV Transmission Risk Reduction or HCV Transmission Knowledge measures.

Outcome 3: Use of Bleach Water to Clean Syringe

There were no significant differences in use of bleach water to clean syringe for any of the Socio-Demographic Characteristics, Injection Drug Use (Past 30 Days), and Needle Sharing (Past 30 Days).

Works Sharing (Past 30 Days)

The proportion of those who use bleach water to clean their syringe before use is statistically significantly different for those with partners who also clean their syringes after use (reduce risk to others) (17.6%) compared to those with injection partners who do not (69.2%) (p-value=0.008). There were no significant differences for the remaining works sharing measures in the past 30 days.

Other Risks

The proportions of those who engage in using bleach water to clean the syringe marginally significant differs by having piercings (57.1% vs. 22.2%; p-value=0.068). There were no significant differences for participants that had been in jail, shared syringes in jail, injected drugs in jail, tattoos, and received blood transfusion/plasma.

HCV Transmission Risk Reduction

There were no significant differences in using bleach water to clean the syringe for any of the HCV transmission risk reduction measures.

HCV Transmission Knowledge

The proportion of those who use bleach water to clean their syringe before use is statistically significantly different for those who believe they can still be infected with HCV, though they don't have yellow skin or eyeballs (48.0%) compared to those who do not (0%) (p-value=0.029) and also those who falsely believed they could get HCV from contaminated food (23.8%) compared to those who could not get HCV from contaminated food (63.6%) (p-value=0.053) There were no significant differences for the remaining HCV transmission knowledge measures.

Outcome 4: Receptive Works Sharing

There were no significant differences in receptive works sharing for any of the measures used in this study. The proportion of those engaging in receptive works sharing was marginally statistically significantly different for shared syringes in jail (100.0%) compared to those who did not share syringes in jail (0%) (p-value=0.056).

Outcome 5: Use of Used Water to Clean Syringe

There were no significant differences in using used water to clean syringe by any of the measures for Socio-Demographic Characteristics or Injection Drug Use (Past 30 Days).

Needle Sharing (Past 30 Days)

There was a marginally significant difference in the proportion of using used water to clean syringe for any of the receptive needle sharing after their injection partner (95.0% vs. 66.7%; p-value=0.053). There were no significant differences for the remaining needle sharing measures in the

past 30 days.

Works Sharing (Past 30 Days)

The proportion of those who use used water to clean their syringe before use is statistically significantly different for those with partners who also use same rinse or liquids to clean the syringe after use (25.0%) compared to those with injection partners who do not use same rinse or liquids to clean the syringe after use (96.3%) (p-value=0.003). There were no significant differences for the remaining works sharing measures in the past 30 days.

Other Risks

The proportion of those engaging in receptive needle sharing was marginally statistically significantly different for those who had ever injected drugs in jail (95.0%) versus those who had not (66.7%) (p-value=0.076). There were no significant differences for participants that had been in jail, shared syringes in jail, tattoos, piercings, and received blood transfusion/plasma.

HCV Transmission Risk Reduction

There were no significant differences in using used water to clean syringe for any of the HCV transmission risk reduction measures.

HCV Transmission Knowledge

The proportion of those who use used water to clean their syringe before use is statistically significant different for those who believe a person who has HCV, could also be at risk for HIV (92.3%) compared to those who do not believe a person who has HCV, could also be at risk for HIV (50.0%) (p-value=0.034). There were no significant differences for participants in the remaining HCV transmission knowledge measures.

CHAPTER 7: DISCUSSION

There is minimal published literature on the HCV knowledge among PWID including risks for transmission, protective behaviors, disease characteristics, etc. This study indicates that knowledge base on the risk behaviors and knowledge of injection drug users to reduce risks to self and others is not associated with engaging in these risk behaviors. The disconnection between knowledge and behavior is evident in other areas of addiction research such as binge eating which is linked to obesity. For example, despite the awareness of the impact of caloric consumption and lack of physical activity, people who binge eat engage in their risky eating behaviors that are altering their health⁷⁹. Also, individuals who smoke cigarettes may know the consequence of consuming tobacco, but they still engage in the behavior⁸⁰.

In regards to HCV transmission knowledge, participants who injected with others had higher rates of believing that they are at risk for becoming infected with HCV, using used bleach water to clean the syringe could still be infected with HCV, and knew people could still be infected with HCV even if they don't have yellow skin or eyeballs. This could be as a result of harm reduction messages reaching certain injection circles where this knowledge is circulated or put into practice. Thus, those who inject with others likely have a network in which injection information is shared. This indicates that network and peer led interventions with this population may be effective.

Another opportunity for prevention lies with HCV testing and link to care. All study participants were HCV reactive, only 39.6% had ever been tested for HCV and of those 25% recalled they were reactive. Hence, only 8.3% of the sample knew their positive HCV status. This finding suggests there is a need to increase prevention efforts, testing and treatment, and health care services for this population.

In terms of socio-demographic characteristics, females had higher rates of receptive needles

sharing compared to men (90% vs. 50%). Given the stigma toward women who use and inject drugs, this may suggest that they are using needles after their sex partner or other injectors in their circle. Understanding the context in which women are sharing needles is necessary to understand this difference by gender. A study by Tracy et. al. (2014) illustrated that among 417 female PWID that participated in the UFO study in San Francisco and California between January 2000 and October 2012, females were more likely to engage in risky behaviors (e.g., sexual risky behaviors and injecting risky behaviors) with their intimate partner⁸¹ compared to men. Also, females have partners that promote their injection drug use and discourage them to seek help for their drug use⁸². Males also have power that they use the needle first then they can use it after them, which could be contaminated at that time. There is an empowerment that could happen where all the males will use in the network and then give it to the females once they are done⁸².

Education level is a social determinant of health found to be relevant for many health outcomes. Consistent with that, in this study, the proportion of PWID with lower education levels reported engaging in more risky behaviors compared to participants with at least a high school education. Furthermore, PWID with less education may be experiencing worse health outcomes.

We observed that participants that are injecting with others are more likely injecting more often. The high numbers of injecting could be due to the scenes they are placing themselves in or are marginalized into (e.g., only have PWID in their social network). If this is the case, identifying and entering these PWID networks is critical and can be pivotal for future intervention and harm reduction efforts. If we could meet the people where they inject their drugs, use peer based interventions to increase the protective behaviors within injection networks, we can reduce health risks for the PWID. Also, have government assistance to help monitor police practicing and collaborating with safe drug injecting sites within the drug using community⁸³.

There is a notable pattern in the receptive and distributive risk behaviors. We clearly see this pattern for receptive syringe sharing and receptive works sharing. This may be an indication of the impact and the extent of which past and current outreach and education efforts in this community like NEPs. Hence, if someone is practicing behaviors to reduce risk to self (e.g., not engaging in receptive needle sharing or not using used water from others), then they are also practicing behaviors that reduce risk to others (e.g., not engaging in distributive needle sharing or not sharing used water with others). On average, participants reporting using less new syringes when they engaged in receptive needle sharing. This can be an indication that they are re-using their own needle or injecting less frequently.

These findings expand our understanding of the importance of harm reduction efforts among PWID, particularly for those who are injecting with others. Although we did not find a significant association with HCV transmission risk reduction measures, we found important patterns of behavior. Those who are practicing HCV risk reduction measures to protect themselves are also practicing risk reduction measures to protect others. This could be due to PWID are in a network that are receiving harm reduction messages and practicing these measures within their circle. Those who are not practicing risk reduction measures to protect themselves are also not practicing risk reduction measures to protect others. This could be an indication that PWID in a network or injection circle that has not received harm reduction messages, are not aware or reinforced to engage in safe injection practices.

These study results also indicate that those with a history of incarceration and who injected while incarcerated are engaging in higher rates of risk behaviors such as receptive syringe sharing and use of used water while injecting in jail. Given that this is a cross-sectional study, we cannot determine causation however, we can hypothesize that those with a history of incarceration are engaging in more risk to self, in and out of prison. In jail, unsafe practices are a result of the lack of access to clean works and cleaning equipment. Jails are a critical environment for harm reduction efforts that would require

buy-in from directors or other policy makers rather than a denial that drugs are accessible in jails.

In Mexico personal drug use is legal, but PWID are still being arrested for carrying needle and their works, but there is decriminalization⁵¹. Decriminalization in other countries has linked to a reduction of risk behaviors and health risks for PWID, and thus, the greater population. Increasing police enforcement is not changing drug use but is potentially causing harm to PWID health and social impacts. There needs to be systems that can monitor policing practices that will reduce the harassment towards PWID. Also, with safer injecting facilities that provide PWID safe environments and get treatment information will help decrease contaminated needles and works⁸⁴. With the support of implications of prevention, for binational policies it will help the drug using community.

Future research efforts should stress the importance of harm reduction messages and prevention practices for not only needle sharing, but works sharing as well. Further research needs to be addressing prevention transmission and the risks from risky practices that they engage in. Drug policies need to adapt to the new era and be based off the knowledge we know now about PWID and what is working to reduce the risk of transmission of HCV and HIV.

There are public health implications that need to be addressed among PWID as these have implications for the general populations. There is a need for the implementation of evidence based risk reduction strategies and government assistance to keep these programs working within the communities. Needle and works sharing among PWID is a common factor for transmission of HCV and some injection networks have not been reached. There is a need for collaboration with jails/prisons, and places that practice piercings because sharing of needles or equipment are being not only receptive but distributive as well.

CHAPTER 8: LIMITATIONS

8.1 *Methods*

Certain limitations need to be acknowledged for this study. First, since the questionnaire included many sensitive questions on drug use and sexual behaviors, participants may have possibly not been truthful when answering the questions. We can not assume, although its plausible that, participants who tested positive for HCV were infected through injection drug use and needle sharing, other sources of transmission documented were works sharing, piercings, transfusions, and jails. A multivariate analysis is necessary to account for needle sharing and those factors and identify the factors independently associated with HCV transmission. This would then allow us to identify point of intervention that target specific behaviors.

8.2 *Analysis*

A limitation that occurred during the analysis was that SPSS software, on several occasions, crashed and corrupted the data files when running the analysis. This limitation was overcome by using syntax to run the analysis and having several versions and backed up files of the clean dataset. Another limitation is missing data. To ensure if the data was actually or erroneously not entered into the dataset, we went back to each paper version of the questionnaire to confirm. We hope this strategy of data entry and cleaning addressed the errors with the dataset. Lastly, the lack of significant associations with the HCV transmission risk reduction measures sample size decreased from 48 to 32, for certain sets of questions, therefore was not able to find significance when perhaps it does exist.

CHAPTER 9: STRENGTHS

Fifty couples participated in the study. A main strength in this study was that participants were willing to bring in their non-injecting sex partner to this interview on HCV. Another strength was only one couple was not eligible in this study due to not meeting the age eligibility criteria of the parent study. Another couple was excluded for this analysis because they were not HCV reactive; to meet eligibility of this study. The Programa Compañeros have the trust within the injection drug using community because of their decades of services to this population to improve quality of life for them and greater community in Ciudad Juarez. The outreach workers have gained their trust to answer sensitive information honestly. Despite that, we do acknowledge the possibility of interview bias. Furthermore, participants were recruited through ongoing outreach program efforts that brought awareness of HCV to a high-risk, underserved community. Also, participants may not have known their HCV status when they were tested. Finding out their HCV status could have caused an emotional reaction. The interviewers gave a pre-test before the testing started, then proceeded with the interview and then had a post-test which concluded with counseling afterwards. CAPASITS was a form of support to cope and understand their options once they knew their HCV status.

CHAPTER 10: MPH CORE COMPETENCIES

Within the MPH program there are five core competencies that we will be using throughout our degree. For instance this study has demonstrated a few of these competencies, but I did not addressing environmental health sciences and health policy and management core competencies.

Biostatistics core competencies

Biostatistics is the development and application of statistical reasoning and methods in addressing, analyzing and solving problems in public health; health care; and biomedical, clinical and population-based research. In my Thesis I will be performing biostatistics and applying a variety of necessary statistical methods that will include database management and data cleaning. I created variables, then I will need to conduct univariate and bivariate statistically analyses. I interpreted the result of statistical analyses of this study. Lastly, I provided a written and oral presentation based on statistical analyses for public health professionals.

Epidemiology core competencies

Epidemiology is the study of patterns of disease and injury in human populations and the application of this study to the control of health problems. I identified the prevalence of Hepatitis C Virus in the United States on the decline or progression throughout the years. I presented the data over the years to also present the risk factors and disease progression. Next, I identified the limitations of programs that are readily available. I discussed the limitations that happen with people who are PWID with HCV and could be denied medical care. I provided description of the risk factors of transmitting HCV to other individuals based on literature and data.

Social and behavioral sciences core competencies

The social and behavioral sciences in public health address the behavioral, social and cultural factors related to individual and population health and health disparities over the life course. Research

and practice in this area contributes to the development, administration and evaluation of programs and policies in public health and health services to promote and sustain healthy environments and healthy lives for individuals and populations. I discussed the literature on social and behavioral factors that affect PWID that are positive with HCV. Identify the interventions that are along the border to assist PWID about the different factors. Lastly, I provided minimal literature on behaviors and knowledge among PWID that are positive with HCV.

Hispanic/border health concentration-specific competencies

I discussed the accessibility of drugs along the border region and mobility. I also described the stigma on drugs along the U.S.-Mexico border. I acknowledged also the availability for PWID to access drugs. I will also be providing literature on HCV and PWID along the border. Lastly, I acknowledged the cultural beliefs that are affecting Hispanics along the border.

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CURRICULUM VITA

Leah Morgan has a Bachelors Degree in Health Promotion with a minor in Community Health from the University of Texas at El Paso (UTEP). Her practicum was at Planned Parenthood Desert Rainbow Center in El Paso, TX. Her practicum experience provided her the background to launch her career in public health. Her first position was at Planned Parenthood of West Texas in Midland, TX. There, she worked as a health educator, quality assurance risk manager, and clinic health manager. Leah later worked for the Texas Department of Family and Protective Services as a Conservatorship employee, working with children that had been removed from their homes due to parental drug use and abuse. She is now attending UTEP pursuing her Masters in Public Health (MPH) and will graduate Summer 2014. While working on her MPH, she graduated from the University of Texas of the Permian Basin with her first Masters degree in Public Administration.

In the past two years, Leah has been a research assistant for the UTEP VIDA Project, which has provided financial support during the MPH program. Her work has been primarily focused on PWID and HCV infected in Juárez. Also participated in preparation for launch of a study focusing on factors associated with methamphetamine use initiation in Cd. Juárez. Leah is currently working on her internship at the City of El Paso Department of Public Health in the Emergency Preparedness Department supported by the Directors of Health Promotion and Education (DHPE) from May 2014 to August 2014. Leah would like to develop her career in the area of sexually transmitted infections among vulnerable populations.

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