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Hepatitis C: A Perspective Through the Social Ecological Model

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Hepatitis C:
A Perspective Through the Social Ecological Model

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Hepatitis C virus (HCV) is a major global public health problem. The Center for Disease Control and Prevention (CDC) estimates that the Hepatitis C virus (HCV) affects 3.2 million Americans and 500 million people from a global standpoint (CDC, 2012). HCV contributes to significant morbidity and mortality with about 1 million deaths due to liver disease (World Hepatitis Alliance, 2010). Chronic liver disease has origins ranging from acquired, infectious, toxic and metabolic causes. Long-term consequences include cancer, cirrhosis (scarring of the liver), and liver failure. Given the substantial morbidity attributable to HCV-related liver disease, it is necessary to develop an HCV-related public health plan for the prevention of new HCV infections. The source of HCV infection includes transfusion of blood or blood products from unscreened donors, exposure to blood through the use of contaminated and inadequately sterilized instruments and needles used in medical and holistic medicine, persons who participate in high-risk sexual practices, or sexual interactions with HCV-infected persons. The relative contribution of these various sources of infection has not yet been defined with population-based epidemiological studies. New infections continue to occur and burden global public health systems.

The aim of this paper is to discuss the prevalence, incidence and burdens of chronic hepatitis C and to report on the fieldwork project completed at the California Pacific Medical Center in conjunction with the San Francisco Center for Liver Disease. Utilizing an ecological framework the role of public health to develop awareness opportunities about HCV, help patients access and evaluate their treatment options, and provide support to those newly diagnosed and their families will be examined.

Public Health Problem

The hepatitis C virus (HCV) is recognized as a major cause of chronic liver disease worldwide. Moreover, hepatitis C leads to cirrhosis, which is the most common cause of chronic liver disease in the United States (Mueller et al., 2009). The World Health Organization (WHO, 1998) estimates that the prevalence of HCV infection is 2%, which represents 123 million people worldwide. Additionally, a liver transplant is a common treatment option for those with chronic liver failure to enhance the quality of life (WHO, 1998). The CDC predicts that the availability of highly effective antiviral therapies will significantly reduce the incidence rates to make HCV a rare disease by 2036. Despite those positive trends in treatment options, 10-16% still develop cirrhosis (Robert et al., 2004). However, the public health problem at hand is the lack of data and interventions for high-risk groups such as those co-infected with HIV/AIDS (Proeschold-Bell, 2011). An estimated 1 million people in the United States are diagnosed with both HIV and HCV with approximately 56,000 new HIV infections occurring each year (Proeschold-Bell, 2011).

Accurate epidemiological data is the foundation to prevent and control any infection. Co-morbidities are common especially when diseases share the similar routes of transmission. Such is the case of HCV and HIV. Modes of transmissions are via blood and bodily fluids and transmission can occur via multiple portals. Risk of transmission exists in occupational and perinatal settings, as well as through sexual encounters, regardless of population or geographic region. One of the cofactors known to accelerate the progression of HCV among those infected is HIV (Chiao, 2014) (See Appendix A). The epidemiology of this cofactor is an important area of public health research and

education. Nevertheless, the HCV-infection population has grown so large, it is now considered a global endemic, even though it occurs in only a fraction of people.

Social Ecological Model

Education and treatment interventions have been shown to positively influence behaviors related to chronic disease prevention (Wilson et al., 2006). When treatment options are publicly demonstrated, those more at-risk are given a reason to get tested. Public health interventions can be approached using the comprehensive multilevel Social Ecological Model (SEM). This promising approach is important for those diagnosed with HCV because HCV prevention and treatment occurs within multiple levels of the health care system. The SEM is described using five levels that influence health:

1. Intrapersonal-beliefs and characteristics,
2. Interpersonal-relationships and social networks such as spouse, friends and family
3. Community-experiences and resources,
4. Institutional-rules and regulations concerning healthcare,
5. Policy-structures and environments that impact health.

In general, the SEM suggests that individual behavior and social environments are related. This model would be beneficial in gaining more insight to target the specific population of those HCV-infected or at-risk for HIV. Although each level is unique, each level is capable of impacting one another. Individuals infected with either HCV or both HIV-HCV can live a long time with their diseases and their care can impact their family and other relationships, as well as their community establishments, such as liver clinics and hospitals. Furthermore, the SEM is extremely useful in tailoring a community-based

intervention to a particular socio-cultural context for people with HIV and HCV that also includes individual intervention levels (Proeschold-Bell, 2011). For example, many feel hesitant to discuss their disease status because of cultural factors that fall into place.

Proeschold-Bell et al. (2011) utilized the social ecological model and conducted a multilevel intervention to improve the knowledge of HCV risk, knowledge of one's own HCV status, and receipt of HCV education from a medical provider of those infected with HIV. Their primary target group was people with HIV who already had HCV co-infection or were at risk for HCV. The intervention was conducted at four levels of the SEM: intrapersonal, interpersonal, community, and institutional. At the individual level, participants were assigned case management and provided mental health and substance use counseling and included harm reduction such as reduced and clean needle use. At the interpersonal level, monthly support groups were offered at 2 sites. At the community level, health classes were offered to the general public as well as HIV infected persons who were at risk for HCV infection. A public media campaign was also launched to inform and educate people about HCV risk, transmission and treatment. At the institutional level, information technology was changed at HIV clinics that enabled the creation of a face sheet to be placed on the charts to flag if a patient was tested for HCV, the test date and results, and whether or not the patient was vaccinated against hepatitis A or B. In addition medical providers were educated on HIV-HCV co-infection patient care, HCV treatment, testing, and transmission.

The sample included $n = 259$ participants of whom data were collected every two weeks over a two year period. This Interrupted Time Series design enabled the researchers to collect pre intervention community data and continue throughout the

intervention period over time. Demographics of the participants included: mean age of 43 years old; 68.3% male; 58.3% African-American; 76% with high school education; and 24% with a college degree or higher. Patient characteristics were tested systemically as “covariates” so that only statistically significant covariates were kept in the final analysis. Data collection methods included face-to-face interviews, which included questioning participants about their HIV status, whether they knew about HCV risk behaviors, and history of high-risk sexual encounters. Participants were also asked whether or not they had been tested for HCV and if they received education on HCV from their respective provider(s) (Proeschold-Bell et al., 2011).

Results demonstrated that “accurate HCV knowledge among patients with HIV was higher during the intervention phase than the pre-intervention phase” (p. 8). (See Appendix B for complete results.) The authors reported that the framework of SEM was a successful guide and the primary goal was achieved. The HIV-positive population is increasing in liver-related mortality, which makes HCV prevention and treatment a significant priority.

HCV prevention can be addressed on multiple levels represented in the social ecological model and on all levels of prevention—primary, secondary, and tertiary. Liver transplants would be considered a tertiary prevention that entails interventions on multiple levels of the SEM such as intrapersonal (the need for individuals to maintain a healthy lifestyle and resist alcohol and drug consumption), interpersonal (working with clear communication between discordant couples to reduce transmission, as well as drumming up social support for liver transplant candidates), and organizational levels such as transplant organizations to assure the effective and thorough care and selection of

transplant candidates to guarantee success and efficient use of limited public resources. Work done in this fieldwork placement was mostly focused on the organizational level of a transplant center although intrapersonal education and care as well as interpersonal support was included in the center's scope of practice.

Fieldwork Details

Due to the high volume of patients consistently being diagnosed with various liver diseases, the primary goal of this fieldwork project conducted at the California Pacific Medical Center in conjunction with the San Francisco Center for Liver Disease was to promote and facilitate communication among the team and develop better guidelines for patient care. This fieldwork experience focused on providing a highly specialized framework to outpatient registered nurses. The role of the Transplant Specialist was further developed to enable integration between all team members of the liver and heart transplant department. In the first 30 days, it was essential to monitor and track the number of phone calls in order to provide significant patient data of incoming calls. These calls were due to the elevated number of patients in the hepatology and transplant program(s). The nurses were not able to provide sufficient care due to the high volume. Therefore, this fieldwork experience not only provided primary support to the nurses but also reduced their workload to prevent medical errors while practicing medicine.

All goals were accomplished through activities guided by detailed objectives. These objectives were organized meticulously as the fieldwork progressed. The first objective was in correlation with goal one. In order to become familiar with the general service of this clinic and hospital, it was vital to complete an extensive assessment of department materials during orientation. This involved arranging several meetings with

multiple members of the hepatology and transplant department to better understand each specific individual role. Furthermore, it was necessary to attend and participate in all department meetings. Observing how each team member worked together helped understand how patients are commonly organized towards the end result: a healthy quality of life.

The final learning objective was to implement clinic-based projects aimed at a non-clinical level. These projects included data collection for compliance with United Network for Organ Sharing (UNOS), transition patients who are >5 years post-transplant to primary care and the development of the prior authorization packet for hepatitis C treatment medications. It was essential to understand how compliance and ethical considerations were formulated within the hospital policies and procedures; every protocol is interwoven between numerous pathways. Principally, the hospital and clinic change their protocols every so often due to federal regulations such as Centers for Medicaid Services (CMS), United Network for Organ Sharing (UNOS) and Donor Network West (California's Organ Procurement Center). Consistently changing protocols aids to explore risk-benefits as well as ensure safer practices for patients. These preventive measures are based upon a national data derived from individual and population-level statistics. The fieldwork project simplified strategies to establish, enhance and developed the initial role of the Transplant Specialist as an important asset in the public health prevention segment. (See Appendix B for SMART goals.)

Public Health Significance

California Pacific Medical Center Department of Liver Transplant is a united multidisciplinary community consisting of surgeons, transplant hepatologists, social workers, financial analysts, nutritionists and nurses. This team is “designed” to encompass all to fundamentally provide the best care and support for all patients’ part of the program. Each patient in the program starts in the hepatology “phase.” This means that any patient a part of the hepatology phase is battling a specific liver disease. For example, hepatitis B, autoimmune hepatitis and hepatitis C are of the most common. If the patient’s primary hepatologist believes that a patient is “ready” to be evaluated for a transplant, then the patient is moved into the “evaluation” phase. During evaluation, patients undergo a series of diagnostic tests, lab work and a mandatory psychosocial assessment. Additionally, it is a requirement for the patient to have a valid support person. The support person is also evaluated by a licensed social worker if she or he can withstand the necessary and complex care for a recently transplanted person. Once a patient is listed, the patient is placed in the donor “pool” based on MELD score and blood type. MELD score is defined as: “Model for End Stage Liver Disease.” The MELD score ranges from 6-40; patients are arranged into either low-MELD (6-20) or high-MELD (21-40). Sometimes patients get deactivated because their liver disease has improved even though they may still be symptomatic.

While the program is highly organized, the public health problem(s) presented needs continuous time and effort to develop interventions that would be more successful and efficient. Recently, a successful cure for HCV has been developed. An abundance of hepatitis C medication orders began to occur in late 2014 when the Federal Drug

Administration approved the hepatitis C treatment drug, Harvoni. Harvoni is the first combination pill approved to treat chronic HCV genotype 1 infection (FDA, 2014). It is also the first approved regimen that does not require administration with interferon or ribavirin, two FDA-approved drugs also used to treat HCV infection (FDA, 2014). The efficacy of Harvoni was evaluated and observed in multiple clinical trials involving patients that were either treatment-naïve or treatment-experienced (Gilead Sciences, 2015). These trials were designed to measure whether or not the virus was detected in the blood after 12 weeks of treatment. This is known as a “sustained viral response” (SVR). Due to the miraculous discovery that the medication, Harvoni significantly reduced the detection of the virus (SVR), the clinic experienced a significantly high increase in the amount of medications ordered. It is an understatement to note that patients chronically diagnosed with hepatitis C for over two decades were interested in this revolutionary medication. Hence, a protocol was implemented to stay as organized as possible. This protocol added the duty of the Transplant Specialist to respond to these orders in a timely fashion. The role of the Transplant Specialist expedited HCV orders while adhering to an established protocol. Although the epidemiological data are limited, other agents awaiting FDA approval are expanding as part of the advancing public health surveillance and development of effective treatments to combat HCV.

Conclusion

It is difficult to prevent and control chronic liver disease due to the multiple contributing factors. Regrettably, there is no vaccine and no post-exposure prophylaxis for HCV. Many also do not seek care because they don't know they are infected; the incubation period for HCV can be decades long (Kamal, 2008). Primary prevention tactics should

include but not be limited to: safer blood transfusions in developing countries, and safer injection practices in health care and in other settings such as tattoo parlors. Individuals who are HIV-infected and inject drugs may find it difficult to retain knowledge about HCV transmission. Data suggest that injecting drug use between intimate partners is a *significant* contribution to the occurrence of the hepatitis C infection mostly because those with HCV who are in intimate relationships often do not disclose their status to their partners (Seear et al., 2012). Furthermore, unprotected sexual relations between discordant couples increases transmission rates even more (Seer et al., 2012). The public health community must address this risk in order to reduce the transmission of HCV.

The need to coordinate efforts for either primary HCV prevention focused on a specific risk-group or secondary prevention efforts such as the ability of those infected with HCV to receive effective treatment drugs without delay are both crucial public health imperatives. Future prevention efforts should include the development of educational materials that can be posted in a clinic or within the community to encourage patients to attend classes, get tested and practice safer sex, especially in those already receiving counseling with HIV. Training HIV providers early about HCV infection may also be implemented during appointments, as some may never have had formal medical training on hepatitis in general. Lastly, it may also be wise to initiate a system-wide electronic medical record for those who pose significant risk when visiting healthcare providers, or being admitted into hospitals. These strategies can help minimize incidence of new cases and thus decrease the overall prevalence of HCV. Reducing incidence of HCV would greatly decrease the need for liver transplants in those with chronic liver damage and thus save valuable resources that could be utilized for

primary prevention. These recommendations are consistent from the CDC's HCV National Prevention Strategy for Health Professionals (CDC, 2010).

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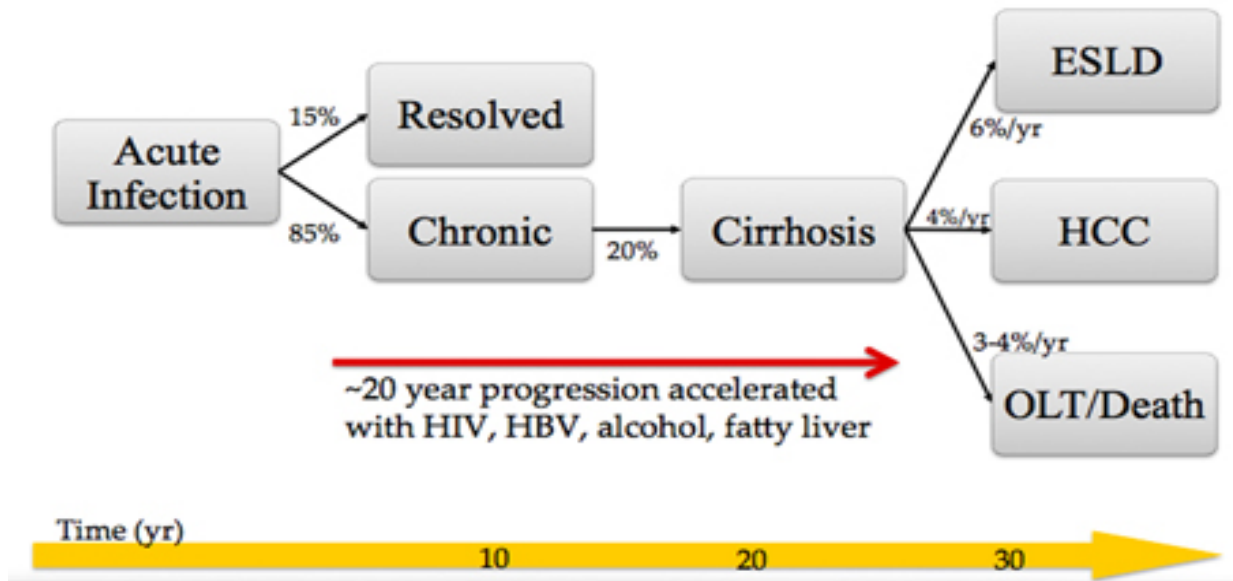
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Appendix A

HCV Progression of Disease

HCV: Progression of Disease



Source: Chiao, H., & Frenette, C. (2014). Solid Organ Transplantation: Little Research, Big Need for Patients with HCV

Appendix B

Social Ecological Model

Level of influence	Definition	Example
Intrapersonal	<ul style="list-style-type: none"> • Individual behaviors 	<ul style="list-style-type: none"> • Substance abuse counseling • HCV antiviral therapy • Sexual abstinence
Interpersonal	<ul style="list-style-type: none"> • Family • Friends • Co-workers • Neighbors 	<ul style="list-style-type: none"> • Support groups for those in close relationships with infected populations
Organizational Community	<ul style="list-style-type: none"> • Neighborhoods • Churches • County jails • Media • Homeless shelters 	<ul style="list-style-type: none"> • Free health classes to the available general public • Training HIV educators on HCV • Public health campaigns such as websites that offers locations of free test sites
Public Policy*	<ul style="list-style-type: none"> • Laws - both local, state and federal 	<ul style="list-style-type: none"> • More public awareness • Free testing sites • Government assistance programs for cost-effective treatment

Source: Proeschold-Bell, R., Hoepfner, B., Taylor, B., Cohen, S., Blouin, R., Stringfield, B., & Muir, A. (2011). An interrupted time series evaluation of a hepatitis c intervention for persons with HIV. *AIDS Behaviors*, 15(8), 1721-1731

Appendix C

SMART Goals

GOAL 1:
 General familiarization with clinic services specializing in inpatient and outpatient Hepatology, Pre-transplant and Post-transplant care.

ASSOCIATED OBJECTIVES W/ ACTIVITIES			
	Start/End Date	Responsible Parties	Tracking Measures
<p>Objective 1A Learn the daily activities and roles of each member in transplant department.</p> <ul style="list-style-type: none"> <i>ACTIVITY: Complete review materials, orientation and set up meetings with each member of transplant department to better understand roles.</i> <i>ACTIVITY: Attend and participate in department meetings</i> 	06/03/15 to 06/22/15	Lori Coleman, RN	Meet with Lori Coleman or other available parties Attend meetings with appropriate RN
<p>Objective 1B Observe how hepatology patients are referred to be evaluated for transplant listing, in compliance with UNOS (United Network for Organ Sharing)</p> <ul style="list-style-type: none"> <i>ACTIVITY: Review processes and protocols needed to be listed for organ transplant with UNOS</i> <i>ACTIVITY: Attend the weekly Selection Committee, a multidisciplinary meeting combined of all members within transplant department (Hepatologists, Surgeons, Social Workers, Financial Analysts, and Nutritionists)</i> 	06/03/15 to 06/22/15	Lori Coleman, RN	Meet with Lori Coleman or other available parties Attend meetings with appropriate RN

Appendix C continued

SMART Goals

GOAL 2:
 Strengthen skills in communication and coordination within a complex organization that involves strong qualities of care.

ASSOCIATED OBJECTIVES W/ ACTIVITIES			
	Start/End Date	Responsible Parties	Tracking Measures
<p>Objective 1A Develop a standard work instruction (SWI) that involves a specific outline on how to triage incoming phone calls.</p> <ul style="list-style-type: none"> <i>Activity: Produce a diagram "tree" to demonstrate how to process non-clinical telephone calls, in compliance with HIPPA processes.</i> 	06/29/2015 to 07/13/2015	Lori Coleman, RN	Meet with Lori Coleman or other available parties to discuss, add or edit SWI
<p>Objective 1B Review and evaluate existing processes that may require recommendations.</p> <ul style="list-style-type: none"> <i>Activity: Separate incoming facsimile transactions for RN's, Administrative Assistants and Transplant Specialists.</i> 	06/29/2015 to 07/13/2015	Lori Coleman, RN	Meet with Lori Coleman or other available parties to discuss, add or edit SWI
<p>Objective 1C Add all patient related communication(s) into OTR – transplant and hepatology communication software</p> <ul style="list-style-type: none"> <i>Activity: Chart and document each patient-related action or event with further processing to appropriate staff member(s)</i> 	09/01/2015 to 11/01/2015	Lori Coleman, RN	Meet with Lori Coleman or other available parties to discuss, add or edit SWI

Appendix C continued

SMART Goals

GOAL 3:
 Participate in implementing clinic-based projects:
 -UNOS forms
 -5 year post-liver transplant transition
 Hepatitis C Prior Authorization Packets

ASSOCIATED OBJECTIVES W/ ACTIVITES			
	Start/End Date	Responsible Parties	Tracking Measures
<p>Objective 1A</p> <p>Learn standard work instructions (SWI) for completing UNOS forms</p> <ul style="list-style-type: none"> <i>Activity:</i> Shadow designated organ RN to learn how to successfully validate government regulated UNOS forms for post transplant patients 	06/03/2-15 to 10/20/15	Karen Devaney, RN Dolores Minanci, RN	Designated RN signs off ability to complete and comprehend how to validate forms.
<p>Objective 1B</p> <p>Learn standard work instructions (SWI) for completion of 5-year transition project.</p> <ul style="list-style-type: none"> <i>Activity:</i> Follow outlined protocol to determine if patient is suitable for transition into primary care medicine 	10/01/2015 to 10/30/2015	Lori Coleman, RN	Meet with Lori Coleman or other available parties
<p>Objective 1C</p> <p>Learn standard work instructions (SWI) for to initiate Prior Authorization process for Hepatitis C medications.</p> <ul style="list-style-type: none"> <i>Activity:</i> Determine if patient prescribed Hep C medication(s) meets criteria, follow protocol with thorough follow-up and effectively communicate with patient on status of prior authorization. 	10/01/2015 to 10/30/2015	Lori Coleman, RN	Meet with Lori Coleman or other available parties

Competencies Addressed

Multiple competencies part of USF's MPH Program was addressed throughout this fieldwork experience:

1. Assess, monitor, and review the health status of populations and their related determinants of health and illness
2. Identify and prioritize the key dimensions of a public health problem by critically assessing public health literature utilizing both quantitative and qualitative sources.
3. Develop public health programs and strategies responsive to the diverse cultural values and traditions of the communities being
4. Identify and apply ethical, moral, and legal principles in all aspects of public health practice.

Competency #1 was continuously observed; reviewing data related to patients diagnosed with chronic liver disease as well as the social determinants discussed during the transplant evaluation phase of the hepatology program. Observing determinants such as, a history of drug and alcohol use was vital towards understanding the population at hand. Furthermore, competency #2 was achieved because of the management of quantitative and qualitative data consistently being investigated with UNOS compliance. Reviewing patients' charts for compliance was broadly towards successful validation of the UNOS forms. Moreover, patients in process of starting HCV treatment are required compliance; maintaining all blood work and diagnostic imaging tests.

Developing public health programs and strategies based on diverse cultural values was a unique yet critical competency. For patient's diagnosed with HCV, the treatment

plan was based specifically on genotype (See Appendix B). Genotype bases the physician's care plan because of the patient's geographical origin. This competency was achieved through orders directed from the providers; it was clear that genetics make it critical regarding the "design" of treatment. Lastly, competency #4 was analytical in the development of protocol(s). Emerging liver diseases involves professionals to ask, "What is the right thing to say or do? Ethical values have always provided a foundation for the public health practice. The Transplant Specialist role delivered ethical questioning, yet positively expanded the relationship(s) between patients and the clinic. Developing this role was crucial because of patient volume and the need to improve patient care was obvious. Conceptualizing public health within the field of clinical medicine will involve challenges along the way, but the prevention of disease, promotion of health and development of policy will increase in scope and sophistication (Slomka et al, 2008).

Reflection

To conclude, this fieldwork experience was an excellent professional learning experience. California Pacific Medical Center, in conjunction with the San Francisco Center for Liver Disease provide a sufficient environment that is supportive, innovating and challenging in the intricate world of healthcare. Meetings, presentations, series lecture, conferences and personal one-on-one interviews expanded my knowledge heavily. The two preceptors have exceeded all my expectations through example: coaching, training, and providing detailed answers to answers. As an MPH candidate, I was able to witness first hand cases with these two preceptors or registered nurses. This experience was far more interesting because I witnessed a management side and a clinical

nursing side. Further, I was able to utilize my leadership skills by training other members of the team with my past experience as a pharmacy technician.

Although the majority of my role was to establish a HCV protocol, it was truly eye opening to witness a regular person get diagnosed with chronic end stage liver disease, go through the process of being listed for a new organ and then suddenly, get transplanted as if the disease never occurred. It is a miraculous how far medicine and technology improved the last decade and as a MPH, I intend to be a part of this revolution as CPMC's opens new hospital doors in 2020. I intend to promote HCV awareness, advocacy for organ donation while utilizing the skills I've achieved in my epidemiology, advanced biostatistics, communication for healthy communication, social justice and policy and this fieldwork experience. My skills will continue to improve and as a Transplant Specialist, I believe that improving patient lives is by far the most important.