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Community-Based Organizations and Addressing Vaccine Hesitancy: GIANT's Role in Increasing Vaccine Confidence

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Abstract

Vaccines are vital in maintaining a healthy community. They assist in decreasing the spread of diseases; in fact, the World Health Organization estimates that globally vaccines prevent 2-3 million deaths a year, and that 1.5 million deaths could be avoided if vaccine distribution and confidence improved. Vaccine hesitancy is defined as a delay or refusal in vaccines and the concept is growing among all populations due to a decrease in vaccine confidence and misinformation. In order to decrease vaccine hesitancy, the government and larger healthcare agencies must invest in local community-based programs. These organizations play an important role in educating hard-to-reach and vulnerable communities to deliver factual and scientific information in a culturally fair manner. This capstone paper addresses the background of vaccine hesitancy and the importance of community-based organization's efforts to increase vaccine confidence. The Global Immunization Action Network Team (GIANT) is attempting to conduct research to determine the best platforms and practices in delivering scientific and evidenced-based education on vaccines to improve health literacy in the community. Using a logic model assists in determining how community-based organizations should conduct research, achieve goals and evaluate the process. This will ultimately be utilized for funding purposes and to work within achieving the organization's goals, mission, and vision. Using community-based participatory research (CBPR) approach will assist in achieving vaccine uptake in diverse communities.

Introduction

Vaccine hesitancy is a major public health issue that needs to be addressed, as doing so may assist in decreasing the spread of preventable diseases. According to the World Health Organization (WHO), vaccine hesitancy is the delay or refusal of vaccines when there is not an access issue (MacDonald, 2015). Vaccines are important because they reduce the spread of diseases and ultimately decrease mortality and morbidity in all communities. Vaccines assist in mitigating extra costs and ease the burden on the health system as seen with the current COVID-19 pandemic. Unfortunately, with more parents and individuals, who are hesitant to vaccinate themselves or their children, the result has been the return of diseases thought to have been eradicated, such as measles outbreaks resurging in the United States during the 2000s. The decrease in vaccine acceptance by individuals interferes with reaching herd immunity. When herd immunity is not reached, a community is at a significantly higher risk of infections and results in an incredible increased burden on the health system.

Vaccines have been around since the late 18th century when Edward Jenner created the first vaccine for smallpox by using a similar strain of the disease from cows, known as cowpox. This has led to numerous vaccines being produced, including those for diphtheria, tetanus, pertussis, polio, and many more used today. With new technology and many years of research, current vaccines are developed through several different means. The United States uses a variety of different types of vaccines including inactivated vaccines, live-attenuated vaccines, mRNA vaccines, viral vectors, and toxoid vaccines (HHS, 2021). All have been shown to successfully prevent the spread of diseases. The WHO reports that vaccines prevent 2-3 million deaths each year, however vaccine acceptance in childhood vaccines is declining. For instance, in 1997-1999 the incidence of measles was less than 1 case per 1 million, but in 2014, the Center for Disease Control (CDC) reported 668 measles cases, the largest annual total since elimination of measles in the US (Phadke et al, 2016). A recent study by Ackerson et al (2021) found a decline in measles vaccinations of up to 93 percent among children aged 2 to 18 years during the

current COVID-19 pandemic, and while these vaccinations partially recovered, they remained lower in 2020 than in 2019. An assessment completed in March 2020 demonstrates a decline in all vaccines. The CDC National Immunization Survey data found that more than one-third of U.S. children between 19 and 35 months were not following the recommended early childhood immunization schedule (CDC, 2011). Furthermore, a 2019 national survey found that approximately 1 in 4 parents reported serious concerns about vaccinating their children (Olsen et al., 2020).

Recommended methods and programs to decrease vaccine hesitancy will need a multilevel approach and recognize it is a complex issue. Based upon a comprehensive review of the literature, such an approach will require public health agencies to collaborate with local communities to be creative in broadcasting factual information regarding vaccines; healthcare providers must take the time to educate patients on the importance of vaccines; and community-based programs developing and delivering accurate and targeted educational materials that will be receptive by the community members. This will ultimately lead to a lower rate of vaccine hesitancy and an increased rate of vaccine uptake among the community's population.

Background/Literature Review

The first vaccine created by Edward Jenner used cowpox to inoculate a child against the highly contagious disease, smallpox. Authors Kestenbaum and Feemster (2015) suggests that Jenner's approach of using the animal-based disease to develop the human vaccine was highly controversial and therefore started the concept of vaccine hesitancy, which in turn led to the creation of the Anti-Vaccination Society of America in 1879. The organization was created in response to the forced vaccination of smallpox in the US. Even though the Anti-Vaccination Society is not operating today, misinformation is still spreading through a variety of media platforms including, the 1998 publication in the Lancet linking autism to the MMR vaccine which increased vaccine hesitancy among new parents

(DeStafano & Shimbukuro, 2019). Even after the study was proven insufficient to make such a conclusion, the publication created panic and acted as a catalyst for the recurrence of measles in the US in the 2000s.

New vaccines have evolved and improved immensely since the late 18th century due to technological and medical advancements. However, specifically during the current COVID-19 pandemic, the concept of inoculating an individual with a disease has created a lot of controversies and a higher rate of vaccine hesitancy. Today, since the initial rollout of the COVID-19 vaccine, only 49.89% of the United States population has been fully vaccinated against COVID-19 (Our World in Data, 2021). When comparing CDC reports from 2006 and 2010, DTP/DT/DTaP 4-dose vaccines declined from 85 percent in 2006 to 79.7 percent in 2010 (CDC, 2011). A more recent 2020 study by Bramer et al, showed vaccination coverage declined in all milestone age cohorts, except for birth-dose hepatitis B coverage, because it is usually administered at birth (Bramer et al., 2020).

There are several factors and complex reasons for parental vaccine hesitancy (Geoghegan, 2020). In 2014, the WHO Strategic Advisory Group of Experts (SAGE) created three factors influencing vaccine hesitancy: complacency, confidence, and convenience. However, in a study published in 2019, Navin et al report that the most popular reasons for refusals were related to perceived vaccine safety and the belief that vaccine-preventable diseases are not severe but are mild or natural (Navin et al, 2019). Therefore, some people have the perception that vaccines provide little benefit. These attitudes and behaviors are strong predictors of vaccine uptake and declination (Xiao & Wong, 2020). Parental refusal of childhood vaccinations is associated with the notion that children will have an adverse reaction to vaccines, as well as parental skepticism about effectiveness (Gidengil et al, 2019). The complexity of vaccine hesitancy has led to a number of conceptual models that attempt to further define and explain the sources and reasons for vaccine hesitancy (Thomas et al, 2018). Developed in the

1950s, the health belief model was one of the first conceptual models to attempt to understand the perceived barriers for parents to vaccinate against polio (Zhong et al, 2020). It is continued to use today when looking at parents who are debating against vaccinations with the MMR vaccine (Grinber, K & Sela, Y., 2021). A micro-determinant model of vaccine hesitancy combined with the theory of planned behavior was also constructed to identify barriers to influenza vaccinations (Schmid et al, 2017).

Vaccines are cost-efficient and shown to save the healthcare system from incurring astronomical costs (Yarnoff et al, 2019). Vaccine hesitancy with the measles vaccine has led to multiple outbreaks which increased healthcare costs in recent years. Studies have shown a recent decline in childhood vaccines which decreases herd immunity. Recent data from Kaiser Permanente showed a 93 percent decline in measles vaccines between ages 2-18 between January and August 2020, compared to 2019 (Lambert, D., 2020). This large drop in vaccination coverage can increase the chances of another outbreak of measles. A study of the 2008 San Diego measles outbreak found that the cost to the public health system was \$10,376 per individual that was infected with measles and the total cost to contain the outbreak was \$124,517 (Bloom et al, 2014). When performing a public health and an economic consequences analysis, the study reported that just a 5 percent decline in MMR vaccine coverage would result in an estimated three-fold increase in measles for children ages 2-11 years, nationally, every year with an additional \$2.1 million in public sector costs (Lo & Hotez, 2017).

Global initiatives, including the Global Vaccine Action Plan initiative from 2011-2020, had some success in increasing vaccine uptake with three doses of DTP administered to 116 million infants in 2018 which is 4.9 million more than in 2010 (WHO, 2020). The United Nations International Children's Emergency Fund (UNICEF) supplies vaccines to reach 45 percent of the world's children under five years. In over 100 countries, UNICEF works with governments, the private sector, non-governmental organizations, and other United Nations (UN) agencies to engage communities, procure and distribute

vaccines, keep supplies safe and effective, and help ensure affordable access for even the hardest-to-reach families (UNICEF, 2021). With the current pandemic, COVAX was established to accelerate the development and manufacture of COVID-19 vaccines and to guarantee fair and equitable access for every country in the world (WHO, 2020).

In the United States, community-based programs have shown improvements to healthcare access and vaccination rates (Lebaron et al, 1998). Community programs have led to children between ages 19 and 35 months whose parents or caregivers completed education sessions and benefitted from a community-wide social marketing message that increased their immunization status from 45 percent baseline to 82 percent over four years (Willis et al, 2016). By using a community-based approach, the percentage of vaccine hesitancy decreased from 22.6 percent to 14.0 percent (Schoeppe et al, 2017). Utilizing a community approach, especially through the use of mobile health clinics, has shown success in reaching vulnerable populations by delivering services directly at the curbside in communities, as well as addressing medical and social determinants of health at a community level (Yu et al 2017). In 2014, approximately 90 percent of patients received vaccinations through mobile clinics (Gupta et al, 2017). Therefore, community-based clinics are recommended to assist in delivering access and education about vaccines. When community members design educational material or determine best means to deliver culturally fair vaccine information, vaccine hesitancy decreases, and vaccine confidence increases.

Healthcare providers play a significant role in achieving vaccine acceptance (Barrow et al, 2015). Parents have higher odds of accepting vaccines if their provider initiates a consultation using a presumptive approach (Peterson et al, 2016). A study found that 86 percent of parents identified their healthcare providers as a trusted source of information for vaccines and reported that a brief education class regarding vaccines in a clinical setting led to vaccine uptake when compared to the control group

that did not receive information from their provider (Williams et al, 2013). Medical professionals are the first line of communication and are a trustworthy source for patients. As such, the role of a healthcare provider should include giving parents the necessary information regarding vaccines and should take the time to address concerns (Barrow et al, 2015). Furthermore, healthcare providers should be persistent in continuing to educate those who are hesitant about vaccines (Jacobson et al, 2020).

Public health departments need to utilize effective messaging to educate the diverse public in an attempt to control the spread of vaccine-preventable diseases (Merchant et al, 2021). Employing all types of communication channels in combination, including interpersonal, community-based, and mass media channels, is preferable and has a better chance of changing an individual's mindset (Arede et al, 2019). In order to improve public health messaging, it is vital that such communication includes the target population in their design and dissemination of information (Lawes-Wicker et al, 2021). In a 2016 systematic review, Daniela Ghio et al found that in order to influence behavior effectively, public health departments should collaborate with community-based programs, thereby assisting in creating effective public health messaging (Ghio et al, 2016). Using a tailored messaging system to specifically target populations can have an increased effect on vaccine uptake (Bennett et al, 2015).

In conclusion, recommendations to address vaccine hesitancy will require the public health departments to create effective communication strategies to specific populations. Secondly, efforts must be made to encourage healthcare professionals to take the time to educate their patients on the importance of vaccines. Success in decreasing vaccine hesitancy will require community-based programs to build trust and rapport with communities to deliver appropriate messaging about vaccines in a culturally fair method.

Methods

The Global Immunization Action Network Team (GIANT), a project of the California Hepatitis C Task Force, is dedicated to researching community responses and educating local communities on the importance of all vaccines in a culturally fair manner. The organization launched in the summer of 2020 in response to the mass amounts of misinformation regarding COVID-19 and its vaccines. So far, the program has developed a team of expert volunteer scientists, healthcare workers, and media experts from all over the world to network and collaborate as a team to determine the most effective approach of conducting community research and providing education to communities regarding the information on vaccines. The program understands that what works for one country may not necessarily work for the other. However, we work together to collaborate with other community-based organizations to perform research and deliver accurate information regarding vaccines in a culturally appropriate manner. By doing this, it is our hope to decrease vaccine hesitancy, increase vaccine confidence, and increase health literacy, so all communities can live safely.

In creating the mission, vision, and goals of GIANT, we took into account our advisory board and our members, who are located around the world. GIANT's mission is to "improve global public health outcomes by combating vaccine hesitancy through effective, sensitive, science-based communication and education" (GIANT, 2020, Mission section). Since we are composed of scientists, educators, pharmacists, health advocates, and public health experts, we are well equipped to educate the public on scientific and evidence-based information regarding vaccines, specifically in a culturally meaningful delivery. The vision is "to reverse infectious disease trends globally by half by the year 2025 and by 100 percent by the year 2030 through the adoption of immunization as one of the top important public health options for infectious diseases prevention and control in most countries of the world in collaboration with national governments and developing partners" (GIANT, 2020, Vision section).

A logic model was created to assist in achieving vaccine uptake through education by utilizing community-based organizations. The Director-General and I, the Administrative Director, created the logic model over a Zoom meeting. Our intent was to describe our activities- including inputs, outputs, and outcomes- and to provide valuable metrics, ensuring the success of our ultimate goal: vaccine uptake and confidence. We defined our inputs as what we invest including expert volunteers, research, education, technology, and partners. We decided our activities would include creating an international network of experts because vaccine hesitancy is a worldwide issue. We recognize that there is no unifying, accurate, culturally fair set of education tools that target the gaps in vaccine hesitancy because it is different in each country and community. It is our objective to design best practices and create culturally fair tools to deliver education. Our target demographics include international and local community influencers, educators, policymakers, media, the public, and medical professionals.

With our inputs and outputs, we identified short-, medium- and long-term outcomes. Short term goals included creating an international working committee of experts, collecting and creating a body of accurate information that leads to a toolkit for vaccine information, creating and designing measurements of efficacy and delivery, and developing a platform to create universal information and delivery tools in a variety of formats. Medium-term goals include collecting bodies of work among participants, developing dissemination tools, gauging participation with pre/post tests, monitoring progress, and measuring the stabilization of messaging through instruments of behavioral change. Long-term impacts include creating a unified effort to deliver culturally fair messaging about vaccine safety, supporting messaging efforts with vetted and accurate information, supporting in-country implementation, and creating measures of results, outcomes, and impacts. To evaluate our activities, we will be researching public records for vaccine uptake.

While GIANT is a global organization, its main headquarters is in Petaluma, CA. In applying for a grant through the Full Circle Fund, a California Bay Area nonprofit, we were able to utilize local community organizations to assist in health literacy and vaccine uptake through education. California Hepatitis C Task Force has been serving the Bay Area and communities statewide through advocacy, research, and collaboration since March 2003. So, it was a perfect funding opportunity to make a significant impact in our own local and diverse community. According to the 2019 United States Census Bureau, San Francisco's County population was 881,549 (US census, 2019). The Census also reports the population self-identifies as 5.6 percent Black or African American, 36 percent Asian, and 15.2 percent Hispanic. By addressing vaccine hesitancy in California's San Francisco Bay Area, we can reach multiple diverse communities in one of the most highly populated areas in the state. Since the Bay Area is also a travel gateway to the rest of the world through air, water, and land, it is an ideal location and opportunity to research, study, and deliver science-based education regarding vaccines. Applying for the Full Circle Fund presented an opportunity for GIANT to research, collaborate, educate, and deliver vaccine information and increase health literacy within our own local and highly diverse community.

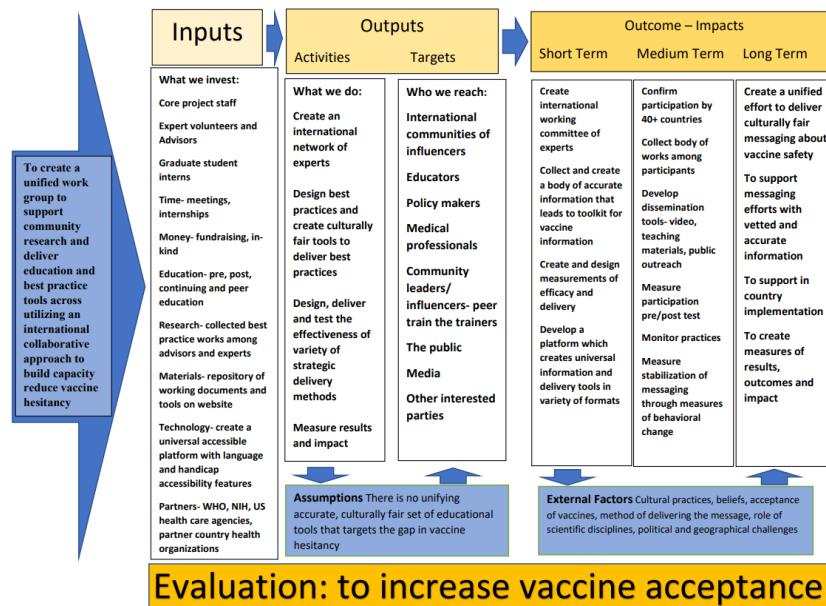
The Full Circle Fund was referred to us by one of our advisory board members. Information to assist in data dissemination to identify the importance of addressing vaccine hesitancy in the Bay Area were recent newspaper articles from CBS local news and the San Francisco Examiner, which included information and data gathered by the World Health Organization. The Director-General and Senior Advisor contributed to the grant writing process in editing and granting approval. After submitting to the Full Circle Fund, the Fund sent an email stating that the application was a semi-finalist. The next step to achieve funding was an interview. This was done via Zoom and GIANT committee members including the Director-General, Senior Advisor and myself, and a board member from Full Circle Fund were in attendance. A two-week follow-up from the Full Circle Fund was stated that GIANT did not qualify for the next funding process. Even though GIANT was not accepted for the grant, the organization continues

to search for new funding opportunities. Recently, GIANT has been recognized by The World Stem Cell Summit in receiving the education award in its efforts to deliver accurate messaging through culturally fair strategies and trusted messaging sources regarding vaccines to local communities.

Recommendations

Community-based programs are essential in delivering quality care to vulnerable and hard-to-reach populations. A recent report found that in 2016, federally funded community health centers served 25.9 million children and adults in the United States, and 58 community health centers that were state and locally funded cared for approximately 738,000 patients (Bureau of Healthcare, 2017). This study indicates community clinics reach a large number of people resulting in increased access to healthcare for often marginal and underserved populations. These community-based programs are able to build rapport and trust by embracing their community’s cultural background. By providing education in a culturally competent manner, patients are more likely to have a positive relationship with their provider. This ultimately increases vaccine confidence and uptake.

Logic Model



See Appendix 1 for a larger version.

A logic model is an important tool for community-based programs. It is a diagram that is able to visually display the resources and anticipated accomplishments of the program (McKenzie et al, 2017). The logic model for the Global Immunization Action Network Team was created initially to help raise money and apply for grant funding. The intentional purpose of the model is to show how the organization will create a unified workgroup to support community research, deliver best practice tools and education, and use a collaborative approach to reduce vaccine hesitancy. The community-based program inputs (or investments) focus on utilizing skills-based volunteers and college interns to assist in achieving community-based research and teaching tools to assist in increasing vaccine acceptance. By doing this, it also incorporates parts of Jim Collins Good to Great model by “getting the right people on the bus” (Collins, 2005). With skills-based volunteers, their passion for education, vaccines, and serving the community is vital to assist in achieving the outcomes. This is because they are focused on doing good rather than on the money or other incentives. Volunteers are interested in giving back, sharing their skills and talents, or improving their community wellness. Also, when working with skills-based volunteers, the organization requires less funding.

The logic model gives a clear description of four activities that the organization performs, or implements. First, GIANT creates an international network of experts. By networking within a structured forum, an organization can strengthen its potential so that its mission and goals can be accomplished. Collaborating and coordinating are essential and doing this will expand the knowledge, skills, and experience of the organization. Second, the model designs best practices and creates culturally fair tools to deliver education material. This is important because each community is different, and educating the community on how to provide culturally competent services, will have more positive results (Bitely, 2020). Third is to design, execute, and test the effectiveness of a variety of strategic delivery methods. Having a variety of strategic delivery messages goes back to differences in communities: a variety of strategies to deliver information should be researched. The last activity is measuring the results and

impacts. This, ultimately, will be the process of evaluating which strategies or culturally fair tools led to an increase in vaccine uptake, and vaccine confidence in communities.

Implementation

Before implementing activities, research needs to be conducted in communities to understand cultural factors and influences. This will assist in determining how vaccine education and health literacy should be disseminated. Community-based organizations need to understand and relate to the social and economic factors and behaviors of the community. Methods in implementing culture into interventions are described best by first collecting data to assess which intervention matches the characteristics of the target group. Second, is designing the evidence-based intervention to match the characteristics of the community. Third, is piloting a test with feedback from the target population and community agencies (Barrera et al, 2013). The logic model shows that GIANT is indeed utilizing this approach in delivering vaccine education. The goal of GIANT is to collect and create a body of accurate information that leads to a toolkit for vaccine information based on community research performed.

As previously mentioned, implementation of the program relies on skills-based volunteers. Funding for community-based programs can be difficult. GIANT has been searching for grant funding and gifts to assist with infrastructure, website development, and the designing of learning modules to create a train-the-trainer program. Due to the pandemic, the ability to fundraise has been difficult to non-existent. Fundraising can be incredibly beneficial to secure the extra funds needed to assist with personnel, materials, technical resources, infrastructure, and miscellaneous costs. GIANT is a non-profit organization; it needs to develop a program that reaches donors interested in the same mission as GIANT which can be difficult. Fundraising strategies should assess how best to reach individual and corporate donors while also implementing a strong grant writing program that applies to both private and public foundations and governmental agencies. Recruiting the right people who are passionate and

have the ability and willingness to fundraise and write grants for foundations, or state and federal governments, is essential.

Evaluation

Evaluation of the program includes assessing vaccine acceptance in the targeted communities. To gather vaccine data, the organization has access to a variety of registries and dashboards through the CDC and local public health departments. If data identifies an increase in vaccine uptake from previous years, it shows that the program is in fact working. If the data shows vaccination rates are declining or maintaining the same numbers from previous years, it will be assumed the program is not effective and the research and implementation strategies must be re-evaluated. Monitoring practices are important to identify gaps in vaccine education and health literacy in the community. When gaps appear, the implementation of new strategies and ideas should be applied.

Alternatives

Community-based organizations, like GIANT, can perform research that collaborates with skilled local professionals and the community so that a tailored messaging system reaches the designated population. Alternatives to address vaccine acceptance require the participation of healthcare providers to consult with their patients specifically on vaccines. However, providers may not necessarily have the time or desired dedication to discuss the health benefits of vaccines or the risk of being vaccine hesitant. Some providers in a healthcare setting may not be culturally competent and may not know how to deliver the best education to certain populations. For example, language barriers in which a clinic does not have access to interpreters, or simply the medical professional is unable to describe the information at a lower health literacy rate for an individual can comprehend.

Another alternative involves policies mandating vaccines from the government. This is one of the most controversial alternatives. Such a policy would undoubtedly meet with major resistance from individuals that strongly believe in personal choice and that government programs should not impede on individual's right to determine their personal healthcare decisions. This is being seen currently with

the distribution of the COVID-19 vaccine and the resistance of some individuals not willing to take the vaccine.

Conclusion

Community-based clinics and organizations can perform a vital role in promoting vaccine confidence and uptake. Local agencies have a good understanding of what may be the best means of messaging and how the delivery will be most successful. Each community has unique social and economic norms that make the community. Therefore, platforms and practices used by community-based organizations may vary in order to instill greater confidence in the use of vaccines. We are a diverse world, nation, and state, so a one-size-fits-all program is not feasible to meet the needs of the communities. Despite problems associated with fundraising, community-based organizations can deliver effective messaging by collaborating with other stakeholders, such as local medical experts, and build rapport with local community members, so that vaccine messages are delivered in a manner that is accepted by the target population.

Implications and Discussion

Community-based organizations play an important role in building healthy communities through education and research. Community organizations can connect with the community in a way that governments and health systems cannot. In order to have a healthy community, we must make known the cultural, social, and economic diversities in all communities. Delivery of education in a culturally fair strategy is vital to vaccine uptake, especially since information about vaccines is complex and is often misunderstood. According to an article by Linda Neuhauser, health communication is critical not only to improve health for the overall population, but also for socially disadvantaged groups who face barriers due to information access, including literacy, language culture, discrimination, geographic location, disability, social isolation and low healthcare access (Neuhauser, 2017). Community organizations can build rapport with the communities and deliver scientific education in a culturally respectful way.

Through education, research and trust, this will lead to a higher rate of confidence which will lead to an increase in vaccine uptake and better health outcomes for the community.

A collaborative approach from the health system and government with community-based programs are vital to vaccine confidence and vaccine uptake. Performing community-based participatory research (CPBR) can allow a collaborative approach between university hospitals and the community (Wallerstein & Duran, 2006). The academic universities and government can build and add resources to community organizations. This allows the community to participate in all aspects of the research and assist in determining the best principles in delivering education and the best platforms to deliver the information in a culturally unbiased manner. Using a collaborative approach to assist in education on vaccines can also reach vulnerable populations and address the gaps in the health system and government. To ultimately increase vaccine uptake, efforts must be designed to address the specific confidence and misinformation issues within the community.

Building relationships is difficult; particularly when relationships include both small and large organizations and governments. Limitations to a community-based approach are finding larger organizations and systems to partner with due to the complexity of businesses and government agencies (Takahashi & Smutney, 2001). Institutions and government agencies have limited budgets and community organizations must compete against other nonprofits. It also takes time and resources to determine which foundations or government agencies may already have maxed their involvement in community-based clinics for that budgeted year. Moreover, some potential stakeholders may not want to be involved in a controversial topic such as that of vaccines.

Time constraints are a major limitation when trying to collaborate with larger organizations, governmental agencies, as well as community leaders. It takes time and energy to build relationships and trust with community members to drive more local involvement and with organizations. Yet, this does not always mean that members and organizations will be willing participants to collaborate. It also

takes time to perform research to be able to apply the best implementations regarding education platforms for vaccine hesitancy.

Infrastructure, research, implementation, and evaluation are costly, and funding is not consistent. Funding options may not always be available and may be hard to get, or may require a significant amount of time in writing proposals rather than actually undertaking research. Environmental challenges, such as the coronavirus, can add to the difficulty of securing funding and grants. Other challenges include competing for limited funding and finding a funding source that aligns with the mission, vision, and goals of the community-based program. Difficulty in finding funding sources can affect the sustainability of the program.

Community-based programs have shown great benefits in reaching populations that have been missed by the health system and the government. Education and health communication is a key strategy to convert scientific findings into actionable items (Neuhauser, 2017). Being health literate and have the ability to discuss and educate peers about vaccines can allow a person to make informed health decisions, and can ultimately help the community shield itself from widespread infections and contagious diseases. With the community being vaccinated, it can reach herd immunity leading to better health outcomes, longer lives, and the prevention of spreading the disease.

Conclusion

Apart from clean water, vaccines are an important and effective approach to decrease mortality and the spread of diseases in a cost-efficient way. The best approach to educate the communities and deliver vaccine information is through community-based organizations. These organizations can build rapport and trust with communities to ultimately increase vaccine confidence. When culturally sensitive and science-based education regarding vaccines is delivered to hard-to-reach communities, we will ultimately save lives by increasing vaccine confidence and acceptance resulting in herd immunity. It is important to increase confidence and trust in vaccines to protect all communities against vaccine-

preventable infectious diseases. Addressing vaccine hesitancy through community-based clinics can reach diverse and vulnerable populations that have been missed by the health system and government.

One community-based clinic that is committed to educating the community and filling in the gaps is The Global Immunization Action Network Team (GIANT), a project of the California Hepatitis C Task Force. The organization is dedicated to research communities to assist in creating the best toolkit for educating the community on scientific evidence-based information with vaccines and delivering in a culturally appropriate manner. With research and implementation, GIANT can educate communities with the best platform regarding vaccines in the most culturally fair manner. To achieve best health outcomes, it is important to utilize CPBR by collaborating with stakeholders and community members. When starting with local communities, eventually information will disseminate and vaccine education, confidence, and uptake will take place.

References

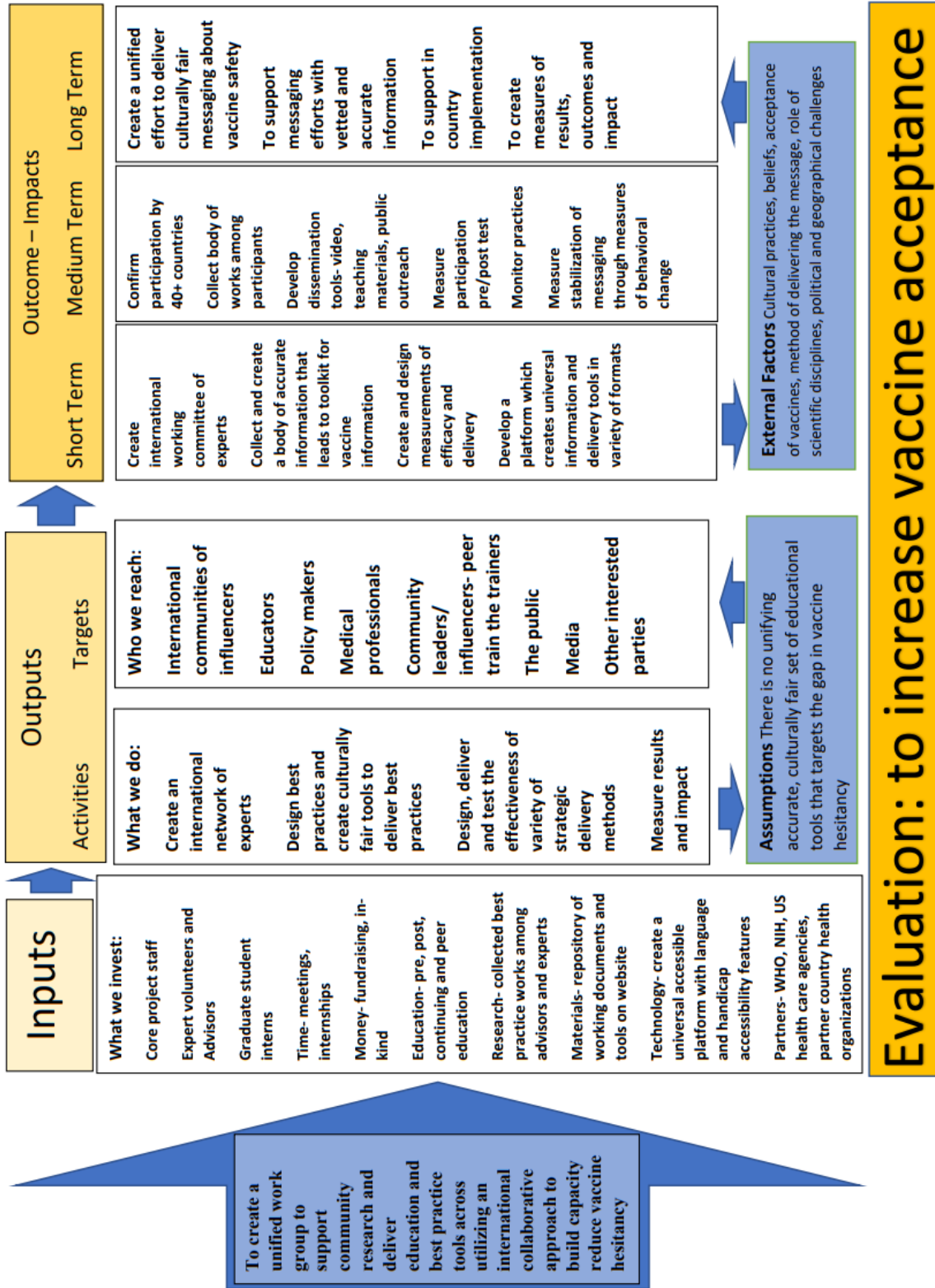
1. Ackerson BK, Sy LS, Glenn S, Lei Qian MS, Park C, Riewerts R, Jacobsen S. (2021) Pediatric vaccination during the COVID-19 pandemic. *Pediatrics*
<https://doi:10.1542/peds.2020047092>
2. Arede, M., Bravo-Araya, M., Bouchard, É., Singh Gill, G., Plajer, V., Shehraj, A., & Adam Shuaib, Y. (2019). Combating Vaccine Hesitancy: Teaching the Next Generation to Navigate Through the Post Truth Era. *Frontiers in public health*, 6, 381.
<https://doi.org/10.3389/fpubh.2018.00381>
3. Barrera, M., Jr., Castro, F.G., Strycker, L.A., & Toobert, D.J. (2013) Cultural adaptations of behavioral health interventions: A progress report. *Journal of Consulting and Clinical Psychology*, 81(2), 196-205.
4. Barrow M, Coddington, J Richards, E (2015) Parental Vaccine hesitancy: clinical implications for pediatric providers. *Department of Pharmacology Continuing Education* 29(4) 385-394
DOI: <https://doi.org/10.1016/j.pedhc.2015.04.019>
5. Bennett, A. T., Patel, D. A., Carlos, R. C., Zochowski, M. K., Pennewell, S. M., Chi, A. M., & Dalton, V. K. (2015). Human Papillomavirus Vaccine Uptake After a Tailored, Online Educational Intervention for Female University Students: A Randomized Controlled Trial. *Journal of women's health* (2002), 24(11), 950–957. <https://doi.org/10.1089/jwh.2015.5251>
6. Bitely, Julie (2020) Community health centers play an important role in addressing care disparities. <https://www.mibluesperspectives.com/2020/08/10/community-health-centers-play-important-role-in-addressing-care-disparities/>
7. Bloom, B., Marcuse, E. Mnookin, S (2014) Addressing Vaccine Hesitancy *Science* 334(6182) 339
DOI: <https://doi.org/10.1126/science.1254834>
8. Bramer, C. A., Kimmins, L. M., Swanson, R., Kuo, J., Vranesich, P., Jacques-Carroll, L. A., & Shen, A. K. (2020). Decline in child vaccination coverage during the COVID-19 pandemic - Michigan Care Improvement Registry, May 2016-May 2020. *American journal of transplantation : official journal of the American Society of Transplantation and the American Society of Transplant Surgeons*, 20(7), 1930–1931.
<https://doi.org/10.1111/ajt.16112>
9. Bureau of Primary Health Care. (2017). 2016 National Health Center Data: Health Center Program Look-Alike Data. <https://bphc.hrsa.gov/uds/lookalikes.aspx?state=national>
10. CDC, National and State Vaccination Coverage Among Children Aged 19-35 months, 2006-2010
<https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6034a2.htm#tab1>
11. CDC, (2011) Vaccination coverage for selected diseases by age 24 months 2010-2015
<https://www.cdc.gov/nchs/data/hus/2019/031-508.pdf>
12. DeStefano, F., & Shimabukuro, T. T. (2019). The MMR Vaccine and Autism. *Annual review of virology*, 6(1), 585–600. <https://doi.org/10.1146/annurev-virology-092818-015515>
13. Geoghegan, S., O'Callaghan, K. P., & Offit, P. A. (2020). Vaccine Safety: Myths and Misinformation. *Frontiers in microbiology*, 11, 372.
<https://doi.org/10.3389/fmicb.2020.00372>
14. Ghio, D., Lawes-Wickwar, S., Tang, M., Dr, Epton, T., Howlett, N., Jenkinson, E., ... Keyworth, C. (2020, July 13). What influences people's responses to public health messages for managing risks and preventing infectious diseases? A rapid systematic review of the evidence and recommendations. <https://doi.org/10.31234/osf.io/nz7t>

15. Gidengil, C., Chen, C., Parker, A. M., Nowak, S., & Matthews, L. (2019). Beliefs around childhood vaccines in the United States: A systematic review. *Vaccine*, 37(45), 6793–6802. <https://doi.org/10.1016/j.vaccine.2019.08.068>
16. Global Immunization Action Network Team. (2020) Vision, mission and goals. Retrieved from <https://www.giant-int.org/about/>
17. Grinber, K & Sela, Yael (2021) What affects maternal response to measles vaccinations? Examining the Health Belief Model. *Sci* 3(2) 20 <https://doi.org/10.3390/sci3020020>
18. Gupta, A., Misra, S. M., Garcia, C., & Ugalde, M. (2017). Utilizing Lean Principles to Improve Immunization Administration Efficiency in a Pediatric Mobile Clinic Program. *Pediatric quality & safety*, 2(5), e037. <https://doi.org/10.1097/pq9.000000000000037>
19. Jacobson, RM., St. Sauver, JL., Griffin, JM., MacLaughlin, K. & Finney Rutten, L. (2020) How health care providers should address vaccine hesitancy in the clinical setting: Evidence for presumptive language in making a strong recommendation, *Human Vaccines & Immunotherapeutics*, 16:9, 2131-2135, [DOI: 10.1080/21645515.2020.1735226](https://doi.org/10.1080/21645515.2020.1735226)
20. Kestenbaum, L. A., & Feemster, K. A. (2015). Identifying and addressing vaccine hesitancy. *Pediatric annals*, 44(4), e71–e75. <https://doi.org/10.3928/00904481-20150410-07>
21. Health and Human Services. Vaccine Types. April 29, 2021 <https://www.hhs.gov/immunization/basics/types/index.html>
22. Lambert, Diana 2020 *California immunization rates drop 40% during pandemic*. EDSOURCE. Retrieved on May 10, 2021 from: <https://edsource.org/2020/california-immunization-rates-drop-40-percent-during-pandemic/633594>
23. Lawes-Wickwar, S., Ghio, D., Tang, M. Y., Keyworth, C., Stanescu, S., Westbrook, J., Jenkinson, E., Kassianos, A. P., Scanlan, D., Garnett, N., Laidlaw, L., Howlett, N., Carr, N., Stanulewicz, N., Guest, E., Watson, D., Sutherland, L., Byrne-Davis, L., Chater, A., Hart, J., ... Epton, T. (2021). A Rapid Systematic Review of Public Responses to Health Messages Encouraging Vaccination against Infectious Diseases in a Pandemic or Epidemic. *Vaccines*, 9(2), 72. <https://doi.org/10.3390/vaccines9020072>
24. LeBaron CW, Starnes D, Dini EF, Chambliss JW, Chaney M. The Impact of Interventions by a Community-Based Organization on Inner-city Vaccination Coverage: Fulton County, Georgia, 1992-1993. *Arch Pediatr Adolesc Med*. 1998;152(4):327–332. <https://doi.org/10.1001/archpedi.152.4.327>
25. Lo NC, Hotez PJ. (2017) Public Health and Economic Consequences of Vaccine Hesitancy for Measles in the United States. *JAMA Pediatrics*. 171(9):887-892. DOI: <https://doi.org/10.1001/jamapediatrics.2017.1695>
26. MacDonald, N. E., & SAGE Working Group on Vaccine Hesitancy (2015). Vaccine hesitancy: Definition, scope and determinants. *Vaccine*, 33(34), 4161–4164. <https://doi.org/10.1016/j.vaccine.2015.04.036>
27. McKenzie, J., Neiger, B., & Thackeray, R. (2017) Planning, implementing and evaluating health promotion. *Pearson* ISBN 978-0-13-421992-9
28. Merchant RM, South EC, Lurie N. Public Health Messaging in an Era of Social Media. *JAMA*. 2021;325(3):223–224. doi: <https://doi.org/10.1001/jama.2020.24514>
29. Navin, M. C., Kozak, A. T., & Clark, E. C. (2018). The evolution of immunization waiver education in Michigan: A qualitative study of vaccine educators. *Vaccine*, 36(13), 1751–1756. <https://doi.org/10.1016/j.vaccine.2018.02.046>

30. Neuhauser, Linda (2017) Integrating participatory design and health literacy to improve research and interventions. *Health Literacy IOS Press* [doi:10.3233/978-1-61499-790-0-303](https://doi.org/10.3233/978-1-61499-790-0-303)
31. Olsen, Berry, Kumar (2020) Addressing Parental Vaccine Hesitancy towards Childhood Vaccines in the United States: A Systematic Literature Review of Communication Interventions and Strategies *Vaccines*, 8, 590; <https://doi.org/10.3390/vaccines8040590>
32. Our World in Data (2021) Share of People Who are Fully Vaccinated. Data collected on August 10, 2021 from Center of Disease Control. Retrieved on August 11, 2021 from: <https://ourworldindata.org/covid-vaccinations?country=USA>
33. Paterson P., Meurice, F., Stanberry L., Glismann, S., Rosenthal, S., Larson, H. (2016) Vaccine hesitancy and healthcare providers, *Vaccines*, Volume 34, Issue 52. pages 6700-6706 ISSN 0264-410X <https://doi.org/10.1016/j.vaccine.2016.10.042>.
34. Phadke, V. K., Bednarczyk, R. A., Salmon, D. A., & Omer, S. B. (2016). Association Between Vaccine Refusal and Vaccine-Preventable Diseases in the United States: A Review of Measles and Pertussis. *JAMA*, 315(11), 1149–1158. <https://doi.org/10.1001/jama.2016.1353>
35. Schmid, P., Rauber, D., Betsch, C., Lidolt, G., & Denker, M. L. (2017). Barriers of Influenza Vaccination Intention and Behavior - A Systematic Review of Influenza Vaccine Hesitancy, 2005 - 2016. *PloS one*, 12(1), e0170550. <https://doi.org/10.1371/journal.pone.0170550>
36. Schoeppe, J., Cheadle, A., Melton, M., Faubion, T., Miller, C., Matthys, J., & Hsu, C. (2017). The Immunity Community: A Community Engagement Strategy for Reducing Vaccine Hesitancy. *Health promotion practice*, 18(5), 654–661. <https://doi.org/10.1177/1524839917697303>
37. Thomson, A.; Vallée-Tourangeau, G.; Suggs, L.S. (2018) Strategies to increase vaccine acceptance and uptake: From behavioral insights to context-specific, culturally-appropriate, evidence-based communications and interventions. *Vaccine*, 36, 6457–6458
38. United States Census. (2019) San Francisco County. Retrieved from <https://www.census.gov/quickfacts/fact/table/sanfranciscocitycalifornia,sanfranciscocountycalifornia/PST045219>
39. WHO. (2020) Global Vaccine Action Plan 2011-2020. <https://www.who.int/teams/immunization-vaccines-and-biologicals/strategies/global-vaccine-action-plan>
40. Williams, S. E., Rothman, R. L., Offit, P. A., Schaffner, W., Sullivan, M., & Edwards, K. M. (2013). A randomized trial to increase acceptance of childhood vaccines by vaccine-hesitant parents: a pilot study. *Academic pediatrics*, 13(5), 475–480. <https://doi.org/10.1016/j.acap.2013.03.011>
41. Willis, E., Sabnis, S., Hamilton, C., Xiong, F., Coleman, K., Dellinger, M., Watts, M., Cox, R., Harrell, J., Smith, D., Nugent, M., & Simpson, P. (2016). Improving Immunization Rates Through Community-Based Participatory Research: Community Health Improvement for Milwaukee's Children Program. *Progress in community health partnerships : research, education, and action*, 10(1), 19–30. <https://doi.org/10.1353/cpr.2016.0009>
42. Xiao, X., & Wong, R. M. (2020). Vaccine hesitancy and perceived behavioral control: A meta-analysis. *Vaccine*, 38(33), 5131–5138. <https://doi.org/10.1016/j.vaccine.2020.04.076>
43. Yarnoff B, Kim D, Zhou F, et al. Estimating the Costs and Income of Providing Vaccination to Adults and Children. *Med Care*. 2019;57(6):410-416. <https://doi.org/10.1097/MLR.0000000000001117>

44. Yu, S., Hill, C., Ricks, M. L., Bennet, J., & Oriol, N. E. (2017). The scope and impact of mobile health clinics in the United States: a literature review. *International journal for equity in health*, 16(1), 178. <https://doi.org/10.1186/s12939-017-0671-2>
45. Zhong, Z., Zhang, J., Peng, X., (2021) Conceptual Models and Coping Strategies of “Vaccine Hesitancy”: A Review Study Proceedings of the 6th International Conference on Economics, Management, Law and Education (EMLE 2020) *Atlantis Press* 425(429) 2352-5428 <https://doi.org/10.2991/aebmr.k.210210.068>

Appendix 1 Logic Model



Appendix 2 Competencies

CEPH Foundational Competencies

| Competency | For the 1-2 foundational competencies chosen, briefly note why you feel it is relevant to your ILEX paper or presentation. (Note: all students can choose Competency #19, and mention the particular audience) |
|--|---|
| Evidence-based Approaches to Public Health | |
| 1. Apply epidemiological methods to the breadth of settings and situations in public health practice | |
| 2. Select quantitative and qualitative data collection methods appropriate for a given public health context | |
| 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software as appropriate | |
| 4. Interpret results of data analysis for public health research, policy and practice | Apply research results to address effective policy and practice has on vaccine uptake |
| Public Health & Health Care Systems | |
| 5. Compare the organization, structure and function of health care, public health and regulatory systems across national and international settings | |
| 6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and societal levels | |
| Planning & Management to Promote Health | |
| 7. Assess population needs, assets and capacities that affect communities' health | |
| 8. Apply awareness of cultural values and practices to the design or implementation of public health policies or programs | Designing culturally competent tools such as a logic model to implement recommendations |
| 9. Design a population-based policy, program, project or intervention | |

| | |
|--|--|
| 10. Explain basic principles and tools of budget and resource management | |
| 11. Select methods to evaluate public health programs | |
| Policy in Public Health | |
| 12. Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence | |
| 13. Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes | |
| 14. Advocate for political, social and economic policies and programs that will improve health in diverse populations | |
| 15. Evaluate policies for their impact on public health and health equity | Evaluate best practices to impact communities |
| Leadership | |
| 16. Apply principles of leadership, governance and management, which include creating a vision, empowering others, fostering collaboration and guiding decision making | Use principles of leadership to address the importance of collaborating with private and public offices to disseminate truthful information regarding vaccines |
| 17. Apply negotiation and mediation skills to address organizational or community challenges | |
| Communication | |
| 18. Select communication strategies for different audiences and sectors | |
| 19. Communicate audience-appropriate public health content, both in writing and through oral presentation | Through capstone project, will communicate audience-appropriate public health content. |
| 20. Describe the importance of cultural competence in communicating public health content | |
| Interprofessional Practice* | |
| 21. Perform effectively on interprofessional teams | |
| Systems Thinking | |

| | |
|---|--|
| 22. Apply systems thinking tools to a public health issue | Will create a logic model on factors affecting vaccine hesitancy and vaccine uptake. |
|---|--|

MPH - Community and Public Health Practice Competencies

| Competency | For CPHP concentrators, choose 1 competency you plan to draw on, and mention how it is relevant. |
|---|---|
| 1. Apply qualitative methods to assess community assets for addressing public health and environmental issues | |
| 2. Analyze how issues of power, race and ethnicity, sex and gender identify, and socioeconomic factors affect the development, implementation, and evaluation of community-based projects | |
| 3. Develop a research project proposal using mixed methods to address a public health problem | |
| 4. Apply project management strategies to improve the quality of programs and services in public health settings | |
| 5. Identify environmental health risks in vulnerable communities and examine strategies to reduce exposures | |

MPH – Health Policy Leadership Competencies

| Competency | For HPL concentrators, choose 1 competency you plan to draw on, and mention how it is relevant |
|--|---|
| 1. Predict how health policies may impact risks and drivers of health outcomes at the health system and public health sector level | |
| 2. Synthesize evidence from literature review and/or databases to write a policy paper for a specific audience, identifying a problem and proposing alternative approaches to meet health needs in underserved communities | |

| | |
|--|---|
| <p>3. Design a leadership plan and strategies to manage stakeholders and related political processes, addressing conflict, resistance, and cooperation in the implementation process</p> | <p>Will design an effective learning tool for stakeholders to be able to discuss the importance of vaccines in a culturally appropriate manner.</p> |
| <p>4. Communicate recommendations to improve organizational strategies and capacity to implement health policy</p> | <p>Recommendations include looking at organizational strategies, such as the Good to Great model, to assist in recommendations</p> |
| <p>5. Advocate and make recommendations on legislation or regulation related to a current environmental health issue, drawing on risk assessment evidence</p> | |

MPH – Behavioral Health Competencies

| <p>Competency</p> | <p>For BH concentrators, choose 1 competency you plan to draw on, and mention how it is relevant.</p> |
|---|--|
| <p>1. Plan a health education training, curriculum, or workshop including stakeholder identification, resource planning and timeline, volunteer recruitment and marketing, strategy selection, and monitoring process.</p> | |
| <p>2. Effectively deliver evidence-based health education and behavior change intervention skills such as motivational interviewing, health coaching, peer education, mindfulness, or social media messages to individuals or groups.</p> | |
| <p>3. Analyze the impact of chronic conditions and propose strategies to address prevention and management across all levels of the Socioecological Model.</p> | |
| <p>4. Formulate strategies for mental health and substance abuse prevention and treatment in community settings.</p> | |
| <p>5. Develop a data collection and analysis plan including measures and methods for research on behavioral health.</p> | |