CREATING AN EXPANSION PLAN FOR STIGMA FREE WORCESTER

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ABSTRACT

Many people face barriers that prevent or limit access to needed health and social services. These barriers often result in health disparities. Our goal was to assist the Worcester Department of Health and Human Services in investigating the feasibility of expanding the Stigma Free Worcester mobile application, a Virtual Resource directory of public health and social service resources, to the fourteen largest cities in Massachusetts. We conducted eleven interviews and comparatively analyzed ten virtual resource tools. Based on our research, we identified the core considerations for developing a larger scale Virtual Resource Tool. We used these factors to recommend three potential courses of action that Worcester DHHS could take.

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We would like to dedicate this page to the many people who assisted us in the completion of this project.

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PUBLIC HEALTH AND VIRTUAL TOOLS

Introduction

Access to healthcare services is an issue constantly being battled in the frontlines of the United States public healthcare system. According to a 2019 survey done by the Centers for Disease Control (CDC), an estimated 32.8 million people, or 12.1% of the 2019 U.S. population, reported being uninsured for at least part of the previous 12 months. While this may come as a surprise, what may be even more astonishing is the individuals who do not seek medical services for reasons apart from insurance. Failure to seek medical care is prevalent in individuals struggling with substance abuse and mental health issues in urban areas, who find themselves facing widespread stigma and, consequently, afraid of seeking treatment. The 2017 Massachusetts Health Assessment (MHA) showed that approximately one in four people with MassHealth, Massachusetts' Medicaid program, identified as having a serious mental illness. The 2017 MHA also found that the risk of a fatal opioid-related overdose is six times higher for individuals diagnosed with a serious mental illness and three times higher for those diagnosed with depression (MHA, 2017). Many Massachusetts residents do not have sufficient access to public health care. Experts define access to public health using the primary characteristics that allow access, specifically: affordability, awareness, language, and transportation / location

Access To Healthcare

Affordability + Awareness + Language + Location

Public Healthcare in the United States

Prior to the 21st century, the healthcare system in the United States had focused more on clinical services, physical health, and treatment of chronic diseases, but in the early part of the 21st century, there was a clear shift. According to Regina Benjamin (2011), the 18th Surgeon General of the United States, there is now a greater focus on public health which involves preventing and addressing the underlying social, behavioral, economic, and psychological determinants of health. Preventative care and awareness programs are an increasingly important topic as they can have a direct effect on the outcome of the patient. Paula Braveman, the Director of the Center on Social Disparities in Health at the University of California, explained in a National Institute of Health (NIH) public health report (2014) : a portion of one's overall health can be attributed to several non-medical factors such as access to and quality of clinical care, health behaviors and dieting, socioeconomic factors, and residential environments.

Public Health in Cities

There are unique considerations for addressing public health in urban areas. The 14 largest cities in Massachusetts vary greatly in size and the types of people who inhabit each city. The variation in size and diversity between these cities means that delivering public health in each city has different challenges. By exploring the factors that affect the delivery of public health in different sized cities and how cities affect the health of those who live there, we were able to better understand the cities that our project focused on. Size can be broken into two separate categories, population density and land area. Population and land area influence the number of resources and infrastructure that cities use to deliver healthcare. The second factor that affects the delivery of public health in cities is diversity. Diversity can take many sizes, for example, socio-economic, ethnic/racial, age, and gender. Below is a graphic showing socio-economic diversity in Worcester, on the right is a graphic showing racial diversity for Massachusetts and two of its counties. Diversity affects the delivery of public health as it can influence the treatment methods that must be used in order to provide effective care (Mays et al., 2003).

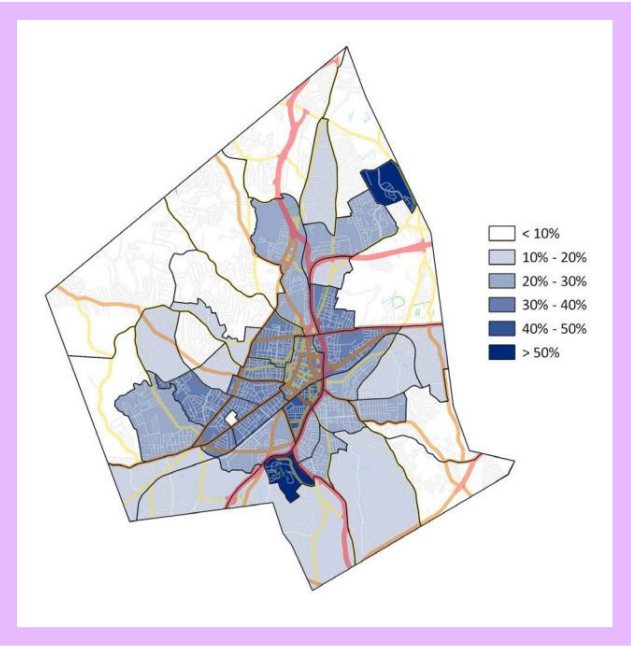

Figure 1. Percentage of Worcester residents living below the poverty line. Source: U.S. Census Bureau, American Community Survey, Image from Worcester Alamanac, 2018

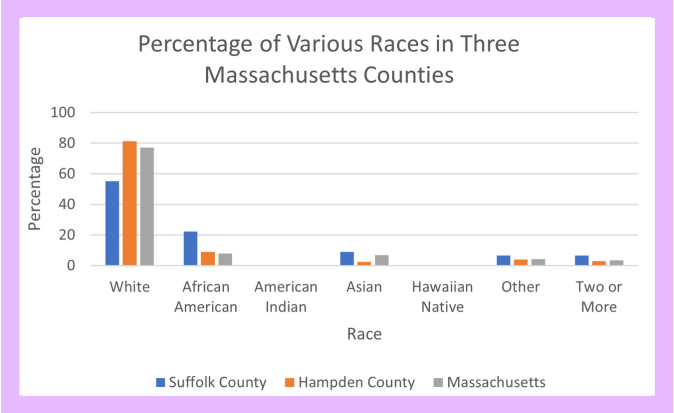

Figure 2. Diversity statistics for two Massachusetts counties, Hampden and Suffolk, compared with the entire state

Necessity of Substance Use Treatment

To improve access to preventative and treatment interventions for substance use, cities need both sufficient resources and a way of sharing the availability of these resources with the public. Substance use is a significant problem in the public health field, particularly in urban settings. According to the World Health Organization, an estimated 35.6 million people globally suffered from substance use disorders in 2018 , and in the United States, the number of deaths due to opioid overdose increased by 120% between 2010 and 2018 (WHO, 2019) . What is even more astonishing, as illustrated in Figure 3 (below), is in the state of Massachusetts alone , the number of opioid related deaths in 2016 showed a 350% increase since 2010 (MHA, 2017).The burden of substance use on hospital inpatient and Emergency Department (ED) services is extreme, as individuals are struggling to get access to care services, including rehabilitation, detox, outpatient treatment, and medication-assisted

treatment (CHA, 2018). Finding the best way to make treatment available to these individuals and discovering the best preventative measures proves to be a large barrier in solving this public health issue. In 2018, University of Massachusetts Medical School researcher, Eric Romo, studied substance use prevention. Romo found the most reported reason for not receiving treatment was not having health coverage or being unable to cover the cost of treatment. This same study found that when individuals did pursue treatment, the two most common treatment locations were rehabilitation facilities and hospitals. Romo ultimately concluded that insufficient treatment capacity, policy barriers, treatment-related stigma, and individuals not perceiving a need for treatment all contribute to a large treatment gap among individuals with opioid use disorders (Romo, 2018). Many community partners are working to fill gaps in substance use care through cross-agency outreach programs in Massachusetts. However, mental health issues are not as easily tackled given the difficulty in detecting them.

Mental Healthcare

Access to mental healthcare services varies for people of different socioeconomic status. In many communities, race and economic factors are barriers to accessing healthcare. Also, poor engagement between patients and their clinicians, patients' unawareness of symptoms, and slow clinician responses are examples of problems with the effectiveness of the management of severe mental illness (Byrne, et al.). The Cohen Veterans Network, and National Council for Behavioral Health presented a study of Americans' current access and attitude towards mental healthcare through a webpage, *America's Mental Health 2018*. The study revealed that mental health services are insufficient and present a lack of access - or the ability for people to find care (2018). According to the study, a large percentage of Americans don't believe mental health services are accessible for everyone and believe the services are limited. These sentiments are driven by data that says 42% of Americans saw high costs and insufficient insurance coverage as barriers to mental health services. Moreover, 25% of Americans also had to choose between getting mental healthcare and paying for daily necessities (2018). Participants in the 2018 study blamed both the U.S. government and insurance providers for insufficient funding of mental health services. Moreover, according to the study, 64% Americans strongly believe the U.S. government has a responsibility to improve mental health services (2018). This is because nearly 1-in-5 (17%) Americans had to choose treatment for either physical or mental health conditions (2018) . Lack of awareness is another barrier where people do not know where to go for mental health services.

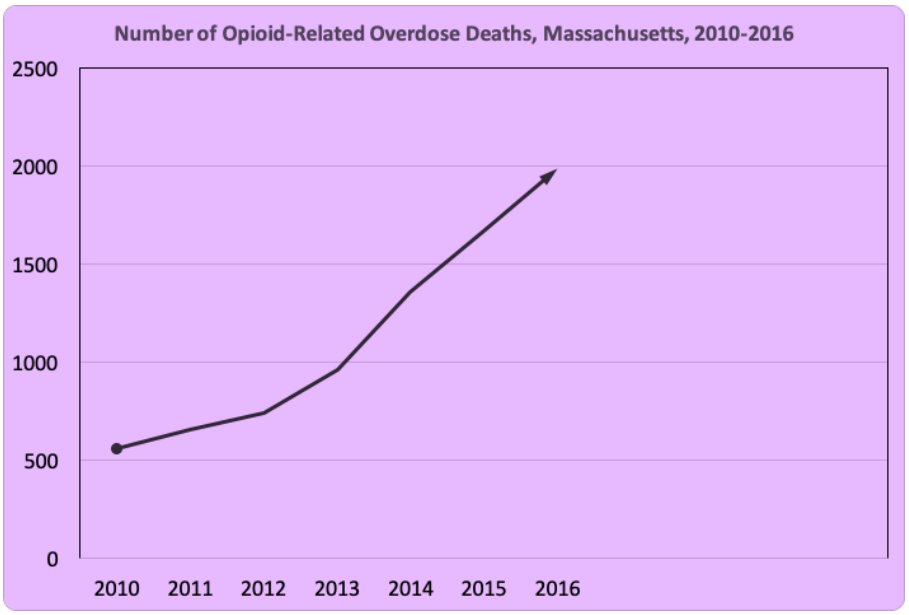

Figure 3: This figure was created from data found on the 2017 Massachusetts State Health Assessment (MHA) on the increase of opioid related overdose deaths in Massachusetts from 2010 to 2016.

State and income level-based disparities in accessibility are major barriers of providing mental healthcare. States that lack funding, facilities, and providers struggle with creating mental health access. Income level and location presents a large access disparity as those who live in rural and lower-income areas report having limited access to accessible mental health services (2018). These Americans who live in these conditions are less likely to know where to go for care and may be forced to use unreliable community centers instead of qualified and certified mental health centers (2018). Moreover, 53% of Americans who did seek mental health treatment lived in low-income households. People describe in data, what they see as their top barrier seeking effective mental health services for themselves and for Americans in general.

Utility of a Virtual Resource

Since mobile apps and online support groups have been developed, mobile and online resources have changed how people access mental health services. Development or expansion of a virtual resource tool could increase access for individuals with substance abuse and mental health issues. Mobile health (mHealth) applications have made a tremendous impact in the revolution of personal health monitoring as they help speed detection and treatment of mental illness by streamlining communication and information transfer. Young adults, who are more adept with contemporary technology, experience a notable benefit from mHealth devices. E-Health, which comprises web- and mobile-based healthcare resources, similarly benefits mental health service users (Ashurst, et al.). E-Health methods include computerized cognitive behavioral therapy to reduce depression and anxiety, online forums for social support, web-based interventions to improve health behaviors and cost efficiency for users. These mobile applications have the potential to improve care for communities in need by enhancing communication and intervention. Pooja Chandrashekar (2018) discovered that mobile health apps are a great way to reach people who are not receiving healthcare for any number of reasons. Chandrashekar showed that mHealth apps are similar in effectiveness to traditional therapy for disorders such as anxiety. Still, this category of apps' overall effectiveness is hindered by the lack of a standard of quality. As a result, large numbers of people with mental health and drug use issues may not feel comfortable relying so heavily on such an inconsistent

DATA ANALYSIS FROM 2018 STUDY CONDUCTED BY THE COHEN VETERANS NETWORK DESCRIBING THE TOP BARRIERS TO MENTAL HEALTH CARE FOR INDIVIDUAL AMERICANS AND THE GENERAL PUBLIC

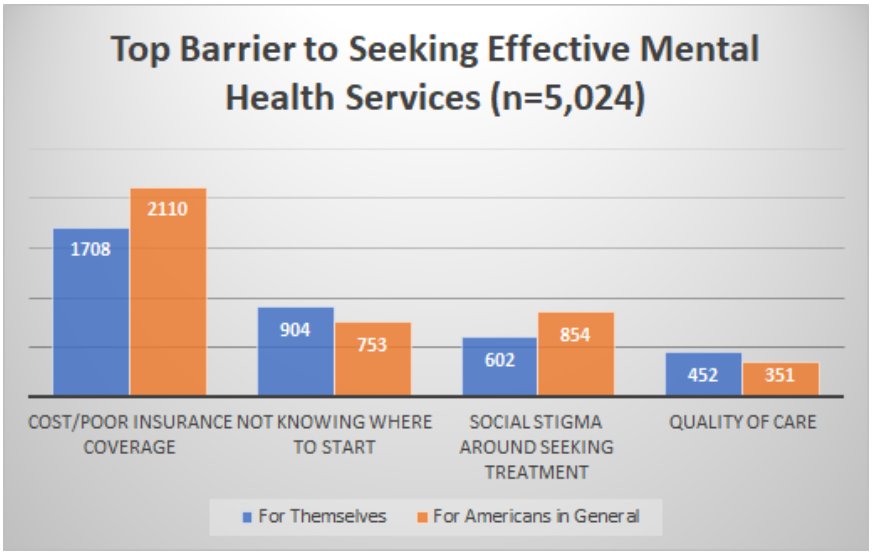

Figure 4: This is based off the article, *New Study Reveals Lack of Access as Root Cause for Mental Health Crisis in America*
SOURCE LINK: https://www.thenationalcouncil.org/press-releases/new-study-reveals-lack-of-access-as-root-cause-for-mental-health-crisis-in-america/

category of tools. An mHealth app that, instead of providing a service itself, displays the list of available services in a user's geographic area, would help users find information about various resources available to them, so they feel confident making healthcare-related decisions. Consequently, improvements in a community's knowledge of and access to online public health resources will likewise improve the health of the

community. Regarding those with mental health, substance use, or housing issues, mHealth apps have unmatched potential as virtual information boards for services related to users' needs. With telehealth becoming the norm, a virtual collection of physical and virtual health resources for a given community would allow members of the community to contact providers prior to treatment and choose the exact services and/or providers they feel is most beneficial to them. In 2018 to address the issue of access to mental health and substance abuse resources in Worcester, the DHHS worked with a group of four WPI students to create the Stigma Free Worcester Application. The Stigma-Free App consolidated information about local mental health support groups, addiction treatment programs, food and clothing relief organizations, and housing and shelter resources.

As a result of significant support for the Stigma Free Worcester Application and its' potential, the DHHS is interested in expanding the reach of the Stigma-Free Worcester App.

Project Goal

The goal of this project was to investigate the feasibility of expanding Stigma Free to reach the 14 largest cities in Massachusetts. We go into detail about our methods of accomplishing this goal in the next section.

Figure 5. Stigma Free Worcester Application

DEVELOPING A PLAN FOR AN IMPROVED VIRTUAL TOOL

In order to assess the feasibility of expanding a virtual resource tool to help residents of Massachusetts get access to public health resources, we first analyzed the Stigma Free Worcester application. This process helped us become familiar with the app and also find out what improvements would need to be made in an updated virtual resource tool. After analyzing Stigma Free, we identified other virtual resource tools and repositories and comparatively analyzed these resource tools to examine what the strengths and weaknesses of each. Simultaneously we began to compile a sample of resources from some of the 14 largest cities and developed a methodological approach for collecting public health resources in other cities. This approach included the most suitable verification process according to interviews done with developers of other resource tools to ensure the reliability of the resources that are found. Finally, we developed a set of recommendations to continue development of a virtual resource tool that would provide information on public health resources in the 14 largest cities in Massachusetts and proposed this plan to stakeholders.

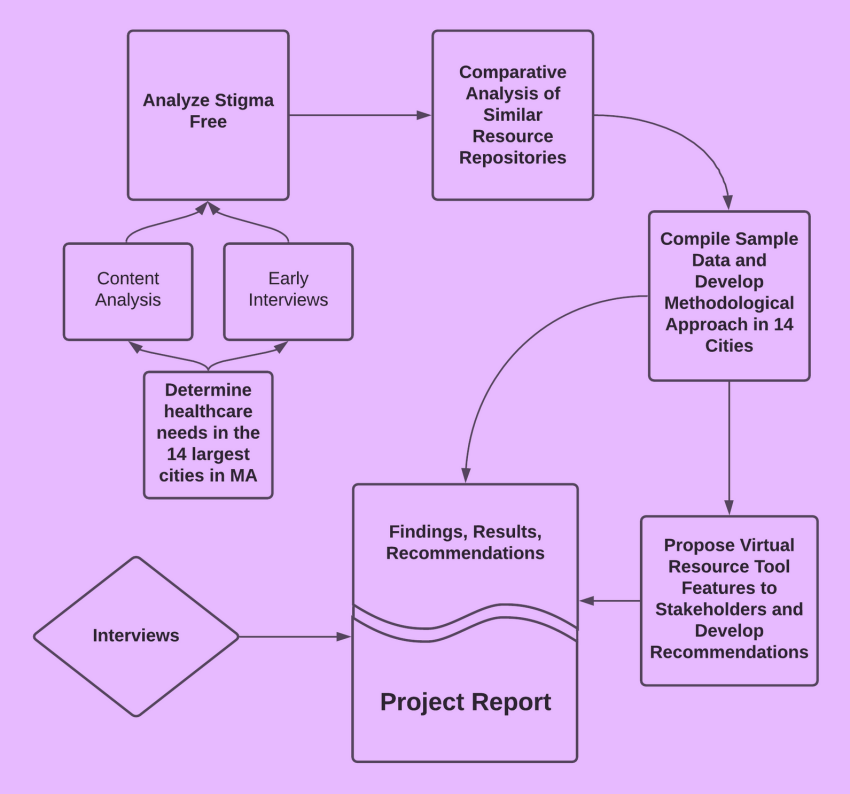

Figure 6. Flowchart representing the process in developing a plan for creating an expanded Virtual Resource Tool

Analyze Stigma Free Worcester

The Stigma Free Worcester app (Stigma Free) contains public health resources for the city of Worcester. In collaboration with the Worcester Department of Health and Human Services (DHHS) we researched the specifics of implementing a new virtual resource tool (Virtual Tool) with updated functionality and mental health/substance use resources for the 14 largest cities in Massachusetts (Massachusetts cities). In order to assess how a Virtual Tool could be utilized in all 14 cities, we had to first examine the Stigma Free app and gather information on what the Department of Health and Human Services (DHHS) and other stakeholders thought of the Stigma Free app. We asked questions about user interface, functionality, features, etc. These interviews were conducted with stakeholders who had technical experience with the app, and in the field of public health. Early interviewees included: Dr. Eniya K. Lufumpa, Ph.D and Evis Terpollari, two coordinators of the Worcester DHHS' homeless outreach team, Everyday Miracles; Valerie Gold, the Director of Training and Technical Assistance Programs at C4 Innovations; and Walker Christie, Stigma Free Worcester's primary developer. By interviewing these three sources, we were able to identify the most pressing opportunities for improvement and resource-effective ways of implementing these changes. The interviews were semi-structured and conducted over Zoom, with two team members in attendance: one interviewer, one scribe. After these interviews, we deduced what features care providers and other stakeholders would like to see in a large-scale Virtual Tool. After conducting the aforementioned interviews, we continued the content analysis of the Stigma Free. We determined, through hands-on testing and feedback from interviewees, which features of the app are most effective and which features need to be reworked. Using the app ourselves and the responses we received from care providers who use the app proved most informative, as we were able to gain an understanding of how the app could be used by healthcare workers to help the patients/clients they work with.

Comparative Analysis of Similar Resource Repositories

To identify features not currently in the app that should be implemented in a larger-scale resource tool, we carried out research to find and analyze apps similar to the Stigma Free Worcester App, created for use in various locations. To accomplish this task we searched the iOS App Store, Google Play Store, and internet for these kinds of tools, as well as asking public health professionals if they knew of other directories. We used search terms such as "Mental Health Resources", or "Substance Use Resources" to find apps and websites that were focused on information, rather than apps or websites that provide virtual treatment or support directly. Once we found apps and websites that were relevant to our project, we created a comparative matrix showing the features or concepts that each resource implemented . (Resource repositories analyzed can be found on appendix X) Using our findings from this comparison, we devised a list of features and ideal conditions for the new Virtual Resource Tool.

Compile Sample Data and Develop Methodological Approach for Compilation

After comparatively analyzing other resource directories and tools, we then conducted research to identify the public health resources in the 14 largest cities (see Appendix A for list). In order to accomplish this, we used the resource tools that were previously identified and analyzed to collect a list of substance use, mental health, food and clothing resource centers as well as homeless shelters in each city of interest. By conducting this research, we were able to compile a sample of resources from some of the 14 largest cities. Due to time constraints, we were unable to compile all of the resources for the 14 largest cities but we collected a substantial amount in order to get a sense of what the process entails. After compiling the sample of resources we conducted an interview with one of the student developers of the original Stigma Free Worcester Project, Walker Christie, and an additional interview with the developer of the 211 HelpSteps tool, Dr. Eric Fleegler. Among other things, we conducted these interviews to gain insight on their methods for verifying resources and ensuring reliability. Although we received great information, due to time constraints we were unable to assess the quality of resources ourselves and could only work off the recommendations of previous developers.

Propose Virtual Resource Tool Features to Stakeholders and Develop Recommendations

After comparatively analyzing resource tools and compiling a sample of resources , we investigated the most suitable features for an expanded virtual resource tool that can house resources from the 14 largest cities. We conducted interviews with Everyday Miracles: the Homeless Outreach Program from the Worcester DHHS, Justin M. Chellman: program director of the Opioid Overdose Prevention for the Springfield Use Disorder Prevention Services , Mary Kowalczuk: manager of the Substance Use Prevention Programs for the Cambridge Public Health Department , Valerie Gold : Director of Training and Technical Assistance Programs for the Center for Innovations in Needham, MA, as well as an interview with a women living in transitional housing. These interviews were conducted to identify the highest priority features that should be included in the virtual resource tool. After identifying the most ideal features for the virtual resource tool, we had also used the previously mentioned interview with Dr. Fleegler to assess the financial implications and budget needed to maintain 211 HelpSteps to understand the budget necessary to appropriately maintain a virtual resource tool for the 14 largest cities. Once we identified the primary features that should be included as well as the financial budget needed for the maintenance of this tool, we were fully equipped to begin recommendations for DHHS to facilitate the expansion of a virtual resource tool for the 14 largest cities.

REQUIREMENTS FOR AN EFFECTIVE VIRTUAL RESOURCE TOOL

Based upon our research, we have identified six core considerations related to the feasibility of developing and maintaining a Virtual Research Tool (VRT). We used these factors to establish three recommendations for potential courses of action for DHHS to consider.

Purpose and Platform of a Virtual Resource Tool

An effective VRT should be available through multiple platforms and be targeted towards people seeking treatment. Justin M. Chellman of the Springfield DHHS explained that “the timeliness of treatment in some circumstances could be a benefit of a virtual public health tool if it is designed to do so” (Justin M. Chellman, personal communication, April 22, 2021). Therefore, a VRT needs to be available to the most people and on a platform that is easy to access. A website would allow for the VRT to have the largest possible user base. In interviews with the Homeless Outreach Team, Mary Kowalczuk and Justin Chellman, we discovered many of the potential users of this VRT do not have access to a smartphone. Having a substance abuse/mental health app available online, means that people can access it in a public library, for example. However, the VRT should also be available through a mobile app. Justin Chellman explained that mobile apps are often quicker to access for those who do have phones, and will make those who have smartphones more likely to use the VRT. As for potential users of the tool, according to Mary Kowalczuk of the Cambridge Health Alliance, the tool should be targeted towards people seeking treatment, as clients lack the large networks of connections that many providers of public health have (Mary Kowalczuk, personal communication, April 20, 2021). Therefore, according to Mary Kowalczuk and Dr. Matilde Castiel, MD, Commissioner of DHHS, the VRT will be most effective when tailored towards people seeking care, rather than providers.

Different Approaches For Organization of a VRT

There is more than one effective approach to providing mental health, substance use, and other health services, each with strengths and weaknesses. We discovered ten resource directories that provide information on mental health and/or substance use resources. We created a matrix to summarize the pros and cons of a localized or need-specific resource in comparison with those of a larger, more centralized resource (see App. B, Supp. Materials). Some examples of localized and/or targeted resource tools include Stigma Free Worcester and Coming Home [Worcester, Boston]. An example of a centralized resource tool is 211 HELPSteps, with resources from across the state in many different categories. We found that smaller, localized resource tools would be extremely useful in combination with a solid network of communications between these tools’ hosts. On the other hand, a large, centralized resource is more manageable and requires less effort from many individual organizations or people.

Localized/Targeted		Centralized/General	
Pros	**Cons**	**Pros**	**Cons**
small number of listings for users to look through	small range of use	expansive lists of resources	much higher overhead/maintenance costs
quicker response times	multiple apps/websites may need to be used	large usable range	large databases could become difficult to maintain/organize
lower overhead and maintenance costs	will reach a much smaller population	provides support for many different needs	potentially slower response times
less time required to validate resources	may not become commonly used, and fall into dismaintenance	larger userbase	significant effort required to validate all resources
easier to organize	Many people with social issues already know what is available to them locally, and may not need a website or app	single app/website	may not be as useful for a specific need as a resource made to specifically address that need
lower code complexity	only useful by people in need	potential for use by providers	requires a network of support
can become well-known quickly among a community through word of mouth	may be hard to gather funding outside of local sources	easier to find state funding	can be hard to spread awareness to individual communities
easier to find staff dedicated to a single cause		can attract workers and funding from a larger area	

Figure 7. Section of the Pros/Cons of Localized and Centralized Resources

Maintainence of a VRT

For a Virtual Resource Tool to retain its usefulness, it must be continually maintained. Many components go into maintenance, including verifying the existence and quality of facilities, expanding the VRT to include more resources, and understanding the needed resources and funding for the Tool. We discuss each of these components in the sections that follow.

Compiling and Verifying Resources

Having a solidified methodology for compiling resources to be housed in a VRT and verifying the reliability of those resources is crucial to producing a quality tool. According to Valerie Gold, Director of Training and Technical Assistance Programs for Substance Recovery and Mental Health at the Centers for Innovations, it is essential to ensure the reliability of resources and hence the credibility of the resource tool. Gold explained that “you can Google anything and find anything but to find something that is credible and is a good resource that others have had good experiences with is much harder” (Valerie Gold, personal communication, April 7, 2021). A quantitative approach of sending out surveys and following up with cold calls or in person visits is an effective methodology for verifying the existence of resources in the tool (Dr. Eric Fleegler, personal communication, April 23, 2021), (Walker Christie, personal communication, April 8, 2021). approaches and develop a plan for assessing the quality of resources. targeted towards people seeking treatment, as clients lack the large networks of connections that many providers of public health have (Mary Kowalczuk, personal communication, April 20, 2021). Therefore, according to Mary Kowalczuk and Dr. Matilde Castiel, MD, Commissioner of DHHS, the VRT will be most effective when tailored towards people seeking care, rather than providers.

Expansion

A Virtual Resource expansion would need a communicative, collaborative, and accommodative approach, not just a technical update. By having a communicative approach to expansion, it would get input from other locations as to what their specific needs are and accommodate to those needs. Dr. Castiel described how collaborating and inspiring more cooperation between cities in Massachusetts can lead to new discoveries of what features could be expanded for a tool like Stigma Free (Dr. Matilde Castiel, personal communication, April 11, 2021). Walker Christie explained that three or more WPI student groups would be needed to fully expand the app. (Walker Christie, personal communication, April 22, 2021). Both Dr. Eniya K. Lufumpa and Evis Terpollari expressed their interest in adding more categories of housing resources that would accommodate for the community like including Single Room

Occupancies (SROs) in Stigma Free (Dr. Eniya K. Lufumpa and Evis Terpollari, personal communication, April 6, 2021). Expansion is beneficial if it's able to reach struggling communities and the DHHS explores all avenues, whether it's technical or communicative, to increase health care access across Massachusetts.

Funding and Resources Required

Hiring a team of permanent workers is essential to adequately maintaining, updating, and promoting the resource tool, but has significant financial implications. The total annual cost of the workers required to properly manage Stigma Free Worcester or a similar tool, without expanding, can be expected to be between $40,000 and $80,000 per year. Dave McMahon, Co-Executive Director of Dismas House, helps manage the Coming Home Worcester Directory, a similar tool to Stigma Free focused on resources for prisoners in their reentry to society. McMahon estimates that Coming Home Worcester costs $25,000 to $35,000 per year, which is lowered by taking advantage of other local resources (Dave McMahon, Personal Communication, May 3, 2021). Dr. Fleegler reported that expanding 211HELPSteps over the years was costly. Fleegler estimates that expanding Stigma Free to reach 13 other cities while maintaining the same level of quality and reliability would likely increase these annual costs by an additional $50,000 to $80,000 per year (Dr. Eric Fleegler, Personal Communication, April 23, 2021). This yearly increase in the budget would depend heavily on the number of employees required to accommodate the desired rate of expansion. In both cases, most of the budget would be wages, with smaller costs such as domain hosting, app marketplace posting fees, etc. being relatively consistent between plans. In addition, outreach workers, which could be current employees, volunteers, or new hires tasked with reaching out to communities to promote awareness and public support could introduce new costs depending on the approach that is taken. Outreach workers will be responsible for spreading awareness of the tool, as discussed in the next section.

Awareness

A key factor in the effectiveness of any VRT is awareness of that resource. Two ways of spreading awareness to targeted users of a VRT are advertising at public health facilities and word of mouth. According to Dr. Castiel, an effective way to spread awareness of a VRT is to place advertisements where people receive care (Dr. Matilde Castiel, personal communication, April 11, 2021). Residents of Veterans INC., believe word of mouth and interpersonal interactions are the most important ways of spreading awareness of a VRT (Residents of Veterans INC., personal communication, April 27, 2021). Hearing from someone you trust instills trust in others and creates a higher chance they will use the resource and continue to pass it down the line. By advertising the VRT through these two methods, the user base can be expanded.

POTENTIAL COURSES OF ACTION FOR DHHS

Based on our research, interview responses, and hands-on testing of many VRTs, we have developed the following three courses of action for the DHHS to move forward with their plan to provide a tool for accessing social service resources to the 14 largest cities in Massachusetts. Each option has its strengths and weaknesses that the DHHS should consider carefully as they move forward with the expansion of Stigma Free.

Option 1: Keep Stigma Free Worcester, aid in the expansion of 211HELPSteps, and use combined resources to improve both tools over time

The first option is for Worcester DHHS to partner with and spread awareness of an already existing VRT known as 211 HELPSteps. 211 HELPSteps is a large, centralized resource tool run by the 211 phone service and United Way of Massachusetts. 211 HELPSteps provides health and human resources for all cities and towns in Massachusetts and can be accessed via their website and mobile app. As 211 HELPSteps is a centralized resource, it has a more manageable maintenance program than a collection of smaller resources. Moreover, 211 has established a very robust maintenance program which ensures that information provided on the app and on the website is reliable and that both platforms are working properly. Partnering with 211 would be an excellent idea as no costly initial development of a state-wide resource would have to be done. However, this method does not facilitate the development of tools that are better suited for the city they aim to serve.

Option 2: Cooperate with the Massachusetts Large Cities Project and other Depts. Of Health and Human Services to create a network of Stigma-Free-like directories, and a web-based dashboard to recommend users to the correct directory to use.

The second option is based on having many localized resources working together. Dave McMahon showed support for a dashboard with both filtering by region and by service type (Dave McMahon, personal communication, May 3, 2021). Individual counties/cities/townships would be encouraged to create or improve their own local resource directories, which could then be added to a web-based dashboard. This dashboard would ask users for the service they are looking for and the area of Massachusetts they are looking in. As illustrated in figure 6, the dashboard would then recommend a list of directories to use when finding that type of resource.

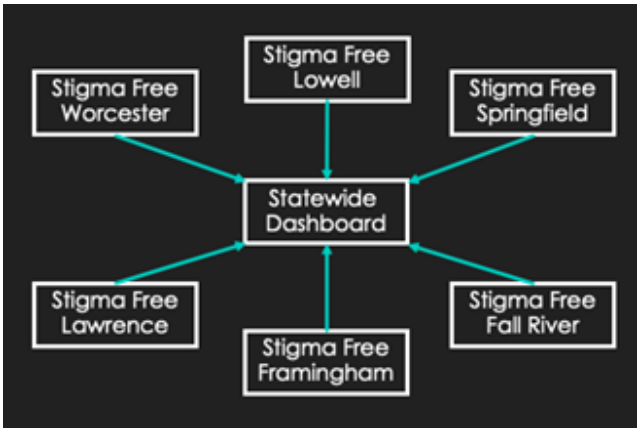

Figure 8.: Graphic that represents concept of directories within dashboard.

The main advantages of this plan are the low or negligible increase in overhead and maintenance budget on DHHS, as costs are shared between other public health departments, and the flexibility to add and remove entire directories from the dashboard as they get created or fall into disrepair. Another significant pro of this option is that smaller directories will no longer be overshadowed by larger, more expansive ones because the dashboard will direct users based on service type and location, not on how well-known or commonly used the directories are. This will also increase collaboration between public health departments and allow for tools to be better suited to the areas and populations they aim to serve. Disadvantages of this course of action are the slow startup time and initial effort needed to create the dashboard. Overall, this plan is most effective in the long term and would require significant buy-in from the Massachusetts healthcare community.

Option 3: Expand the Stigma Free Worcester App to Stigma Free Massachusetts

Expanding Stigma Free to meet the needs of the 14 largest cities in Massachusetts is possible but will require much more funding and effort from the DHHS itself. Stigma Free Massachusetts would have to be maintained by either a permanent web development position or team at DHHS or by a third-party agency, both of which introduce a costly annual expense. Additionally, updating a much larger database and maintaining its accuracy would require a year-round effort from a team of dedicated workers, which is another annual expense. DHHS would also need to create a team or teams of outreach workers to spread awareness to the communities by developing connections with healthcare providers in the area. The outreach team(s) could also be responsible for small, localized advertising campaigns. For example, handing out flyers or QR code stickers to healthcare locations, hospitals, detox facilities, and libraries would directly expose people to the resource tool. Local advertising campaigns could be highly effective at spreading awareness in single communities, and the budget would be easier to manage than an online pay-per-click service. The advantages of expanding Stigma Free are that Worcester DHHS maintains control over the branding and app, therefore being able to expand, update and change the resource as they please. The disadvantages of this are the extremely high cost of development and maintenance. In order to expand stigma free whole new teams of people would need to be hired by DHHS and many thousands of dollars would be needed. One way of overcoming these disadvantages would be to purchase an API from 211Helpsteps; this would allow DHHS to use the information on the facilities and resources included in 211Helpsteps, but still maintain control of Stigma Free, therefore greatly reducing the cost of expansion.

CONCLUSION

There are many factors to consider when creating a VRT for public health. The tool must first be set up on the right platform , it must be well maintained, and the information contained in the tool must be kept up to date so that people using the tool always have the correct information at their fingertips. It also must have the right features so that it is simple to use, but still effective at providing a large amount of information. Finally, people must be aware of its existence, because without users, the tool serves no purpose, even if it does have all the other factors that make for an effective VRT. There are a few different ways to create an effective VRT. The first is to have one large, centralized resource as this method allows for streamlined advertising and maintenance of the tool, even though it is often expensive to maintain such a large resource. Another way of developing an effective tool is by creating a network of smaller tools that are focused on their respective city. This method allows for each tool to be tailored towards the needs of the city and the people who live there, as well as increasing collaboration between public health departments across Massachusetts. There are many ways to create a VRT or expand an existing one, but it is important to remember the main purpose is to serve the general public and facilitate the access of health and human services to vulnerable populations.

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