Monitoring and Visualizing of Strategic Health Issues:

Creation of an Internal Dashboard for Benton County, WA

Shih-Yin Lin[1], Yiliang Ma[1], Andrew Teng[1]

[1] University of Washington, BIME, School of Medicine, Seattle WA 98195

I. INTRODUCTION

In order to assist the Benton-Franklin Health District (BFHD) health officer monitor health trends within the community, assess the progress of interventions, and make decisions about resource allocation, an internal dashboard was proposed and a mockup was designed. The purpose of the internal dashboard would to allow the public health end users within the health district to easily monitor trends to make informed resource and policy decisions.

Benton County, Washington

Benton County is situated in the south central portion of Washington state and borders Oregon, as well as the Columbia, Snake, and Yakima rivers. The largest city within the county is Kennewick; however, the county seat lies in Prosser, Washington (Washington State Employment Security Department, 2015). Due to the historical nature of the community, the efforts of BFHD cover both Benton and Franklin counties. While most public health efforts and organizations are typically teamed with the neighboring county to minimize costs and increase reach, this report will focus solely on Benton County, when possible. Based on the 2013-2020 Community Health Improvement Plan (CHIP), the 2016 Community Health Needs Assessment (CHNA), as well as interviews with key informants, three health strategies and priorities were identified: (1) obesity, (2) access to care, and (3) mental and behavioral health. Additionally, new categories, including communicable disease and sexually transmitted infections (STIs), are added to the mockup, according to informant suggestions.

Demographics

In 2016, Benton County had 193,686 residents, of which 49.9 percent were female and 50.1 percent male (U.S. Census Bureau, 2017). It is the ninth most densely populated county in the state at 103 persons per square mile (Washington State Employment Security Department, 2015). Compared to the state as a whole, Benton County has a slightly smaller proportion, by one percent, of adults age 65 or older, but a higher proportion, by three percent, of people below the age of 18 (U.S. Census Bureau, 2017). Benton County has a higher White, Latino, and non-Hispanic White population when compared to the state of Washington and the United States. In contrast, Benton County has a lower proportion of all non-Latino minority groups, including Asian, Indian/Alaska native, Hawaiian/Pacific Islander, non-Hispanic Black, and non-Hispanic multiracial than the state of Washington. Since Benton County has a relatively large Hispanic/Latino population at 21.4 percent, some residents may experience a language

barrier when attempting to pursue public health resources. Furthermore, it is reported that one in five people do not speak English at home (Benton-Franklin Community Health Alliance & Benton-Franklin Health District, 2017).

Benton County, on average, has a less educated population as only 29.4 percent (33.6 percent for Washington) of residents have received at least a bachelor's degree. Furthermore, 14 percent of adults over the age of 25 have obtained less than a high school education. The less educated population is at higher risk of poverty, unemployment, adverse health outcomes, and other negative conditions (Benton-Franklin Community Health Alliance & Benton-Franklin Health District, 2017). Benton County has a lower median household income compared to the state (U.S. Census Bureau, 2017). There is a slightly higher percentage of Benton County residents below the age of 65 who do not have health insurance, at 7.4 percent, and 6.9 percent in the state (U.S. Census Bureau, 2017). The rate of uninsured individuals below the age of 18 has steadily declined since 2009; however, healthcare utilization has also been decreasing.

II. METHODS

U.S. Census Bureau QuickFacts (U.S. Census Bureau, 2017), County Health Rankings and Roadmaps (County Health Rankings & Roadmaps, n.d.), and the Washington Department of Health Benton County Chronic Disease profile (Washington State Department of Health, 2017) were all consulted to assess the community characteristics and to identify health disparities in Benton County. A health disparity was identified when Benton County performed worse than the Washington State and/or national average for a specific health risk or outcome. The BFHD webpage was also used to help identify public health programs currently offered through the health district. Furthermore, it was used to review the top health priorities identified by the 2016 CHNA, which was carried out collaboratively by the health district and a volunteer-based community health group, the Benton-Franklin Community Health Alliance (BFCHA). Top health priorities were coined as "strategic issues" in the 2016 CHNA. Finally, three key informant interviews were conducted to understand decisions around prioritizing health issues in Benton County, identify additional health concerns, understand current approaches to monitoring community health status and program/intervention effectiveness, and to elicit feedback on the mockup dashboard. The key informants included Dr. Amy Person (the health director at BFHD), Mr. Chas Hornbaker (the epidemiologist at BFHD), as well as Mr. Kirk Williamson (the program manager at BFCHA).

Health Priorities

According to our own health disparity assessment, Benton County performs worse than the U.S. top performers (90 percentile) and the Washington state in the following health risk factors/outcomes/indicators: adult obesity, access to exercise opportunity, excessive drinking, teen birth (twice as bad as the U.S. top performers), access to primary care physicians, dentists, mental health providers, preventable hospital stays, unemployment rate, children in poverty, children in single-parent households, air pollution, and driving alone to work. More than half of these areas of concern overlapped with the strategies health issues identified in the 2016 CHNA and were also confirmed or touched on by the informants during the interviews.

Together with the BFCHA, the BFHD carried out the 2016 CHNA which gathered 18 months of community engagement to identify the current problems and needs of the community. The community feedback confirmed that the areas of focus should include improving access to care, reducing obesity, and improving the mental and behavioral health system (Sutherland et al., 2016). Furthermore, the 2013-2020 CHIP, created by the BFCHA, focuses on mobilizing community health improvement by collaborating with local partners and agencies, as well as by incorporating and aligning evidence-based practices with regional, state, and national health priorities (Benton-Franklin Community Health Alliance & Benton-Franklin Health District, 2017). As mentioned, three health priorities were identified: (1) obesity, (2) access to care, and (3) mental and behavioral health.

Although the BFHD tends to align many of their priorities with those of the state and nation to provide more opportunities at a lower cost, interviews with key informants indicated the presence of secondary health priorities of interest, such as high rates of sexually transmitted infections and teenage pregnancy. These priorities are secondary as the BFHD faces challenges regarding controversial topics as the community is fairly conservative. Therefore, they choose to focus on less tendentious health concerns to promote their priorities. Furthermore, the community members' perceived health concerns sometimes differ from the ones derived from the data. For example, the community did not perceive obesity as an issue, but many considered diabetes as one. The BFHD instead rose awareness about obesity as a risk factor for diabetes in the community and a direct side effect was reducing obesity. Therefore, when the educators and coalition do their work with diabetes, they also try to put a

focus on reducing obesity. The BFHD takes this feedback into account when curating their top strategic issues.

In addition to the three strategies health issues, two key informants recommended the inclusion of communicable disease (including reportable conditions and STIs) on the dashboard mockup. These recommendations were made as communicable disease is among one of the few areas that the health district collects primary data for and because communicable disease data are updated regularly and can supply real time or close to real time data for an internal dashboard.

Data Selection

The 2016 CHNA and 2013-2020 CHIP use data from County Health Rankings, Healthy Youth Survey, and the Behavioral Risk Factor Surveillance System (BRFSS) to monitor the top strategic health issues. Progress of each strategic health issue was classified according to the completion status of each actionable goal/objective as described in the 2013-2020 CHIP. Currently, the BFHD can access county-level BRFSS data through the Community Health Assessment Tool (CHAT), which is a secure, online query system matinatiend by the Washington State Department of Health (Washington State Department of Health, n.d.). In addition to BRFSS data, CHAT provides population-based datasets on pregnancy, fertility, abortion, birth risk factors, communicable diseases (including STIs), cancer incidence, hospitalizations, death, infant death, and life expectancy. All population-based datasets provided through CHAT can be stratified by age, sex, race, ethnicity and geographic location and be exported to Excel and other programs as tables or charts for further analysis. Timeliness of CHAT data are maintained through periodic data releases, updates and corrections. However, according to Mr. Chas Hornbaker, the data on CHAT is usually a year behind. For reportable conditions, the BFHD usually receives lab data from Public Health Reporting of Electronic Data (PHRED), which they print out and manually enter the data into Public Health Issue Management System (PHIMS). In addition to these resources, it is possible to gather data from other surveillance systems as resources as well to enhance the currently used data sources as other systems also include measures for these three strategic issues.

1. *Obesity*
   The National Health Interview Survey (NHIS) could also be used to monitor obesity risk factors in Benton County. It is an annual, cross-sectional survey that is collected through personal household interviews. It provides nationally representative estimates on health

status nationwide. The survey includes a special topic with regards to obesity: Adult Physical Activity Information. This section includes questions related to physical activity and the whole 2016 questionnaire can be viewed online (2016 NHIS Sample Adult Questionnaire). Since the data are being collected at the national level, utilizing this information could help end users and stakeholders evaluate the local trends against the national trend. Similar to NHANES, data can be extracted at a lower geographic level by region. Further filtering is not available to the public as they pose a disclosure risk, but can be accessed for research purposes (National Health Interview Survey (NHIS) Geocodes, 2017).

2. *Access to Care*
   As mentioned above, BRFSS is one of the data sources that the Benton County currently relies on heavily to monitor its strategic health issues. BRFSS is an ongoing, telephone-based survey that collects state-based data on health risk behaviors, chronic disease and conditions, access to health care, and use of preventive health services of non-institutionalized adults in all 50 U.S. states, the District of Columbia, Puerto Rico, Guam, Virgin Islands, American Samoa, and Palau (Centers for Disease Control and Prevention, 2014). BRFSS consists of a core component (asked by all states), optional modules, and state-added questions. BRFSS is useful in monitoring/tracking access to care because it includes four questions in its core questionnaire that measure health insurance coverage, usual source of health care, cost barrier to health care need, and routine medical checkup, as well as an optional Health Care Access module, which measures primary type of health insurance coverage at the time of interview, continuity of health insurance coverage during the preceding 12 months, cost barrier to prescribed medication, medical debt, number of healthcare visits during the preceding 12 months, and satisfaction with received health care (2018 BRFSS Questionnaire, 2018). However, since mental and behavioral health (including access to mental and behavioral health providers) is of particular concern in Benton County, the BFHD should urge Washington State to add additional access to care questions specific to mental and behavioral health to BRFSS, collect its own primary data, or consider incorporating data from other surveillance systems, such as National Health and Nutrition Examination Survey (NHANES).

3. *Mental and Behavioral Health*
   Further data regarding mental and behavioral health could be access from NHANES. While there is currently no gold standard for measuring use of mental health services in the U.S.,

self-reported use and administrative records have been shown to provide equivalent estimates of mental health service use (Janney et al., 2008). With regards to mental health and depression, the survey has a nine-item general questionnaire, which can be seen in Table A1. All participants in the survey were at least 12 years of age. The data that are publicly available includes participants who were 18 years and older; data for youth aged 12-17 years are available through the NCHS Research Data Center. Therefore, NHANES is able to capture both the youth and adult population. NHANES collects data annually which allows for temporal analysis of trends. The system is flexible as the data can be further subdivided and extracted by region, state, county, and zip code to allow for more detailed analysis for a population of interest. However, many of the geographically specific data, due to disclosure issues, are not available publicly and access to these datasets must be obtained through the NCHS Research Data Center (NHANES Non-Public Data, n.d.).

Data quality, completeness, and evaluation

The data sources for each 2013-2020 CHIP goal and objective are described within the report itself. The data selected were provided from national surveillance methods and are very reliable as they are performed by national institutions. The completeness of the data varied as some surveillance methods did not cover the county or region for certain years, leading to missing data. Furthermore, collection of data at times was challenging as resources were limited. As with all surveillance systems, there is a lag between when the data is collected and when it is released to the health district. Therefore, it can be hard to evaluate the success of certain interventions as the data following implementation of an intervention might not be readily available. Furthermore, Dr. Amy Person noted that it may take up to ten years to fully see whether or not an intervention is successful (e.g. obesity prevention). On the other hand, Mr. Chas Hornbaker noted that instead of the health outcome of interest (e.g. obesity), it sometimes is useful to look at counts of persons reached by the program/intervention (e.g. number of people who have completed an obesity prevention program) in determining success. To address concerns around data timeliness, we propose that the health district conduct their own data collection to evaluate intervention and program effectiveness.

For communicable disease data, once the BFHD has direct access to a centralized source for primary data, that data would be directly integrated into the dashboard to allow for easy monitoring of trends. Currently, the Health District utilizes a few internal databases for medical

records, food inspection, waste management, etc. and manual analysis of the data is performed through 3rd party software (Nightingale Notes and MAGIC). Additionally, some of the software is in flux, such as reportable diseases, which is currently managed under PHIMS, but will be replaced by the Washington Disease Reporting System (WDRS). The health district officer mentioned that all the hospitals in the community have switched to electronic health records, and is cautiously optimistic in being able to collect and capture primary data as under reporting may be an issue and sometimes their data does not match the state data because additional investigations are needed to confirm a case. With the shift to electronic health records, there is a lot more information that more easily accessible. However, interoperability and information sharing between the different EHRs at the hospitals in the community has been a challenge. Apart of Meaningful Use, all of the hospitals have agreed to provide emergency room and hospital data to the state and the state uses the access system, which the BFHD has access to. Therefore, the BFHD will have access to more data around diseases and injury.

Data Integration

Although some data were missing during our retrieval stage, imputation was used to fill in missing data points. The majority of the data comes from County Health Rankings, Healthy Youth Survey, and BRFSS as described in the 2016 CHIP. There were no patient identifiers within the data provided. The time-series data was sorted by strategic health issue, followed by the respective goal for each priority. Line charts were used for visualization as they presented the data in a clean and intuitive fashion. The goal of the visualization was to provide the end user an easy way to assess and evaluate trends within the community. Communicable health data was provided from the health district and the data presented in the dashboard, but the data is only current up to 2016. They include diseases that may be of possible interest to the health district.

Data Security, Privacy, Confidentiality

In order to access BRFSS data through CHAT, the BFHD has a data confidentiality agreement with CHAT. To ensure data security, each BFHD user can only access CHAT using their assigned username and password combination. According to Dr. Amy Person, HIPAA privacy rules are utilized for all electronic data exchange. Therefore, there is low concern regarding data privacy, confidentiality, and security for the BFHD to use BRFSS data. Because this dashboard mockup is proposed for internal purposes, the data may contain more sensitive information than

what is currently being displayed on the public facing dashboard created by Eastern Washington University. It is imperative to ensure that the data being displayed are not being exposed to the public. Proper security protocols will be enforced, such as Open Authorization (OAuth) for login purposes to our mockup dashboard and encrypted hard drives if the end user downloads the data. Furthermore, the BFHD has security protocols in place and it would be optimal to align protocols. Such protocols include internally accessible files and data that can only be accessed within the health district building or through remote access.

III. DASHBOARD

The internal dashboard was approached using a hierarchical design that utilizes Ben Shneiderman's Visual Information Seeking Mantra. The mantra states that visual displays are more attractive in providing context as they have the power to reveal patterns, clusters, and outliers in a cleaner and more efficient manner. The mantra provides a guideline in visualizing information and can be summarized in three principles: (1) overview, (2) zoom and filter, (3) details-on-demand (Shneiderman, 2003).

The US Department of Health and Human Services outline the user-centered design (UCD) process which utilizes the international standard 9241, ergonomics of human-system interaction, which encompasses the former ISO standard 13407, human-centered design for interactive systems (International Organization for Standardization, 2015). UCD is a cyclic process that includes the following overarching principles: (1) analysis, (2) design, (3) evaluation, and (4) implementation. This process takes into account the user to enhance usability and improve the user experience. By following these two approaches, it was hoped to achieve maximum usability amongst all potential end users.

The overview principle allows the user to understand the general scope of the system. The main page of the internal dashboard displays the top health priorities with a status bar below each priority. This status bar allows the user to understand and summarize the general progress of treatment and interventions for each health priority. If the user would like to explore a specific health priority, the goals will then be displayed for the priority of interest. Following the same idea on the overview page, each goal listed also has a progress bar indicating the status of the interventions and objectives for each respective goal. The user can then explore the data further and receive interactive graphs for each objective within the respective goal. There is an alert banner above each graph, using the well-understood traffic light coloring scheme, that easily

alerts the user whether the objective is in progress (yellow), has been met (green), or has not been met (red). Icons are used in addition to the colors in case users are not well acquainted with the coloring scheme. These principles were taken into account during the creation and development of the internal dashboard for BFHD. Furthermore, at the charts level, users can also filter the data being displayed by the county or nation. This interaction allows for users to select data of interest, such as county or nation levels.

Literacy Design Considerations

Because the internal dashboard could be potentially used by staff with varying levels of health literacy, it was important to keep the technical language to a minimum during the design and implementation of the mockup dashboard. Although our primary target users include the health director and epidemiologist at BFHD, other users such as lower-level staff members as well as part-time volunteers may be considered potential users as well. Therefore, to ensure and promote clear communication and health literacy, large visuals were used and the hierarchical approach was pursued to ensure users were not overwhelmed with initial information. Rather than presenting the strategic health issue data within tables, charts were used so all users were able to clearly see progress status. Charts displayed under each respective goal are interactive. The user can toggle which features to show or hide. The lines in the chart are of varying width and style to ensure printability as well as to aid those who may be color blind. Coloring and font are consistent throughout the dashboard to prevent confusion among different issues of interest. Icons and symbols are used to complement text as these visuals may resonate better with other users.

Participatory Design and User Feedback

All three of our key informants provided constructive feedback when developing the dashboard. Because Dr. Amy Person is the health director and has a medical degree, a masters in Healthcare Informatics, and a GIS certificate, she is comfortable with using various software and complex features within packages. Mr. Chas Hornbaker, recently graduated with his bachelor's degree and is comfortable using statistical software, such as R, and tends to prefer visuals over text. However, Mr. Kirk Williamson, is an older part-time staff member who prefers text over visuals. By using the concurrent think aloud process, it was determined that the mockup dashboard was well received amongst the three individuals. However, each had a few minor

quirks in terms of rates vs. number in the communicable disease window. They each found the traffic light color scheme in the status bar and alert bar to be intuitive and easily understandable.

IV. FUTURE CONSIDERATION

Usability Testing

Allow low-level staff members to use the internal dashboard. Furthermore, revisions based on the initial feedback from the end user interview regarding the mockup dashboard will be implemented. After the edits are published, further evaluation sessions would be necessary to ensure the data is being displayed in an efficient manner that is suitable for the health district. Furthermore, since the initial usability testing with informants were conducted remotely, it would be interesting to perform in-person think aloud sessions with video recording to gain more qualitative feedback.

Additional Health Resources

From the key informant interviews, additional health strategies of interest beyond the top three health strategic issues can be added. After speaking with Mr. Chas Hornbaker, it was discovered that other health issues plague the region including high STI rates and opioid overdoses. Dr. Amy Person also agreed that communicable diseases were a new area of interest in addition to the three top health strategies.

Franklin County

Although the focus of the dashboard mockup was solely on Benton County, the BFHD is a bi-county district. Dr. Person noted that it will be desirable to see health status in each county, as well as in a bi-county combined view. Future implementations of the dashboard would include data from Franklin County to provide end users with the scope of data that they are used to. Filtering of the data would also be included for Franklin County as well to allow users the opportunity to see combined or separated data for targeted interventions.

V. CONCLUSION

The 2016 CHNA, 2013-2020 CHIP, and interviews with key informants identified the top three health objectives of Benton County as improving reducing obesity, access to health care, and improving the mental and behavioral health system. In order to help the end users at the health district evaluate and analyze trends for these strategic issues, a mockup internal dashboard was

created and proposed to the key informants. By utilizing the Visual Information Seeking Mantra and UCD, the dashboard presents data cleanly and effectively to allow for easy usability among users of varying health literacy. The graphs as well as overall status bars being displayed at higher levels effectively allows the end user to evaluate goals and based off of summaries and actual data trends represented in charts. This internal data visualization dashboard will ultimately allow public health officials at BFHD to plan and monitor targeted interventions across the region.

REFERENCES

2016 NHIS Sample Adult Questionnaire. Retreived March 05, 2018, from ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Survey_Questionnaires/NHIS/2016/english/qadult.pdf

2018 BRFSS Questionnaire (2018). Retrieved from https://www.cdc.gov/brfss/questionnaires/pdf-ques/2018_BRFSS_English_Questionnaire.pdf

Benton-Franklin Community Health Alliance (n.d.). *History*. Retrieved from http://www.bfcha.org/about/history/

Benton-Franklin Community Health Alliance & Benton-Franklin Health District. (2017, May). *Community health improvement plan for the people of Benton and Franklin Counties 2013-2020*. Retrieved from http://www.bfcha.org/wp-content/uploads/2017/06/CHIP_Update_7_2017.pdf

Benton-Franklin Health District. (n.d.) *Promoting physical activity*. Retrieved from http://www.bfhd.wa.gov/ph/pahep.php

Centers for Disease Control and Prevention (2014). *About BRFSS*. Retrieved from https://www.cdc.gov/brfss/about/index.htm

Community Health Assessment Tool. Retrived March 05, 2018, from https://www.doh.wa.gov/ForPublicHealthandHealthcareProviders/PublicHealthSystemResourcesandServices/CommunityHealthAssessmentandImprovement/CHAT

County Health Rankings & Roadmaps. (2017). *Benton County, Washington*. Retrieved from http://www.countyhealthrankings.org/app/#!/washington/2017/rankings/benton/county/factors/overall/snapshot

Eastern Washington University Institute for Public Policy and Economic Analysis. (n. d.) *Benton-Franklin trends*. Retrieved from http://www.bentonfranklintrends.ewu.edu/index.cfm

NHANES Non-Public Data. Retrieved February 11, 2018, from https://wwwn.cdc.gov/nchs/nhanes/search/datapage.aspx?Component=Non-Public

National Health Interview Survey (NHIS) Geocodes. (2017 February 16). Retrieved from https://www.cdc.gov/rdc/geocodes/geowt_nhis.htm

International Organization for Standardization. (2015, June 18). Retrieved February 28, 2018, from https://www.iso.org/standard/52075.html

Janney, C. A., Richardson, C. R., Holleman, R. G., Glasheen, C., Strath, S. J., Conroy, M. B., & Kriska, A. M. (2008). Gender, mental health service use and objectively measured physical activity: data from the National Health and Nutrition Examination Survey (NHANES 2003–2004). Mental health and physical activity, 1(1), 9-16.

U.S. Census Bureau QuickFacts. (2017). *Benton County, Washington*. Washington, D.C: U.S. Census Bureau. Retrieved from https://www.census.gov/quickfacts/fact/table/bentoncountywashington/PST045217

Shneiderman, B. (2003). The eyes have it: A task by data type taxonomy for information visualizations. In The Craft of Information Visualization (pp. 364-371).

Sutherland, R., Person, A., Moser, C., Fernandez, A., & Harnish, K. (2016). *2016 community health needs assessment*. Retrieved from http://www.bfcha.org/wp-content/uploads/2016/06/2016-CHNA.pdf

Washington State Department of Health. (2017). *Benton County chronic disease profile*. Retrieved from https://www.doh.wa.gov/portals/1/Documents/Pubs/345-271-ChronicDiseaseProfileBenton.pdf

Washington State Department of Health. (n.d.). *Community Health Assessment Too*l. Retrieved from https://www.doh.wa.gov/ForPublicHealthandHealthcareProviders/PublicHealthSystemResourcesandServices/CommunityHealthAssessmentandImprovement/CHAT

Washington State Employment Security Department. (2015, October) *Benton County profile*. Retrieved from https://fortress.wa.gov/esd/employmentdata/reports-publications/regional-reports/county-profiles/benton-county-profile

Wikipedia. (n.d.) Map of Washington. Retrieved from https://upload.wikimedia.org/wikipedia/commons/thumb/5/55/Map_of_Washington_highlighting_Benton_County.svg/800px-Map_of_Washington_highlighting_Benton_County.svg.png

APPENDIX

Screenshots of mockup dashboard

Interactive demo can be viewed at https://benton-county.github.io/index.html

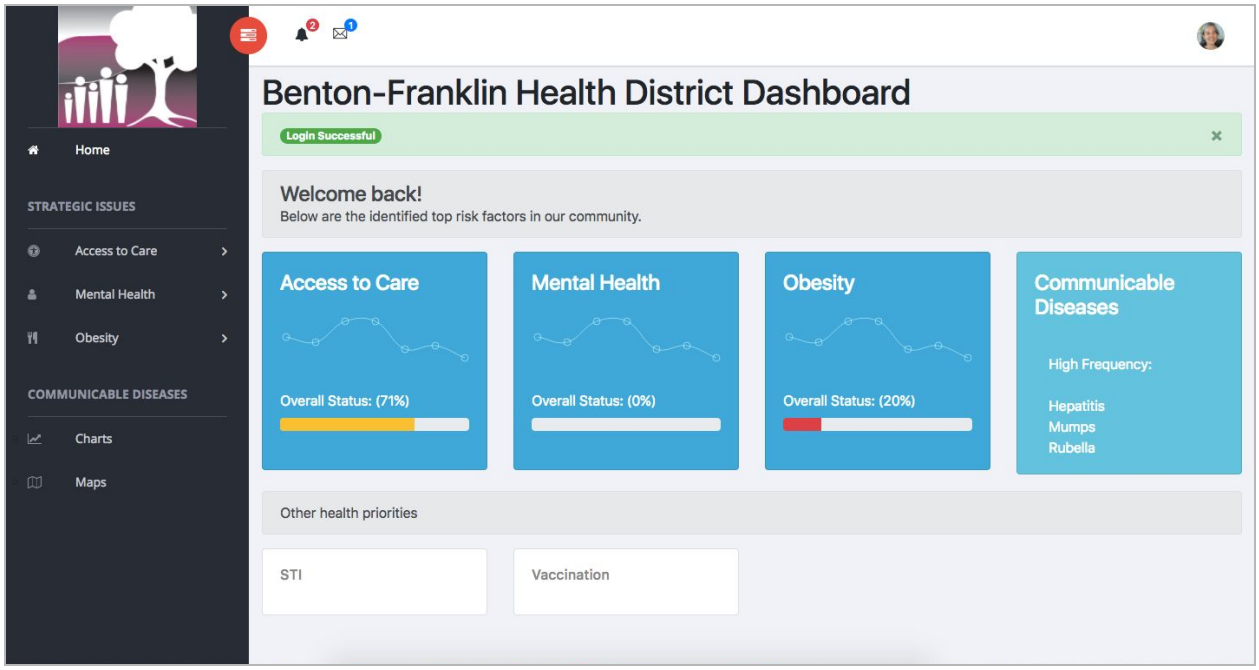

Figure A1: Overview page displaying top strategic issues and other areas of interest

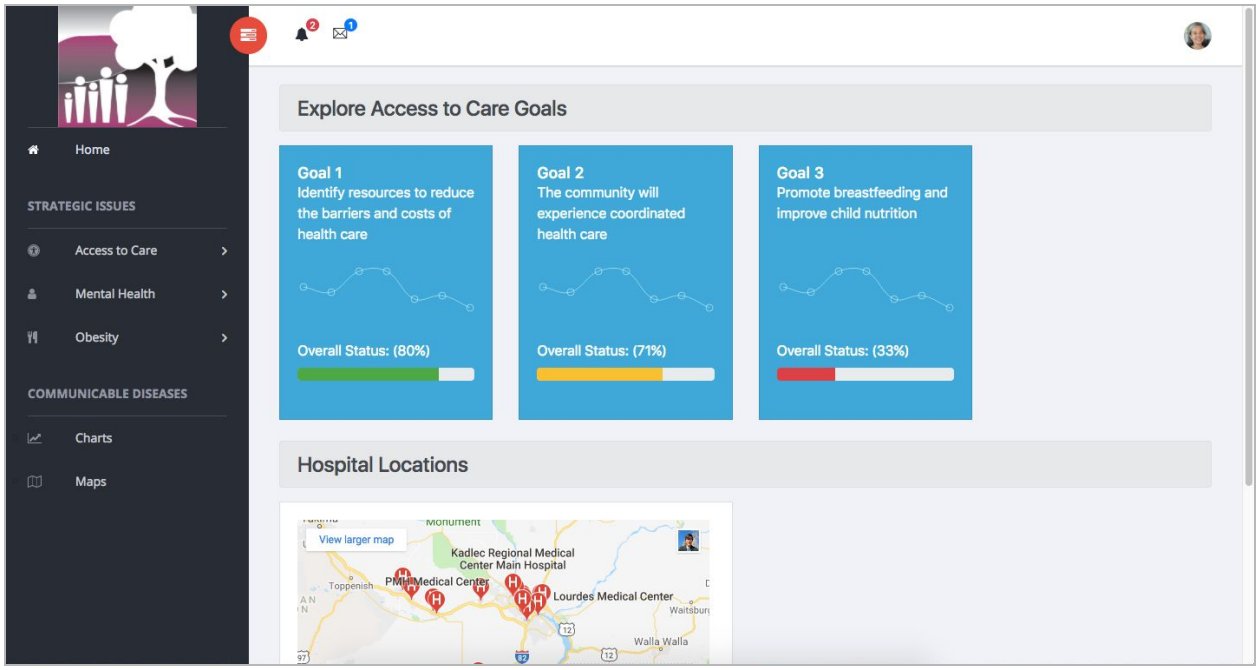

Figure A2: Page displaying goals and highlighting progress using overall status bars

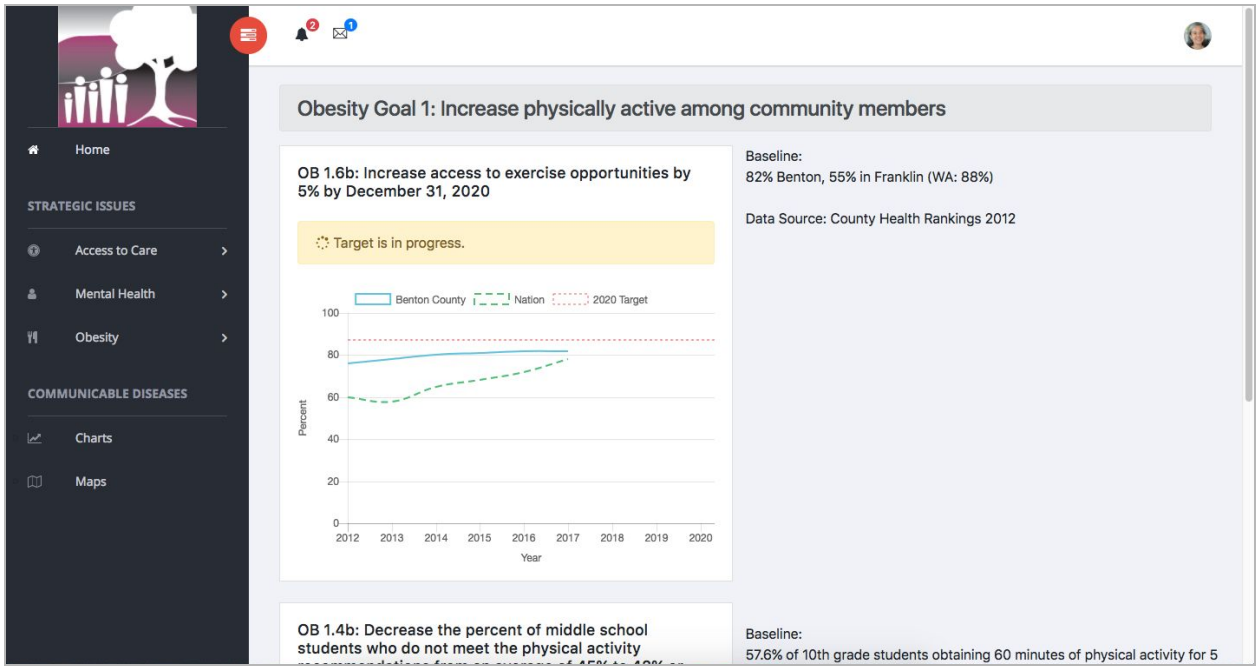

Figure A3: Charts displaying target line, current data, and current status

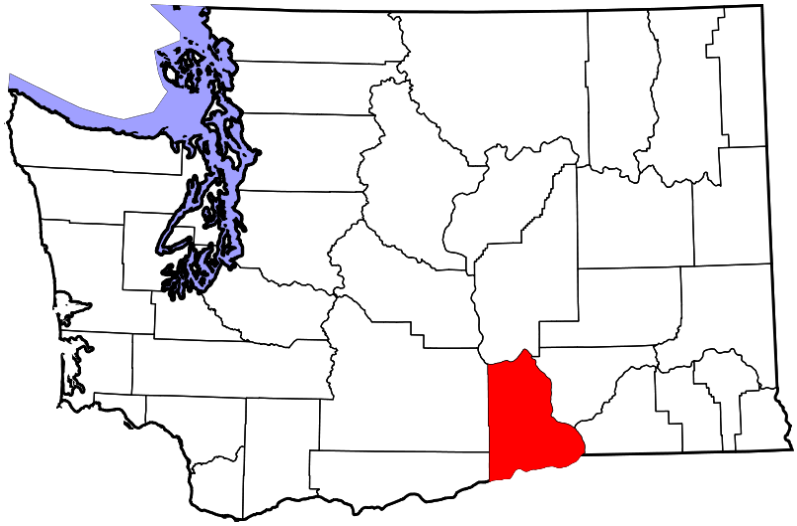

Figure A4: Location of Benton County, WA

Table A1: Mental Health- Depression Screener Questions

(Extracted from National Health and Nutrition Examination Survey)

Code	Label	Question
DPQ010	Have little interest in doing things	Over the last 2 weeks, how often have you been bothered by the following problems: little interest or pleasure in doing things? Would you say ...
DPQ020	Feeling down, depressed, or hopeless	Over the last 2 weeks, how often have you been bothered by the following problems: feeling down, depressed, or hopeless?
DPQ030	Trouble sleeping or sleeping too much	Over the last 2 weeks, how often have you been bothered by the following problems: trouble falling or staying asleep, or sleeping too much?
DPQ040	Feeling tired or having little energy	Over the last 2 weeks, how often have you been bothered by the following problems: feeling tired or having little energy?
DPQ050	Poor appetite or overeating	Over the last 2 weeks, how often have you been bothered by the following problems: poor appetite or overeating?
DPQ060	Feeling bad about yourself	Over the last 2 weeks, how often have you been bothered by the following problems:] feeling bad about yourself - or that you are a failure or have let yourself or your family down?
DPQ070	Trouble concentrating on things	Over the last 2 weeks, how often have you been bothered by the following problems: trouble concentrating on things, such as reading the newspaper or watching TV?
DPQ080	Moving or speaking slowly or too fast	Over the last 2 weeks, how often have you been bothered by the following problems: moving or speaking so slowly that other people could have noticed? Or the opposite - being so fidgety or restless that you have been moving around a lot more than usual?
DPQ090	Thought you would be better off dead	Over the last 2 weeks, how often have you been bothered by the following problems: Thoughts that you would be better off dead or of hurting yourself in some way?

Table A2: Comparisons of Identified Health Concerns in Benton County and Washington
(Extracted from Sutherland et al., 2016)

Health Concern	Health Indicator	Data Source	Benton County (Washington)
1. Access to health care	Adults without health insurance	Benton-Franklin Trends Dashboard, DOH statistics (2014)	18.3% (12.8%)
2. Obesity	Adult obesity prevalence	Benton-Franklin Trends Dashboard (2012), CDC BRFSS	31.4% (27.6%)
	Access to exercise opportunities	RWJF County Health Rankings (CHR)	83% (89%)
3. Mental and Behavioral Health	Adults age 18 or older who report 14 or more days of poor mental health in the past month	CDC BRFSS	3.1% (3.3%)
	Total people detained for mental health reasons and individuals detained per 1,000 residents	Benton-Franklin Trends Dashboard (local data source) (2014)	1.23 per 1,000 residents, 273 adults, 63 youths (Washington: N/A)