

Greater Worcester

Community Health Assessment

2018 CHA



Central Massachusetts Regional Public Health Alliance

Grafton • Holden
Leicester • Millbury
Shrewsbury • West Boylston
Worcester

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EXECUTIVE SUMMARY

BACKGROUND AND PURPOSE

The 2018 Greater Worcester Regional Community Health Assessment (CHA) was developed collectively by the City of Worcester Division of Public Health, Fallon Health and UMass Memorial Medical Center. These three organizations worked in close association with the Central Massachusetts Regional Public Health Alliance (CMRPHA). Since 2009, these entities have joined forces every three years to conduct a regional CHA and align their associated strategic implementation plans or community health improvement plans (CHIPs). Together, members from each of these groups make up the CHA Steering Committee, called the Facilitating Partners in this report. This CHA Report is the culmination of yet another successful assessment effort.

Since 1994, the Massachusetts Attorney General's Office has published Community Benefit Guidelines that encourage nonprofit hospitals and health maintenance organizations (HMOs) to address social determinants of health in the communities they serve. In 2012, the federal Affordable Care Act (ACA) further reinforced these expectations by mandating that these entities engage in similar assessment, planning and community health improvement activities. Local and state health departments have similar requirements and obligations born out of their civic obligation to ensure the health and well-being of those who live, work or visit their communities. The Worcester Division of Public Health has opted to build on its commitment to strong public health principles by becoming an accredited public health department under the auspices and accreditation guidelines of the Public Health Accreditation Board (PHAB). To identify leading social determinants, major health issues and vulnerable populations, the Community Benefit Guidelines encourage institutions to conduct comprehensive community health needs assessments (CHNAs) and to develop associated strategic implementation plans. In developing these materials, institutions are expected to fully engage the community-at-large and to collaborate with other community health stakeholders, including health departments, service providers and community-based health and social service organizations.

The primary goals for the CHA and this report are to:

- Assess community health need, defined broadly to include health status, social determinants and service system strengths and weaknesses
- Engage the community, including local health departments, service providers across sectors and community residents
- Identify the leading health issues and the population segments most at-risk based on a review of the quantitative and qualitative information gathered by the assessment

This CHA should be used as a source of information and guidance to:

- Clarify issues related to community characteristics, barriers to care, existing service gaps, community need and other health-related factors
- Prioritize and promote community health investment
- Inform and guide a comprehensive, collaborative community health improvement planning process

APPROACH

The CHA was conducted in three phases, which allowed the Facilitating Partners to compile an extensive amount of quantitative and qualitative data (Phase One), engage key public health stakeholders, community residents and service providers (Phase Two), and analyze and prioritize findings for use in developing targeted, data-driven, strategic implementation plans or CHIP (Phase Three). The assessment began in December 2017. Hundreds of individuals from across the region were engaged in the assessment and planning process:

- Health and social service providers
- Public health officials
- Law enforcement
- Elected officials
- Faith-based organizations
- Public and private schools and universities
- Other community-based organizations
- Community residents

These stakeholders were invited to share their thoughts through interviews, focus groups, community forums, a community survey and a final Community Health Strategic Retreat. While it was not possible for this assessment to involve all community stakeholders, the Facilitating Partners tried to be as inclusive as possible and provided a broad range of opportunities over many months. Ultimately, thousands of people were involved across the region. Those involved, particularly those who participated in interviews, focus groups and community forums, showed a deep commitment to strengthening the region's health system, particularly for people most at-risk.

CHA SERVICE AREA

The CHA service area includes the municipalities of the CMRPHA: Grafton, Holden, Leicester, Millbury, Shrewsbury, West Boylston and Worcester. This region is extremely diverse, demographically and socioeconomically, as well as with respect to population density.

The CHA is a population-based assessment, meaning it considers the needs of the entire population regardless of demographics, socioeconomics, or other characteristics. As per the Community Benefit Guidelines that govern the CHA, special attention is given to address the needs of populations that are disadvantaged, face disparities in health-related outcomes, and are deemed most at-risk or vulnerable. Worcester, the second largest city in New England, has a high concentration of vulnerable and at-risk populations and is very ethnically diverse.

PRIORITY TARGET POPULATIONS

The Facilitating Partners, along with health and social service stakeholders throughout the region, are committed to improving the health status and well-being of all residents in the service area. People within all segments of the population face challenges that may limit their ability to access health services, regardless of age, race/ethnicity, income, family history, or health status. In the body of this report, there is a comprehensive review of the full breadth of quantitative and qualitative data that was compiled for this project. This review includes findings that touch on challenges common among residents throughout the region, across all demographic and socioeconomic segments. However, in order to target the region's limited resources and comply with state, federal and PHAB guidelines, there was broad agreement that the CHA should prioritize segments of the population with complex health needs or significant barriers to care. With this in mind, the Facilitating Partners and Advisory Committee identified six population segments that organizations should prioritize as they invest their resources and develop their strategic implementation plans. These segments include:



For a detailed description of priority populations, please see Page 107 of this report.

COMMUNITY HEALTH PRIORITIES AND CROSS CUTTING ISSUES

The CHA was designed as a population-based assessment, meaning the goal was to identify the full range of community health issues affecting the region, across all its demographic and socioeconomic segments. The issues identified are framed in a broad context to ensure that the breadth of unmet needs and community health issues are recognized.

With this in mind, the Facilitating Partners framed the leading community health issues into four priority areas:

- Mental health
- Substance use
- Social determinants of health
- Chronic/complex conditions and their risk factors

The Facilitating Partners identified two cross-cutting issues that underlie the leading health priorities and that they believe must be addressed to improve overall health status and reduce existing disparities:

- Racism, discrimination, and health equity
- Health system issues (e.g., health literacy, cultural competency, care coordination, information sharing, health education, prevention, screening and workforce development)

Please see Page 108 of this report for a detailed description of health priorities.

ACKNOWLEDGEMENTS

The 2018 Greater Worcester Regional Community Health Assessment (CHA) was developed collectively by the City of Worcester Division of Public Health, Fallon Health and UMass Memorial Medical Center, in close association with the Central Massachusetts Regional Public Health Alliance (CMRPHA). These organizations have taken part in this collaborative effort since 2015—they conduct the CHA and then align their associated community health improvement plans with the results. This CHA Report is the culmination of yet another successful assessment effort.

Representatives from each of these organizations served on the CHA Steering Committee, called the Facilitating Partners in this report. The Facilitating Partners invited the Coalition for A Healthy Greater Worcester's Steering Committee to serve as the Advisory Committee for the CHA. These groups—the Facilitating Partners and the Advisory Committee—met periodically throughout the CHA process to inform the assessment and planning approach, oversee progress and provide critical feedback on preliminary and final results.

Since the assessment began in December 2017, hundreds of individuals participated in interviews, focus groups, community forums and strategic retreats. Participants included representatives of health and social service organizations, public health departments, academic institutions, community-based organizations and advocacy groups, as well as businesses leaders and individuals who live and work in the community. In addition, nearly 3,000 people in Greater Worcester completed community health surveys, either in person at community events or via email. The information gathered through these efforts enabled the CHA to engage the community and gain a better understanding of the region's capacity, strengths and weaknesses, as well as health status, barriers to care, service gaps and underlying determinants of health. While it was not possible for this assessment to involve all community stakeholders, it engaged a comprehensive and inclusive sample of the population; those involved showed commitment to strengthening the region's health system, particularly for people most at-risk.

The Facilitating Partners would like to thank everyone who was involved in this effort, but particularly the CHA Advisory Committee, as well as the region's service providers, health departments, advocacy groups and community members who invested their time, effort and expertise through interviews, surveys, community forums and listening sessions. They would also like to thank the Worcester Regional Research Bureau (WRRB) for allowing the assessment to draw on the Worcester Almanac, the WRRB's informational resource on local

government, demographics, the economy, public safety, education, health, arts and culture. This assessment would not have been possible without their support.

This work was supported by John Snow, Inc. (JSI), a public health and health care consulting and research organization dedicated to improving the health of individuals and communities. The Facilitating Partners appreciate the contributions that JSI has made in analyzing data, engaging the community and conducting research throughout the CHA development process.

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ACRONYMS

ACA	Affordable Care Act
ACE	Adverse childhood experiences
AHCW	Academic Health Collaborative of Worcester
ACS	American Community Survey
ASL	American Sign Language
BRFSS	Behavioral Risk Factor Surveillance System
BSAS	Bureau of Substance Abuse Services
CDC	Centers for Disease Control and Prevention
CHA	Community Health Assessment
CHIP	Community Health Improvement Plan
CHNA	Community Health Network Area
CHGW	Coalition for a Healthy Greater Worcester
CMRPHA	Central Massachusetts Regional Public Health Alliance
COPD	Chronic obstructive pulmonary disorder
EBT/SNAP	Electronic Benefit Transfer/Supplemental Nutrition Assistance Program
ED	Emergency Department
EMS	Emergency Medical Services
FPL	Federal Poverty Level
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
HMO	Health Maintenance Organization
IMR	Infant Mortality Rate
LED	Light Emitting Diode
LEP	Limited English Proficiency
LGBTQ	Lesbian, Gay, Bisexual, Transgender, Queer/Questioning
MAHB	Massachusetts Association of Health Boards
MAPP	Mobilizing for Action through Planning and partnerships
MassCHIP	Massachusetts Community Health Information Profile
MDPH	Massachusetts Department of Public Health
MPHA	Massachusetts Public Health Association
NACCHO	National Association of County and City Health Officials
PHAB	Public Health Accreditation Board
POS	Point of service
PPO	Preferred provider organization

PTSD	Post-traumatic stress disorder
RYHS	Regional Youth Health Survey
SEAL	Seal, Educate, Advocate for Learning
SES	Socioeconomic status
STIs	Sexually transmitted infections
UMMHC	University of Massachusetts Memorial Health Care
UMMMC	University of Massachusetts Medical Center
USDA	United States Department of Agriculture
WCFB	Worcester County Food Bank
WDPH	Worcester Division of Public Health
WRRB	Worcester Regional Research Bureau
WRTA	Worcester Regional Transit Authority

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CHA FACILITATING PARTNERS

WORCESTER DIVISION OF PUBLIC HEALTH

The Worcester Division of Public Health (WDPH), the first nationally accredited health department in Massachusetts, is the only multi-jurisdictional accredited health department in the country. The Division is the lead agency of the Central Massachusetts Regional Public Health Alliance (CMRPHA), which is a coalition of seven municipalities (Grafton, Holden, Leicester, Millbury, Shrewsbury, West Boylston and Worcester) working cooperatively to create and sustain a viable, cost-effective and labor-efficient regional public health district. Together, the Division and the CMRPHA created a regional public health district where community voices are valued and all people have the opportunity to be healthy. Its mission is to equitably improve health outcomes and quality of life for all residents by providing high-quality, data-driven public health leadership and services.

FALLON HEALTH

Founded in 1977, Fallon Health provides health care services designed to meet the unique and changing needs of the residents of Central Massachusetts and across the Commonwealth. Fallon Health's mission and vision, put simply, is to "Make our communities healthy" through "Extraordinary innovation, quality and health care." Fallon Health's mission and vision are guided by its commitment to innovation, accountability and teamwork. Fallon's insurance and self-insurance product portfolios include a variety of group and non-group health plan options (HMO, POS and PPO, as well as Medicaid and Medicare Advantage plans) featuring flexible and innovative benefit designs. In addition, Fallon offers a Program of All- Inclusive Care for the Elderly, called Summit ElderCare®, and a Medicare Advantage Special Needs Plan/Senior Care Options program, called NaviCare®. Fallon Health is proud to have a strong record of partnership and collaboration with community organizations and residents throughout the Commonwealth.

UMASS MEMORIAL MEDICAL CENTER

Located in Worcester, UMass Memorial Medical Center (UMMMC) is the four-campus academic medical center of UMass Memorial Health Care, Inc. (UMMHC), the largest not-for-profit health care delivery system in Central Massachusetts with 1,700 physicians and 13,000 employees. UMMMC is a teaching hospital and the clinical partner of the University of Massachusetts Medical School. UMass Memorial Health Care's Community Benefits Mission incorporates the World Health Organization's broad definition of health defined as "a state of complete physical, mental and social well-being and not merely the absence of disease." UMMHC's Community Benefits Mission was developed and recommended by the Community Benefits Advisory Committee and approved by the UMass Memorial Health

Care Board of Trustees. Mission statement: “UMass Memorial Health Care is committed to improving the health status of all those it serves and to addressing the health problems of the poor and other medically underserved populations. In addition, nonmedical conditions that negatively impact the health and wellness of our community are addressed.”

I. BACKGROUND, PURPOSE AND APPROACH

BACKGROUND

This Community Health Assessment (CHA) is the culmination of nearly eight months of work that began in December 2017. The CHA and report development process was led collectively by the City of Worcester Division of Public Health (WDPH)—the lead agency of the Central Massachusetts Regional Public Health Alliance (CMRPHA)—Fallon Health and UMass Memorial Medical Center. This CHA focuses on the municipalities that are part of CMRPHA, which include Grafton, Holden, Leicester, Millbury, Shrewsbury, West Boylston and Worcester.

The value of this effort cannot be understated. Over the past decade, there has been an increasing appreciation—among researchers, policymakers, public officials and service providers across all sectors—of the importance of working collectively to develop comprehensive, system-wide strategic implementation plans or community health improvement plans (CHIP). These plans are meant to align community health priorities and guide how public and private agencies, as well as the full range of service providers, work together to strengthen health systems and improve the overall health and well-being of their communities.

This CHA report is a comprehensive assessment of community need for the Greater Worcester region, including the region's assets, strengths and weaknesses. The CHA process gathered extensive quantitative data from federal, state and local sources, including a community health survey of nearly 3,000 individuals who live, work and play in Greater Worcester. Qualitative information was captured through community interviews, focus groups, community forums and a strategic retreat. The process engaged community residents as well as community health service providers and other stakeholders across all sectors. This report summarizes the findings and identifies, based on quantitative data and input from all those involved, the leading community health issues in Greater Worcester. It also identifies the populations most at-risk due to health-related challenges and disparities.

The CHA process and findings will serve as the foundation for the creation of the strategic implementation plans or CHIPs developed by CMRPHA, the Facilitating Partners and the Coalition for Healthy Greater Worcester. It will also inform and serve as a guide for community health improvement for all of Greater Worcester.

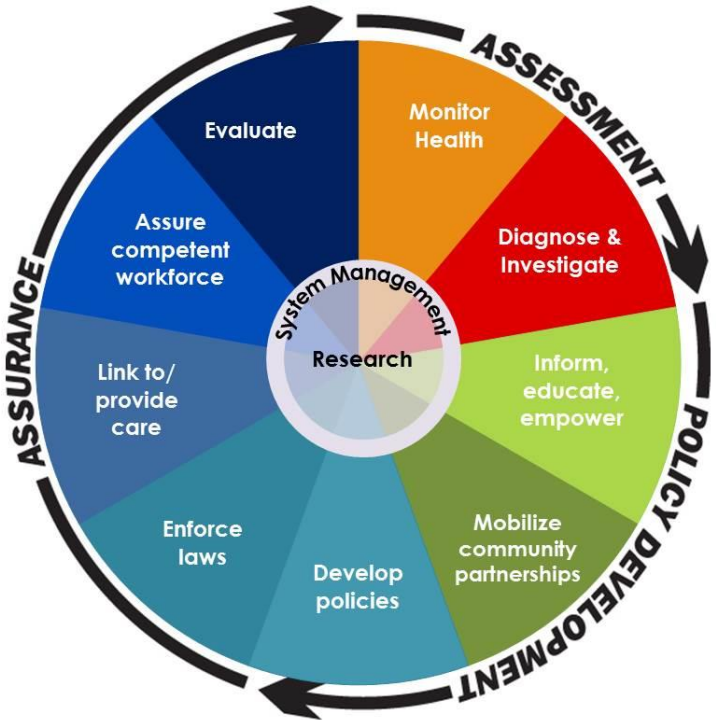
PURPOSE

Not-for-profits such as hospitals and health maintenance organizations (HMOs) play essential roles in the Massachusetts health care system by helping to ensure that residents have access to health-related services they need to live healthy, productive lives.

In its voluntary Community Benefits Guidelines for hospital and HMOs, the Massachusetts Attorney General's Office encourages these not-for-profits to address the identified social determinants of health identified in their service areas. Specifically, the guidelines encourage these institutions to conduct a comprehensive community health needs assessment. In conducting the CHA and developing and implementing the strategic implementation plans or CHIPs, these institutions are expected to take steps to fully engage the community at large and to work in close cooperation with other community health stakeholders, including local health departments, community coalitions, service providers and other community-based health and social service organizations. The Attorney General's Community Benefits Guidelines have been in place since 1994. In 2010, the Federal Affordable Care Act (ACA) further reinforced these expectations for not-for-profit hospitals by mandating that they engage in similar assessment, planning and community health improvement activities as required by the state.

Local and state health departments have similar requirements and obligations born out of their civic obligation to ensure the health and well-being of those who live, work or visit their communities. Community health assessments, strategic planning, community engagement and program/policy development are integral parts of the Centers for Disease Control and Prevention's (CDC) guidelines for the 10 Essential Public Health Services (Figure 1). In addition, the Worcester Division of Public Health has opted to build on its commitment to strong public health principles by becoming an accredited public health department under the auspices and accreditation guidelines of the Public Health Accreditation Board (PHAB). All three CHA partners are required to conduct a are

Figure 1: The 10 Essential Public Health Services



Source: Centers for Disease Control and Prevention

required to conduct a Community Health Assessment to fulfill respective guidelines; this assessment identifies the leading barriers to care, social determinants and health-related conditions or diseases as well as service or capacity gaps across health-related service categories.

The primary goals for the CHA and this report are to:

- Assess community health need, defined broadly to include health status, social determinants and service system strengths and weaknesses
- Engage the community, including local health departments, service providers across sectors and community residents
- Identify the leading health issues and the population segments most at-risk based on a review of the quantitative and qualitative information gathered by the assessment

This CHA should be used as a source of information and guidance to:

- Clarify issues related to community characteristics, barriers to care, existing service gaps, community need and other health-related factors
- Prioritize and promote community health investment
- Inform and guide a comprehensive, collaborative community health improvement planning process

The Communtiy Benefits and PHAB guidelines include the expectation that institutions conduct their CHAs and develop their strategic implementation plans in close collaboration with existing multisector, community coalitions to take advantage of and leverage work already completed—as well as avoid duplication of effort. In this regard, this CHA has been developed in close cooperation with the Coalition for a Healthy Greater Worcester. It has been shared with the Coalition, along with local health departments, service providers and other stakeholders across the region. The community engagement process culminated with a meeting of service providers, stakeholders and residents at the Worcester Public Library, where CHA key findings were presented and a prioritization process took place. This event was attended by approximately 75 people.

This CHA was conducted with the support and involvement of the governing bodies and senior leadership of Fallon Health, UMass Memorial Medical Center and the City of Worcester. Members of their senior leadership teams were interviewed and briefed on a regular basis, and these leaders will continue to be involved with the implementation planning process. All three entities have developed community benefit mission statements that articulate their commitment to this effort.

On the following pages are details regarding this assessment's approach and a detailed description of how the CHA was conducted.

ASSESSMENT APPROACH

Over the past decade, there has been an increased understanding—among policymakers, public officials, HMOs and service providers—of the importance of developing broad system-wide plans to guide public and private agencies, service providers and other stakeholders as they work collectively to address barriers to care, improve health status and strengthen regional health systems. To be effective, these plans and their assessments and recommendations must be:

- **Comprehensive—**involving the full range of health care, social service and public health providers
- **Data-driven—**applying quantitative and qualitative data from primary and secondary sources in ways that allow for sound decision making
- **Collaborative—**engaging all relevant stakeholders including, public agencies, service providers and the at-large community in a transparent, inclusive process
- **Action-oriented, measurable and justifiable—**providing a clear path or roadmap that guides action in clear, specific, measurable ways and allows for the implementation of short-term and long-term strategies
- **Evidence-based—**implementing projects and strategies that are proven, rooted in clinical or service provider experience and that take into consideration the interests and needs of the target population

Figure 2: MAPP Framework

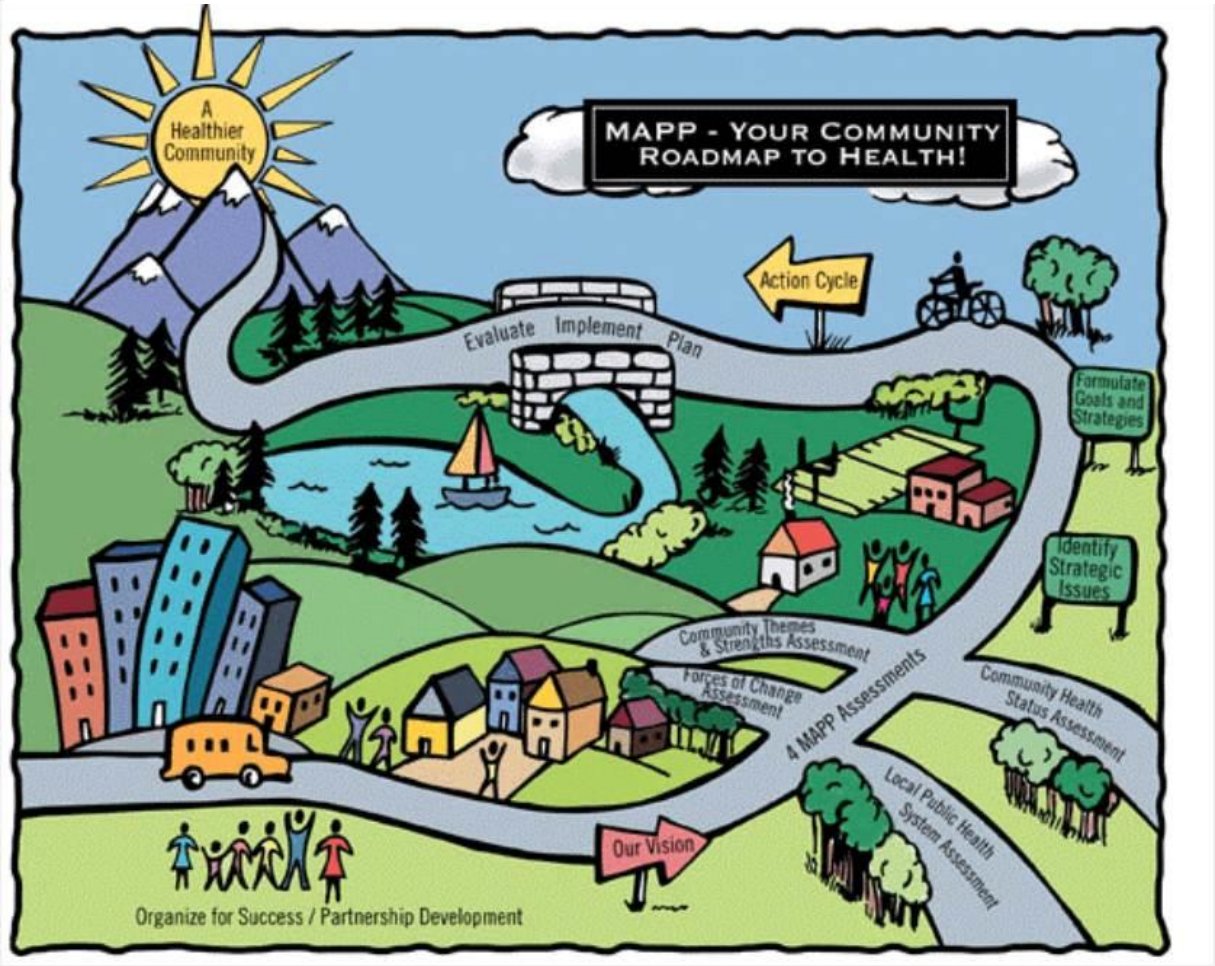


Source: Worcester CHA 2015, Adapted from NACCHO

The CHA described in this report was developed with these principles in mind and provides a comprehensive summary of community need. It also identifies the leading health issues for the region and characterizes the segments of the population most at risk of poor health outcomes due to the challenges and health-related disparities they face. This information will be used by the assessment's Facilitating Partners and community health stakeholders across the region to prioritize the leading issues and guide community health improvements over the next three chose to utilize the Mobilizing for Action through Planning and Partnerships (MAPP) framework to guide the assessment

process.

Figure 3: MAPP Roadmap to Health



Source: National Association of County and City Health Officials (NACCHO)

The MAPP Framework (Figures 2 and 3) was developed by the National Association of County and City Health Officials (NACCHO) with support from the Centers for Disease Control and Prevention (CDC) and represents a best practice model for health improvement planning. From the outset, the Facilitating Partners worked to ensure that their proposed approach was aligned with the MAPP Field Guide and the MAPP User's Handbook. It was also critical that the CHA could be used to fulfill the PHAB guidelines for public health department accreditation. The Facilitating Partners ensured that the CHA approach was aligned with the National Public Health Performance Standards Local Implementation Guide and National Public Health Performance Standards Local Assessment Instrument.

The MAPP framework includes six phases:

1. Organizing for success
2. Visioning
3. Four MAPP assessments
4. Identifying strategic issues
5. Formulating goals and strategies
6. Action

The CHA approach includes phases 1–4, while the subsequent strategic implementation planning or CHIP process includes phases 4–6.

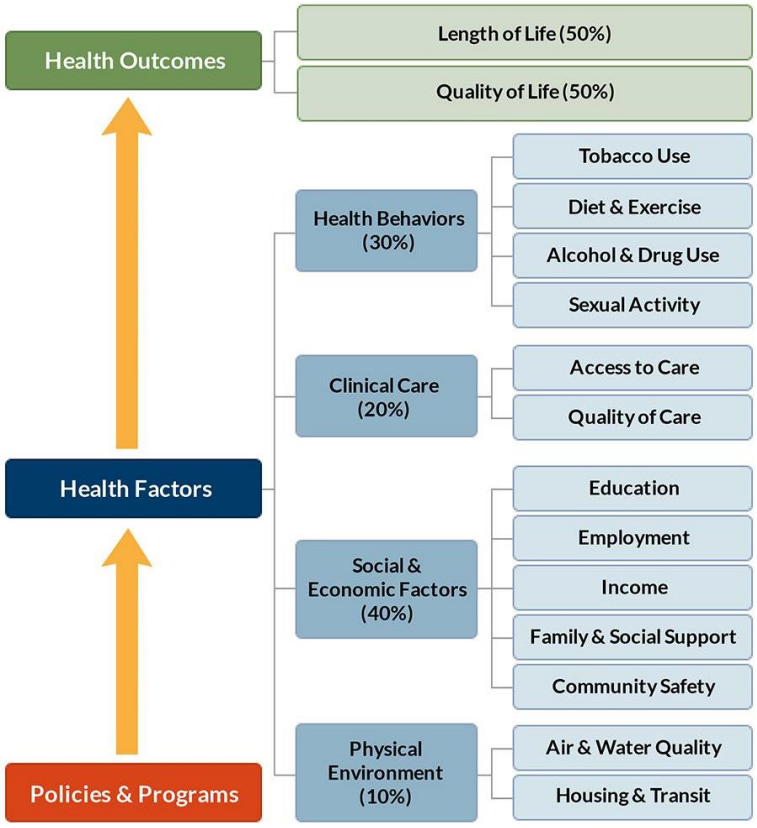
BROADER CONTEXT OF COMMUNITY HEALTH ASSESSMENT

Historically, the health care system has focused more on clinical services, physical health and treatment of chronic conditions, such as heart disease, cancer, asthma and diabetes. Over the past decade, however, there has been a thoughtful, clear shift. There is now greater focus on preventing and addressing the underlying social, economic, behavioral and physical determinants of health.

There is increasing awareness that these issues are at the root of poor individual health status, community well-being and overall population health. A growing body of research shows that only a small portion of one's overall health can be attributed directly to access to and quality of clinical care. The remainder is linked to genetics, health behaviors, social and economic factors, and physical residential environments.

With respect to community health assessment and improvement, the efforts of the Greater Worcester Regional CHA and CHIP, along with the expectations of the

Figure 4: Framework for Community Health Improvement



Source: Robert Wood Johnson Foundation

Commonwealth, the federal government and PHAB are framed with these ideas in mind.

The Massachusetts Attorney General's Office's Community Benefits Guidelines and the Massachusetts Department of Public Health (MDPH) Determination of Need Guidelines have established priorities to guide and focus the community health improvement work of hospitals and HMOs across the Commonwealth. With emphasis on helping disadvantaged populations, reducing health disparities and promoting wellness, these priorities include chronic disease management, mental health, substance use, housing and violence.

These guidelines are not meant to restrict the unique issues that not-for-profit hospitals and HMOs decide to prioritize. Rather, they clarify the idea that in order to reduce health-related disparities and have a genuine and sustained impact on health and well-being, CHAs and the subsequent strategic implementation plans or CHIPs must address the underlying social determinants, inequities and injustices at the root of health status issues.

The Facilitating Partners also understood the need for the CHA to be aligned with the region's broader agenda of promoting health and well-being, addressing health disparities and conducting their efforts in the context of health equity. Health equity is the attainment of the highest level of health for all people. Achieving health equity requires valuing everyone equally, with focused, ongoing societal efforts to address avoidable inequalities, underlying socioeconomic factors and injustices, whether historical or contemporary.

Figure 5: Equality vs. Equity



Source: Robert Wood Johnson Foundation

There has been increased understanding of the impact that trauma plays with respect to physical, emotional and behavioral health. Trauma of all types and levels of intensity is toxic, can limit an individual's ability to cope, and can have adverse impacts on short- and long-term health. Evidence shows that individuals directly or indirectly affected by trauma are at higher risk of long-term health conditions (e.g., heart disease, cancer, autoimmune diseases and mental health conditions) and that certain populations are more at risk (e.g., children, youth/adolescents, people living in low-income communities, racial/ethnic minorities, LGBTQ individuals, individuals with disabilities and women/girls).

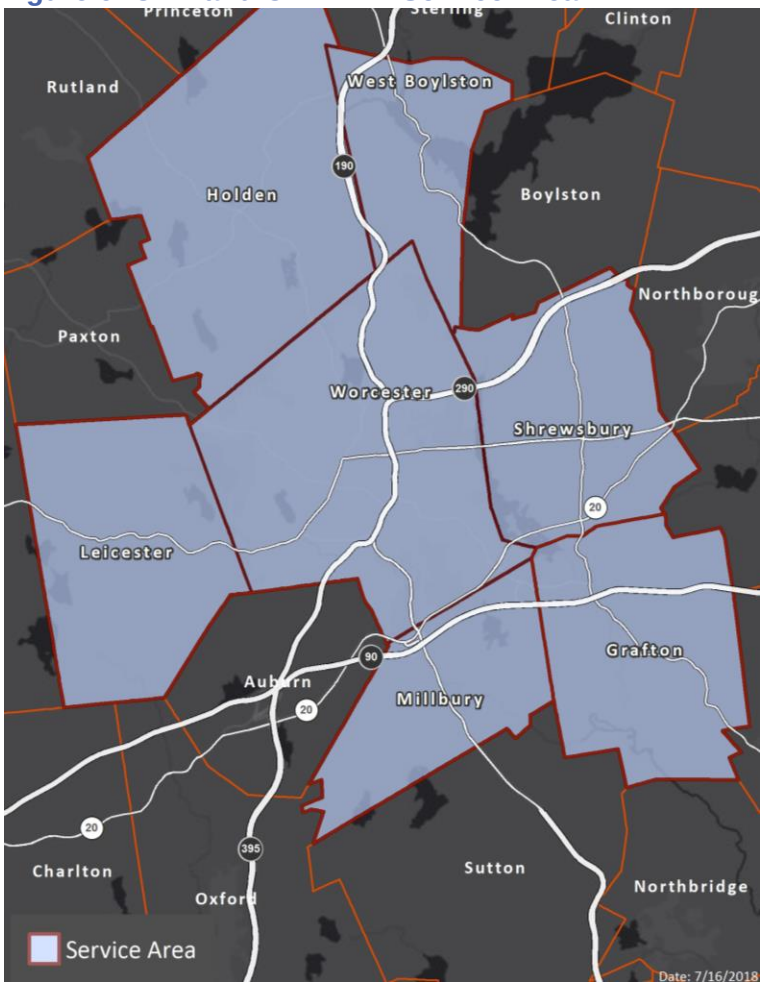
Traumatic experiences do not always lead to adverse health impacts. There are therapies, services, and organizations available to help individuals shield themselves from trauma or respond in ways that limit its impact. There is a tremendous need to design the CHA to better understand and raise awareness about the range of traumatic events that impact the region.[1]

CHA SERVICE AREA

The service area for the CHA includes the municipalities of the CMRPHA: Grafton, Holden, Leicester, Millbury, Shrewsbury, West Boylston, and Worcester. This region is extremely diverse, demographically and socioeconomically as well as with respect to population density.

The CHA is a population-based assessment, which means it considers the needs of the entire population regardless of demographic, socioeconomic or other population characteristics. However, as per the guidelines that govern the CHA, special attention is given to address the needs of populations that are disadvantaged, face disparities in health-related outcomes and are

Figure 6: CHA and CMRPHA Service Area



[1] Center for Health Care Strategies, Inc., "Advancing Trauma-Informed Care", https://www.chcs.org/project/advancing-trauma-informed-care, (December 2015).

deemed most at-risk or vulnerable. Worcester, the second largest city in New England, has a high concentration of vulnerable and at-risk populations and is very ethnically diverse.

ASSESSMENT AND PLANNING METHODS

The assessment process began with the creation of a committee made up of representatives from each of the lead partners: The Worcester Division of Public Health, Fallon Health and UMass Memorial Medical Center, which are referred to throughout this report as the Facilitating Partners. The Facilitating Partners selected the Coalition for A Healthy Greater Worcester's Steering Committee to serve as the Advisory Committee for the CHA. The Coalition is made up of a representative group of administrative and clinical staff from a diverse array of community health partners across the region. The Advisory Committee included individuals throughout the service area, representing health, public health, social service, faith-based and other community-based organizations. It also included experts and organizations that served the full breadth of the population, such as children, youth/adolescents, adults, LGBTQ and racial/ethnic, immigrants and others.

The Facilitating Partners managed the day-to-day assessment and planning efforts of the CHA. They met nearly every two weeks to oversee project activities and provided important input to ensure that the assessment met Commonwealth, Federal and PHAB requirements. The CHA Advisory Committee met four times during the course of the assessment. It met at the outset to ensure that the overall approach and methods were appropriate and to provide insights on data sources, key community contacts and community engagement activities. The CHA Advisory Committee also met twice during the course of the assessment in roughly two-month intervals to inform the assessment process and provide input on the CHA's initial findings with respect to the leading social determinants, barriers to care, service gaps and health issues. Finally, the Advisory Committee met at the end of the assessment process to provide input on the full range of quantitative and qualitative findings, to identify a set of priority population segments and to identify a series of leading community health priorities.

With respect to the assessment, the CHA used a three-phased process:

Phase One involved a rigorous and comprehensive review of existing quantitative data along with more than 45 interviews with community stakeholders. In Phase One, efforts were also made to begin the development of a regional Resource Inventory.

Phase Two involved a more targeted assessment of need and broader community engagement activities that included 10 focus groups with health, social service and public health service providers as well as groups of community residents representing populations deemed most likely to face disparities in health outcomes (e.g., youth, older adults, non-

English speakers, Southeast Asians, Hispanics/Latinos and African Americans). In Phase Two, the CHA also conducted community forums in Grafton, Shrewsbury and Worcester for the community at large. The Worcester Division of Public Health also administered a community health survey of nearly 3,000 individuals who live, work and play in Greater Worcester. A detailed description of the Community Engagement approach is included in Appendix A.

Phase III involved a series of strategic planning and reporting activities that involved a broad range of internal and external stakeholders. In addition to developing the report, the primary activity in Phase III was a Strategic Planning Retreat held at the Worcester Public Library. This retreat allowed for a summary presentation of the results of the CHA as well as more detailed discussion of findings in small breakout sessions. The event culminated in a prioritization session, facilitated by automated polling software that allowed participants to identify priority populations and leading health-related issues. The retreat was attended by approximately 75 people who represented an array of service providers and stakeholder groups as well as representatives from all communities in the service area.

Figure 7: CHA Activities by Phase

Phase One	Phase Two	Phase Three
Preliminary Assessment and Engagement	***Targeted Assessment and Engagement***	***Priority Setting, Planning, and Reporting***
Quantitative Data • MA Dept. of Public Health • Worcester Almanac • US Census Bureau • Local data sources	**Additional Data Collection** • Collect additional secondary data as it becomes available	**Planning and Reporting** • Prioritization Retreat • Identification of emerging strategic ideas and themes • Development of Community Health Assessment (CHA)
Qualitative Data • Interviews with community stakeholders and subject matter experts • Community Health Survey	**Community Engagement** • Focus Groups • Community Forums • Community Health Survey	

The goals of Phases One and Two were to gain understanding of health-related characteristics of the region's population, including demographic, socioeconomic, geographic, health status, care seeking and access to care characteristics. This involved quantitative and qualitative data analysis, including, to the extent possible, an analysis of changes over time.

Quantitative Data Analysis

JSI collected quantitative data from a broad range of sources to characterize the community, better understand the health status of the region and inform a comprehensive understanding of the health-related factors associated with poor health status. Whenever possible, data was captured at the municipal or even sub-municipal level. The primary sources of data were the Massachusetts Department of Public Health, the Worcester Division of Public Health, the Worcester Regional Research Bureau and the U.S. Census Bureau. The leading datasets and data sources are listed below. Data analysis was performed to test for statistically significant differences between data at the municipal level and the Commonwealth overall and are noted when applicable.

- U.S. Census Bureau, American Community Survey 5-Year Estimates (2012–2016)
- Massachusetts Hospital Inpatient Discharges (2008–2012)
- Massachusetts Hospital Emergency Department Discharges (2008–2012)
- Massachusetts Vital Records (2015)
- Massachusetts Bureau of Substance Abuse Services (BSAS) (2014)
- Massachusetts Bureau of Infectious Disease and Laboratory Sciences (2016)

Community Interviews

JSI conducted interviews with more than 45 community leaders, service providers, public officials, community residents and other stakeholders. A list of the people interviewed for the CHA is included in Appendix A. Phone and in-person interviews were conducted using a standard interview guide. The focus was on identifying the leading social determinants of health, the major health issues facing the region and the populations most at risk or vulnerable.

Focus Groups

JSI staff and the Facilitating Partners worked together to conduct a series of 10 focus groups. These sessions enabled them to gather critical community input from service providers, community leaders and community residents with an emphasis on engaging at-risk populations (e.g., Hispanics/Latinos, youth, South East Asians and individuals with disabilities) as well as service providers representing fields most likely to be prioritized (e.g., behavioral health providers, health providers for elders and public health officials). These focus groups were organized in collaboration with the assessment's Facilitating Partners to leverage their community connections and help ensure community participation.

Community Health Survey

The 2018 CHA Community Survey was a modified version of the 2015 CHA Community Survey. The questionnaire was pared down in length based on community feedback that said there were too many questions for residents to complete during the 2015 CHA process. The

staff at WDPH thoroughly reviewed each question, taking into account response rates and importance of each question. The Facilitating Partners were presented with the proposed changes to the modified survey and decided on the final version.

To collect as many responses as possible, especially from the hard-to-reach and marginalized populations, the survey was administered both electronically and in person. The web-based survey was sent via Survey Monkey utilizing listserv and social media. Interns from the Academic Health Collaborative of Worcester (AHCW), managed by staff from the WDPH, distributed surveys at 32 community locations including health centers, food pantries, nonprofit organizations and many community events, health fairs and community forums.

The survey was available in five languages—English, Spanish, Albanian, Vietnamese and Arabic. As often as possible, interpreters were available to support participants with lower literacy levels to complete the survey. Student and staff language proficiency, particularly in Spanish and Albanian, helped to support these populations in completing the survey.

Community Forums

JSI conducted four community forums—open and marketed to the public by the Facilitating Partners—in Grafton, Shrewsbury and Worcester. In total, the forums were attended by more than 100 community residents. During the first three community forums, JSI presented findings from the quantitative and qualitative data compiled for the assessment and posed a range of questions to community members:

- What are the leading social determinants of health (e.g., housing, poverty, food access, transportation, etc.)?
- What are the leading health conditions (e.g., diabetes, hypertension, asthma, respiratory disease, etc.)?
- Which segments of the population are most vulnerable (e.g., immigrants, LGBTQ, older adults, etc.)?
- What strategies would be most effective to improving health status and outcomes in these areas?

In the final community forum, at the Worcester Public Library, JSI presented key CHA findings and facilitated an exercise to prioritize community health issues and populations most at risk.

Figure 8 provides a summary of focus groups, community forums and additional engagement efforts, including events where the Facilitating Partners provided information about the CHA and gathered survey responses. A full listing of the community engagement activities and approaches, including a description, count and method of activities conducted, is included in

Appendix A.

Figure 8: Focus Groups, Community Forums, Special Events

FOCUS GROUPS	
Audience	**Date**
Central Massachusetts Funders	March 30, 2018
Worcester Department of Health and Human Services (Disabilities, Veterans, Youth, Human Rights)	April 13, 2018
Parents	April 26, 2018 May 22, 2018
Youth	May 24, 2018
Behavioral health providers	June 8, 2018
Latino Educational Institute; Limited English proficiency	June 14, 2018
Individuals with disabilities	June 19, 2018
Elder health service providers	June 26, 2018
South East Asian Coalition	July 10, 2018
Spanish-speaking medical interpreters	July 11, 2018
COMMUNITY FORUMS	
Location	**Date**
Grafton Police Department	May 9, 2018
Shrewsbury Town Hall	May 2, 2018
Worcester Senior Center	May 23, 2018
Worcester Public Library	July 12, 2018
OTHER ENGAGEMENT EFFORTS	
Event/Effort	**Date**
Nueva Vida Health Fair	June 23, 2018
Juneteenth Festival	June 16, 2018
Out to Lunch Series	May/June 2018
Listserv to Service Area Towns	May/June 2018

Resource Inventory

Federal, Commonwealth and PHAB requirements indicate that a Resource Inventory should be created to inform the extent to which there are gaps in health-related services. To meet this obligation, JSI compiled a list of resources across the broad continuum of services, including clinical health care services, community health and social services, and public health resources. This was done primarily by compiling information from existing resource inventories and partner lists from the Facilitating Partners. Information was also compiled

from membership lists of the existing community health coalitions and from CHA interviews, focus groups and community forums. It was then put into a table that enabled JSI to present the leading resources, by service type, across the region. A discussion of the service gaps that have been identified by the CHA quantitative and qualitative findings is included in Appendix C: Resource Inventory.

Prioritization

After compiling the assessment's findings, the Facilitating Partners organized a strategic retreat at the Worcester Public Library. More than 75 community residents and service providers from throughout the service area participated in the strategic planning session. The primary goals of this session were to:

1. Summarize and discuss the leading issues from the CHA in a full group session
2. Discuss the findings of the CHA in depth through a series of small breakout sessions organized by topic area (i.e., mental health, substance use, social determinants of health and health equity, and chronic and complex conditions and their risk factors)
3. Prioritize leading health issues, social determinants of health and vulnerable/at-risk populations

These plenary and breakout group sessions allowed participants to review and discuss the full breadth of quantitative and qualitative findings from Phases One and Two, as well as consider the segments of the population that were thought to be most affected by these issues. Retreat participants, including members of the Advisory Committee, participated in a polling process to identify the populations most at risk and the health-related issues that participants believed should be prioritized to best address the findings from the assessment.

Draft and Final Community Health Assessment Report

Once the CHA Strategic Retreat was completed, JSI collaborated with the Facilitating Partners to develop draft and final versions of the CHA Report, which included a summary of the purpose and background of the CHA process, key findings, community health priorities, and target populations.

As required by Federal and Commonwealth guidelines and the PHAB, this CHA has been posted on the websites of the Facilitating Partners and is available in hardcopy by request. The CHA has also been shared with the Coalition for a Healthy Greater Worcester (CHGW). Community members and service providers were encouraged to share their thoughts, concerns, or questions throughout the CHA process. They were involved in a discussion of key findings and the identification of priorities and will be encouraged to continue to share their thoughts and ideas moving forward.

There was no written feedback on the previous CHA or Implementation Plan since its posting in 2015. There was also no feedback on the Massachusetts Attorney General's website, which publishes the hospital's community benefits reports and provides an opportunity for public comment. The Facilitating Partners encourage feedback and comments on this report; any feedback is taken into account when updates and changes are made to the Implementation Plan or to inform future CHA processes.

DATA LIMITATIONS

Assessment activities of this nature nearly always face limitations in quantitative and qualitative data collection. With respect to the project's quantitative data, the most significant limitation was the availability of timely data. Relative to most of the rest of the U.S., Massachusetts does an exemplary job at making comprehensive data available at the state, county and municipal levels through the MDPH. The breadth of demographic, socioeconomic and epidemiologic data made available was enough to facilitate an assessment of community health needs and support the implementation plan development process.

A major limitation was that much of the epidemiologic data available, particularly at the municipal, neighborhood and ZIP code levels, was at least three to five years old. The list of data sources included in this report provides the dates for each of the major data sets provided by the Commonwealth. Great effort was made to ensure that the data reported was the most current. The CHA's full quantitative data set was provided to MDPH at the end of Phase Two and MDPH staff provided assurance that the most current data was being applied. The data was still valuable and enabled the identification of health needs relative to the Commonwealth and specific communities. However, older datasets may not reflect recent trends in health statistics.

In addition, the quantitative data was not stratified by age, race/ethnicity or income, which severely limited the CHA's ability to identify the most at-risk segments of the population in an objective way. The qualitative data sources did allow us to explore these issues but the lack of objective quantitative data highly constrained this effort.

With respect to qualitative data, information was gathered through stakeholder interviews, focus groups, the community survey and community forums, during which service providers, community leaders/advocates and community residents offered important information. These interviews, focus groups, surveys and forums provided valuable insights on major health-related issues, barriers to care, service gaps and at-risk target populations. Every effort was made to promote the community forums to the community and to identify a representative sample of community members.

II. REGIONAL AND COMMUNITY CHARACTERISTICS

To understand community needs and health status for the service area, we must begin with a description of the population's geographic and demographic characteristics, as well as the underlying social, economic and environmental factors that affect health status and equity. This information is critical to:

- Recognizing disease burden, health disparities and health inequities
- Identifying target populations and health-related priorities
- Targeting strategic responses

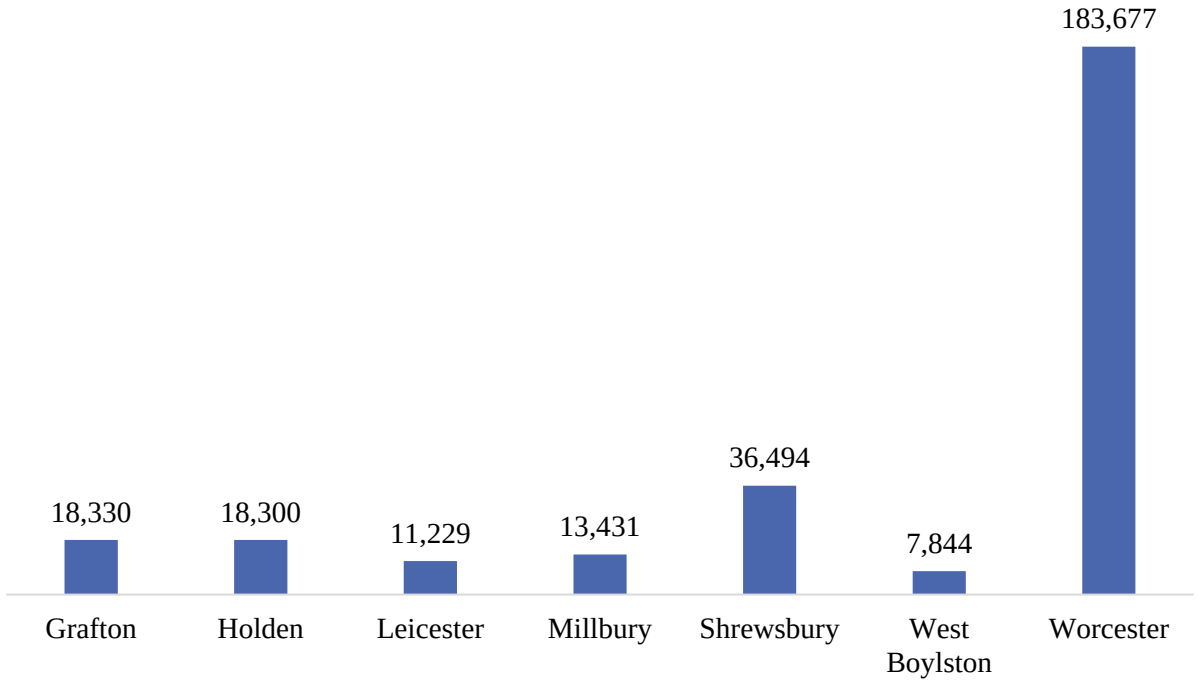
The CHA captured a range of quantitative and qualitative data related to age, gender, sexual orientation, race/ethnicity, income, poverty, family composition, education, violence, crime, unemployment, access to food and recreational facilities, and other determinants of health. These data provided valuable information that characterized the population and provided insights into the leading determinants of health—and health inequities.

The following is a summary of key findings related to community characteristics and the social, economic and environmental determinants of health for the Worcester CHA's service area. Conclusions were drawn from quantitative data and qualitative information collected through interviews, focus groups and community forums. Summary data tables are included below; more expansive data tables are included in the Greater Worcester CHA Data Book (Appendix B).

The service area includes the City of Worcester and the six surrounding towns of Grafton, Holden, Leicester, Millbury, Shrewsbury and West Boylston—together, these municipalities form a regional public health district under the Central Massachusetts Regional Public Health Alliance (CMRPHA). CMRPHA works cooperatively through the Coalition for a Healthy Greater Worcester to align the efforts of local hospitals and health care providers, health departments, community organizations and other partners to improve health for all those that live, work and play in the region.

The service area sits squarely in Central Massachusetts. The region's climate is typical of New England, where summers are warm and humid, and winters are cold and snowy. Worcester, the second largest city in New England, has approximately 183,000 residents. Within the service area, West Boylston has the smallest population (7,844) with other municipalities ranging between approximately 11,000 and 36,000 residents.

Figure 9: Total Population, 2012-2016



Source: US Census Bureau, American Community Survey

AGE AND GENDER

Age and gender are fundamental factors to consider when assessing individual and community health status. Men tend to have shorter life expectancies and more chronic illnesses than women. Older individuals typically have more physical and mental health vulnerabilities and are more likely to rely on immediate community resources for support compared to young people.[2,3]

Regarding gender, none of the municipalities in the service area have a significantly higher or lower percentage of male or female residents compared to the Commonwealth as a whole, with the exception of West Boylston, which has significantly more male residents (62%) than female (38%). See Figure 10 for gender breakdowns in each municipality.

[2] Linda Lyons, "Age, Religiosity, and Rural America," Gallup Web Site, http://www. gallup.com/poll/7960/age-religiosity-rural-america.aspx., (March 11, 2013)
[3] Harvard Men's Health Watch, "Mars vs. Venus: The Gender Gap in Health," Harvard Health Publications Web Site, http://www.health.harvard.edu/newsletter_article/ mars-vs-venus-the-gender-gap-in-health, (January 2010)

Figure 10: Gender (Service Area), 2012-2016

	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
Male (%)	**48.5**	47.9	49.4	49.5	51.0	49.5	62.4	49.2
Female (%)	**51.5**	52.1	50.6	50.5	48.4	50.5	37.6	50.8

Source: US Census Bureau, American Community Survey
Shading represents statistical significance compared to the Commonwealth. Figures highlighted in red are statistically higher compared to the Commonwealth overall, while figures highlighted in blue are significantly lower.

The population of residents under 18 is significantly higher in Grafton (24%), Holden (24%) and Shrewsbury (25%) compared to the Commonwealth overall (21%), while the percentage was significantly lower in Leicester (17%) and West Boylston (13%).

None of the towns had a significantly higher population of residents over the age of 65 compared to the Commonwealth (15%), but Grafton (13%) and Worcester (13%) had significantly smaller percentages. Figure 11, below, depicts age breakdowns by municipality across the service area.

Figure 11: Age Distribution (Service Area), 2012-2016

% of Population	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
Under 5	**5.4**	5.6	5.2	3.0	6.4	5.3	3.6	5.9
5 to 9	**5.5**	6.3	6.0	5.1	5.6	6.3	2.7	5.6
10 to 14	**6.0**	7.4	7.9	5.5	5.7	7.8	4.2	5.5
15 to 19	**6.8**	6.1	7.3	7.7	6.3	8.2	3.4	8.1
20 to 24	**7.3**	5.0	4.5	6.0	7.1	6.3	8.3	10.2
25 to 54	**40.7**	44.8	40.1	36.9	40.2	40.4	49.6	40.8
55 to 64	**13.1**	12.0	13.9	19.1	12.3	11.1	11.3	11.3
65 to 74	**8.3**	7.6	8.7	8.3	10.7	8.2	9.2	6.3
75 and older	**6.7**	5.2	6.3	8.5	5.7	6.4	7.6	6.3
Under 18	**20.6**	24.0	24.1	17.3	21.9	25.0	12.5	20.3
Over 65	**15.1**	12.8	15	16.8	16.4	14.6	16.9	12.7

Source: US Census Bureau, American Community Survey
Shading represents statistical significance compared to the Commonwealth. Figures highlighted in red are statistically higher compared to the Commonwealth overall, while figures highlighted in blue are significantly lower.

RACE AND ETHNICITY

An extensive body of research illustrates the health disparities that exist for racial/ethnic minorities and foreign-born populations. According to the CDC, non-Hispanic Blacks have higher rates of premature death, infant mortality and preventable hospitalization

than non-Hispanic Whites.[4] Individuals with limited English proficiency (LEP), defined as the ability to read, speak, write or understand English "less than very well," have lower levels of medical comprehension. This leads to higher rates of medical issues and complications, such as adverse reactions to medication.[5,6] These disparities show the disproportionate and often avoidable inequities that exist within communities and reinforce the importance of understanding the demographic makeup of a community to identify populations more likely to experience adverse health outcomes. Stakeholders report that race, ethnicity, country of origin and immigration status are key predictors and drivers of major health disparities in the region. The impacts of racism and discrimination—and the linkage between geographic disparities and where one lives, or their "place"—is clear. Interviewees and community forum participants alluded to issues of overt and discreet racism, prejudice and discrimination both within and outside the health care system, especially for non-English speakers and new immigrants and refugees.

In 2015, the racial/ethnic makeup of Worcester was majority White alone (70%), followed by Hispanic/Latino of any race (21%), Black or African American alone (14%) and Asian alone (7%). In other municipalities, racial/ethnic breakdowns generally mirrored that of the Commonwealth, with the majority of residents identifying as White alone and significantly smaller percentages of residents identifying as Black/African American, Asian, other races, or Hispanic/Latino of any race. One exception, however, is Shrewsbury, where compared to the Commonwealth (6%), there was a significantly higher percentage of residents identifying as Asian alone (17%). According to research, Shrewsbury has one of the highest concentrations of Indian Americans in the Commonwealth, with the population doubling between 2000 and 2010.[7]

[4] Centers for Disease Control and Prevention, "CDC Health Disparities and Inequalities Report (CHDIR)," Centers for Disease Control and Prevention Web Site, https://www.cdc.gov/minorityhealth/chdireport.html, September 10, 2015
[5] E Wilson, AH Chen, K Grumbach, F Wang, and A Fernandez, "Effects of Limited English Proficiency and Physician Language on Health Care Comprehension," *Journal of General Internal Medicine* 20, no. 9 (Sep 2005): 800-806.
[6] Joshua S. Coren, Frank A. Filipetto, and Lucia Beck Weiss, "Eliminating Barriers for Patients With Limited English Proficiency," *Journal of the American Osteopathic Association* 109, no. 12 (December 2009): 634-640.
[7] Craig S. Semon, "Indian Community At Home in Central Mass," *Worcester Telegram,* December 10, 2017

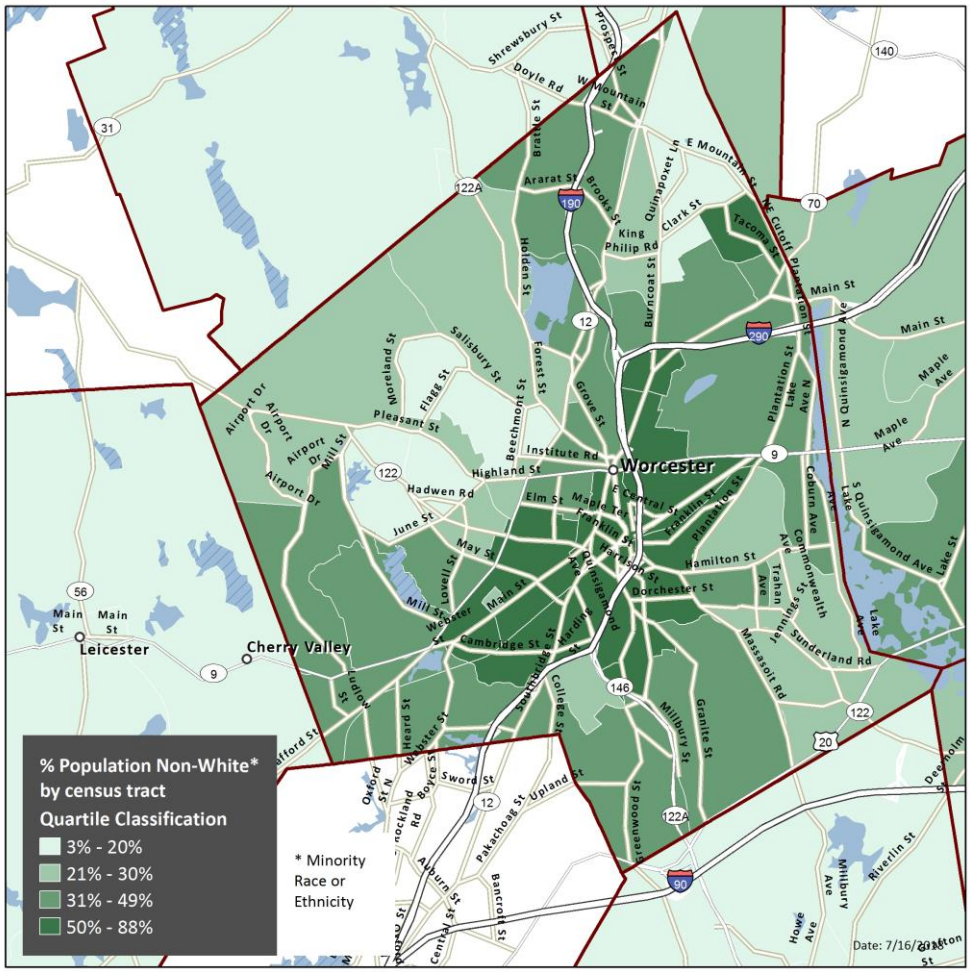
Figure 12: Race/Ethnicity (Service Area), 2012-2016

% of Population	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
White Alone	**79.3**	83.1	94.1	95.4	93.7	76.1	87.5	69.5
Black or African American Alone	**7.3**	4.5	1.2	1.6	0.8	3.8	6.8	13.6
Asian Alone	**6.1**	7.2	2.1	0.8	2.5	16.6	1.6	7.1
Hispanic/Latino (Of Any Race)	**10.9**	5.8	4.1	4.4	2.4	3.7	11.6	20.8

Source: US Census Bureau, American Community Survey
Shading represents statistical significance compared to the Commonwealth. Figures highlighted in red are statistically higher compared to the Commonwealth overall, while figures highlighted in blue are significantly lower.

Figure 13 illustrates the percentage of people identifying as non-white within Worcester at the census-tract level. According to this map, there are several areas around Central Worcester, and a portion of Northeast Worcester, where 50–88% of the population identifies as non-white.

Figure 13: Percentage of Population Non-White (Worcester), 2012-2016



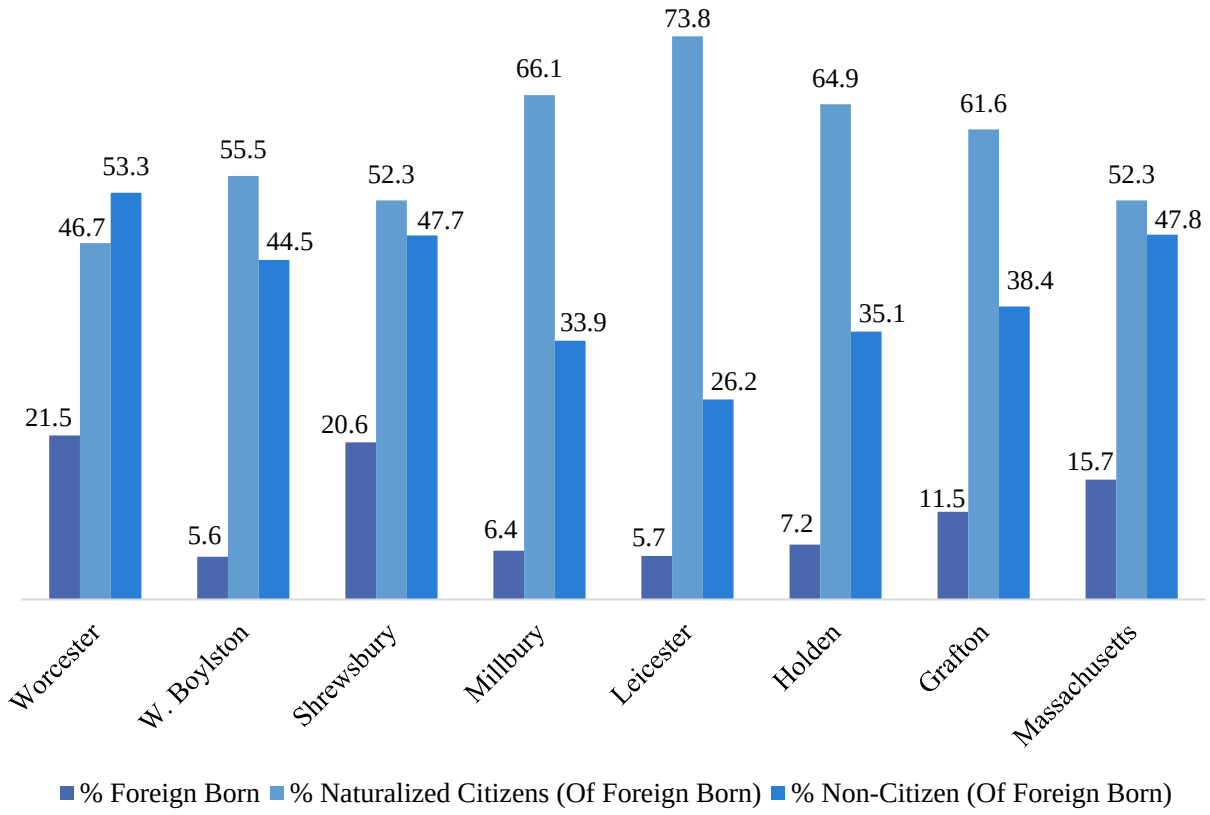
Source: US Census Bureau, American Community Survey

FOREIGN BORN

Many key informants and focus group/forum participants reported that foreign-born residents experience extreme stress and anxiety related to immigration status, especially in the context of current political debate. Fear of detainment and deportation prevents individuals from seeking vital community services and health care—and from engaging in their communities. These barriers allow health inequities to persist, creating undue burden on health care institutions and impeding prevention efforts.

The percentage of foreign-born residents in each municipality is significantly lower than the Commonwealth overall (16%), with the exceptions of Shrewsbury (21%) and Worcester (22%).

Figure 14: Foreign Born (Service Area), 2012-2016

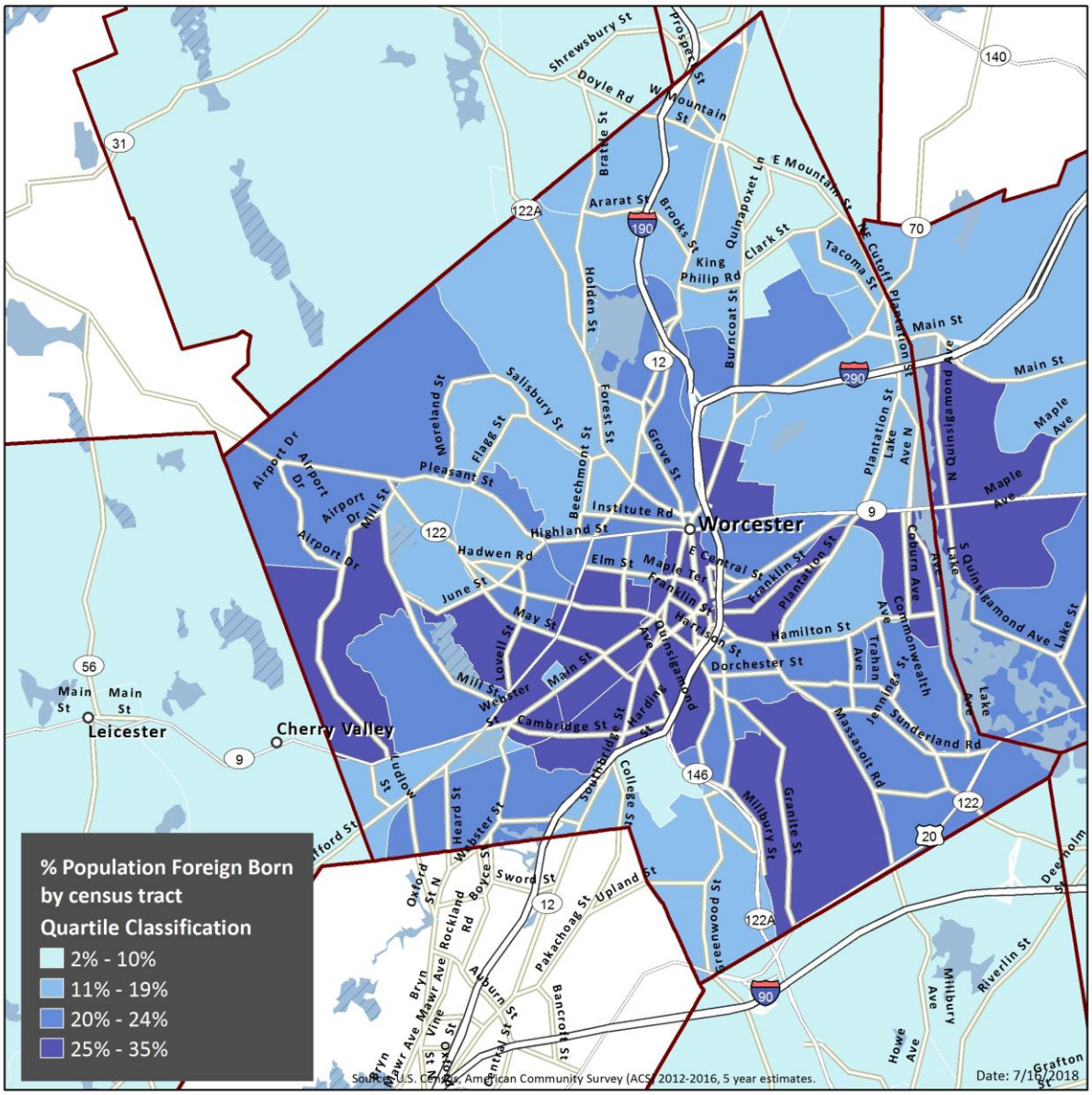


Source: US Census Bureau, American Community Survey

In Worcester, 30% of foreign-born residents were from Latin America, followed by Asia (29%), Africa (22%), Europe (18%) and North America (1%). In 2016, the number one country of origin of foreign-born residents in Worcester was Ghana (4,019), followed by the Dominican Republic (3,497) and Vietnam (3,491). In total, there were approximately 39,240 foreign-born residents in Worcester in 2016; 47% of them were naturalized citizens. Figure

15 depicts the percentage of foreign-born population in Worcester at the census tract level. Note that 25-30% of residents are foreign-born in many census tracts in the southern half of the city.

Figure 15: Percent of Population Foreign-Born (Worcester), 2012-2016



Source: US Census Bureau, American Community

LANGUAGE

Language barriers pose significant challenges to providing effective and high-quality community services and health care. While many larger health care institutions, including UMMMC, have medical interpreter services available at their facilities, research has found that the health care providers' cultural competency is key to reducing racial and ethnic health

disparities. Community focus group and forum participants supported these ideas, specifically noting a need for more Spanish- and Vietnamese-speaking providers. Beyond the need for diverse providers, participants also referred to the importance of hiring diverse support staff (medical assistants, certified nursing assistants, phlebotomists, etc.) and administrative staff to mediate other issues such as medication management, scheduling and arrangement of follow-up services.

Compared to the Commonwealth overall, most of the municipalities in the CHA service area had significantly lower percentages of non-English speakers (Figure 16). However, Shrewsbury has a significantly higher percentage of non-English speakers, specifically those that speak Indo-European languages, Asian and Pacific Islander languages and other languages. In Worcester, approximately 35% of residents speak a language other than English and among those residents, 17% have limited English proficiency.

Figure 16: Language Spoken At Home and Limited English Proficiency (Service Area), 2012-2016

Language Spoken At Home (%) and LEP* (%)	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
Other than English	**22.7**	17.4	9.9	7.7	8.4	25.4	15.3	34.7
Other than English, LEP	**8.9**	4.6	3.8	4.5	2.4	11.6	5.0	16.7
Spanish	**8.6**	4.6	2.8	3.1	0.6	2.5	10.6	15.9
Spanish, LEP	**3.5**	1.2	0.8	1.5	0	1.1	3.1	7.4
Other Indo-European	**8.7**	8.5	4.4	3.3	6.3	11.3	2.9	8.4
Other Indo-European, LEP	**3.0**	2.4	1.2	2.2	1.9	5.3	0.8	3.8
Asian/Pacific Islander	**4.1**	3.4	1.6	0.7	0.7	9.3	0.7	5.2
Asian/Pacific Islander, LEP	**1.9**	0.7	0.7	0.5	0.3	4.5	0.7	3.1

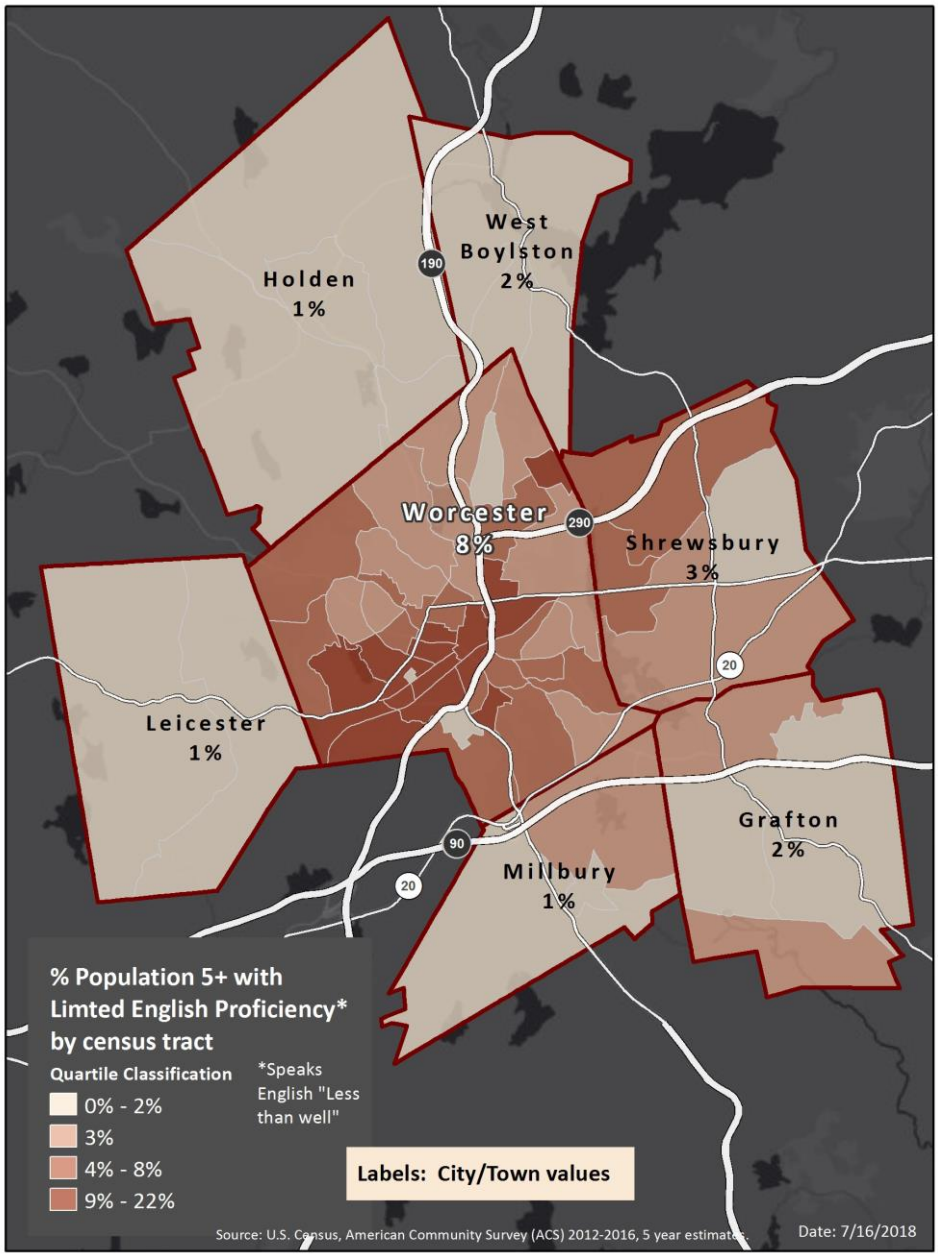
*Limited English Proficiency, or speaking English "less than very well."

Source: US Census Bureau, American Community Survey

Shading represents statistical significance compared to the Commonwealth. Figures highlighted in red are statistically higher compared to the Commonwealth overall, while figures highlighted in blue are significantly lower.

Figure 17 shows the percentage of the population with limited English proficiency by census tract in Worcester.

Figure 17: Percent of Population Over 5 Years of Age with Limited English Proficiency (Service Area), 2012-2016



Source: US Census Bureau, American Community Survey

LGBTQ

Lesbian, gay, bisexual, transgender and queer/questioning (LGBTQ) individuals face a number of health disparities linked to discrimination and stigma, though the severity of these disparities is often difficult to quantify, since questions around gender identity and sexual orientation are not included in most population-based surveys. Though there are no LGBTQ-specific diseases, members of this community are more likely to experience barriers in

accessing and maintaining care than heterosexuals and cis-gendered individuals.[8] For some among the LGBTQ population, sexually transmitted infections, like HIV, are a major concern. LGBTQ individuals are more likely to experience behavioral health issues, such as depression and substance abuse, which may be tied to high rates of stress.[9]

The Williams Institute, a think tank within the UCLA School of Law, has conducted a number of research studies on sexual orientation and gender identity in relation to law and public policy.[10] According to the Institute:

- In Massachusetts, 5% of the population identifies as LGBT (48% male and 52% female). The average age of LGBT individuals in Massachusetts is 40. Within this population, 26% are raising children.[11]
- In Massachusetts, 74% of LGBT individuals identify as white, 9% as Hispanic, 6% as African American, 3% as Asian/Pacific Islander, 1% as American Indian/Alaska Native and 7% as other race.[12]
- Looking at socioeconomic factors, 51% of LGBT individuals in Massachusetts have a college education compared to 47% of non-LGBT individuals; 8% of LGBT individuals in Massachusetts are unemployed, compared to 7% of non-LGBT individuals in Massachusetts and 27% of LGBT individuals have an income below $24,000 compared to 19% of non-LGBT individuals.[13]
- In Massachusetts, 95% of both LGBT and non-LGBT individuals have health insurance.[14]

VETERANS

Veterans are a population with distinct cultural values and unique health issues. They experience substance use disorders, mental health disorders (including depression, post-traumatic stress disorder and serious mental illnesses), traumatic brain injuries, chronic pain and serious bodily injuries at disproportionate rates compared to civilians.[15] These factors coalesce to produce a complicated set of issues that make it difficult for some veterans to reintegrate successfully into civilian life, exacerbating existing health issues and creating instability in personal and professional lives. According to the U.S. Census Bureau, approximately 8,500 veterans reside in Worcester; they are overwhelmingly male (94%).

[8] Cis-gendered refers to a person whose sense of personal identity and gender corresponds with their birth sex.
[9] Kevin L. Ard and Harvey J. Makadon, "Improving the Health Care of Lesbian, Gay, Bisexual and Transgender (LGBT) People: Understanding and Eliminating Health Disparities," *The National LGBT Health Education Center, The Fenway Institute*, 2012.
[10] The Williams Institute, "Same-Sex Couple and LGBT Demographic Data Interactive," *The Williams Institute Web Site,* https://williamsinstitute.law.ucla.edu/visualization/lgbt-stats/?topic=LGBT&area=25#economic, May 2016
[11] Ard, "Improving"
[12] Ard, "Improving"
[13] Ard, "Improving"
[14] Ard, "Improving"
[15] Maria Olenick, Monica Flowers, and Valerie J. Diaz, "US Veterans and Their Unique Issues: Enhancing Health Care Professional Awareness," *Advances in Medical Education and Practice* 6, (2015): 635-639.

Nearly one-third of veterans in Worcester are disabled (30%) and 12% live below the Federal poverty line (Figure 18). Though not mentioned often, veterans were identified as a priority population in Worcester by some focus group and forum participants.

Figure 18: Veterans (Worcester), 2012-2016

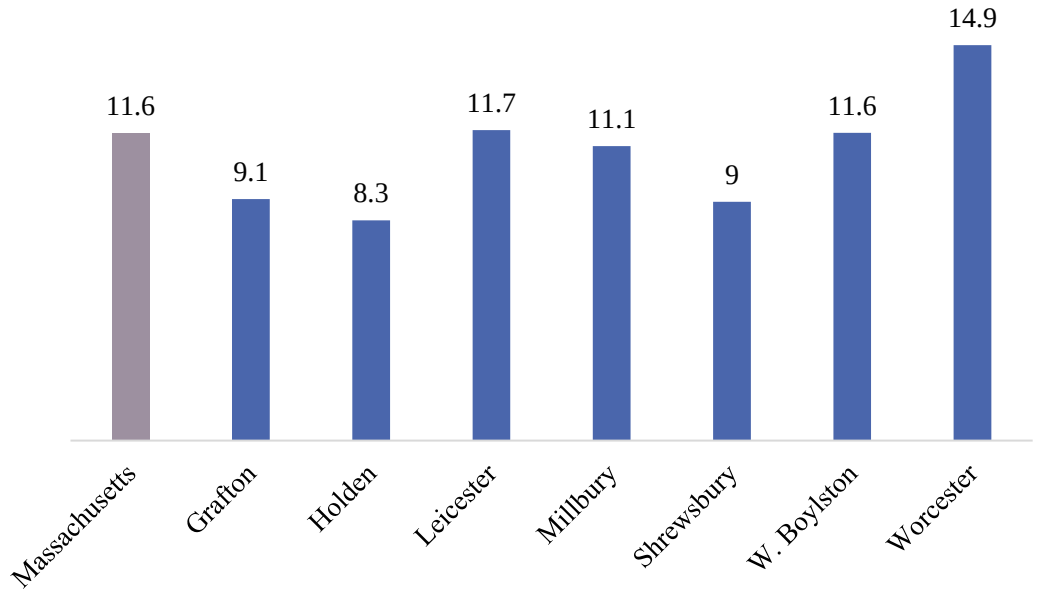
	Percent
Veterans as Percent of Population 18 and Older (%)	5.8
Male	94
Female	6
Disabled	30.2
Living Below Poverty Line	12

Source: U.S. Census Bureau, American Community Survey.

DISABILITY STATUS

Across the service area, the percentage of the civilian noninstitutionalized population who identify as differently-abled was low or significantly low in most municipalities compared to the Commonwealth, with the exception of Worcester (Figure 19).[16] Note that these figures do not include disabled veterans. As previously mentioned, veterans are more likely than civilians to be disabled. Including veterans in this category would likely skew the percentages higher.

Figure 19: Percent of Population Identifying as Disabled (Service Area), 2012-2016



Source: U.S. Census Bureau, American Community Survey

[16] Note that the American Community Survey six disability types: hearing difficulty, cognitive difficulty, ambulatory difficulty, self-care difficulty and independent living difficulty. Respondents who report any one of the six disability types are considered to have a disability.

One of the CHA Focus Groups centered around those with disabilities. Participants reported that disabled individuals of all ages struggle to find comprehensive, culturally competent and accessible medical care. Many participants described encounters at medical facilities with equipment, such as scales, examination tables and hospital beds that were inadequate for those with disabilities. Furthermore, there are significant gaps in competent care for individuals with specific disabilities, such as deafness. Several participants reported struggling to find medical and mental health care due to a lack of signing providers and American Sign language (ASL)/deaf interpreters.

SOCIOECONOMIC CHARACTERISTICS

Socioeconomic status (SES), as measured by income, employment status, occupation, education and the extent to which one lives in areas of economic disadvantage. It is linked closely to morbidity, mortality and overall well-being. Lower than average life expectancy is highly correlated with low-income status.[17]

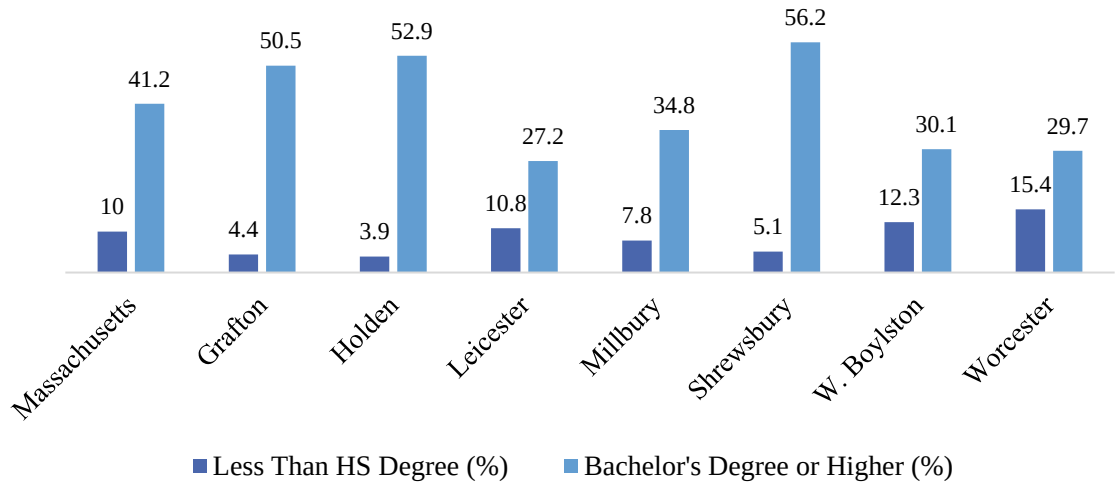
Education

Higher education is associated with improved health outcomes and social development at the individual and community levels.[18] Compared to individuals with more education, people with less education are more likely to experience health issues, such as obesity, substance use and injury.[19] The health benefits of higher education typically include better access to resources, safer and more stable housing and better engagement with providers. Proximate factors associated with low education that affect health outcomes include the inability to navigate the health care system, educational disparities in personal health behaviors and exposure to chronic stress.[20] It is important to note that, while education affects health, poor health status may also be a barrier to education.

As seen below in Figure 20, the percentage of residents with less than a high school degree was higher than the state in Leicester, West Boylston, and Worcester. The percentage of residents who earned a bachelor's degree or higher was significantly higher in Grafton, Holden and Shrewsbury than in the Commonwealth overall, but significantly lower in all other towns in the service area.

[17] Raj Chetty, Michael Stepner, Sarah Abraham, Shelby Lin, Benjamin Scuderi, Nicholas Turner, Augustin Bergeron, and David Cutler, "The Associaton Between Income and Life Expectancy in the United States, 2001-2014," *Journal of the American Medical Association* 315, no. 16 (April 26, 2016): 1750-1766.
[18] Emily B. Zimmerman, Steven H. Woolf, and Amber Haley, "Population Health: Behavioral and Social Science Insights – Understanding the Relationship Between Education and Health," Agency for Healthcare Research and Quality Web Site, https://www.ahrq.gov/professionals/education/curriculum-tools/ population-health/ zimmerman.html, September 2015
[19] Centers for Disease Control and Prevention, "Adolescent and School Health: Health Disparities," Centers for Disease Control and Prevention Web Site, https://www.cdc.gov/healthyyouth/disparities/index.htm, August 17, 2018
[20] Zimmerman, *Population Health*

Figure 20: Percent of Population by Educational Attainment for Population 25 and Older (Service Area), 2012-2016



Source: U.S. Census Bureau, American Community Survey.

Figure 21, below, breaks down educational attainment in Worcester in further detail.

Figure 21: Educational Attainment (Worcester), 2012-2016

Highest Level of Education	Number	Percent of Population 25 Years and Over
Less than 9th grade	7,811	6.5%
9th to 12th grade, no diploma	10,673	8.9%
High school graduate, includes equivalency	35,977	30.2%
Some college, no degree	19,778	16.6%
Associate's degree	9,274	7.8%
Bachelor's degree	21,921	18.4%
Graduate or professional degree	13,395	11.2%

Source: U.S. Census Bureau, American Community Survey.

The Massachusetts Department of Elementary and Secondary Education provides data on public school enrollment, attendance, retention and student characteristics. Figure 22 shows that, compared to the Commonwealth average, the dropout and retention rates, average absentee days and unexcused absences greater than nine days were all higher among Worcester Public School students.

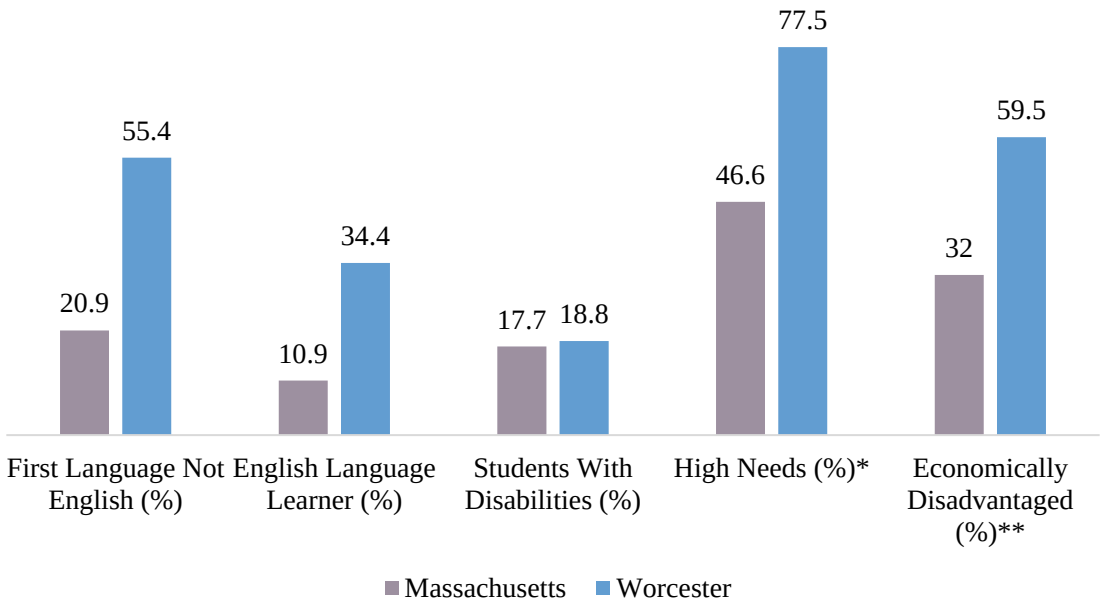
Figure 22: Public School Indicators (Worcester), 2016-2017

	Worcester	Massachusetts
Grade 9-12 dropout rate (%)	2.2	1.8
Retention rate (%)	2.0	1.3
Attendance rate (%)	94.1	94.6
Average number of days absent	9.8	9.3
Students with unexcused absences greater than nine days (%)	33.8	15.8

Source: Massachusetts Department of Elementary & Secondary Education.

It is important to consider the information shown in Figure 23 to contextualize these issues. Compared to the Commonwealth as a whole, the percentage of Worcester Public Schools students who are economically disadvantaged, high needs, disabled, or English as a Second Language/English Language Learners was higher in every category. All five of these factors may impede a child's ability to attend school and retain information, which in turn increases the chances of absenteeism and dropping out.

Figure 23: Worcester Public School Students, 2016-2017



Source: Massachusetts Department of Elementary & Secondary Education.

*The high needs subgroup is comprised of students who belong to one or more of the following student groups: students with disabilities, English learners (ELs) and former ELs, and economically disadvantaged students.

**A student is considered economically disadvantaged if they participate in one or more of the following state-administered programs: the Supplemental Nutrition Assistance Program (SNAP); Transitional Assistance for Families with Dependent Children (TAFDC); the Department of Children and Families' (DCF) foster care program; or MassHealth (Medicaid).

The Massachusetts Department of Education also reports on graduation rates by student group. Figure 24 shows that, in Worcester, Asian students have the highest graduation rate (95%), while students with disabilities have the lowest (63.7%). Students with disabilities also have the highest dropout rate (12%). Among racial/ethnic groups, Hispanic/Latino students have the highest dropout rate (9.9%).

Figure 24: 4-Year Graduation and Dropout Rates (Worcester), 2017

Student Group	% Graduated	% Dropped Out
English language learners	75.6	9.9
Students with disabilities	63.7	11.9
Low income	81	7.6
High needs	81.2	7.6
Black/African American	87.7	3.6
Asian	95.3	0.7
Hispanic/Latino	76.6	9.9
White	86.9	5.6

Source: Massachusetts Department of Elementary & Secondary Education.

Employment and Workforce

Lack of gainful and reliable employment is linked to several barriers to care, such as lack of health insurance, inability to pay for health care services and copays, and inability to pay for transportation that would enable them to receive services. Looking across the service area, the civilian labor force unemployment rate was significantly lower in all municipalities compared to the Commonwealth. However, as noted in nearly every interview, focus group and community forum, certain populations struggle to find and retain employment for a variety of reasons—ranging from mental and physical health issues to lack of childcare to transportation issues and other factors. According to the U.S. Census Bureau, the unemployment rate in Worcester was highest for Hispanic/Latino individuals (11.4%), followed by Blacks or African Americans (10.4%), Whites (8%) and Asians (7.9%). Figure 25 depicts the civilian unemployment rate by municipality.

Figure 25: Unemployment Rate (Civilian Labor Force) (%), 2012-2016



Source: U.S. Census Bureau, American Community Survey

In Worcester, the industry with the most employees were educational services, health care and social assistance. The next largest industry was retail, followed by professional, scientific, management and administrative waste management. Figure 26 includes the number of employees and median earnings in Worcester, by industry. Median earnings were highest for those in the information industry and lowest for those in agriculture, forestry, fishing, hunting and mining.

Figure 26: Employees and Median Earnings by Industry (Worcester), 2012-2016

Industry	Employees	Median Earnings
Public administration	3,556	$51,737
Finance and insurance and real estate and rental and leasing	5,547	$50,147
Information	1,742	$66,333
Professional, scientific, management, administrative waste management	9,206	$47,248
Manufacturing	7,029	$39,122
Construction	4,294	$46,479
Wholesale trade	2,666	$46,364
Educational services, health care, social assistance	28,073	$32,160
Transportation, warehousing, utilities	4,148	$29,136
Agriculture, forestry, fishing, hunting, mining	136	$6,402
Retail trade	11,191	$21,364
Other services, except public administration	3,702	$33,859
Arts, entertainment, recreation, accommodation services	9,392	$19,883

Source: U.S. Census Bureau, American Community Survey

Income and Poverty

The social determinants of health that rose to the top during interviews, focus groups and community forums as most critical were income and poverty. Based on these discussions, one of the greatest concerns in the region is generational poverty—poverty that persists in a family for at least two generations—and the way this impacts all aspects of an individual's life, including the ability to continue to higher education, access food and safe housing, and maintain good health.

The median household income was significantly higher than the Commonwealth's average in Grafton, Holden and Shrewsbury and significantly lower in Worcester. Looking at Figure 27, it is clear that issues related to income and poverty are most apparent in Worcester, where many lower income individuals may reside in locations with better proximity to supportive services, such as shelters, food pantries and multi-service programs. There were significantly more individuals living in poverty, across several demographic characteristics, in Worcester compared to the Commonwealth, and more individuals receiving cash public assistance and Supplemental Nutrition Assistance Program (SNAP) benefits.

Figure 27: Income and Poverty (Service Area), 2012-2016

	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
Median Household Income	**$71K**	$96.3K	$100.6K	$72.6K	$72.6K	$98.8K	$74K	$45.4K
Below 200% Poverty (%)	**24.3**	13.8	10.7	19.3	16.5	10.6	13.7	41.1
Below FPL* - All (%)	**11.4**	5.6	4.1	6.2	6.8	4.5	7.6	22.1
Below FPL* - Families (%)	**8.0**	3.7	2.2	3.1	5.7	3.2	3.6	16.5
Below FPL* - Under 18 (%)	**14.9**	5.3	3.7	5.6	9.1	3.7	10.6	30.6
Below FPL* - Over 65 (%)	**9.0**	9.8	6.0	7.1	9.9	5.5	5.7	14.4
Below FPL* - Female Head of Household, No Husband (%)	**25.2**	11.0	8.2	8.8	16.5	11.5	24.5	33.1
With Cash Public Assistance (%)	**2.9**	2.2	1.4	1.5	1.0	1.2	0.6	5.0
Food Stamps/SNAP in Past 12 Months (%)	**12.5**	6.3	3.5	6.9	7.1	2.9	3.8	22.1
Free and Reduced Lunch Enrollment (%)**	**44**	14.0	No data	37.0	31.0	17.0	21.0	75.0

*Federal Poverty Level

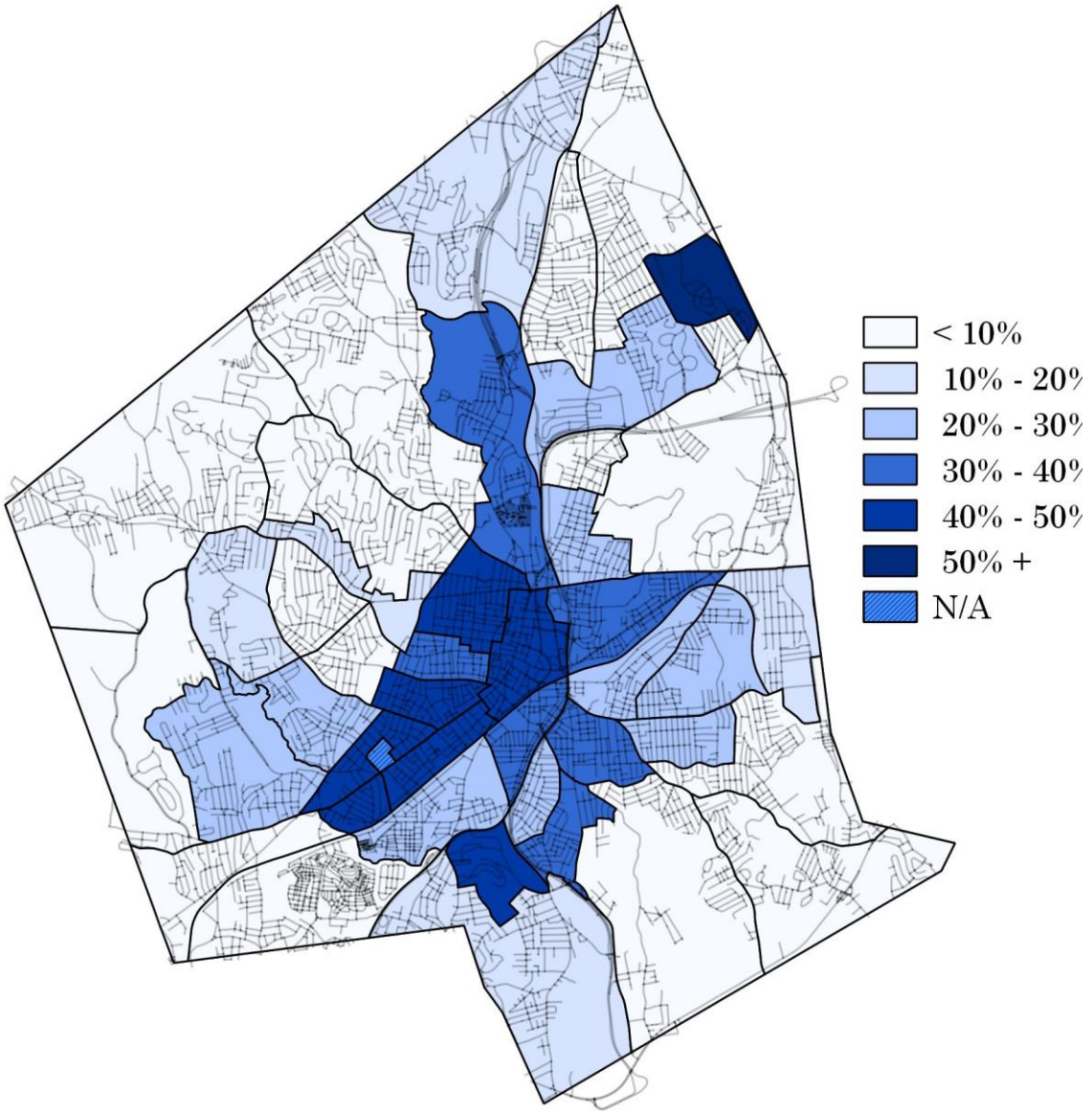
**Source is the Annie E. Casey Foundation, 2014-215

Source: US Census Bureau, American Community Survey

Shading represents statistical significance compared to the Commonwealth. Figures highlighted in red are statistically higher compared to the Commonwealth overall, while figures highlighted in blue are significantly lower.

Figure 28 depicts the percentage of residents living below the poverty level by census tract in Worcester. In a cluster of neighborhoods in the city center, 40–50% of residents live in poverty.

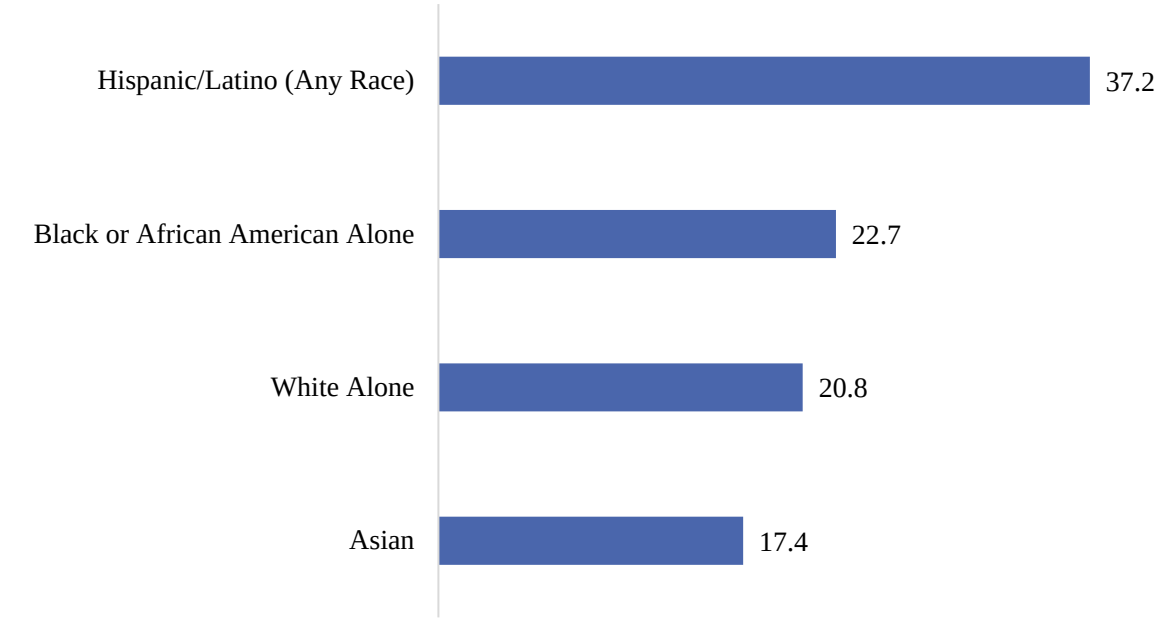
Figure 28: Percent of Worcester Residents Living Below Poverty Line, 2012–2016



Source: U.S. Census Bureau, American Community Survey, Image from Worcester Almanac

Looking at poverty in Worcester by race, there are nearly 25,000 White people living in poverty, followed closely by Hispanic/Latinos at nearly 15,000. Figure 29 breaks out poverty in Worcester by race/ethnicity.

Figure 29: Percent Living Below Poverty Level by Race/Ethnicity (Worcester), 2012-2016



Source: U.S. Census Bureau, American Community Survey

III. KEY FINDINGS: SOCIAL DETERMINANTS OF HEALTH AND BARRIERS TO CARE

The social determinants of health are the conditions in which people live, work, learn and play.[21] These conditions influence and define quality of life for many segments of the population in the CHA service area. A dominant theme from key informant interviews and community forums was the tremendous impact that the underlying social determinants, particularly housing, poverty, transportation and food access, have on residents in the service area.

The following is a brief discussion of the major domains. They are listed in order of concern or priority based on the frequency with which they arose during interviews and in the community forums.

HOUSING

Lack of affordable housing and poor housing conditions contributes to a wide range of health issues, including respiratory diseases, lead poisoning, infectious disease and poor mental health.[22] At the extreme are those without housing, including those who are homeless or living in unstable or transient housing situations. They are more likely to delay medical care and have mortality rates four times higher than those who have secure housing.[23]

According to a 2013 study of America's 25 largest cities, lack of affordable housing was the leading cause of homelessness. Adults who are homeless or living in unstable situations are more likely to experience mental health issues, substance use, intimate partner violence and trauma; children in similar situations have difficulty in school and are more likely to exhibit antisocial behavior.[24] Many key informants and participants in forums and focus groups expressed concern over the limited number of affordable housing units in Worcester and how this affects all individuals, including families with children, young professionals and older adults with fixed incomes.

[21] Centers for Disease Control and Prevention, "Social Determinants of Health: Know What Affects Health," Centers for Disease Control and Prevention Web Site, https://www.cdc.gov/socialdeterminants/, January 29, 2018.
[22] James Krieger and Donna L. Higgins, "Housing and Health: Time Again for Public Health Action," *American Journal of Public Health* 92, no. 5 (2002): 758-768.
[23] Thomas Kottke, Andriana Abariotes, and Joel B. Spoonheim, "Access to Affordable Housing Promotes Health and Well-Being and Reduces Hospital Visits," *The Permanente Journal* 22, (2018): 17-079.
[24] Kottke, *Access to Affordable*

Figure 30 provides information from a point-in-time survey of homeless individuals in Worcester as of January 2017.

Figure 30: Point-in-Time Homeless Counts (Worcester), January 2017

	SHELTERED				
	Emergency	**Transitional**	**Safehaven**	**Unsheltered**	**TOTAL**
Total # of Persons	640	362	13	96	1111
# Under 18	300	110	0	3	413
# Age 18-24	58	42	0	6	106
# Over 24	282	210	13	87	592
Total # Chronically Homeless Individuals	40	0	11	31	82

Source: Central Massachusetts Housing Alliance

While availability of housing is critical, the safety and accessibility of housing is just as important to maintaining good health. Studies have linked substandard housing to a number of chronic illnesses. Pest infestations, mold and water intrusion, old carpeting, and inadequate ventilation all contribute to higher rates of asthma and respiratory diseases, allergies, neurological disorders and hematologic illnesses. Rental households with children are more likely to have asthma triggers (e.g., mold, smoke, water leaks) in their home and more likely to have at least one child with asthma than owner households.[25]

All municipalities had significantly fewer vacant housing units compared to the Commonwealth, with the exception of Worcester (Figure 31). In all municipalities with the exception of Worcester, the majority of homes were owner-occupied; in Worcester, over half of homes are renter-occupied, and 54% of inhabitants spend more than 30% of their household income on rent.

[25] Bhargavi Ganesh, Corianne Payton Scally, Laura Skopec, Jun Zhu, *The Relationship Between Housing and Asthma Among School-Age Children*, The Urban Institute, October 2017.

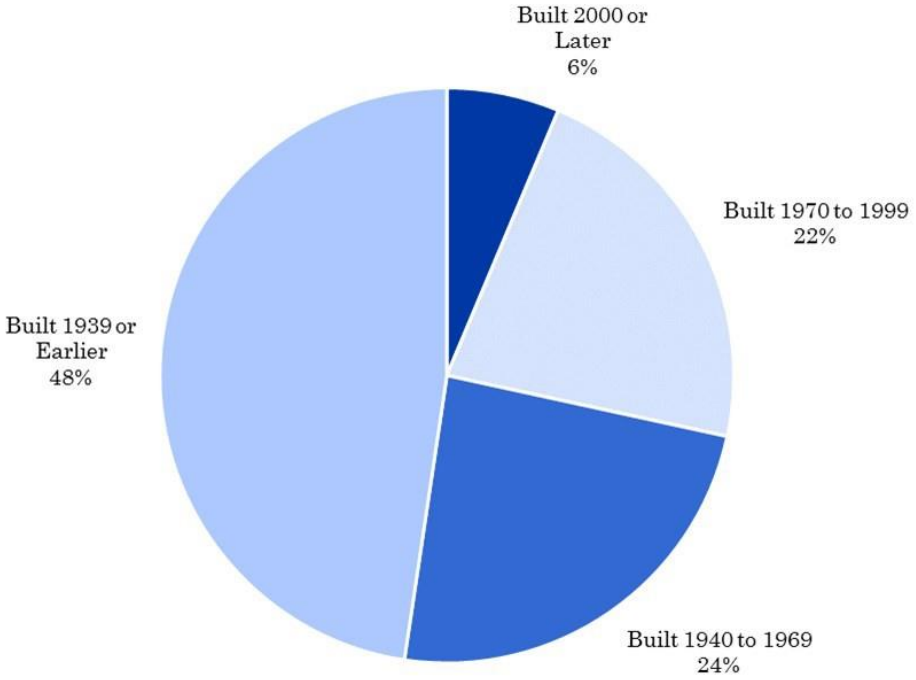
Figure 31: Housing (Service Area), 2012-2016

	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
Vacant Housing Units (%)	9.8	5.2	4.8	5.6	6.3	6.8	5.5	9.1
Owner-Occupied (%)	62.1	72.3	89.1	71.3	73.2	74.0	84.3	42.4
Monthly Owner Costs >30% of Household Income (%)	32.7	23.0	27.5	31.4	32.0	20.3	31.8	22.2
Renter-Occupied (%)	37.9	27.7	10.9	28.7	26.8	26.0	15.7	57.6
Gross Rent >30% of Household Income (%)	50.1	35.1	39.3	29.7	52.7	41.7	44.3	53.9

Source: US Census Bureau, American Community Survey
Shading represents statistical significance compared to the Commonwealth. Figures highlighted in red are statistically higher compared to the Commonwealth overall, while figures highlighted in blue are significantly lower.

In 2016, there were approximately 76,000 housing units in Worcester, most of which were occupied (91%) and within a multi-unit housing structure (62%). Almost 50% of Worcester's housing stock was built before 1939; much of it requires upgrades to achieve modern standards of safety and accessibility (Figure 32).

Figure 32: Age of Housing Stock (Worcester), 2012-2016



Source: U.S. Census Bureau, American Community Survey, from 2018 Worcester Almanac

TRANSPORTATION

Lack of transportation was cited as having a significant impact on access to health care services—and as a determinant of whether an individual or family had the ability to access the basic resources that allowed them to live productive and fulfilling lives. Access to affordable and reliable transportation widens opportunity and is essential to addressing poverty, unemployment and goals such as access to work, school, healthy foods, recreational facilities and a myriad of other community resources.

Interviewees and focus group/forum participants stated that while the Worcester Regional Transit Authority (WRTA) offered transportation for a reasonable fare, there were issues in the frequency and reliability of busses. For those living outside of Worcester and without a personal vehicle or access to ride-sharing services, traveling to the city for services or recreation is difficult.

FOOD ACCESS

Issues related to food insecurity, food scarcity and hunger are often discussed as risk factors to poor physical and mental health for both children and adults. There is an overwhelming body of evidence to show that many families, particularly low-income families of color, struggle to access food that is affordable, high-quality and healthy. While it is important to have grocery stores placed throughout a community to promote access, research shows that there are a number of factors that influence healthy eating, including quality and price of fruits and vegetables, marketing of unhealthy food and cultural appropriateness of food offerings.[26]

According to a report by Feeding America, over 41 million Americans live in food-insecure households. There are over 71,000 insecurity households in Worcester County in 2018—approximately 1 in 11 people. Among children, the rate is 1 in 8. The Worcester County Food Bank (WCFB) reports that across the region, patrons visit food pantries in the short term to sustain them through periods of disability or job loss. Increasingly, food pantries are being used as long-term strategies to supplement monthly shortfalls in food. Pantries and community meal programs have evolved from providing temporary or emergency food assistance to providing ongoing support for individuals, families, seniors living on fixed income, people with disabilities and adults working multiple low-wage jobs to make ends meet.

Many interviewees and community forum participants mentioned local efforts to combat food insecurity, including farmer's markets, community gardens, the Worcester County Food

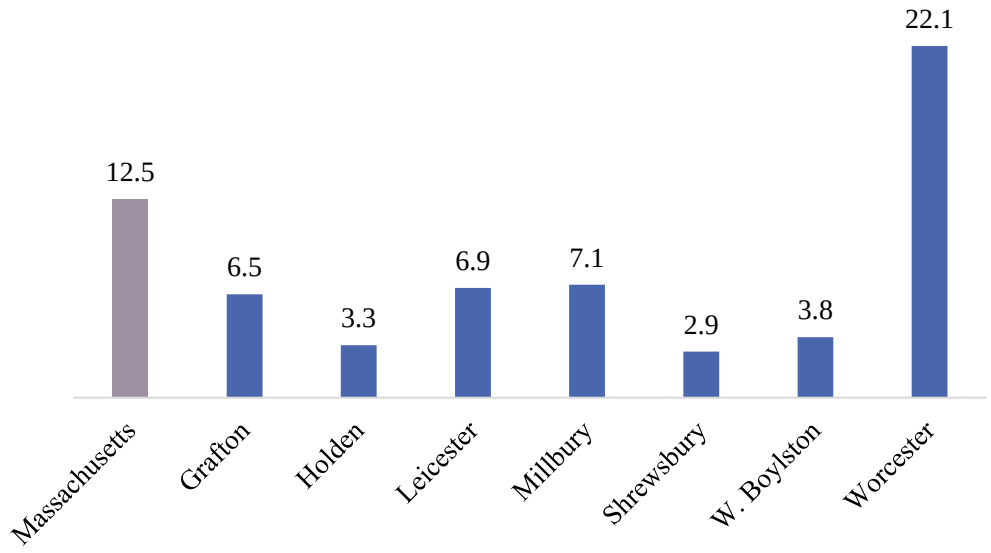
[26] The Food Trust, "Access to Healthy Food and Why It Matters: A Review of the Research," http://thefoodtrust.org/uploads/media_items/executive-summary-access-to-healthy-food-and-why-it-matters.original.pdf

Bank and the Worcester Food Policy Council. Although many are working towards total food security in the region, there is work to be done.

According to a 2012 study by students at Worcester Polytechnic Institute, supermarkets, which are larger and have more varied selections of healthy food and produce than convenience stores or small grocers, were likely to lie within Worcester neighborhoods that were predominantly white.[27] Furthermore, at the time of this study, the researchers found ethnic grocers in only four of Worcester's neighborhoods, with the most offerings in the Main South neighborhood.[28]

Looking at the larger service area, all municipalities, with the exception of Worcester, had a significantly lower percentage of residents receiving SNAP benefits in the past 12 months compared to the Commonwealth overall.

Figure 33: Percent of Population Receiving Food Stamp/SNAP Benefits (Service Area), 2012-2016



Source: U.S. Census Bureau, 2016 5-Year American Community Survey.

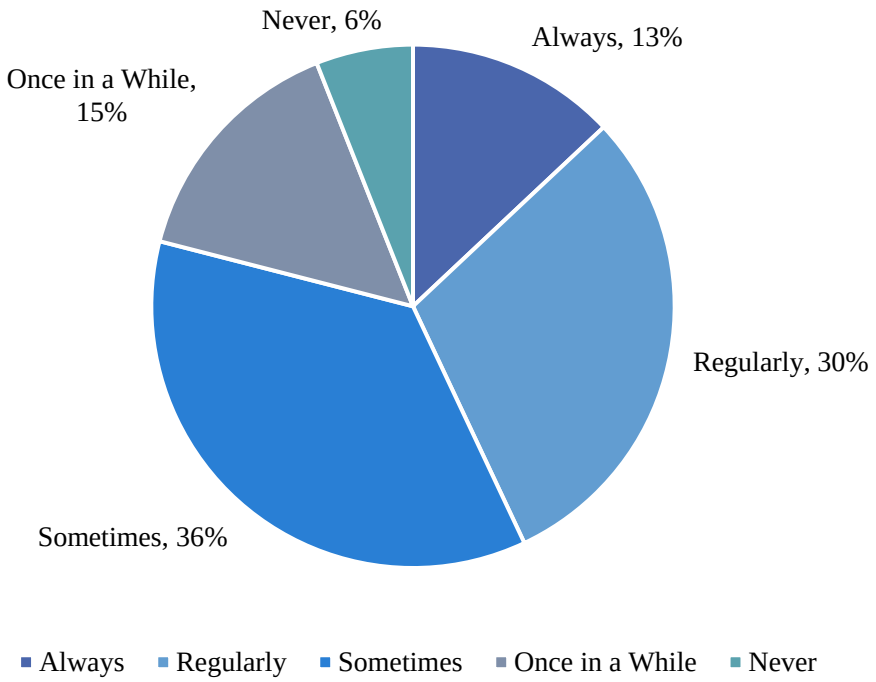
Several questions in the 2018 Community Health Survey were intended to characterize food insecurity and buying habits.

When asked how often they ate at least five servings of fruits and vegetables each day, approximately 13% responded "always," approximately 30% responded "regularly,"

[27] David Allen, James Filice, Neel Patel, and Brandy Warner, "Analyzing Food Security in Worcester," https://web.wpi.edu/Pubs/E-project/Available/E-project-043012-090858/unrestricted/IQP_Final_Paper.pdf, May 15, 2012
[28] Allen, *Analyzing Food*

approximately 36% responded “sometimes,” approximately 15% responded “once in a while,” and approximately 6% responded “never” (Figure 34).

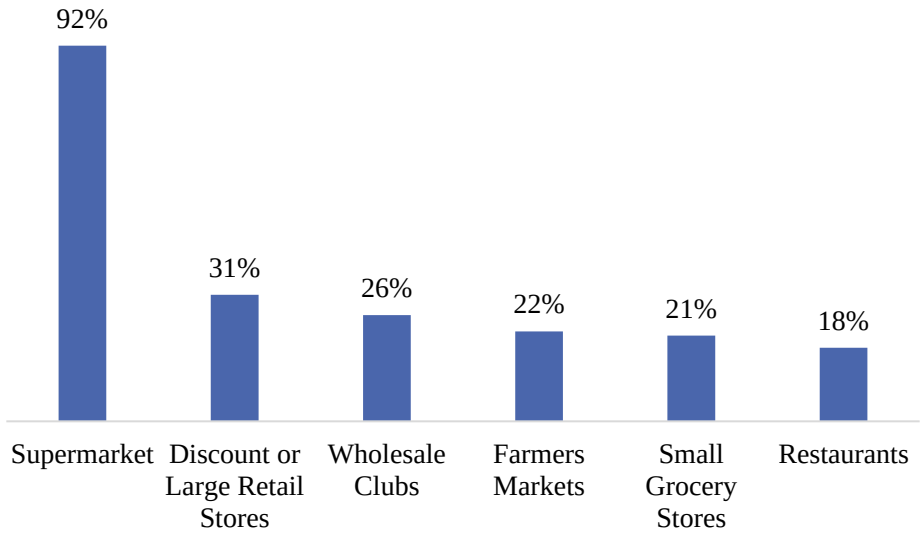
Figure 34: CHA Survey Results - How often do you eat five servings of fruits and vegetables each day?



Source: 2018 Community Health Survey

Respondents were asked where they got food from most often. Approximately 92% of respondents said the supermarket, 31% said discount or large retail stores, 26% said wholesale clubs, 22% said farmer’s markets and 21% said small grocery stores, and 18% said restaurants (Figure 35).

Figure 35: CHA Survey Results - Where do you get your food from most often?



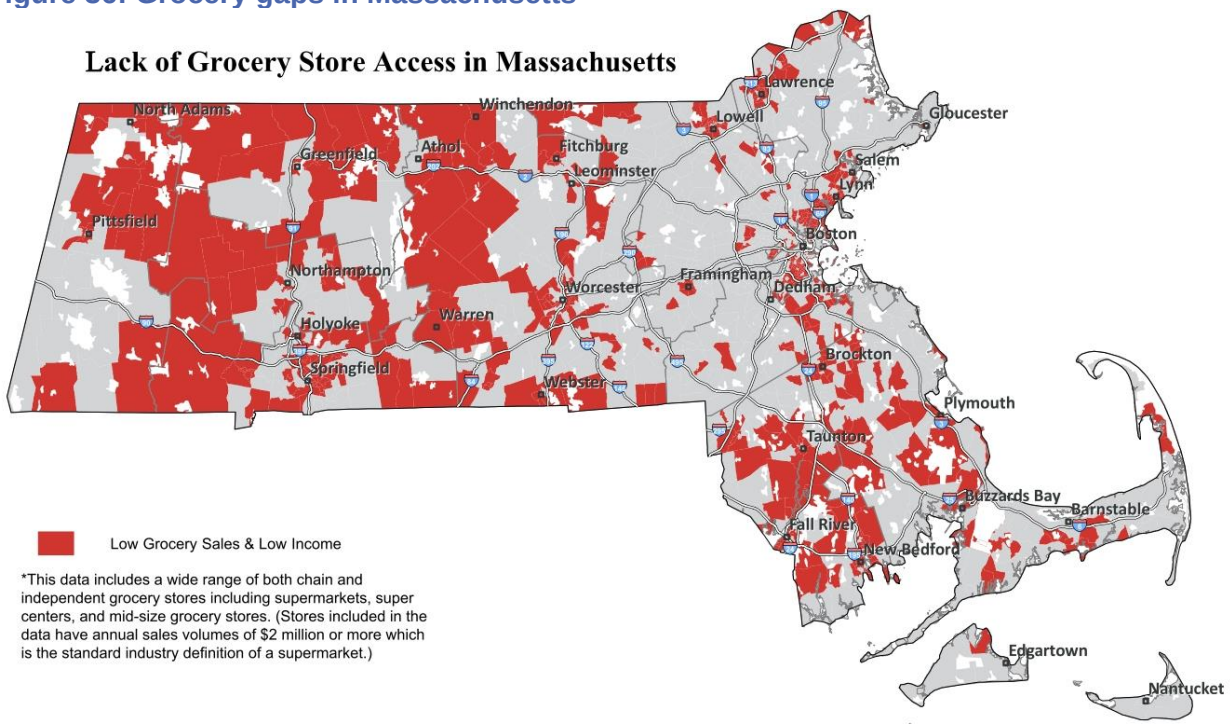
Source: 2018 Community Health Survey

In 2017, the Massachusetts Public Health Association (MPHA) produced a map of areas with "grocery gaps" in Massachusetts—grocery gaps are low-income areas that lack fully stocked and accessible grocery stores.[29] The map shows the gaps in the Greater Worcester region (Figure 36). According to the United States Department of Agriculture (USDA), there are three zip codes within Worcester that belong to census tracts that qualify as food deserts – 01603, 01602, and 01611, all located in the Western portion of the city. A food desert is defined as a low-income census tract where at least 33% of the population (or a minimum of 500 people) lives more than one mile away from a supermarket or large grocery store.[30] In 2017, 80,688 people in Worcester County received food assistance from the WCFB and its network of food pantries and community meal programs.

[29] Michael P. Norton, Where the Food Deserts Are: Gateway Cities Tend to Have Less Access to Grocery Stores," https://commonwealthmagazine.org/economy/where-the-food-deserts-are/, April 12, 2017

[30] United States Department of Agriculture Food Desert Census Tracts, reported by Community Commons, https://maps.communitycommons.org/viewer/?action=open_map&id=38120&bbox=-8013227.973648066,5191440.858365053,-7974436.181793392,5211773.107888883

Figure 36: Grocery gaps in Massachusetts



Source: Massachusetts Public Health Association

CRIME AND VIOLENCE

Crime and violence are public health issues that influence health status on many levels, from death and injury, to emotional trauma, anxiety, isolation and absence of community cohesion.

In Worcester in 2017, there were nearly 140,000 incidents reported to police (Figure 37). Violence disproportionately affects young people of color and people living in low-income neighborhoods.[31] Living in a neighborhood with pervasive violence is likely to increase chronic stress, leading to poorer health outcomes. These impacts often have a ripple effect on families, schools and entire communities.

Figure 37: Crime (Worcester), 2017

Type of Incidents	Count
Incidents	139,779
Disorderly conduct	19,841
Traffic accidents	9,356
Arrests	6,084
Noise disturbances	4,596
Vandalism	1,556
Breaking & entering	977
Larceny from motor vehicle	880
Motor vehicle theft	440
Aggravated non-domestic assault	389
Robberies	349
Aggravated domestic assault	259
Stabbings/slashings	101
Shooting victims	25
Shootings	24
Murder	5

Source: Worcester Police Department, from the 2018 Worcester Almanac

Although quantitative data is limited, a number of key informant interviewees and participants in focus groups/forums cited violence, specifically domestic violence and child abuse, as a key contributor to poor mental health and generational trauma. In the past, Worcester was among the 16 Massachusetts communities with the highest child victimization rates; in 2010, the child maltreatment reporting rate in Worcester was 84.6 per 1,000 residents, compared to 56.3 per 1,000 for the Commonwealth overall.

[31] Prevention Institute, "Fact Sheet Overview: Violence and Health Equity," https://www.preventioninstitute.org/sites/default/files/publications/Violence.HealthEquity.Overview.pdf

In the 2018 Worcester Community Health Assessment Survey, approximately:

- 36% of respondents reported witnessing violent incidents in their community
- 16% of respondents reported that they had been a victim of violence or domestic violence
- 85% of respondents reported feeling safe in their community
- 93% of respondents reported feeling safe in their home

BUILT ENVIRONMENT

The built environment—buildings, streets, parks, open spaces and other forms of physical infrastructure—have major influences on physical activity and lifestyle. Creating safe outdoor spaces for people to exercise, relax and commute is an important component in establishing healthy lifestyle habits that protect against poor health outcomes.

As of 2017, there were 60 parks, 34 playgrounds and over 1,300 acres of park space in the city of Worcester (Figure 38). Worcester is also home to the Blackstone River Bikeway, an off-road, multi-use path along the Blackstone River. The bike path stretches 48 miles, from Worcester to Providence. There are also bike paths in West Boylston and Holden.

Figure 38: Parks and Recreation (Worcester)

Type	Count
Parks	60
Dog Parks	2
Playgrounds	34
Fields for Sports	124
Swimming Beach, Pool, Spray Parks	7
Total Park Acreage	1,316
% of Total Acreage in City	6.3
State Parks	1
State Pools and Beaches	3

Source: City of Worcester Department of Public Works and Parks, from 2018 Worcester Almanac

ENVIRONMENT AND CLIMATE

In assessing the health of a community, we must consider the effects of environmental issues, including air and water quality, hazardous waste and climate change. While environmental health was not a key theme of this assessment, these issues can work to either prevent or control disease and disability in the community.

In 2017, drinking water in Worcester met all federal and state requirements set forth in the Safe Drinking Water Act. At the time of this assessment, air quality in Worcester was classified as “Good,” meaning that air quality is satisfactory and air pollution poses little or

no risk.[32]

In 2010, Worcester was designated as a "Green Community" by the Massachusetts Green Communities Program. Since then, there have been a number of sustainability accomplishments. In 2017, the city has:

- Completed construction of Nelson Place Elementary, an energy efficient building
- Made LED lighting upgrades in four municipal garages
- Installed over 13,000 LED streetlights
- Completed construction on a solar farm at the former Greenwood Street Landfill—the largest municipal solar farm in New England[33]

HEALTH LITERACY

Health literacy is the degree to which individuals have the capacity to obtain, process and understand basic health information needed to make appropriate health decisions. Low health literacy can have a major impact on health, as patients can have difficulty locating providers, following doctors' instructions, understanding medication directions and managing chronic conditions, among other issues.

Populations most likely to experience low health literacy are older adults, racial/ethnic minorities, people with low levels of education, low-income individuals, non-native speakers of English, and people with compromised health status.[34] During community forums and interviews, the need for improved health literacy arose as a key priority, especially for new immigrants, refugees, and asylees. Immigrants experience higher rates of morbidity and mortality than other segments of the population, and disproportionately suffer from a number of serious diseases. It is important for health providers and support staff to adopt culturally sensitive communication practices to improve the health literacy of immigrant populations.[35]

[32] World Air Quality Index, http://aqicn.org/contact/
[33] Worcester Energy, "Sustainability Accomplishments," http://www.worcesterenergy.org/leading-by-example/sustainability-accomplishments/chrono
[34] Office of Disease Prevention and Health Promotion, "Quick Guide to Health Literacy Fact Sheet: Health Literacy Basics," https://health.gov/communication/literacy/quickguide/factsbasic.htm
[35] GL Kreps and L Sparks, "Meeting the Health Literacy Needs of Immigrant Populations," Patient Education and Counseling71, no. 3 (2008): 328-332.

IV. KEY FINDINGS: BEHAVIORAL RISK FACTORS AND HEALTH STATUS

At the core of the CHA process is understanding—of access-to-care issues, of the leading causes of morbidity and mortality, and of the extent to which populations and communities participate in certain risky behaviors. This information is critical to assessing health status, clarifying health-related disparities and identifying health priorities. This assessment captures a wide range of quantitative data from federal and municipal data sources. Qualitative information gathered from key informant interviews and community forums informed this section of the report by providing perspective on the confounding and contributing factors of illness, health priorities, barriers to care, service gaps and possible strategic responses to the issues identified. This data augmented the quantitative data and allowed for the identification of the demographic and socioeconomic populations most at risk of experiencing barriers to care that have historically affected minority groups disproportionately.

BEHAVIORAL RISK FACTORS

There is a clear connection between certain health risk factors—such as obesity, lack of physical exercise, poor nutrition, tobacco use and alcohol abuse—and health status, the burden of physical chronic and complex conditions and issues related to mental health and substance use. While there was some recognition among interviewees and forum participants that the region's population was healthy and fared well across many risk factors, there was strong sentiment that racial/ethnic minorities and low-income populations were more likely to experience poor outcomes related to health risk factors. Issues such as obesity, fitness, nutrition and tobacco use were rarely, if ever, at the very top of informants lists of health priorities, but were clearly considered fundamental building blocks of good health.

Nutrition, Fitness, and Obesity

Lack of physical fitness and poor nutrition are among the leading risk factors associated with obesity and chronic health issues. Adequate nutrition helps prevent disease and is essential for the healthy growth and development of children and adolescents, while overall fitness and the extent to which people are physically active reduce the risk for many chronic conditions and are linked to good emotional health. Over the past two decades, obesity rates in the United States have doubled for adults and tripled for

children. Overall, these trends have spanned all segments of the population, regardless of age, sex, race, ethnicity, education, income or geographic region.

Looking at the service area, rates of hospitalization due to obesity were significantly lower in Holden (45.8 per 100,000) and Shrewsbury (35.9 per 100,000) compared to the Commonwealth overall (67 per 100,000). Rates in other towns were not significant compared to the Commonwealth (Figure 39).

Figure 39: Obesity Hospitalizations (Age-adjusted rate per 100,000 population), 2008-2012

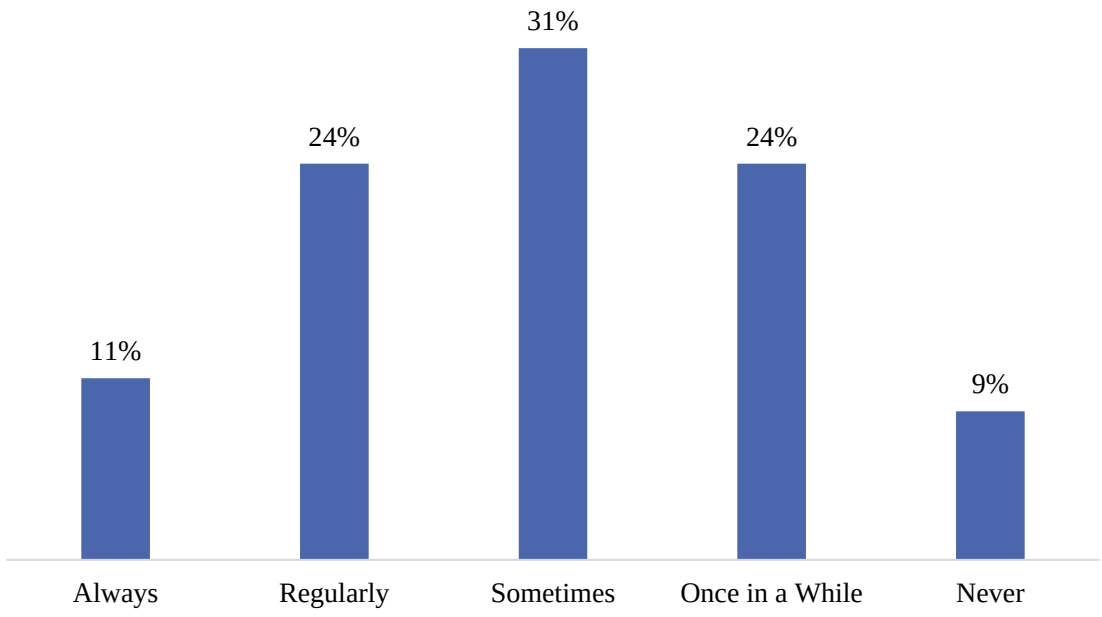
	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
Obesity Hospitalizations	**66.9**	54.0	45.8	68.5	65.5	35.9	54.5	63.0

Source: 2018 Community Health Survey

Shading represents statistical significance compared to the Commonwealth. Figures highlighted in red are statistically higher compared to the Commonwealth overall, while figures highlighted in blue are significantly lower.

In the 2018 Greater Worcester Community Health Survey, respondents were asked how often they exercised at least 30 minutes per day; approximately 11% responded "always," 24% responded "regularly," 31% responded "sometimes," 24% responded "once in a while," and 9% responded "never" (Figure 40).

Figure 40: CHA Survey Results - How often do you exercise at least 30 minutes per day?



Source: 2018 Community Health Survey

Tobacco and E-Cigarettes

Reducing tobacco use is the single most effective way to prevent death and disease in the U.S. Each year, more than 480,000 Americans die from tobacco-related illnesses. For every person who dies from tobacco use, 30 more people suffer with at least one serious tobacco-related illness, such as chronic airway obstruction, heart disease, stroke or cancer.

Using small area estimates from 2011-2015 Behavioral Risk Factor Surveillance System (BRFSS) data, the Massachusetts Association of Health Boards (MAHB) estimated the smoking rate for adults in all Massachusetts towns (Figure 41). As seen below, percentages were higher than the Commonwealth in Leicester, Millbury, West Boylston, and Worcester.[36]

Figure 41: Percent of Adult Population Who Smokes (Service Area), 2011-2015 Estimates

	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
Adult Smoking (%)	**15.5**	11.7	11.8	15.8	18.7	11.2	13.1	18.8

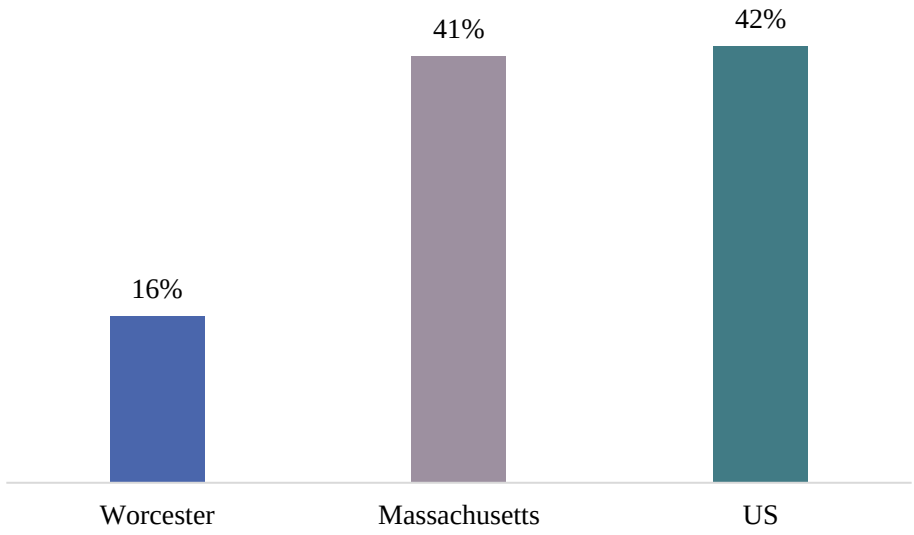
Source: 2011-2015 Behavioral Risk Factor Surveillance System (Analysis by Massachusetts Association of Health Boards)

Among high school students who participated in the Regional Youth Health Survey (RYHS), which includes students from Grafton, Millbury, Leicester, Shrewsbury and Worcester, approximately 8% reported that they had ever tried cigarette smoking. This was far lower than Commonwealth and national rates, which were 20% and 29%, respectively.

Interviewees and participants in focus groups and forums identified e-cigarette/vaping use as an emerging area of concern, especially among young people. While originally thought of as a safer alternative to cigarettes, the effects of using electronic cigarettes remain to be seen. What is known, however, is that these products, depending on the device used, may be used discreetly in schools, restaurants and other public places. Furthermore, these products are available in a variety of flavors, making them more attractive to children and teens. According to the RYHS, approximately 16% of high school students in the region reported having ever used an electronic vapor product, including e-cigarettes, e-cigars, e-pipes, vape pipes, vaping pens, e-hookahs and/or hookah pens. This is far lower than the percentage in the Commonwealth overall (41%) and the nation (42%).

[36] Massachusetts Association of Health Boards, "Tobacco Maps of Massachusetts," http://www.mahb.org/tobaccomaps/

Figure 42: Regional Youth Health Survey Results - Percent of High School Students Reporting They Have Ever Used an Electronic Vapor Product



Source: 2017 Greater Worcester Regional Youth Health Survey; 2017 Youth Risk Behavior Surveillance System

Alcohol Use

Risky behaviors related to alcohol are strongly correlated with chronic medical and mental health issues. Alcohol abuse raises the risk of developing chronic illnesses and increases the severity of illnesses once they emerge. Although much recent national and regional dialogue centers on the opioid epidemic, alcohol was consistently mentioned as one of the leading substance use issues in the Greater Worcester region at focus groups and community forums. Opioids and other drugs are discussed on Page 77 of this report.

Figure 42 includes data for those served by the Massachusetts Bureau of Substance Addiction Services (BSAS) in 2014. Looking across the service area, 25–35% of people served by BSAS in the service area named alcohol as their primary drug of choice. This is consistent with the Commonwealth average of 32%. Looking at hospitalizations and ED discharges related to alcohol and substance use, rates were significantly lower than the Commonwealth in all municipalities, with the exception of Worcester, which had a significantly higher rate of ED discharges related to alcohol/substance use (1,209 per 100,000 vs. 858 per 100,000).

Figure 42: Alcohol (Service Area)

	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
Total Number in BSAS Licensed Facilities (2014)*	**85,823**	161	101	126	223	253	0-100	4,915
Alcohol as Primary Drug of Use (%)	**31.9**	34.2	26.7	30.2	27.8	35.2	35.1	24.8
Alcohol/Sub. Use Related Hospitalizations (Age-adjusted per 100,000), 2008-2012**	**337.56**	136.93	145.54	194.7	198	122.01	164.72	338.82
Alcohol/Sub. Use Related ED Discharges (Age-adjusted per 100,000), 2008-2012	**858.83**	426.62	389.64	426.34	649.24	372.32	488.09	1209.27

*Source is the Massachusetts Bureau of Substance Abuse Services (BSAS), 2014

**Source is Massachusetts Hospital Inpatient and Emergency Visit Discharges, 2008-2012 (Accessed through MassCHIP)

Shading represents statistical significance compared to the Commonwealth. Figures highlighted in red are statistically higher compared to the Commonwealth overall, while figures highlighted in blue are significantly lower.

Sexual Health

Several interviewees and participants of focus groups and forums identified sexual health as a key area of concern, especially for adolescents and teens. Many felt that youth did not receive adequate sexual education in school, and made note of the consequences—sexually transmitted infections (STIs) and births to teen mothers. According to public health officials, STIs are on the rise nationally. In Worcester County, rates of gonorrhea, chlamydia and syphilis remain below overall Commonwealth rates, but they have been steadily increasing since 2015. Experts posit several theories as to why STIs are on the rise:

- More people are having unprotected sex.
- There are inconsistent approaches to screening, diagnosing and treating infections.
- "Hookup" culture has been made more popular by dating apps and social media.[37]

Figure 43 includes the number of lab-confirmed chlamydia and gonorrhea cases, as well as the probable and confirmed number of syphilis cases, for each municipality in the service area.

[37] Carl Enomoto, Sajid Noor, and Benjamin Widner, "Is Social Media to Blame for the Sharp Rise in STDs?" *Social Sciences* 6, no. 78 (2017)

Figure 43: Sexually Transmitted Infections – Number of Cases (Service Area), 2016

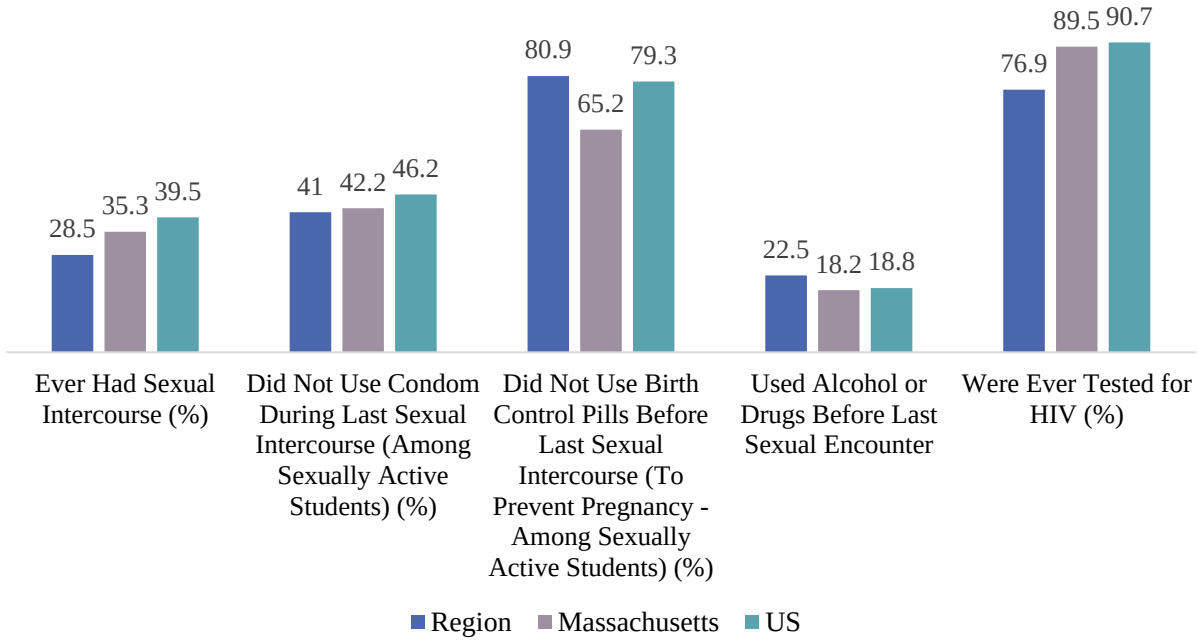
	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
Chlamydia cases (lab confirmed)	**26,448**	59	35	32	30	78	33	1156
Gonorrhea cases (lab confirmed)	**4,617**	<5	6	<5	5	7	<5	151
Syphilis cases (probable and confirmed)	**1,033**	NA	<5	<5	<5	<5	NA	37

Source: Massachusetts Department of Public Health Bureau of Infectious Disease and Laboratory Sciences

Several of the questions on the 2017 RYHS asked about sexual health. Figure 44 includes results among high school students in the region compared to the Commonwealth overall and to national averages. Compared to these state and national benchmarks:

- A smaller percentage of the region's high school students have ever had sexual intercourse.
- A smaller percentage of sexually active students in the region reported not using a condom during their last sexual encounter, but a larger percentage reported using birth control pills to prevent pregnancy.
- A larger percentage of the region's high school students reported that they used alcohol or drugs before their last sexual encounter.
- A smaller percentage of the region's high school students reported having ever been tested for HIV.

Figure 44: Results of Youth Health Survey - Sexual Health Among High School Students (Region vs. State vs. US) (2017)



Source: 2017 Greater Worcester Regional Youth Health Survey

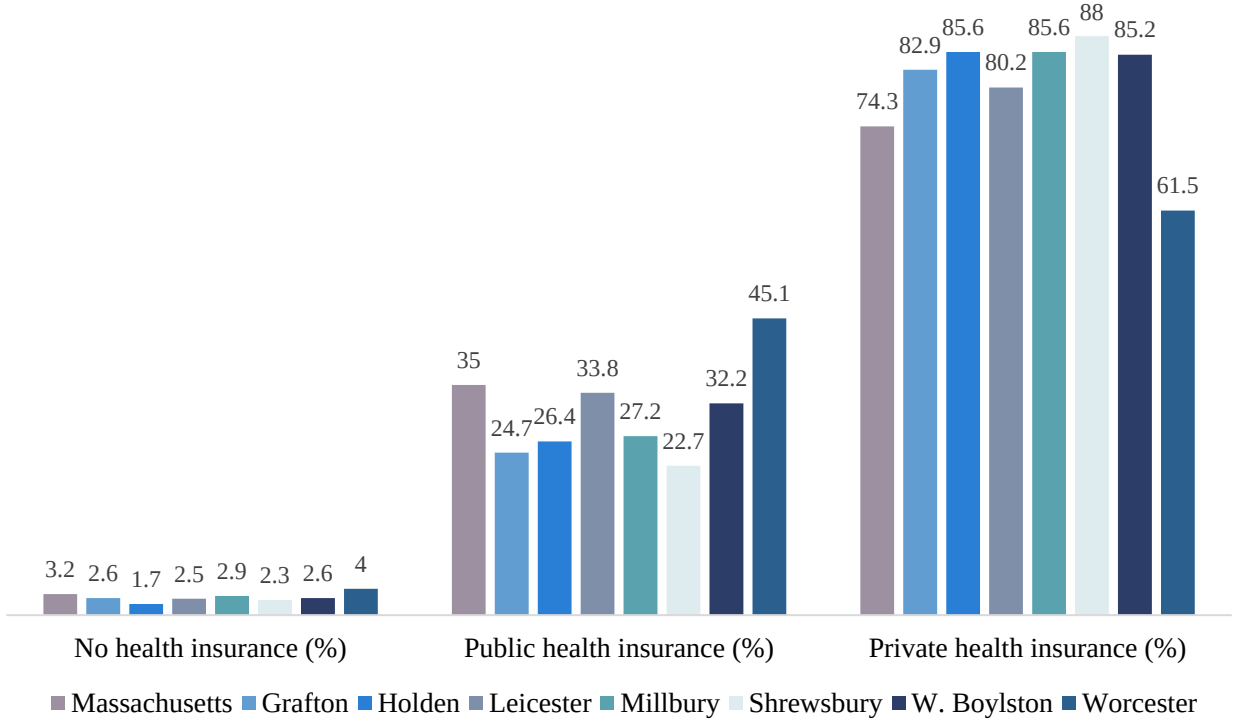
HEALTH STATUS ISSUES

Health Insurance and Access to Care

Whether an individual has health insurance—and the extent to which it helps to pay for needed acute services and access to a full continuum of high-quality, timely and accessible preventive and disease management or follow-up services—has been shown to be critical to overall health and well-being. Access to a usual source of primary care is particularly important, since it greatly affects the individual's ability to receive regular preventive, routine and urgent care—and to manage chronic diseases.

While Massachusetts has one of the highest health insurance coverage rates in the U.S., there are still pockets of individuals without coverage, including young people, immigrants and refugees, as well as those with low incomes. The percentage of residents without health insurance coverage was significantly lower in Holden (1.7%) compared to the Commonwealth overall (3.2%) and significantly higher in Worcester (4%). Looking at types of coverage, significantly more residents are covered under public health insurance plans in Worcester (45%) compared to the Commonwealth overall (35%). A significantly higher percentage of residents were covered under private health insurance in all municipalities, with the exception of Worcester, compared to the Commonwealth overall (74%).

Figure 45: Health Insurance Coverage (Service Area), 2012-2016



Source: US Census Bureau, American Community Survey

All-Cause Hospitalization, Emergency Discharge, and Mortality

Hospitalization, emergency discharge and mortality rates for all-causes combined (or "all-cause rates") are significantly lower or on-par with the Commonwealth average in most service area municipalities, with the exception of Worcester (Figure 46). It is important to note that certain populations face barriers to care that drive inappropriate hospital utilization and high rates of chronic disease. For example, individuals awaiting citizenship may delay seeking routine and preventative care out of fear of deportation, and utilize the emergency department more often than those with access to primary care. Furthermore, all-cause rates do not indicate that all residents of a municipality have equal or similar access to care simply based on proximity to services. For example, not all residents in Worcester have better access to health services than those in other municipalities, simply because they live closer to the hospital.

Figure 46: All-Cause Hospitalizations, ED Discharge, and Mortality (Service Area)

	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
All-cause hosp. (Age-adjusted rate per 100,000) (2008-2012)	**11,569.7**	9,394.9	9,534.3	10,516.3	10,625.5	9,596.0	9,251.8	13,169.1
All-cause ED discharges (Age-adjusted rate per 100,000) (2008-2012)	**36,897.6**	25,627.9	22,528.4	27,131.0	28,499.3	23,243.9	24,695.0	45,333.0
All-cause mortality (Age-adjusted rate per 100,000) (2015)*	**684.5**	840.4	713.9	842.5	873.0	620.8	701.9	905.3

Source: Massachusetts Hospital Inpatient and Emergency Visit Discharges, 2008-2012 (Accessed through MassCHIP)
*Source is Massachusetts Vital Records, 2015
Shading represents statistical significance compared to the Commonwealth. Figures highlighted in red are statistically higher compared to the Commonwealth overall, while figures highlighted in blue are significantly lower.

Chronic and Complex Conditions

Chronic and complex diseases such as heart disease, stroke, cancer and diabetes are responsible for approximately 7 in 10 deaths each year. Treating people with chronic conditions accounts for 86% of our nation's health care costs. Half of all American adults (ages 18 and over) have at least one chronic condition. Nearly 1 in 3 have multiple chronic conditions. Perhaps most significantly, chronic diseases are largely preventable, despite their high prevalence and dramatic impact. This underscores the need to focus on health risk factors, primary care engagement and evidence-based chronic disease management. There was broad, if not universal, acknowledgement and awareness of these pervasive health issues among interviewees and most forum participants.

For individuals with diabetes, the rates of hospitalization, related-hospitalizations (e.g. hypoglycemia, lower extremity amputation), ED discharges and mortality were lower or significantly lower in all municipalities compared to the Commonwealth, with the exception of Worcester. During focus groups with Hispanic/Latino participants, diabetes was identified as a major health issue for the population. Over the course of a lifetime, approximately 40% of adults in the U.S. are expected to develop type 2 diabetes—this

number increases to over 50% for Hispanic men and women.[38] According to the CDC, Hispanic individuals are also 50% more likely to die from diabetes than white individuals.[39]

Figure 47: Diabetes (Service Area)

	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
Hospitalizations (Age-adjusted rates per 100,000) (2008-2012)	**135.0**	71	79.0	155.1	123.2	89.6	96.4	180.1
Related Hospitalizations (Age-adjusted rates per 100,000) (2008-2012)	**1,845**	1,144.2	1,1288.7	1,922.5	1,662.0	1,391.8	1,362.2	2,450.6
ED Discharges (Age-adjusted rates per 100,000) (2008-2012)	**133.4**	48.8	69.1	107.7	85.0	84.9	102.4	185.4
Mortality (Age-adjusted rates per 100,000) (2015)*	**16.8**	--1	--1	--1	0	16.4	--1	26.1

Source: Massachusetts Hospital Inpatient and Emergency Visit Discharges, 2008-2012 (Accessed through MassCHIP)
*Source is Massachusetts Vital Records, 2015 || A value of --1 means data is suppressed due to low counts
Shading represents statistical significance compared to the Commonwealth. Figures highlighted in red are statistically higher compared to the Commonwealth overall, while figures highlighted in blue are significantly lower.

Cardiovascular and Cerebrovascular Disease

Cardiovascular and cerebrovascular diseases are affected by a number of health and behavioral risk factors, including obesity and physical inactivity, as well as the use of and environmental exposure to tobacco and alcohol use. Hypertension, or high blood pressure, increases the risk of more serious health issues, including heart failure, stroke and other forms of major cardiovascular disease. Racial disparities in hypertension and related disease outcomes are well documented. African-American men and women are at an increased risk for hypertension compared to their White counterparts, which has dramatic effects on life expectancy. The age of onset for stroke is earlier for African Americans, and the stroke mortality rate is double compared to White individuals.[40]

[38] Centers for Disease Control and Prevention, "Hispanic Health: Prevention Type 2 Diabetes," Centers for Disease Control and Prevention Web Site, https://www.cdc.gov/features/hispanichealth/index.html, September 18, 2017
[39] Centers for Disease Control and Prevention, *Hispanic Health*
[40] Daniel T. Lackland, "Racial Differences in Hypertension: Implications for High Blood Pressure Management," *American Journal of Medical Sciences* 348, no. 2 (2014): 135-138.

Looking at cardiovascular disease across the service area in Figure 48, the following is clear:

- Hospitalization, related-hospitalizations, ED discharge and mortality were significantly higher in Worcester across several conditions than in the Commonwealth overall. ED discharges for heart disease and major cardiovascular disease were significantly lower.
- In Leicester, the rate of heart-failure-related hospitalizations (1,341 per 100,000) was significantly higher than in the Commonwealth overall (1,191 per 100,000).
- In Millbury, the rate of hospitalization due to cerebrovascular disease (269 per 100,000) was significantly higher than in the Commonwealth overall (227 per 100,000).

Figure 48: Cardiovascular Disease (Age-adjusted rates per 100,000) (Service Area)

	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
Hypertension								
Related Hospitalizations (2008-2012)	**4,025.1**	2,959.6	3,171.6	3,813.0	3,901.8	3,568.9	3,362.1	4,766.2
ED Discharge (2008-2012)	**121.4**	66.3	71.2	81.3	78.5	81.9	56.7	141.7
Mortality (2015)*	**6.9**	--1	--1	--1	--1	--1	0	10.1
Heart Disease								
Hospitalizations (2008-2012)	**980.3**	771.8	859.1	1,015.2	930.5	933.8	869.3	1,022.3
ED Discharge (2008-2012)	**214.9**	138.6	126.3	187.9	145.2	179.1	168.1	152.1
Mortality (2015)*	**138.7**	170.9	121.5	149.6	173.6	146.5	106.3	161.5
Major Cardiovascular Disease								
Hospitalizations (2008-2012)	**1,343.9**	1,053.1	1,154.2	1,366.7	1,367.2	1,215.5	1,134.6	1,420.7
ED Discharge (2008-2012)	**402.1**	228.9	216	302.1	258.2	283.8	263.4	323.6
Mortality (2015)*	**180.8**	210.1	151	215.6	253.9	188.4	145.4	208.1
Heart Failure								
Hospitalizations (2008-2012)	**273.0**	147.0	196.2	251.8	223.1	258.1	237.1	313.5
Related Hospitalizations (2008-2012)	**1,191.5**	757.6	1,008.8	1,341.8	1,096.4	1,139.2	1,011.7	1,452.0
Cerebrovascular Disease								
Hospitalizations (2008-2012)	**227.6**	165.5	200.3	222.4	269.0	170.2	172.75	236.4
Mortality (2015)*	**28.4**	--1	--1	--1	57.8	29.6	33.6	31.7

Source: Massachusetts Hospital Inpatient and Emergency Visit Discharges (Accessed through MassCHIP)

*Source is Massachusetts Vital Records, 2015 || A value of --1 means data is suppressed due to low counts

Shading represents statistical significance compared to the Commonwealth. Figures highlighted in red are statistically higher compared to the Commonwealth overall, while figures highlighted in blue are significantly lower.

Cancer

Experts have identified risk and causal factors associated with cancer, but more research is needed to understand many unknowns. The majority of cancers occur in people who have no known risk factors, though the most common risk factors are well known: age, family history of cancer, smoking, overweight/obesity, excessive alcohol consumption, unprotected exposure to the sun, unsafe sex and exposure to airborne environmental and occupational pollutants. Outcomes and death rates resulting from all forms of cancer show major disparities, which are directly associated with race, ethnicity, income and comprehensive medical health insurance coverage, or lack thereof.

Figure 49 shows hospitalization, ED discharge and mortality rates for all cancers combined and the four most common forms (i.e., breast, colorectal, lung and prostate). Across service area municipalities, rates were lower or significantly lower compared to the Commonwealth overall, with two exceptions:

- The all-cause cancer hospitalization rate was significantly higher in Millbury (423 per 100,000) compared to the Commonwealth overall (371 per 100,000).
- The all-cause cancer mortality rate was significantly higher in Worcester (187 per 100,000) compared to the Commonwealth overall (152 per 100,000).

Figure 49: Cancer (Service Area)

	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
All-Cause								
Hospitalizations (2008-2012)	**371.3**	355.0	359.5	347.4	423.4	336.8	269.3	378.3
ED Discharge (2008-2012)	**15.5**	NA	NA	NA	NA	9.4	NA	13.0
Mortality (2015)*	**152.8**	200.2	186.1	123.8	194.9	145.7	135.6	187.8
Breast Cancer								
Hospitalizations (2008-2012)	**39.0**	32.4	21.4	NA	32.7	25.5	NA	23.7
ED Discharge (2008-2012)	**1.9**	0	NA	0	NA	0	0	2.9
Mortality (2015)*	**9.9**	--1	--1	--1	--1	11.7	0	13.9
Colorectal Cancer								
Hospitalizations (2008-2012)	**38.4**	30.2	35.4	39.7	32.7	31.3	NA	34.3
ED Discharge (2008-2012)	**0.8**	0	0	0	0	0	0	NA
Mortality (2015)*	**12**	--1	32.2	0	--1	--1	0	11.4
Lung Cancer								
Hospitalizations (2008-2012)	**44.8**	51.0	35.2	50.7	61.0	36.4	49.6	51.7
ED Discharge (2008-2012)	**2.6**	NA	0	NA	NA	NA	NA	1.3
Mortality (2015)*	**39.0**	67.4	49.5	--1	51.2	30.5	42.4	47.3
Prostate Cancer								
Hospitalizations (2008-2012)	**58.1**	66.2	61.6	36.5	85.4	65.1	47.1	53.3
ED Discharge (2008-2012)	**1.1**	0	0	0	0	0	0	NA
Mortality (2015)*	**7**	--1	--1	--1	0	--1	--1	11.1

Source: Massachusetts Hospital Inpatient and Emergency Visit Discharges (Accessed through MassCHIP)

*Source is Massachusetts Vital Records, 2015 || A value of --1 means data is suppressed due to low counts

Shading represents statistical significance compared to the Commonwealth. Figures highlighted in red are statistically higher compared to the Commonwealth overall, while figures highlighted in blue are significantly lower.

Respiratory Diseases

As discussed in previous sections, respiratory diseases, such as asthma and chronic obstructive pulmonary disorder (COPD), are exacerbated behavioral, environmental and location-based risk factors, including smoking, diet and nutrition, substandard housing and environmental exposures (e.g., air pollution, secondhand smoke). Looking across the service area (Figure 50):

- COPD hospitalization rates were significantly higher in Worcester (498 per 100,000) than in the Commonwealth overall (364 per 100,000)
- COPD mortality rates in Leicester (100 per 100,000) and Worcester (43 per 100,000) were significantly higher compared to in the Commonwealth (33 per 100,000).
- Hospitalization, asthma related-hospitalizations, ED discharge, asthma related-ED discharge and mortality rates for asthma were lower or significantly lower than the Commonwealth in all municipalities with the exception of Worcester, which were significantly higher in all but mortality.

Figure 50: Respiratory Conditions (Service Area)

	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
COPD								
Hospitalizations (2008-2012)	**364.3**	206.8	176.9	350.6	344.6	218.7	211.6	498.7
Mortality (2015)*	**33**	--1	29.5	100.1	65.3	30.2	--1	53.3
Asthma								
Hospitalizations (2008-2012)	**151.9**	91.6	74.9	137.2	112.6	81.6	88.3	226.4
Related Hospitalizations (2008-2012)	**899.1**	765.9	584.6	846.8	839.6	638.6	615.0	1,372.8
ED Discharges (2008-2012)	**573.4**	329.9	312.8	444.6	367.6	319.1	356.8	888.5
Related ED Discharges (2008-2012)	**1,443.9**	1,077.0	1,088.3	1,510.9	1,513.8	1,053.1	1,298.0	3,147.1
Mortality (2015)*	**1**	0	--1	0	--1	0	0	--1

Source: Massachusetts Hospital Inpatient and Emergency Visit Discharges (Accessed through MassCHIP)
*Source is Massachusetts Vital Records, 2015 || A value of --1 means data is suppressed due to low counts
Shading represents statistical significance compared to the Commonwealth. Figures highlighted in red are statistically higher compared to the Commonwealth overall, while figures highlighted in blue are significantly lower.

Pediatric Asthma

Key informants and participants of forums and focus groups mentioned pediatric asthma as a major health issue in the service area. Pediatric asthma is a longstanding issue in this region, as Worcester has historically had some of the highest rates in the Commonwealth. In the 2015-2016 school year, approximately 14% of students in Worcester Public Schools (3,635

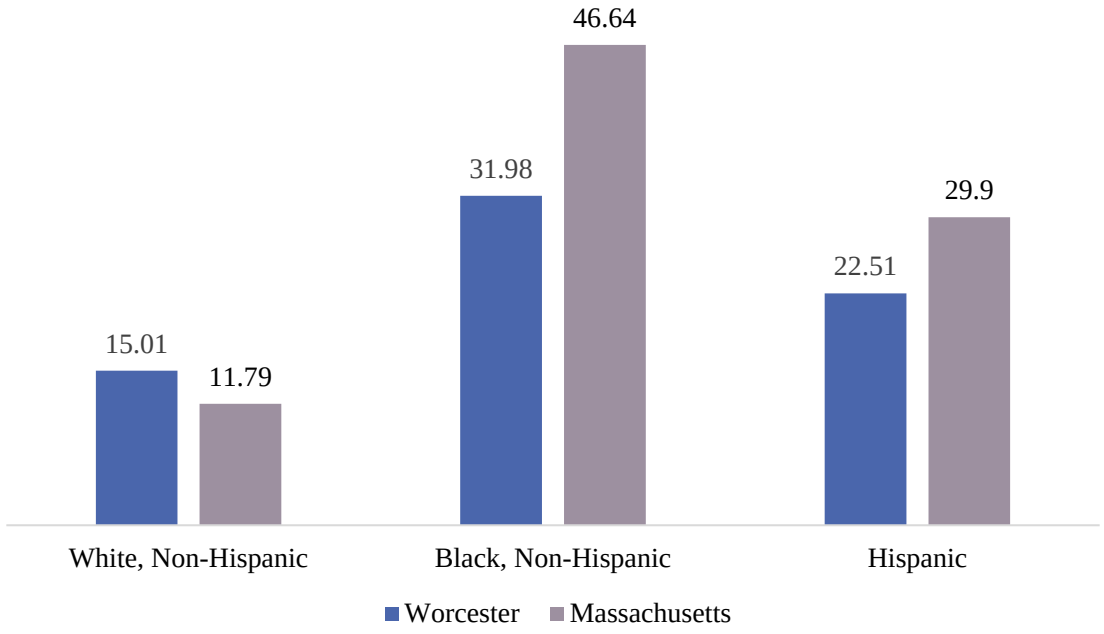
of 12,076 students) had been diagnosed with asthma.[41]

According to a 2012 report by the MDPH:[42]

- Between 2008 and 2012, children in Worcester had higher rates of ED visits due to asthma than children statewide, across racial/ethnic categories (e.g., white, non-Hispanic; black, non-Hispanic; Hispanic).
- Between 2008 and 2012, black and Hispanic children had higher asthma-related hospitalizations and ED discharges than white children.
- Between 2008 and 2012, Worcester health care charges associated with pediatric asthma were $13.1 million; Worcester children accounted for 5.5% of the Commonwealth's 72,442 hospitalizations and ED visits during that time.

Figure 51, below, depicts asthma hospitalization rates for children 19 and under in Worcester and the Commonwealth overall, by race/ethnicity from 2008-2012.

Figure 51: Asthma Hospitalization Rates Among Children 19 and Younger by Race/Ethnicity (Worcester vs. Massachusetts), Age-adjusted rates per 10,000 residents (2008-2012)



Source: Massachusetts Emergency Department Discharge Database, Massachusetts Center for Health Information and Analysis (CHIA), from the MDPH Facts About Pediatric Asthma

[41] Worcester Public Schools Essential School Health Service and Massachusetts Department of Elementary and Secondary Education

[42] Massachusetts Department of Public Health, "The Facts About Pediatric Asthma in Worcester," http://www.mass.gov/eohhs/docs/dph/com-health/asthma/factsheet-worcester.pdf

Mental Health

Mental health—including depression, anxiety, stress, serious mental illness and other conditions—was overwhelmingly cited as the leading health issue for residents of Worcester and surrounding municipalities. Individuals from across the health service spectrum discussed:

- The burden of mental health related to the level of generalized stress and anxiety felt by the general public
- Trauma experienced by children, immigrants, refugees and racial/ethnic minorities
- Co-morbidity among those with substance use issues
- The burden of serious mental illness, especially for those who are unstably housed
- The prevalence of mild to moderate depression across all segments of the population, from children to older adults

There was consensus among interviewees that there was a strong network of community partners working to meet the mental health needs of those in the community. Looking across the service area (Figure 52), the rate of mental health hospitalizations, hospitalizations related to mental health, ED discharges, ED discharges related to mental health, mortality and suicide were significantly lower than the Commonwealth in most municipalities, with some exceptions:

- The rate of mental-disorder-related ED discharges was significantly higher in Millbury (5,536 per 100,000) than the Commonwealth overall (4,990 per 100,000).
- In Worcester, all rates were significantly higher than in the Commonwealth, with the exception of the suicide rate, which was higher but not significantly so.

Figure 52: Mental Disorders (Service Area), Age-adjusted rates per 100,000

	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
Hospitalizations (2008-2012)	**837.8**	508.8	447.1	479.7	747.8	437.9	543.8	1,298.0
Related Hospitalizations (2008-2012)	**3,839.5**	2,693.4	2,522.6	3,229.2	3,710.4	2,518.2	2,941.2	5,289.2
ED Discharges (2008-2012)	**2,091.8**	1,355.1	1,114.2	1,295.4	1,741.5	1,119.7	1,278.8	2,784.3
Related ED Discharges (2008-2012)	**4,990.4**	3,520.9	3,205.8	4,472.4	5,536.0	3,011.9	3,927.5	8,299.9
Mortality (2015)*	**62.9**	80.6	76.5	97	58.1	49.1	86.1	85.2
Suicide Deaths (2015)*	**9.0**	--1	--1	--1	--1	--1	--1	11.6

Source: Massachusetts Hospital Inpatient and Emergency Visit Discharges (Accessed through MassCHIP)

*Source is Massachusetts Vital Records, 2015 || A value of --1 means data is suppressed due to low counts

Shading represents statistical significance compared to the Commonwealth. Figures highlighted in red are statistically higher compared to the Commonwealth overall, while figures highlighted in blue are significantly lower.

Substance Use (Opioids, Alcohol, and Other Drugs)

Second to mental health, substance use was named as a leading health issue among key informants and focus group/forum/survey participants. Behavioral health providers reported that the burden on hospital inpatient and ED services was extreme, as individuals continue to struggle to access care services, including rehabilitation and detox, outpatient treatment and medication-assisted treatment. As with mental health services, there are a number of community partners working to fill service gaps and address the needs of both individuals and the at-large community, although some individuals may face delays or barriers to care due to limited providers and specialists, limited treatment beds and social determinants that impede access (e.g., housing, employment, transportation, etc.). Participants were particularly concerned about the effects of the opioid epidemic on the individuals using the drugs and their children, families and the community at large. Looking at treatment statistics across the service area (Figure 53):

- The majority of clients treated in BSAS contracted/licensed facilities were typically white, between 18 and 40 years old and unemployed. Across municipalities, 37–50% of clients had received prior mental health treatment.
- Across municipalities, the primary drug used by clients was heroin (54–62%), followed by alcohol and crack cocaine. This was consistent with Commonwealth averages.

Figure 53: People Served in BSAS Contracted/Licensed Facilities (Service Area), 2014

	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
Number of People Served	**85,832**	161	101	126	223	253	0-100	4,915
Client Characteristics								
White (%)	**81**	91	94	91	91	91	97	70
Black or African American (%)	**7**	4	M/U	M/U	M/U	M/U	M/U	6
Multi-Racial or Other (%)	**12**	4	M/U	M/U	8	7	M/U	24
Hispanic (%)	**12**	M/U	M/U	6	4	4	M/U	25
Less than HS Diploma (%)	**24**	15	22	26	15	13	10	25
Under 18 (%)	**2**	M/U	M/U	M/U	M/U	M/U	M/U	1
18-25 (%)	**21**	33	43	59	23	47	28	16
26-30 (%)	**21**	16	16	10	16	18	20	20
31-40 (%)	**26**	27	23	15	36	15	24	28
41-50 (%)	**19**	17	9	11	19	10	15	13
51 and Older (%)	**12**	7	9	7	7	9	11	13
Homeless (%)	**18**	8	9	14	7	5	11	25
Unemployed (%)	**76**	71	75	78	76	64	68	87
Had Prior Mental Health Treatment (%)	**44**	37	49	35	45	44	50	45
Primary Drug of Use								
Alcohol (%)	**32**	34	29	30	28	35	35	25
Heroin (%)	**53**	56	55	44	62	54	57	62
All Other Opioids* (%)	**6**	6	10	13	5	5	ND	5
Crack/Cocaine (%)	**3**	M/U	M/U	M/U	3	3	M/U	4
Marijuana (%)	**4**	M/U	M/U	10	M/U	3	M/U	3
Other** (%)	**2**	M/U	M/U	M/U	M/U	M/U	M/U	3

M/U = Value is missing or unknown

*Includes prescription Methadone, other opiates, Oxycodone, non-prescription Suboxone, prescription opiates, and non-prescription opiates

**Includes PCP, hallucinogens, methamphetamine, amphetamines, stimulants, benzodiazepines, tranquilizers, barbiturates, sedatives, inhalants, over-the-counter drugs, club drugs, and other.

Source: Massachusetts Bureau of Substance Abuse Services

Looking at hospitalization, ED discharge and mortality rates for substance use overall and opioids specifically (Figure 55):

- Overall rates of hospitalization and ED discharge due to alcohol/substance use was significantly lower in all municipalities compared to the Commonwealth, with the exception of Worcester, where the rate of related ED discharge was significantly higher (1,209 per 100,000 compared to 858 per 100,000, respectively).
- Rates of hospitalization, related ED discharges and fatal overdoses related to opioids was significantly low in all municipalities, with the exception of Worcester, where hospitalization and ED discharge rates were significantly higher than in the Commonwealth overall.

Figure 54: Substance Use (Service Area), Age-adjusted rates per 100,000

	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
Alcohol/Substance Use								
Related hospitalizations (2008-2012)	**337.5**	136.9	145.5	194.7	198	122.0	164.7	338.8
Related ED discharges (2008-2012)	**858.8**	426.6	389.6	426.3	649.2	372.3	488.0	1,209.2
Opioids								
Hospitalizations (2008-2012)	**315.5**	150.6	118.4	170.6	224.1	122.2	158.3	452.8
Related ED discharges (2008-2012)	**259.6**	158.2	125.3	166.4	203.7	148.8	184.1	315.6
Opioid-related fatal overdoses (2015)*	**24.6**	--1	--1	--1	--1	--1	0	43.6

Source: Massachusetts Hospital Inpatient and Emergency Visit Discharges (Accessed through MassCHIP)

*Source is Massachusetts Vital Records, 2015 || A value of --1 means data is suppressed due to low counts

Shading represents statistical significance compared to the Commonwealth. Figures highlighted in red are statistically higher compared to the Commonwealth overall, while figures highlighted in blue are significantly lower.

The Worcester Police Department compiles a monthly overdose report. According to the most recent report, released on July 13, 2018:

- There have been 1,051 opioid-related overdoses (fatal and non-fatal) in Worcester since July 2017.
- In the past year, 66% of overdose victims were men; 76% resided within Worcester; 55% were white, 24% were of unknown race/ethnicity, 14% were Hispanic, 4% were black and 1% was Asian/Pacific Islander.
- The average age of opioid overdose victims in Worcester was 37, but ranges from 15 to 71.

- It is projected that there will be 1,023 non-drug-specific overdoses in 2018. This is 215 fewer than the 1,238 overdoses reported in 2017

There is limited data about marijuana use among adults, however, the RYHS asked several questions about youth marijuana use:

- 5% of high school students reported that they tried marijuana for the first time before the age of 13. This is slightly higher than the Commonwealth (4%) percentage, but lower than the national percentage (7%).
- 19% of high school students reported that they currently use marijuana (defined as one or more times during the 30 days prior to the survey). This is slightly lower than Commonwealth (24%) and national (20%) averages.
- 31% of high school students reported that they had ever used marijuana – lower than both the Commonwealth (37%) and the national (36%) percentages.

Infectious Disease

Though great strides have been made to control the spread of infectious diseases in the U.S., they remain a major cause of illness, disability and even death. STIs, diseases transmitted through drug use, vector-borne illnesses, tuberculosis, pneumonia and influenza are among the infectious diseases that have the greatest impact on modern American populations. Though not named as a major health concern by interviewees or participants of forums and focus groups, disease burden must be tracked to prevent outbreaks and identify patterns in morbidity and mortality. Young children, older adults, individuals with compromised immune systems, injection drug users and those having unprotected sex are most at risk for contracting infectious diseases.

Across the service area (Figure 55):

- Hospitalizations and mortality due to all infectious and parasitic diseases was significantly higher in Worcester compared to the Commonwealth overall and lower or significantly lower in the other municipalities.
- The rate of hospitalization and mortality due to influenza/pneumonia was significantly higher in Worcester (386 per 100,000) compared to the Commonwealth overall (322 per 100,000). Rates in other municipalities were lower or significantly lower.
- The rate of hospitalizations due to HIV/AIDS was significantly higher in Worcester (42 per 100,000) compared to the Commonwealth overall (12 per 100,000). The HIV/AIDS mortality rate was significantly lower than the Commonwealth in the other municipalities in the region.

Figure 55: Infectious Disease (Service Area)

	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
Hepatitis C cases (confirmed and probable, past or present) (2015)*	**8,986**	6	13	7	11	17	8	330
Lyme Disease cases (confirmed and probable) (2015)*	**4,352**	31	15	10	13	23	10	45
Pneumonia/Influenza								
Confirmed influenza cases (2015)*	**15,869**	19	15	12	19	50	<5	244
Hospitalizations (Age-adjusted rate per 100,000) (2008-2012)**	**322.1**	264.9	316.6	282.6	290.0	283.8	283.2	386.4
Mortality (Age-adjusted rate per 100,000) (2015)***	**17.1**	--1	--1	--1	--1	9.8	34.9	27.9
HIV/AIDS								
Hospitalizations (Age-adjusted rate per 100,000) (2008-2012)**	**12.4**	NA	NA	NA	0	NA	NA	42.3
Mortality (Age-adjusted rate per 100,000) (2015)***	**1.1**	--1	0	0	0	0	0	--1
Infectious and Parasitic Disease								
Hospitalizations (Age-adjusted rate per 100,000) (2008-2012)**	**396.8**	312.6	393.7	423.5	358.6	388.0	386.0	545.4
Mortality (Age-adjusted rate per 100,000) (2015)***	**18.9**	--1	--1	--1	--1	27.3	--1	31.8

*Source: Massachusetts Department of Public Health, Bureau of Infectious Disease and Laboratory Sciences

**Source: Massachusetts Vital Records, 2015 || A value of --1 means data is suppressed due to low counts

***Source: Massachusetts Hospital Inpatient and Emergency Visit Discharges (Accessed through MassCHIP)

Shading represents statistical significance compared to the Commonwealth. Figures highlighted in red are statistically higher compared to the Commonwealth overall, while figures highlighted in blue are significantly lower.

Tuberculosis is an infectious disease that affects the lungs. It was once rare in developed countries. Due to the spread of HIV and its effect on the immune system, tuberculosis infections began to spread in the mid-1980s. The Massachusetts DPH has reported tuberculosis data for the 25 largest cities in Massachusetts, which includes Worcester. In 2017, the tuberculosis case rate was 6.6 per 100,000 population in Worcester, more than

twice the rate in Massachusetts overall (3.1).[43]

Oral Health

Poor oral health not only causes pain and discomfort, but also contributes to various diseases and conditions—including cardiovascular disease, diabetes, infectious disease and Alzheimer's disease.[44] Maintaining good oral health is especially important for children, as untreated dental conditions may lead to issues with development related to speech, eating and learning.[45] Several key informants and focus group/forum participants discussed the importance of routine oral health care, especially for children.

According to a 2016 University of Massachusetts Medical School report on oral health in Worcester, the city has fewer oral health providers who accept MassHealth than Worcester children who need services.[46] Key informants corroborated this information, especially the need for a more effective safety net to provide oral health care for low-income children and families.

Among all municipalities, Leicester and Millbury school districts participate in the Fluoride Mouth Rinse Program, a service supported by the Massachusetts Department of Public Health. This program provides free weekly fluoride to children in grades 1-6; it has been shown to be a safe and effective means to preventing tooth decay.[47]

Community water fluoridation, in which a fluoride compound is added to the public water supply, is not mandated in Massachusetts, though many cities and towns have chosen to participate.[48] There have been several attempts to fluoridate water in Worcester; currently, only a very small portion of residents, approximately 430, receive fluoridated water from a neighboring reservoir in Holden.[49] Over the course of the 2014–2015 school year, 314 students at risk for tooth decay and poor overall health were provided fluoride treatments through the Massachusetts Department of Public Health SEAL (Seal, Educate, Advocate for Learning) Program. That same year, 723 sealants were placed, compared to 271 in 2013–2014. UMass Memorial Community Relations

[43] Massachusetts Department of Public Health. Tuberculosis data and statistics. Retrieved from https://www.mass.gov/lists/tuberculosis-data-and-statistics#five-year-data:-cities-and-towns-

[44] Centers for Disease Control and Prevention Web site. Children's oral health. Published November 10, 2014https:// www.cdc.gov/oralhealth/children_adults/child.htm.

[45] Centers for Disease Control and Prevention, *Children's Oral Health*

[46] Abiola A. Animashaun, Carol Gyurina, and the Center for Health Law and Economics, "Oral Health Community Profile: Worcester," https://www.mass.gov/files/documents/2017/04/zs/oral-health-community-profile-worcester.pdf, August 2016

[47] Massachusetts Department of Public Health: Office of Oral Health, "Fluoride Mouthrinse," https://www.mass.gov/files/documents/2016/07/so/fluoride-mouthrinse-factsheet-eng.pdf

[48] Massachusetts Department of Public Health. Office of Oral Health. Fluoride mouthrinse: A safe and effective way to prevent tooth decay. Retried from https://www.mass.gov/files/documents/2016/07/so/fluoride-mouthrinse-factsheet-eng.pdf

[49] University of Massachusetts Medical School. Oral health community profile: Worcester. August 2016. Retried from https://www.mass.gov/files/documents/2017/04/zs/oral-health-community-profile-worcester.pdf

currently coordinates the Central Massachusetts Oral Health Task Force to ensure the provision of preventive dental services to at-risk children in Worcester's Public and Charter schools. The task force includes several regional partners. In fiscal year 2017, the task force secured commitments from the Superintendent of Worcester Public Schools to allow an outside dental vendor to provide onsite restorative services. A total of 2,600 students received services through task force members.

Maternal and Child Health

Maternal and child health issues are of critical importance to the overall health and well-being of a geographic region and at the core of what it means to have a healthy, vibrant community. Infant mortality, childhood immunization, rates of teen pregnancy, rates of low birthweight and rates of early and appropriate prenatal care for pregnant women are among the most critical indicators of maternal and child health. While infant mortality, low birth weight, and preterm birth were not discussed as leading health issues, the quantitative data suggests there are disparities in this area.

In 2015, the infant mortality rate (IMR) per 100,000 was significantly lower in all service area municipalities with the exception of Worcester, where the rate was higher but not significantly so. The rates of low birthweight babies and preterm births were relatively consistent throughout the service area, with the highest rates in Worcester (Figure 56).

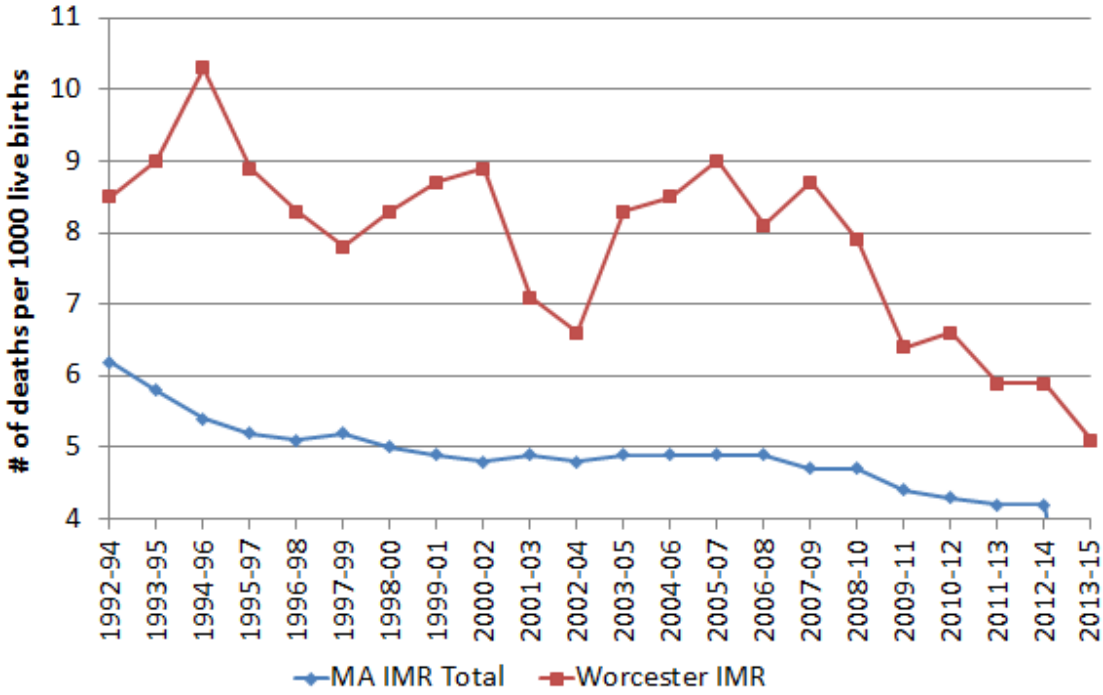
Figure 56: Maternal and Child Health (Service Area)

	MA	Grafton	Holden	Leicester	Millbury	Shrewsbury	W.Boylston	Worcester
Infant Mortality (Rate per 100,000) (2015)	**4.3**	--1	--1	0	--1	0	--1	6.2
Low Birth Weight (<5.5 lbs) (2014) (%)	**7.5**	8.8	5	8.2	6.8	5.5	NA	13.4
Preterm births (<37 weeks) (2015) (%)	**6,001 (#)**	8.8	6.1	8.2	10.3	7.6	NA	10.6
Number of resident births to mothers 15-19 (2015)	**2,140**	Between 1-4	Between 1-4	Between 1-4	Between 1-4	Between 1-4	Between 1-4	130

Source: Massachusetts Vital Records || A value of --1 means data is suppressed due to low counts

Due to the relatively low population and birth rate in Worcester, which can cause variability in the infant mortality rate from year to year, the IMR is generally reported as a 3-year average – most recently 2013-2015. Figure 57, below, shows Worcester's IMR compared to the Commonwealth overall over time. Since 1992-1994, Worcester's average IMR has been higher than the state through every 3-year period.[50]

Figure 57: Infant Mortality 3-Year Rolling Averages (Worcester vs. Commonwealth)



Source: Worcester Healthy Baby Collaborative

Over the past decade, there has been an increase in Hispanic infant mortality in Worcester, where the Commonwealth and national Hispanic IMR did not show a similar increase. Since 2010, the Hispanic IMR in Worcester has declined overall, but it remains over twice the Commonwealth Hispanic IMR. From 2012-2012, the Hispanic IMR in Worcester surpassed the Black IMR for the first time. Similarly concerning is a significant portion of infant deaths in Worcester are to Hispanic mothers, ranging from 36 to 63% over the last five years.[51]

[50] Matilde "Mattie" Castiel (Health and Human Services Commissioner), "CC Order 8653: Infant Mortality," e-mail message to Edward M. Augustus, Jr. (City Manager), May 2, 2017
[51] Castiel, *CC Order 8653*

V. RESOURCE INVENTORY AND GAP ANALYSIS

OVERVIEW AND DESCRIPTION OF INVENTORY

Greater Worcester has a strong and comprehensive health care system. This system is expansive and spans the full health care continuum, including outreach and screening, primary care, medical specialty care, behavioral health (i.e., mental health and substance use), hospital services (i.e., inpatient and emergency) and post-acute services (i.e., home/community services, nursing home and rehabilitation). In addition, there is a strong, comprehensive public health, social service and community health service network throughout the CHA service area. There is also a strong, dedicated system of providers across the continuum that make up the region's safety net and serve low income, vulnerable residents, often uninsured regardless of their ability to pay.



Community Leaders Around the Table

No segment of the continuum is completely without service providers, but this does not mean that everyone in the CHA service area receives the highest quality services when and where

they want them. In fact, despite the overall success of the Commonwealth's heath reform efforts, data captured for this assessment shows that substantial segments of the population face significant barriers to care and struggle to access services due to cost, lack of insurance, transportation, cultural/linguistic barriers and shortages of providers willing to serve MassHealth or low-income, uninsured patients. The barriers are most acutely felt for those seeking primary care, mental health, substance use, rehabilitation, or respite services. In these cases, residents may often seek services urgently for an acute illness or may seek preventive / supportive services to ensure that an illness does not get worse only to be turned away or told they cannot be seen in a timely manner. In these cases, residents often go without needed care, delay care inappropriately, or turn to the region's hospital emergency departments for services that are better provided in other settings.

Those who do not speak English or are not from the U.S. face tremendous challenges. The health care and social service industries strive to ensure appropriate linguistic access and to provide services that are culturally sensitive, yet many interviewees and focus group/forum participants identified this as a major barrier to health and well-being for many residents in the region. The two Federally Qualified Health Centers in Worcester—the Family Health Center of Worcester and the Edward M. Kennedy Community Health Center—provide affordable and high-quality care to many residents, regardless of their ability to pay. Many interviewees and focus group/forum participants lauded their efforts to provide culturally appropriate and respectful care, particularly given the fiscal and other resource constraints in which they operate.



Regional Environmental Council/UMass Memorial Grant Square Youth Urban Agriculture Program & Community Garden - Bell Hill

Appendix C of this report is a resource inventory. Organized by organization/service type, it lists the leading agencies and organizations in the CHA service area that provide services across the health care continuum. This is not meant to be a fully inclusive list but rather a listing of the leading and most known organizations/agencies identified by the Facilitating Partners, the Advisory Committee and other CHA participants. In addition to compiling resources through these individuals and partner organizations, the assessment included information from the 2-1-1 system, CommunityHELP, and the internet.[52, 53] The resource inventory has four major categories—multisector collaboratives, public sector agencies, social determinants of health and health care continuum. The inventory includes resources for all of the seven cities and towns in the service area. Not surprisingly, given the characteristics of the service area, the vast majority of the resources are located in the City of Worcester and, except for the public sector municipal resources, most are available to all residents of the region.



Volunteers at a CommunityHELP Event

[52] 2-1-1 is phone-based resource that connects callers to information about critical health and human services available in their community. It serves as a resource for finding government benefits and services, nonprofit organizations, support groups, volunteer opportunities, donation programs, and other local resources.

[53] Reliant Medical Group and UMass Memorial Health Care have come together to create an on-line resource that helps residents in the region to find the resources they need to overcome the challenges they face. This resource can be accessed at the following link. http://www.communityhelp.net/

Multisector Collaboratives

There is a growing appreciation and understanding of the important role that multisector collaboratives play in addressing complex social problems, including community health improvement. With this in mind, this segment of the resource inventory lists both broadly focused community coalitions as well as more narrowly focused groups in the service area. These organizations convene service providers within and across the health, public health, social service and community health realms and work collectively to strengthen the health system. More specifically, in addition to working together to implement community initiatives, these collaboratives convene their membership on a regular basis, promote capacity building and evaluate their activities; they also facilitate collaboration, partnership and information sharing.

Public Sector Agencies

This segment of the resource inventory includes all of the public sector departments and agencies operated by the local cities and towns in the CHA service area. These departments operate a broad range of health-related programs that are essential to addressing community health needs, particularly for the region's most at-risk populations. More specifically, this category includes the local public health, human service, public school, police/fire and senior/elder services departments that collectively are responsible for providing the 10 essential public health services, as defined by the CDC as being critical to maintaining a strong health system and ensuring a community's health, productivity and overall well-being.[54]

Social Determinants of Health

The next segment of the inventory includes the broad range of community-based social and health organizations that provide the services that facilitate health. Access to these services is believed to determine one's ability to live a healthy, productive life. This category includes housing, transportation, food, education/training and other services. These organizations serve the population as a whole but tend to focus their efforts on those who struggle to maintain these critical social supports. Figure 58, developed by the Kaiser Family Foundation, provides a listing of the full breadth of social and community health services that are thought to be at the foundation of a community's health and overall well-being.[55]

[54] Centers for Disease Control and Prevention, "The Public Health System and the Ten Essential Public Health Services," https://www.cdc.gov/stltpublichealth/publichealthservices/essentialhealthservices.html, June 26, 2018

[55] Kaiser Family Foundation, "Beyond Health Care: The Role of Social Determinants in Promoting Health and Health Equity," https://www.kff.org/disparities-policy/issue-brief/beyond-health-care-the-role-of-social-determinants-in-promoting-health-and-health-equity/, May 10, 2018

Figure 58: Social Services and Community Health Continuum

Economic Stability	Neighborhood and Physical Environment	Education	Food	Community and Social Context	Health Care System
Employment	Housing	Literacy	Hunger	Social Integration	Health Coverage
Income	Transportation	Language	Access to Healthy Options	Support Systems	Provider Availability
Expenses	Safety	Early Childhood Education		Community Engagement	Provider Linguistic and Cultural Competency
Debt	Parks	Vocational Training		Discrimination	Quality of Care
Medical Bills	Playgrounds	Higher Education			
Support	Walkability				

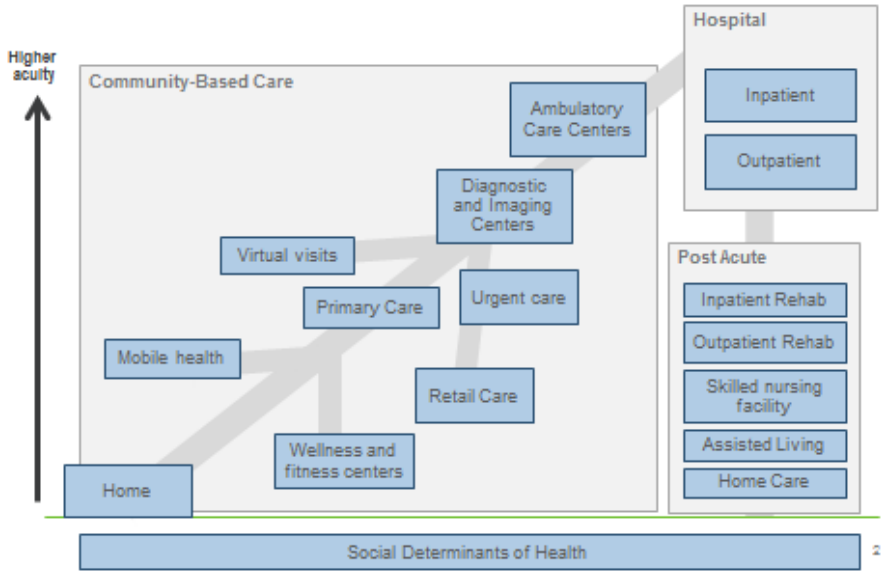
Health Outcomes
Mortality, Morbidity, Life Expectancy, Health Care Expenditures, Health Status, Functional Limitations

Source: Adapted from the Kaiser Family Foundation

Health Care Continuum

The last segment of the resource inventory includes the wide breadth of more clinically focused health care service organizations that provide health education, screening and prevention services and, perhaps most prominently, the medical, behavioral and oral health clinical services that assist individuals in preventing, managing, or recovering from acute illness. This segment includes services that are provided across a range of settings—such as home- and community-based settings, outpatient practice-site settings, and hospital and post-acute settings. Figure 59, drawn from materials developed by SG2, a leading provider of health care business intelligence services, depicts the breadth of the health care continuum.

Figure 59: Health Care Continuum



SERVICE GAPS AND SHORTAGES

Despite the bevy of health care services available in the region, gaps and shortages remain, particularly in the areas of primary care, medical specialty, oral health and behavioral health

services. These services are particularly challenging for many vulnerable populations to access, including those that are low-income, insured by MassHealth (Massachusetts Medicaid), or uninsured. In 2016, only 2.5% of Massachusetts residents were uninsured, the lowest rate in the nation. In addition, as stated above, one could argue that Greater Worcester has one of the strongest health care systems in the Northeast U.S.



Fallon Health: Feed A Family Pick-Up

Despite these factors, there are still substantial numbers of low-income, MassHealth-insured, uninsured and otherwise vulnerable individuals who face health disparities and are not engaged in appropriate preventive, acute and chronic disease management services in the areas of medical, behavioral and oral health services. It is true that there is a strong safety net in Greater Worcester, anchored by a network of Federally Qualified Health Centers. However, these health centers face many challenges, which include caring for an aging population with chronic and complex health care needs as well as recruiting providers, which can be difficult. Additionally, Federally Qualified Health Centers are vulnerable to changes in local and national health policy and funding sources, which may jeopardize their ability to operate at their current capacity.

Efforts must be made to support the safety net across the health, social service and public health continuum, expand access to services and reduce the barriers to care for vulnerable populations. The most significant barrier in this regard is related to a shortage of providers

and practice sites that serve MassHealth-insured and uninsured residents. This is particularly true in the areas of behavioral health and oral health services. Nearly everyone that was interviewed for the assessment commented on the lack of access to providers who are willing and able to serve MassHealth-insured or uninsured patients.

Many populations, including racial/ethnic minorities, immigrants and non-English speakers, older adults and LGBTQ populations, face additional barriers to care and disparities in health outcomes. Based on information gathered primarily from the interviews, focus groups and community forums, the assessment identified a number of vulnerable populations that face barriers to care and disparities in access. These segments struggle to access culturally and linguistically sensitive care, are often discriminated against due to their cultural, ethnic or racial background and face other barriers to access that can affect their ability to live a happy, healthy, productive life, free of disparities in health outcomes. Racial/ethnic minorities, Muslims, LGBTQ and undocumented individuals were identified specifically as facing extreme racism or discrimination. However, there were many others who identified as being vulnerable and facing disparities in access and other health-related outcomes due to their culture or the fact that they do not speak English.

RESOURCE INVENTORY

Due to the size and format of the inventory, this information has been included in a stand-alone appendix. Please refer to Appendix C.

VI. INTEGRATED ANALYSIS AND DISCUSSION OF POPULATION SEGMENTS MOST AT-RISK

The following section highlights population segments in the service area that have been identified as being vulnerable and most at risk, primarily through information collected by the CHA's qualitative interviews, focus groups and community forums. These segments have their own unique contexts, but almost by definition, all of these groups face a multitude of challenges with respect to:

- Access to services because of cost of care, insurance status, transportation, linguistic access and primary care access
- Social determinants of health because of poverty, housing, racism/discrimination, employment, violence and food access
- Health-related outcomes resulting from heart disease, diabetes, asthma and depression/anxiety

On their own, any of these challenges can have a major impact on health status. However, most of those who are part of vulnerable segments of the population discussed in this section face a multitude of challenges that together can severely limit their ability to care for themselves or their families. These challenges can make it difficult for them to take advantage of economic and social opportunities, limit their ability to access needed health and social services, isolate them from family and friends, and generally hinder their ability live happy, healthy, productive lives.

Individuals may be included in more than one of these population segments. In these cases, the burdens are additive and work together to heighten the challenges they face. Perhaps even more devastating is that those who are part of these segments, and who are affected by disparities in access, health status and opportunity, often find it difficult to break out of their situations. Ultimately, this means that the burdens are often passed down to future generations, thus maintaining cycles of disparity that persists from one generation to the next.

Certain demographic characteristics (e.g., age, race/ethnicity, gender orientation and sexual identify) define a number of these segments. However, many of these segments are diverse, both demographically and socioeconomically. This is important because one should not assume that someone is vulnerable because, for example, they live in a low-income

household or are a racial/ethnic minority. (Similarly, one should not assume that someone is safe or not vulnerable if one is affluent, white or an English-speaker.) Note that while those who are in these population segments are more likely to be vulnerable, it is not an absolute. Many who are included in these segments are able to manage or shield themselves from the challenges they face. Common protective factors that can limit the impact of being in one of these vulnerable population segments include the extent to which someone can:

- Navigate the service system
- Access a primary care provider who understands their language and is sensitive to their culture
- Get the affordable and timely access to the broad range of services they may need
- Receive support from family members or friends
- Function in a socially and emotionally competent manner



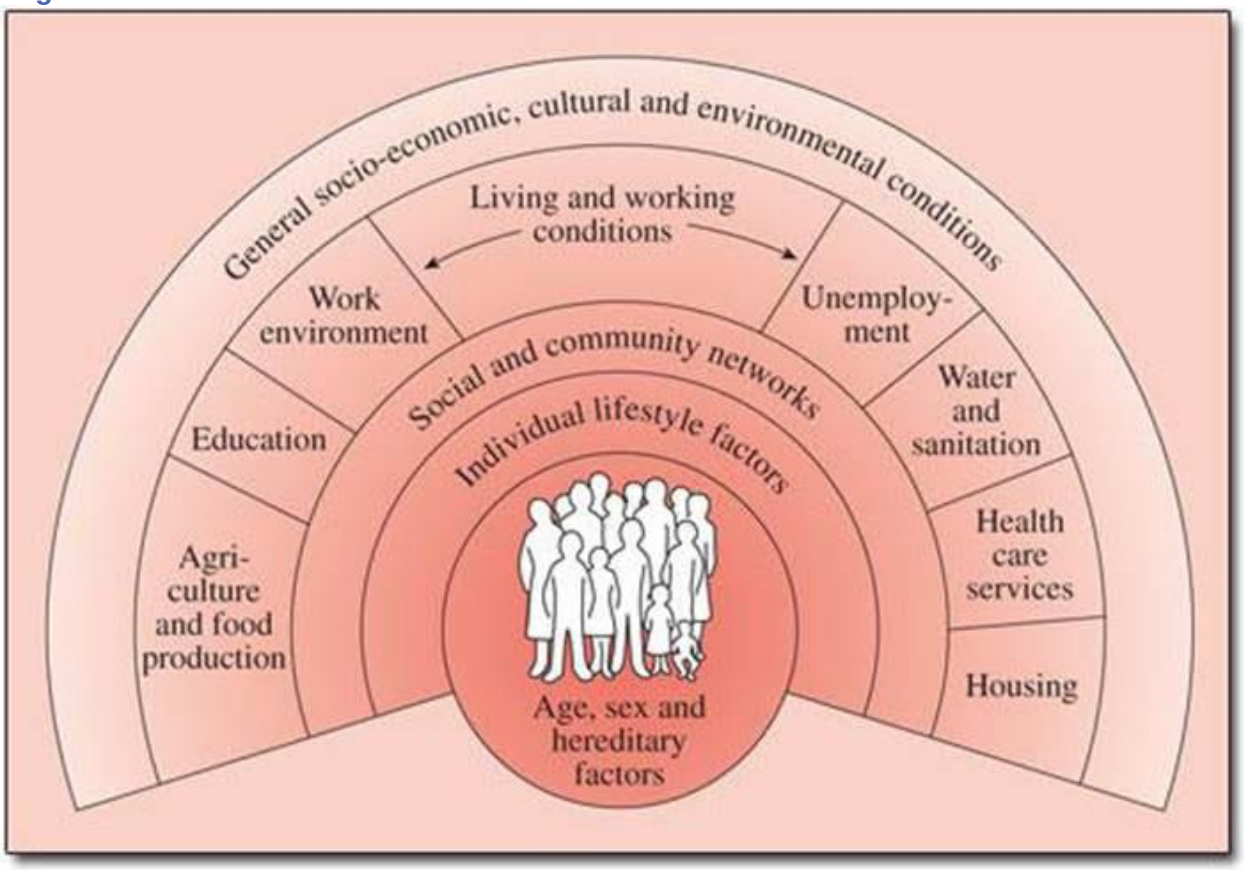
UMass Memorial Medical Center: Ronald McDonald Care Mobile

Another important factor is geography or "place." A large body of literature shows that where you live is a better predictor of poor health status than health, social, environmental or even genetic factors. Those who live in isolated, under-resourced, low-income communities are more likely to be exposed to a multitude of risk factors that influence their health, economic opportunities and overall well-being. Some of these "place-based" factors include unsafe housing, limited public transportation, limited access to healthy foods and safe places to exercise, exposure to crime and violence, and lack of health care facilities. For example, children and youth who live in depressed, isolated, low-income communities are more likely to live in families with parents or caregivers who have limited education and health literacy.

Children, youth and adults living in such areas are also more likely to have been affected by violence and trauma than those in more affluent, highly resourced communities.[56]

As discussed in this report's introduction, social, economic and environmental factors are more likely to be at the root of disparities in health outcomes and poor health status than health-related or clinical factors, such as health care access and quality of health services.[57, 58] If the region's stakeholders are to improve the health status of its residents, they must work to address those social, environmental and physical determinants of health to help residents access services, engage in healthy behaviors, manage chronic/complex conditions, avoid premature death and to live a happy, healthy, productive life. Figure 60, below, created by the National Association of County and City Health Officials (NACCHO), provides a visual describing the interrelation of these factors.

Figure 60: Determinants of Health



Source: National Association of County and City Health Officials (NACCHO)

[56] Garth Graham, MaryLynn Ostrowski, Alyse Sabina, "Defeating The ZIP Code Health Paradigm: Data, Technology and Collaboration Are Key", Health Affairs Blog, August 6, 2015
[57] Office of Disease Prevention and Health Promotion, "Healthy People 2020: Social Determinants of Health," https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health.
[58] World Health Organization, "About Social Determinants of Health," http://www.who.int/social_determinants/sdh_definition/en/

REVIEW OF CROSS-CUTTING ISSUES

Based on the CHA's qualitative findings and the body of academic literature, there are a number of cross-cutting challenges that are common among the at-risk population segments identified below. These issues tend to exacerbate the challenges that those in these segments face. More specifically, the literature and findings from the CHA highlight the tremendous impact that trauma, poverty, racism/discrimination, linguistic access, cultural sensitivity and lack of social/family support or isolation can have on individuals and families.

Impact of Trauma[59]

Throughout the CHA process, there was a persistent theme: the impact of trauma. Research shows that trauma can have a dramatic impact on an individual's "life course" and may diminish the ability to cope and respond to environmental stresses. According to this research, continual exposure to threatening situations can make it difficult for an individual to build meaningful relationships, and may make it difficult to reach out for help." [60,61]

The accumulation of adversities and psychological trauma—particularly if they started in childhood—may cause physiological changes that negatively affect short- and long-term health, emotional and behavioral regulation, and adaptive function. Those exposed to toxic stress, which is defined as strong, frequent and/or prolonged hardships or adversities that stimulate the body's natural responses, can experience long-term negative impacts on their neurobiology, psychology and physical health.[62] This toxic stress can then lead to wear and tear on the body, often termed the allostatic load, which can lead to poor health and health-risk behaviors.[63]

According to research reported by the American Academy of Pediatrics' Pediatric Approach to Trauma, Treatment and Resilience (PATTeRx) Program, 26% of children in the U.S. will witness or experience a traumatic event before they turn 4, and 68% of children seen in pediatric health settings have experienced exposure to at least one traumatic event. Many who were interviewed or participated in our focus groups and community forums talked passionately about the intense and long-lasting impacts of childhood trauma as well as the

[59] This section draws heavily and often directly quotes content from materials produced by a program created by the American Academy of Pediatrics called the Pediatric Approach to Trauma, Treatment, and Resilience (PATTeRx). This program was supported by researchers and clinicians at the University of California Los Angeles and the UMass Memorial Medical School. Heather Forkey, MD from the UMass Memorial Medical School was part of the Project Team for this work.
[60] American Academy of Pediatrics called the Pediatric Approach to Trauma, Treatment, and Resilience (PATTeRx).
[61] JSB International, Inc. and Georgetown University National Technical Assistance Center for Children's Mental Health, "Trauma Informed Care: Perspectives and Resources," 2014
[62] Center for Youth Wellness, "An Unhealthy Dose of Stress: The Impact of Adverse Childhood Experiences and Toxic Stress on Childhood Health and Development," http://ncfy.acf.hhs.gov/library/2014/unhealthy-dose-stress-impact-adverse-childhood-experiencesand-toxic-stress-childhood, 2014.
[63] Sandra L. Bloom, "Adverse Childhood Experiences Study and Allostatic Load," http://www.sanctuaryweb.com/Portals/0/2010%20PDFs%20NEW/2010%20Bloom%20ACEs%20and%20Allostatic%20Load.pdf, 2010

traumatic impacts of unhealthy relationships and sexual violence on youth, adults and older adults.

However, there was also a clear appreciation for the traumatic impacts of poverty, racism/discrimination and long-term social isolation, to name a few types of trauma. As with other challenges, those affected by trauma are much more likely to pass these issues down to future generations. That can lead to cycles of abuse and trauma that can be difficult to break.

Impacts of Poverty

When asked to name the leading health-related issues in Greater Worcester, the most common response by far was poverty. Poverty has tremendous and far-reaching effects on physical and emotional health. It can limit an individual's ability to lead a happy, healthy, productive life or, perhaps even more troubling, to support happy, healthy, socially well-connected families. Poverty affects interactions at home, at work or school, and in the community.

In addition to speaking specifically and directly about poverty, many discussed housing, transportation and food access, all of which are, more often than not, a result of poverty. Substandard housing, homelessness, inadequate nutrition, food insecurity, lack of care, unsafe neighborhoods, poor school attendance, under-resourced schools and lack of access to health, social and community services are all linked to poverty.

Impacts of Racism and Discrimination

One of the most common comments about the health of the Greater Worcester region was the impact of discrimination and racism. This was discussed particularly in the context of racial and ethnic minority groups, but also with respect to other segments of the population such as LGBTQ individuals, Muslims, undocumented individuals and older adults. Many of those who were interviewed or participated in the CHA's focus groups or community forums spoke of the inherent social injustices and inequities that persist in our society today. Many people face a reality in which skin color, age, religious affiliation, sexual orientation or the existence of a mental illness or substance use disorder play a major role in how they are viewed, valued and treated.

Racism and discrimination—whether intentional, overt, malicious or not—affects the health and well-being of individuals and communities, in part by stifling the opportunity to live happy, healthy and productive lives. The impacts of racism and discrimination are exacerbated by other social and environmental determinants but occur to some extent regardless of the existence of factors such as income, employment, education level, age, sexual orientation or gender. This fact shows that racism and discrimination are both predictors of poor health status and limited opportunity. These social injustices and inequities

affect people, including those in Greater Worcester, from "cradle to the grave." Many who are in racial/ethnic minority categories or who are gay or lesbian, for example, experience higher rates of infant mortality, chronic and infectious diseases, disability and premature mortality when compared to national rates overall.[64]

Linguistic Access, Health Literacy, and Cultural Sensitivity

Another of the most common discussion points during the CHA's interviews, focus groups and forums is the remarkable demographic diversity that exists in Greater Worcester. As one person mentioned, "Worcester is truly a melting pot with incredible racial, ethnic and religious diversity." As was reported above, more than 40% of Worcester residents are foreign-born. Even in some of the surrounding communities, such as Shrewsbury, the percentage of foreign-born residents is greater than 25%.



CMRPHA Information Table at Community Event

Historically, Worcester has been home to a broad range of those of European descent along with African Americans and Hispanic Latinos. However, in the past decade or more there has been an influx of immigrants from Africa, Asia and the Middle East.

Residents also come from Ghana, Vietnam, Albania, Iraq, Cambodia, Somalia and

[64] TA LaViest, D Gaskin, P Richard, "The Economic Burden of Health Inequalities in the United States," International Journal of Health Sciences 41, no. 2 (2011): 231-238.

Kenya. Based on academic literature and information gathered through the CHA, these populations are more likely to be uninsured, struggle with access and navigation of the health care system, and face disparities with respect to social determinants and other health-related outcomes.

During the focus group at UMass Memorial Medical Center—attended by a group of medical interpreters, social workers and community health workers—discussions primarily revolved around the experiences of non-English speakers and immigrants. In addition to facing health literacy challenges, these groups lack of access to providers who speak their language and show cultural humility while providing services that are sensitive to their patients' culture and beliefs. There has been growing recognition that low literacy, including health literacy, language barriers and cultural diversity, must all be considered to ensure effective health communication and ultimately to improve health status. Culturally diverse individuals with limited literacy and limited English proficiency (LEP) are among the most vulnerable patients, according to a report published by the Institute of Medicine (IOPM) in 2002.[65,66]

Lack of Social/Family Support and Isolation

Research shows that people with greater family or social support, less isolation and greater interpersonal trust live longer and healthier lives than those who lack support and are socially isolated. This was a common theme during our interviews, focus groups and forums. It was most often discussed in the context of children, youth, recent immigrants, homeless individuals and older adults, but it applies to everyone. Individuals, families and communities that are less isolated and more socially connected, or in the case of communities more cohesive, are less vulnerable and more resilient. These individuals and communities have been shown to be able to better manage and cope with stress than those who are disconnected or isolated.

According to the County Health Rankings and Roadmaps website developed by the University of Wisconsin's Population Health Institute, those who are more socially connected are less likely to be affected by stress and less likely to have poor health outcomes (e.g., cardiovascular disease, depression and anxiety) or to exhibit unhealthy behaviors (e.g., poor nutrition, physical inactivity and tobacco use).[67,68,69]

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[65] Institute of Medicine, "Speaking of Health: Assessing Health Communication Strategies for Diverse Populations," The National Academies Press, 2002.
[66] Dennis P. Andrulis and Cindy Brach, "Integrating Literacy, Culture and Language to Improve Health Care Quality for Diverse Populations," *American Journal of Health Behavior*, 2007.
[67] KI Kawachi, BP Kennedy, and R Glass, "Social Capital and Self-Rated Health: A Contextual Analysis," American Journal of Public Health 89, no. 8 (1999): 1187-1193.
[68] S Egertern, P Braveman, C Barclay, "Stress and Health," Robert Wood Johnson Foundation, Issue Brief 3.
[69] JS House, "Social Isolation Kills, But How and Why?" *Psychosomatic Medicine* 63, no. 2 (2001): 273-274.

POPULATIONS MOST AT RISK

Based on the CHA's quantitative and qualitative findings as well as academic literature, the following populations are thought to be most vulnerable and therefore at greatest risk. This is not necessarily a list of the groups the CHA will prioritize, but rather the groups that were highlighted during the assessment process:

- Young children and vulnerable families
- Youth and adolescents
- Older adults
- Individuals who are homeless or live in unstable housing
- Lesbian, gay, bisexual, transgender and queer/questioning (LGBTQ) individuals
- Immigrants, refugees/asylees and non-English speakers
- Racial/ethnic minorities

The following is a brief discussion of the challenges facing these populations.

Young Children and Vulnerable Families

The extent to which a child lives in a stable, well-resourced home with strong family or social supports and parents/caregivers who are socially and emotionally competent is one of the clearest predictors of good health and long-term success. Conversely, child maltreatment and neglect, domestic violence, children's disabilities, substance use and parental mental illness are some of the strongest predictors of poor health, toxic stress and long-term disparities in health status. While these challenges occur in families at all income levels,



Girl at Local Community Event

many—such as depression, domestic violence and child abuse—are disproportionately frequent among low-income families.[70]

The Adverse Childhood Experiences (ACE) study, initially published in 1998, is a landmark study that demonstrates the relationship between childhood trauma and health outcomes later in life.[71] The study is considered one of the most important public health studies today, because it showed for the first time that more than half the population experiences childhood trauma and that this exposure has long-term consequences.

There was near consensus among those participating in the CHA regarding the vulnerability of young children and their families and the importance of prioritizing this population segment as a way of addressing the current and future health status of Greater Worcester. Dozens of people involved in the CHA—whether as one of the Facilitating Partners, the Advisory Committee, interviewees, or focus group or forum participants—spoke of the importance of prioritizing vulnerable children and families. Participants spoke especially passionately about the importance of prioritizing communities with high numbers of children or families in poverty and of developing programs that strengthen these communities and/or support families to avoid—or break free from—the challenges that define their vulnerability.

Youth and Adolescents

Youth and adolescents from ages 10 to 17 were thought by many to be among the most vulnerable and at-risk populations in Greater Worcester, particularly in the more suburban towns. This may be because there are fewer social services available for this age group in suburban areas, while there are more opportunities for socialization in Worcester. Participants' reasons for believing this group should be prioritized varied a great deal and included the impacts of substance use, lack of family or social support, toxic stress from social/family/school settings, bullying and unhealthy relationships.

The general sentiment was that these issues were further compounded by the other cross-cutting factors discussed above, particularly poverty, discrimination and trauma. Adolescents are at a critical transitional period in their lives that includes biological and developmental changes or tasks that are important to establishing long-term identity and independence but can lead to conflict, isolation and tension between adolescents and youth and their parents or caregivers. During this period of life, many struggle to access health and social services due to stigma and lack of providers that understand the needs of those in this age group.

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[70] The Urban Institute, "Children in Vulnerable Families: Facts and Figures," https://www.urban.org/sites/default/files/publication/51186/901016-Children-in-Vulnerable-Families-Facts-and-Figures.PDF, 2006.

[71] VJ Felitti, RF Anda, D Nordenberg, DF Williamson, AM Spitz, V Edwards, MP Koss, and jS Marks, "Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Deaths in Adults: The Adverse Childhood Experiences (ACE) Study," *American Journal of Preventive Medicine* 14, no. 4 (1998): 245-258.

Although adolescents are generally healthy, they do struggle with certain health and social problems, such as mental health and substance use issues, nutrition and weight conditions, STIs, teen pregnancy, homelessness, suicide and motor vehicle accidents.[72]

Older Adults

Elder health and the challenges faced by older adults came up in nearly every interview, focus group and forum. There was near consensus that many older adults were among the most vulnerable in the region. In the U.S., in the Commonwealth, in Worcester County and across the CHA's service area, older adults are among the fastest growing age groups. The first "baby boomers" (adults born between 1946 and 1964) turned 65 in 2011. Over the next 20 years, these baby boomers will gradually enter the older adult cohort.

Chronic/complex conditions are by far the leading cause of death among older adults[73] and older adults are much more likely to develop chronic illnesses such as hypertension, diabetes, COPD, congestive heart failure, depression, anxiety, Alzheimer's disease, Parkinson's disease and dementia than younger adult cohorts. By 2030, the CDC and the Healthy People 2020 Initiative estimate that 37 million people nationwide (60% of the older adult population ages 65 and over) will need to manage more than one chronic medical condition. Major proportions of this group experience hospitalizations, are admitted to nursing homes and receive home health services and other social supports in home and community settings. The ability to live independently and to "age in-place"—or at least to find the least restrictive housing option—is a leading concern among older adults and their caregivers. Addressing that concern demands a service system that is robust, diverse and responsive.

According to qualitative information gathered through interviews and community forums, elder health is one of the highest priorities for the Greater Worcester region. This is true throughout the service area but is particularly true in the suburban parts of the service area. Chronic disease, depression, cancer, dementia, Alzheimer's disease and Parkinson's disease were identified as the leading health status issues. The impacts of poverty, affordable housing, transportation, elder abuse and lack of family support/isolation were identified as some of the leading social or environmental issues.

As some of the highest utilizers of health services and specialty care, older adults are more at risk of experiencing poor care coordination and gaps in health care, such as specialty care, behavioral health and case management services. While clinical integration and care coordination efforts have been improved, fragmentation of care persists. It is a serious issue

[72] Healthy People, "Adolescent Health," https://www.healthypeople.gov/2020/topics-objectives/topic/Adolescent-Health
[73] Office of Disease Prevention and Health Promotion. "Older Adults," https://www.healthypeople.gov/2020/topics-objectives/topic/older-adults#two

affecting older adults, particularly when they have chronic/complex conditions or have been discharged recently from the hospital. Based on feedback from interviewees and focus group participants, older adults in the service area often find themselves seeing multiple specialty care doctors, following entirely separate care plans and attempting to fill and manage numerous prescription drugs with limited coordinated direction or support. Many of those who participated in the CHA also spoke about the lack of appropriate, affordable housing options for older adults. They cited the need for geriatric services and supports that older adults can draw on at home or in other community settings to maintain their independence.

Homeless and Unstably Housed

There is growing appreciation of the impact that lack of adequate, safe and affordable housing or, in its extreme, no housing at all can have on one's ability to live a healthy, happy, productive life. Among those who participated in CHA interviews, lack of affordable housing was one of the most common responses when interviewees were asked to name the leading health-related issues. Although the lack of safe or adequate housing is an issue in some areas of Worcester, those who discussed housing highlighted the lack of affordable options. Specifically, these participants discussed the challenges that people face when they are forced to decide between housing, food, heat, health care services, child care, transportation or other essentials. Because housing is typically the most expensive of life's essentials, it is seen as the most problematic. The choices that many are forced to make limit their ability to maintain a healthy, productive lifestyle or to live near their family or social support networks. There was nearly a consensus that lack of affordable low- and middle-income housing was a leading problem for the region. When asked about housing safety, several interviewees and participants of focus groups and forums noted that many residents are concerned about maintaining housing quality, particularly the mitigation of conditions that exacerbate asthma in children (e.g., mold, pests, insufficient heating and cooling systems, poor ventilation).

Participants also spoke of the increasing and intensive burdens of homelessness. Many commented that the burdens were increasing due to the opioid crisis. In the context of homelessness, CHA participants also referenced lack of job opportunities and lack of affordable housing. According to a point-in-time estimate conducted in January 2017 by the Central Massachusetts Housing Alliance, Worcester had more than 1,000 homeless individuals residing on the streets or in shelters. People noted the shortage of shelters and transitional housing, particularly in the communities with greatest need for them. Those outside of Worcester spoke of the lack of shelters and the need to build capacity in the outlying communities.

There is abundant evidence of the negative health consequences of homelessness. At a

fundamental level, homeless individuals have higher premature mortality than those who have housing. Injuries, unintentional overdoses and extreme weather events are significant drivers of this mortality. The homelessness also produces poor quality of life, characterized, as noted in various studies, by chronic pain associated with poor sleeping conditions and limited access to medications and other salutary resources. Skin, foot and dental problems as well as chronic infectious diseases are also well documented among homeless populations.[74]

Lesbian, Gay, Bisexual, Transfer, Queer/Questioning (LGBTQ)

The challenges that LGBTQ individuals face in Greater Worcester were highlighted by many people who participated in the CHA, and there was broad interest in this segment being prioritized. First, it is important to understand that the lesbian, gay, bisexual, transgender, queer and questioning community is diverse. While L, G, B, T and Q are usually tied together as an acronym that suggests homogeneity, each letter represents a wide range of people of different races, ethnicities, ages, socioeconomic statuses and identities. What binds them together are common experiences of stigma and discrimination, as well as the struggle of living at the intersection of many cultural backgrounds. These groups also tend to be marginalized and are more likely to be poor. This fact should not be surprising. LGBTQ people face the same socioeconomic challenges of others who share their sex, race, ethnicity, age and disability, but they also face a long history of discrimination, challenges in accessing culturally competent health services and other unique obstacles because of their sexual orientation and gender identity. For example, LGBTQ people are at higher risk of being homeless when they are young, more likely to be harassed and discriminated against at school and in the workplace, and more likely to be denied the economic benefits of marriage.[75,76]

Research has shown that these challenges lead to significant health disparities for LGBTQ populations when compared to heterosexual populations. According to a study conducted in 2009 by the Massachusetts DPH in partnership with MassEquity, LGBTQ populations face disparities with respect to access to health care services, overall health status, cancer screening, chronic health conditions, mental health, substance use, sexual health and violence. While gay and lesbian adults reported poorer health and more risk factors than heterosexuals across several health domains, poorer health was observed most often for bisexual and transgender individuals. The health profile of bisexual and transgender respondents was poorer than that of heterosexual residents in terms of access to medical providers, disability status and 12-month suicidal ideation. For transgender individuals, there

[74] Sandro Galea, "Homelessness, Its Consequences, and Its Causes," https://www.bu.edu/sph/2016/02/28/homelessness-its-consequences-and-its-causes/, February 28, 2016

[75] Brad Sears and Lee Badget, "Beyond Stereotypes: Poverty in the LGBT Community," The Williams Institute, *Momentum*, Issue 4, June 2012.

[76] Fenway Health, "LGBT Health Education," http://www.lgbthealtheducation.org/topic/lgbt-health/

were also worse outcomes with respect to anxious and depressed moods and lifetime violence victimization. The health profile of gay and lesbian residents was poorer than that of heterosexual residents in the following domains: lifetime sexual assault victimization, 30-day binge drinking and substance use, asthma and type 2 diabetes.

Immigrants, Refugees, Asylees, and Non-English Speakers

As discussed above, based on the academic literature and information gathered through the CHA, immigrants, refugees, asylees and non-English speakers—groups that are well represented in Greater Worcester—are known to be extremely vulnerable and much more likely to be uninsured. The diversity of languages and cultures within these groups that must be supported, yet doing so can place a high burden on the health care system, especially the health safety net. These populations often struggle with access to care and face disparities with respect to social determents and other health-related outcomes.

Refugees, asylees and undocumented immigrants face particularly hard-hitting challenges. In addition to being affected by language access, limited acculturation, limited health literacy and other social determinants of health like poverty, food access and transportation, they are also often affected by trauma, stress and uncertainty. Refugees and asylees may arrive with some benefits and services, but they often expire within a year of their arrival.



Stocked Food Pantry

Finally, even with Massachusetts' demonstrated commitment to cover its residents and the strength of the Commonwealth's immigrant community, changes in federal immigration policy are discouraging immigrants from accessing health care services. The Federal Executive Orders regarding travel bans and enforcement orders prioritizing unauthorized immigrants for deportation have created a climate of uncertainty and fear among immigrants

and their families.[77] These sentiments were voiced frequently during the assessment's interviews, focus groups, and community forums. This uncertainty and fear is a barrier to care and can lead to delays in needed care or may prevent people from getting the care they need for themselves or their families.

Racial/Ethnic Minorities

As discussed above at length, one of the most common comments and reflections about the health of the Greater Worcester region was the tremendous impact of discrimination and racism, particularly with respect to racial and ethnic minorities, but also with respect to other segments of the population such as LGBTQ individuals, Muslims, undocumented individuals and older adults. Many of those who were interviewed or participated in the CHA's focus groups or community forums spoke of the inherent social injustices and inequities that remain in our society today. As mentioned above, there is great deal of research that shows that racism and discrimination—whether intentional, overt, malicious or not—affects the health and well-being of individuals and communities and stifles the opportunity of many to live happy, healthy and productive lives.[78]

[77] Insure the Uninsured Project, "Meeting the Health Needs of Immigrant Community in Uncertain Times," http://www.itup.org/wp-content/uploads/2017/07/Immigrants-and-Health-Care_Fact-Sheet-7.24.17.pdf, June 2017
[78] LaViest, *Economic Burden*

VII. POPULATION AND COMMUNITY HEALTH PRIORITIES

Once the assessment's findings were compiled, community health stakeholders and residents throughout the service area were invited to participate in a strategic prioritization retreat held on July 12, 2018, at the Worcester Public Library. More than 75 people attended from throughout the service area. They included representatives from local health departments, health and social service providers, advocacy organizations, academic organizations, youth groups, faith-based organizations and other local, community-based groups. The retreat allowed participants to review and discuss the quantitative and qualitative findings from Phases One and Two of the CHA. A presentation at the outset of the meeting summarized the findings related to community characteristics, social determinants of health, substance use, mental health, chronic/complex conditions and health system challenges. Participants had the opportunity to ask questions and provide their input, which helped to augment and clarify the findings to date. After the initial plenary session, the retreat participants split into four breakout groups:

- Social determinants/health equity
- Mental health
- Substance use
- Chronic/complex conditions



Prioritization Meeting at Worcester Public Library

Each participant was given the opportunity to participate in two of the four groups to discuss what they believed to be the leading issues, system strengths/weaknesses and priority populations relative to each topic area. At the end of the breakout sessions, the lead facilitators for each group summarized their group's discussion. Finally, based on the plenary and breakout discussions, participants used an automated, web-based polling platform to identify the community health issues and population segments that they felt should be prioritized.

The following is a summary of the population segments and community health issues that were prioritized by the Facilitating Partners with input from the retreat participants and the Advisory Committee. This discussion of priority also draws heavily on the quantitative data collected for this project as well as the qualitative information collected through the community interviews, focus groups and forums.

PRIORITY POPULATIONS

The Facilitating Partners and Advisory Committee, as well as other health and social service stakeholders throughout the region, are committed to improving the health status and well-being of all residents living in the service area. Certainly all geographic, demographic and socioeconomic segments of the population face challenges that limit their ability to access the services they need. Regardless of age, race/ethnicity, income, family history, or health-related characteristics, no one can completely avoid being affected by health issues or risk factors or, perhaps more fundamentally, escape the effects of aging.

This CHA Report includes findings that are relevant to residents throughout the service area and to all segments of the region's population. However, there was broad agreement on which demographic and socioeconomic segments of the population the CHA should prioritize—those with complex needs or who face especially significant barriers to care, service gaps or adverse social determinants of health that can put them at greater risk. More specifically, the assessment identified the following groups as priority populations that deserve special attention:

- Vulnerable children and their families
- Youth and adolescents
- Older adults
- Immigrants and non-English speakers
- Racial/ethnic minorities and others facing discrimination
- Homeless and unstably housed

Figure 61 below is a visual summary of these priority population segments deemed most vulnerable.

Figure 61: Priority Populations



COMMUNITY HEALTH PRIORITY AREAS AND CROSS CUTTING ISSUES

As mentioned above, the CHA was designed as a population-based assessment, meaning that the goal was to identify the full range of community health issues affecting the region, across all its demographic and socioeconomic segments. The identified issues have been framed in a broad context to ensure that the breadth of unmet needs and community health issues are recognized. However, it is critical that the CHA identify leading community health issues based on community input and the full range of data collected throughout the CHA process.

With this in mind, the Facilitating Partners framed the leading community health issues into four priority areas:

- Mental health
- Substance use
- Social determinants of health
- Chronic/complex conditions and their risk factors

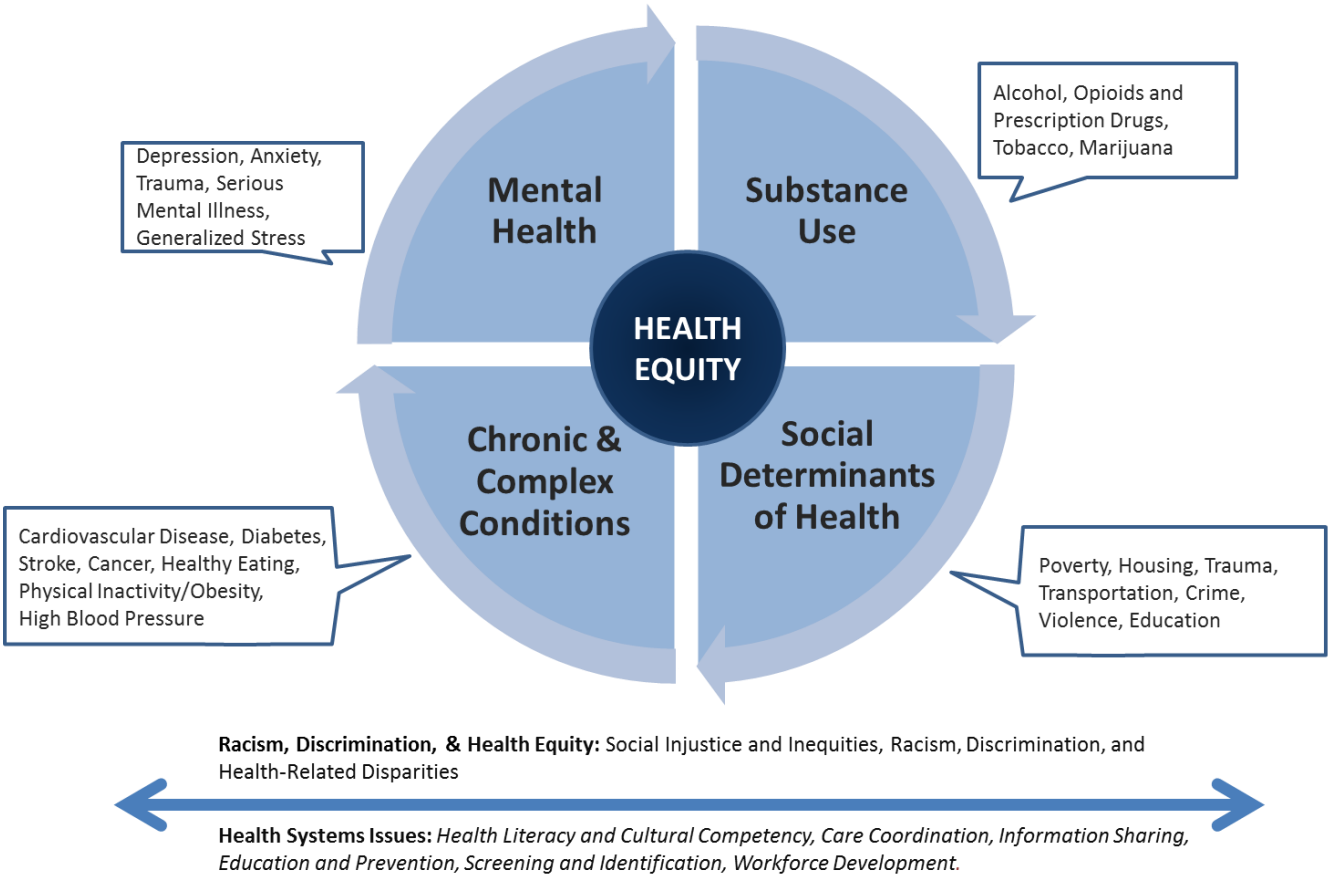
The Facilitating Partners also identified two cross-cutting issues that underlie the leading health priorities and that they believe must be addressed to improve overall health status and reduce existing disparities:

- Racism, discrimination and health equity
- Health system issues (e.g., workforce issues, health literacy, care coordination, health information technology, and health information exchange)

These priorities were identified through an integrated and thorough review of all of the quantitative and qualitative information. Great care was taken to incorporate input from the

assessment's community engagement activities. The priorities have been identified to maximize impact, promote collaboration across the region and across service sectors, and most importantly to address the leading health issues and health-related disparities that were identified through the assessment. During the later stages of the CHA process, significant efforts were made to vet the emerging priorities during the community forums and the strategic retreats. The Facilitating Partners are confident that these priorities reflect the sentiments of the vast majority of those who have been involved in the assessment. Furthermore, the Facilitating Partners are confident that this framework will be well received by the those who will be engaged in the CHIP process and development of the implementation plans.

Figure 62: CHA Priority Issues



Following are brief summaries of these community health priority areas and cross-cutting issues

Substance Use

As it is throughout the Commonwealth and the nation, the burden of substance use/misuse on individuals, families, communities and service providers in the Worcester Region is

overwhelming. Nearly every key informant interview, focus group and community forum included discussions on this topic. From a review of the quantitative and qualitative information, alcohol, opioids and marijuana are the leading issues in this domain. There was particular concern and discussion regarding the impact of the opioid epidemic on the region. Opioid-related deaths in the Commonwealth were more than four times higher in 2015 than in 2000. In 2014, the fatal overdose rate in the Commonwealth was more than double the national average and opioid-related deaths occurred in two-thirds of the cities and towns in Massachusetts.[79]

Substance use/misuse affects all segments of the population by geography and across all age, race/ethnicity and income groups. No segment is left untouched, although different substances are of lesser or greater concern among some segments. Prevalence, incidence and service utilization rates (i.e., inpatient hospitalization, emergency department visits and public program utilization) are higher in a number of cities/towns in the CHA service area when compared to the Commonwealth. Community health interventions vary greatly depending on whether they target those with mild to moderate issues or severe issues. Those who participated in the retreat and the other qualitative components of the assessment thought both segments needed to be addressed.

Despite increased community awareness and sensitivity about the underlying issues and origins of substance use and addiction, there is still a great deal of stigma related to these conditions. There is a general lack of appreciation for the fact that these issues are often rooted in genetics, physiology and environment, rather than an inherent, controllable character flaw. There is, however, a deep appreciation and a growing understanding for the role that trauma plays for many of those with substance use/misuse issues, with many people using illicit or controlled substances to self-medicate and cope with loss, violence, abuse, discrimination and other unresolved traumatic events. There are also major gaps in capacity when it comes to substance use services (i.e., screening, assessment and treatment), particularly for low-income, MassHealth-insured, uninsured or underinsured individuals.

Mental Health

Like substance use, mental health issues affect all segments of the population across all demographic and socioeconomic segments. From a review of the quantitative and qualitative information, depression, anxiety, stress, bipolar disorder and other serious mental illnesses are the leading issues in this priority area. Attention deficit hyperactivity disorder (ADHD), autism and other undefined behavioral issues in children were also highlighted quite often in our interviews, focus groups and forums.

[79] Massachusetts Department of Public Health, "The Massachusetts Opioid Epidemic: A Data Visualization of Findings from the Chapter 55 Report," http://www.mass.gov/chapter55/#footnote-6

While there is growing understanding of the impact mental health has on individuals, families and communities, racism and discrimination have also been shown to play a substantial role with respect to mental illness and access to preventive, treatment and recovery services. Once again, the prevalence, incidence and service utilization rates (i.e., inpatient hospitalization, emergency department visits and public program utilization) are higher in a number of cities/towns in the service area when compared to the Commonwealth. Large proportions of the population are substantially affected by mild to moderate mental health issues such as mild/moderate depression, anxiety, acute stress and grief/loss, while smaller segments struggle acutely with severe mental illnesses like bipolar disorder, schizophrenia and dementia.

As with substance use, there is still a great deal of stigma related to these conditions, which can greatly limit the level of empathy and support those with mental illness need. Trauma is a major factor with respect to mental health. Many of those who have experienced trauma suffer acutely from formally diagnosed post-traumatic stress disorder (PTSD), while others either have milder or undiagnosed PTSD with fewer substantial effects. Isolation and depression among older adults was mentioned in nearly every discussion that touched on elder health. Finally, as with substance use, there is a dramatic gap in capacity when it comes to mental health services, particularly for those who are low income, MassHealth insured, uninsured, or underinsured. Even for those who are insured and have comprehensive benefits, it can be challenging to find mental health professionals willing to take insurance, making care extremely costly and out of reach for those who do not have the financial resources to pay out of pocket.

Social Determinants of Health

An understanding of community need and health status in the service area begins with knowledge of the population's characteristics as well as the underlying social, economic and environmental factors that affect health and health equity. This information is critical to:

- Recognizing disease burden, health disparities and health inequities
- Identifying target populations and health-related priorities
- Targeting strategic responses

A dominant theme from the strategic retreat as well as from the community interviews, focus groups and forums was the tremendous impact that underlying social determinants of health, particularly poverty/income, housing, transportation and access to healthy foods have on the entire population. But it especially affects low-income, immigrant, non-English speaking and other vulnerable segments of the population. The single most common comment that we heard from participants when asked what the leading health-related issue was for residents of the region was poverty, followed by lack of affordable housing.

Chronic / Complex Conditions

Overall, substance use and mental health were perceived by those who participated in the assessment as the leading health status issue facing the service area. Nonetheless, one cannot ignore the fact that heart disease, stroke and cancer are the leading causes of death in the nation, the Commonwealth and the Greater Worcester region. Roughly 6 in 10 deaths can be attributed to these three conditions combined. If you include respiratory disease (e.g., asthma, COPD) and diabetes, which are in the top 10 leading causes across all geographies, then one can account for the vast majority of causes of death.

All of these conditions are generally considered to be chronic and complex and can strike early in one's life, quite often ending in premature death. In this category, according to those who participated in the strategic retreat, interviews, focus groups and forums, heart disease, diabetes and hypertension were thought to be of the highest priority, although cancer was also discussed frequently. There are a number of cities and towns in the service area who have higher rates of certain types of cancer than in the Commonwealth overall. HIV/AIDS, other STIs and hepatitis C were also mentioned frequently in the assessment's interviews, focus groups and forums and should certainly be included in the chronic/complex condition domain. It is also important to note that the risk and protective factors for nearly all chronic/complex conditions are much the same, including tobacco use, lack of physical activity, poor nutrition, obesity and alcohol use.

CROSS CUTTING ISSUES

Racism, Discrimination, and Health Equity

As discussed above in detail, the impact of discrimination and racism was discussed repeatedly in relation to the health of the Greater Worcester region. This frequently came up in the context of racial and ethnic minority groups, but also with respect to other segments of the population such as LGBTQ individuals, Muslims, undocumented individuals and older adults. Many of those who were interviewed or who participated in the CHA's focus groups or community forums spoke of the inherent social injustices and inequities that remain in our society today.

Health status data stratified by race is not available for the Worcester region. However, we know that disparities in health status are large and pervasive nationally. For example, for most of the 15 leading causes of death—including heart disease, cancer, stroke, diabetes, kidney disease, hypertension, liver cirrhosis and homicide—African Americans have higher death rates than whites.[80] Other data indicate that each year nearly 100,000 black people who

[80] HC Kung, DL Hoyert, J Xu, SL Murphy, "Deaths: Final data for 2005," *National Vital Statistics Report* 56, no. 10 (2008): 4-26.

die prematurely would live if there were no racial disparities in health.[81] Hispanic women in Worcester have a higher infant mortality rate compared to White women, and a higher percentage of infant deaths are to White mothers - these are just a few examples of racial health disparities that persist nationally and in the region.

Despite gains in life expectancy for both blacks and whites, the seven-year gap in life expectancy between the races in 1960 was still 5.1 years in 2005.[82] Similarly, although infant mortality has declined over time for both blacks and whites, the relative gap between them is much wider today than it was in 1950. For some health outcomes, the disparities are getting worse Trend data for heart disease and cancer—the two leading causes of death in the U.S.—indicate that blacks and whites had comparable death rates for these conditions in 1950, but African Americans now have higher mortality rates than whites.[83] There was a clear consensus among the Facilitating Partners that racism, discrimination and health equity needed to be identified as priority in the CHA report.

Health Systems

As discussed above, the Greater Worcester region has a strong and comprehensive health care system that spans the full health care, social service, community health, and public health continuum. There is also a strong and committed network of safety net institutions that help to ensure that residents get the services they need regardless of their ability to pay and the barriers they face. However, this does not mean that everyone in the CHA service area receives the highest quality services when they want it and where they want it. In fact, as discussed above, despite the overall success of the Commonwealth's heath reform efforts, data captured for this assessment shows that substantial segments of the population face significant barriers to care and struggle to access services due to lack of insurance, cost, transportation, cultural/linguistic barriers and shortages of providers willing to serve MassHealth-insured or low income, uninsured patients.

Those who do not speak English or who are from cultures outside of the American mainstream face ongoing challenges. Health care and social service providers across the region strive to ensure appropriate linguistic access and to provide services that are culturally sensitive, yet nearly everyone involved in the CHA process expressed concerns that these non-English speaking, often foreign-born face extreme challenges that hinder their ability to get the care they need for themselves and their families.

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[81] RS Levine, JE Foster, RE Fullilove, NC Briggs, PC Hull, BA Husaini, "Black-White Inequalities in Mortality and Life Expectancy, 1933–1999: Implications for Healthy People 2010," *Public Health Reports* 116, 2001: 474-483.
[82] National Center for Health Statistics, "Health United States, 2007 with Chartbook Trends in the Health of Americans," Hyattsville, MD: 2007.
[83] DR Williams and PB Jackson, "Social Sources of Racial Disparities in Health," *Health Affairs* 24, no. 2 (2005): 325-334

Many of those who participated in the assessment also reflected on how fragmented the system can be for those with complex needs who need to be seen by multiple providers. Referrals between providers and information sharing after a visit with a provider can be very challenging to manage and contributes to the difficulty many people have in navigating the system. This is true for all population segments but is particularly true for older adults, non-English speakers and immigrants.

Appendix A:
Community Engagement Approach

Greater Worcester Regional CHA 2018

Summary of Community Engagement Activities

Community Interviews (46)

Purpose: Community interviews are done to collect qualitative information from key health and social service providers, city/town officials, representatives from community organizations or advocacy groups, and other community leaders to:

- Confirm and refine findings from secondary data
- Provide community context
- Clarify needs and priorities identified by the community

Methods: JSI worked with the Facilitating Partners and the Advisory Committee to identify a representative group of interviewees. Interviews were approximately 30-60 minutes long and were conducted using a structured interview guide created by the JSI Project Team. Notes were taken for each interview and findings were compiled to identify key themes.

Name	Title	Affiliation
Fran Anthes	President/CEO	Family Health Center of Worcester
Martha Akstin	Director of Prevention and Screening	AIDS Project Worcester
Edward Augustus	City Manager	City of Worcester
Dr. Kavita Babu	Director of Toxicology	UMass Memorial Health Care
Ken Bates	President/CEO	The Bridge
Maureen Binienda	Superintendent	Worcester Public Schools
Richard Burke	CEO	Fallon Health
Dr. Suzanne Cashman	Professor of Family Medicine and Community Health	UMass Medical School
Dr. Matilde Castiel	Commissioner	Worcester Department of Health and Human Services
Jonathan Chines	VP of Payer Contracting/Network Strategy	Reliant Medical Group
Dr. Eric Dickson	President/CEO	UMass Memorial Health Care
Amy Ebbeson	Project Manager	Worcester Addresses Childhood Trauma
Jack Foley	VP of Government and Community Affairs	Clark University
Dr. Heather Forkey	Chief, Division of Child Protection	UMass Memorial Children's Medical Center
Tim Garvin	President/CEO	United Way of Central Massachusetts
Dr. Gerald Gleich	Medical Director	Navicare
Juan Gomez	President/CEO	Centro
Dr. Michael Hirsch	Medical Director	Worcester Division of Public Health
Dr. Carolyn Langer	Chief Medical Officer	Fallon Health
Cheryl Lapriore	Chief of Staff and Vice President	UMass Memorial Health Care
Ann Lisi	President/CEO	Greater Worcester Community

Name	Title	Affiliation
		Foundation
Barry Maloney	President	Worcester State University
Joe Mangiocotti	Vice President	Worcester Pride
Toni McGuire	President/CEO	Edward M. Kennedy Community Health Center
Jean McMurray	Executive Director	Worcester County Food Bank
Tim Murray	President/CEO	Worcester Chamber of Commerce
Kevin Mizikar	City Manager	Town of Shrewsbury
Michael Nickey	Executive Director of MassHealth Programs	Fallon Health
Daniel Racicot	Chief of Staff to the Mayor	City of Worcester
Jose Ramirez	VP of Operations	Edward M. Kennedy Community Health Center
Sarai Rivera	District 4 City Councilor	City of Worcester
Carla Rodriguez	Director of Client Services	AIDS Project Worcester
Chief Steve Sargent	Chief of Police	City of Worcester
Dr. Laurie Ross	Associate Professor of Community Development and Planning and Director of the HOPE Coalition	Clark University
Anh Vu Sawyer	Executive Director	South East Asian Coalition of Central MA
Joe Sawyer	Superintendent	Shrewsbury Public Schools
Dr. Michael Sheehy	Chief of Population Health	Reliant Medical Group
Dr. Rob Schreiber	VP/Medical Director	Summit Eldercare
Dr. Sara Shields	Professor and Physician, Co-Chair of the Healthy Baby Collaborative	University of Massachusetts Medical School and Family Health Center of Worcester
Richard Siegrist	Chair, Board of Trustees	UMass Memorial Health Care
Imrana Soofi	Executive Director	Muslim Community Link
Rev. Clyde Talley	Pastor	Belmont AME Zion Church
Cathy Violette	Nurse Practitioner, Division of Maternal and Fetal Medicine	UMass Memorial Health Care
Carlton Watson	Executive Director	Worcester Housing Authority
Dr. Linda Weinreb	Director of Medicaid Programs and ACOs	Fallon Health
Jan Yost	President	Health Foundation of Central MA

Focus Groups (10)

Purpose: Focus groups are conducted with key segments of the population and/or key types of service providers. This activity allows for the collection of more targeted and nuanced information from segments of the population who are deemed most at-risk and the key service providers who serve these populations and are critical to community health improvement. Focus groups:

- Augment findings from secondary data and key informant interviews
- Allow for exploration of strategic and programmatic options to address identified health issues, service gaps, and/or barriers to care.

Methods: Focus groups are conducted using a structured guide developed by the JSI Project Team. Each group lasted approximately 60 minutes depending on the size of the group. Specific populations and/or provider groups were recruited to participate based on specific demographic and/or sociodemographic characteristics, population segments struggling with particular health issues, or critical service provider groups identified as emerging target populations. Participants were recruited in collaboration with CHA Facilitating Partners and the Advisory Committee. Notes were taken at each forum and were analyzed to identify key themes.

Audience	Date
Central Massachusetts Funders	March 30, 2018
Worcester Department of Health and Human Services (Disabilities, Veterans, Youth, Human Rights)	April 13, 2018
Parents	April 26, 2018 May 22, 2018
Youth	May 24, 2018
Behavioral Health Providers	June 8, 2018
Latino Educational Institute; Limited English Proficiency	June 14, 2018
Individuals with disabilities	June 19, 2018
Elder Health Service Providers	June 26, 2018
South East Asian Coalition	July 10, 2018
Spanish-speaking Medical Interpreters	July 11, 2018

Community Forums (4)

Purpose: Community forums allow for the capture of information directly from community residents and, to some extent, representatives from local service providers or community organizations. Input is captured from residents on:

- Community health needs and priorities
- Service system gaps
- Barriers to care across a wide array of health-related service and community resource domains (e.g., health, housing, transportation, safety, food access).

Forums are critical to fulfilling a comprehensive community engagement plan and will support the development of a sound and objective health needs assessment that will be used to develop programs that reduce disparities and improve health status.

Methods: The JSI Project Team worked with CHA Facilitating Partners, the Advisory Committee, and interviewees to determine appropriate hosts for Community Forums to ensure that residents have an accessible and safe space to gather and share their thoughts. JSI designed forum materials to fully engage the community in a way that both educated on findings from secondary data and fostered a true spirit of engagement. Forums were approximately two hours and involved a structured and interactive set of plenary and group activities to maximize opportunities for engagement and information gathering. During the final forum at the Worcester Public Library (July 12, 2018), participants were asked to participate in a prioritization exercise using a web-based polling program.

Location	Date
Shrewsbury Town Hall	May 2, 2018
Grafton Police Department	May 9, 2018
Worcester Senior Center	May 23, 2018
Worcester Public Library	July 12, 2018

Other Engagement Efforts

The Facilitating Partners participated in a number of additional community engagement activities. The following is a list of sites where Facilitating Partners spoke with community residents, had informational tables, and solicited participating in the CHA survey.

Location/Event	Date
Vietnamese New Year Celebration	February 4, 2018
Salvation Army/Sally's Place Soup Kitchen	February 15, 2018
Friendly House	February 16, 2018
YMCA	February 19, 2018
Catholic Charities - Youville House	February 20, 2018
Worcester Senior Center	February-April 2018
St. Peter's Church	February-March 2018
St. Peter's Church	February-March 2018
Elder Services of Worcester Area	Spring 2018
Centro Las Americas: Food Pantry and Latino Elder Program	March 2018
Akwaaba Free Clinic	March 1, 2018
South Main Community Development Corporation VITA	March 3, 2018
Jewish Community Center	March 6, 2018
St. John's High School	March 15, 2018
Teen Brain Under Construction	March 15, 2018
YWCA	March 16, 2018
Loaves and Fishes	March 17, 2018
Jeremiah's Inn	March 20, 2018
West Boylston Food Pantry	March 20, 2018
City of Worcester Employees	March 22, 2018
Pernet Family Health Services	March 26, 2018
Worcester Common Ground	April 2018
UMass Medical School	April 2, 2018
Quinsigamond Community College	April 9, 2018
Mental Health and Wellness Fair	April 18, 2018
Family Health Center of Worcester	June 2018
Juneteenth Festival	June 1, 2018
New Life Health and Safety Fair at Piedmont	June 23, 2018

Appendix B:

Greater Worcester CHA Data Book

Key

Statistically higher than statewide rate

Statistically lower than statewide rate

			Primary Service Area							
	MA	*Worcester County*	*Grafton*	*Holden*	*Leicester*	*Millbury*	*Shrewsbury*	*West Boylston*	*Worcester*	*Source*
Population										
Male (%)	48.5	49.3	47.9	49.4	49.5	51.0	49.5	62.4	49.2	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Female (%)	51.5	50.7	52.1	50.6	50.5	48.4	50.5	37.6	50.8	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Under 5 years (%)	5.4	5.5	5.6	5.2	3.0	6.4	5.3	3.6	5.9	US Census Bureau, 2012-2016 ACS 5-Year Estimates
5 to 9 years (%)	5.5	5.8	6.3	6.0	5.1	5.6	6.3	2.7	5.6	US Census Bureau, 2012-2016 ACS 5-Year Estimates
10 to 14 years (%)	6.0	6.7	7.4	7.9	5.5	5.7	7.8	4.2	5.5	US Census Bureau, 2012-2016 ACS 5-Year Estimates
15 to 19 years (%)	6.8	7.1	6.1	7.3	7.7	6.3	8.2	3.4	8.1	US Census Bureau, 2012-2016 ACS 5-Year Estimates
20 to 24 years (%)	7.3	7.0	5.0	4.5	6.0	7.1	6.3	8.3	10.2	US Census Bureau, 2012-2016 ACS 5-Year Estimates
25 to 54 years (%)	40.7	40.5	44.8	40.1	36.9	40.2	40.4	49.6	40.8	US Census Bureau, 2012-2016 ACS 5-Year Estimates
55 to 64 years (%)	13.1	13.4	12.0	13.9	19.1	12.3	11.1	11.3	11.3	US Census Bureau, 2012-2016 ACS 5-Year Estimates
65 to 74 years (%)	8.3	7.9	7.6	8.7	8.3	10.7	8.2	9.2	6.3	US Census Bureau, 2012-2016 ACS 5-Year Estimates
75 and older (%)	6.7	6.3	5.2	6.3	8.5	5.7	6.4	7.6	6.3	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Age under 18 (%)	20.6	22.0	24.0	24.1	17.3	21.9	25.0	12.5	20.3	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Age over 65 (%)	15.1	14.1	12.8	15.0	16.8	16.4	14.6	16.9	12.7	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Civilian Veterans	6.4	7.5 (.2)	5.8	5.9	8.4	9.1	6.5	7.5	5.8	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Disabled (Civilian noninstitutionalized population)	11.6	11.9	9.1	8.3	11.7	11.1	9.0	11.6	14.9	US Census Bureau, 2012-2016 ACS 5-Year Estimates
No health insurance coverage (civilian noninstitutionalized population)	3.2	3.0	2.6	1.7	2.5	2.9	2.3	2.6	4.0	US Census Bureau, 2012-2016 ACS 5-Year Estimates
With public health insurance coverage (civilian noninstitutionalized population)	35.0	34.8	24.7	26.4	33.8	27.2	22.7	32.2	45.1	US Census Bureau, 2012-2016 ACS 5-Year Estimates
With private health insurance coverage (civilian noninstutitionalized population)	74.3	74.5	82.9	85.6	80.2	85.6	88.0	85.2	61.5	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Race, Ethnicity, Origin										
White alone (%)	79.3	84.7	83.1	94.1	95.4	93.7	76.1	87.5	69.5	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Black or African American alone (%)	7.3	4.8	4.5 (2.5)	1.2	1.6	0.8	3.8	6.8	13.6	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Asian alone (%)	6.1	4.6	7.2	2.1	0.8	2.5	16.6	1.6	7.1	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Native Hawaiian and Other Pacific Islander (%)	0	-	-	-	0.1	-	-	-	-	US Census Bureau, 2012-2016 ACS 5-Year Estimates
American Indian and Alaska Native (%)	0.2	0.2	-	0.2	0.2	0.1	0.1	0.1	0.3	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Some Other Race (%)	4.1	3.0	0.6	0.1	0.9	1.4	0.8	1.6	5.2	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Two or More Races (%)	3.0	2.7	4.7	2.2	0.9	1.5	2.6	2.4	4.3	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Hispanic or Latino of Any Race (%)	10.9	10.5	5.8	4.1	4.4	2.4	3.7	11.6	20.8	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Foreign Born (%)	15.7	11.6	11.5	7.2	5.7	6.4	20.6	5.6	21.5	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Naturalized U.S. Citizen (%)	52.2	52.3	61.6	64.9	73.8	66.1	52.3	55.5	46.7	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Not a U.S. Citizen (%)	47.8	47.7	38.4	35.1	26.2	33.9	47.7	44.5	53.3	US Census Bureau, 2012-2016 ACS 5-Year Estimates

			Primary Service Area							
	MA	*Worcester County*	*Grafton*	*Holden*	*Leicester*	*Millbury*	*Shrewsbury*	*West Boylston*	*Worcester*	*Source*
Language Spoken At Home (Population >5 years)										
Language other than English (%)	22.7	18.5	17.4	9.9	7.7	8.4	25.4	15.3	34.7	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Speak English less than very well (%)	8.9	7.2	4.6	3.8	4.5	2.4	11.6	5.0	16.7	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Spanish (%)	8.6	7.9	4.6	2.8	3.1	0.6	2.5	10.6	15.9	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Speak English less than very well (%)	3.5	3.1	1.2	0.8	1.5	-	1.1	3.1	7.4	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Other Indo-European anguages (%)	8.7	6.0	8.5	4.4	3.3	6.3	11.3	2.9	8.4	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Speak English less than very well (%)	3.0	2.1	2.4	1.2	2.2	1.9	5.3	0.8	3.8	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Asian and Pacific Islander languages (%)	4.1	2.8	3.4	1.6	0.7	0.7	9.3	0.7	5.2	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Speak English less than very well (%)	1.9	1.3	0.7	0.7	0.5	0.3	4.5	0.7	3.1	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Other languages (%)	1.4	1.8	0.8	1.1	0.5	0.7	2.4	1.2	5.2	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Speak English less than very well (%)	0.5	0.7	0.3	1.0	0.2	0.1	0.7	0.4	2.4	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Household										
Total households	2,558,889	302,794	6807	6479	4381	5267	12909	2056	69204	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Family households (families) (%)	63.6	66.1	69.7	76.0	66.0	69.1	74.6	68.8	55.2 (1.2	US Census Bureau, 2012-2016 ACS 5-Year Estimates
In married couple family (%)	46.9	49.4	58.3	65.1	50.9	55.6	60.4	57.3	33.8	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Female householder, no husband present, with children under 18 (%)	12.5	6.8	8.7	8.1	9.9	10.6	10.2	7.9	15.8	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Nonfamily household - householder living alone	28.6	27.1	23.0	19.2	26.9	26.3	21.1	25.7	35.3	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Nonfamily household - householder living alone - 65 years or older	11.5	10.6	10.6	10.1	10.9	12.1	9.8	13.6	11.6	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Poverty and Employment										
Unemployment Rate among Civilian Labor Force (%)	6.8	4.5	3.6	3.7	2.9	4.4	3.2	2.2	5.5	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Median household income (dollars)	70,954	67,005	###### ###	100,599.0	72,637.0	72,566.0	98,790.0	74,005.0	45,499.0	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Below 200%	24.3	24.3	13.8	10.7	19.3	16.5	10.6	13.7	41.1	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Below federal poverty line - all residents (%)	11.4	11.4	5.6	4.1	6.2	6.8	4.5	7.6	22.1	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Below federal poverty line - families (%)	8.0	7.8	3.7	2.2	3.1	5.7	3.2	3.6	16.5	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Below federal poverty line - under 18 years (%)	14.9	14.7	5.3	3.7	5.6	9.1	3.7	10.6	30.6	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Below federal poverty line - age 65+ (%)	9.0	9.0	9.8	6.0	7.1	9.9	5.5	5.7	14.4	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Below federal poverty line - female head of household, no husband present (%)	25.2	24.6	11.0	8.2	8.8	16.5	11.5	24.5	33.1	US Census Bureau, 2012-2016 ACS 5-Year Estimates
With cash public assistance income (%)	2.9	2.9	2.2	1.4	1.5	1.0	1.2	0.6	5.0	US Census Bureau, 2012-2016 ACS 5-Year Estimates
With Food Stamp/SNAP benefits in the past 12 months (%)	12.5	12.4	6.3	3.5	6.9	7.1	2.9	3.8	22.1	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Free and Reduced Lunch Enrollment (%)	44.0		14.0		37.0	31.0	17.0	21.0	75.0	Annie E. Casey Foundation, 2014-2015

			Primary Service Area							
	MA	*Worcester County*	*Grafton*	*Holden*	*Leicester*	*Millbury*	*Shrewsbury*	*West Boylston*	*Worcester*	*Source*
Educational Attainment (Population 25 Years and Older)										
High school degree or higher (%)	90.1	90.0	95.7	96.1	89.2	92.2	94.9	87.7	84.4	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Bachelor's degree or higher (%)	41.2	34.8	50.5	52.9	27.2	34.8	56.2	30.1	29.7	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Housing										
Vacant housing units (%)	9.8	8.0	5.2	4.8	5.6	6.3	6.8	5.5	9.1	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Owner-occupied (%)	62.1	64.7	72.3	89.1	71.3	73.2	74.0	84.3	42.4	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Monthly owner costs exceed 30% of household income (%)	32.7	29.8	23.0	27.5	31.4	32.0	20.3	31.8	22.2	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Renter-occupied (%)	37.9	35.3	27.7	10.9	28.7	26.8	26.0	15.7	57.6	US Census Bureau, 2012-2016 ACS 5-Year Estimates
Gross rent exceeds 30% of household income (%)	50.1	49.0	35.1	39.3	29.7	52.7	41.7	44.3	53.9	US Census Bureau, 2012-2016 ACS 5-Year Estimates

Key

Statistically higher than statewide rate

Statistically lower than statewide rate

M/U = Missing or Unknown

A value of --1 indicates that value is suppressed due to low counts

			Primary Service Area							
	MA	*Worcester County*	*Grafton*	*Holden*	*Leicester*	*Millbury*	*Shrewsbury*	*West Boylston*	*Worcester*	*Source*
Overall Morbidity and Mortality (age-adjusted rates per 100,000)										
All cause										
Hospitalizations (2008-2012)	11569.7	11053.52	9394.93	9534.25	10516.25	10625.47	9595.99	9251.75	13169.05	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
ED discharges (2008-2012)	36897.6	36005.62	25627.88	22528.38	27130.98	28499.33	23243.85	24694.99	45332.97	MA Hospital Emergency Visit Discharges, 2008-2012 (accessed through MassCHIP)
Mortality (2015)	684.5	757.5	840.4	713.9	842.5	873	620.8	701.9	905.3	MA Vital Records 2015
Premature mortality for <75 yr population	279.6	316.8	293.3	403.2	288.6	386.7	221.5	296.3	466.7	MA Vital Records 2014
Injuries and Poisonings										
Hospitalizations (2008-2012)	852.06	832.51	590.06	705.65	734.41	765.94	716.09	682.72	1020.57	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Mortality - Accidents (2015)	58	63.8	34.5	86.6	55.3	63.1	34.4	38.5	94.1	MA Vital Records 2015
Mortality - Self Inflicted (2015)	9	10.4	--1	--1	--1	--1	--1	--1	11.6	MA Vital Records 2015
Motor Vehicle Related										
Hospitalizations, 2008-2012	59.32	63.2	56.58	60.57	98.51	57.65	46.04	50.68	63.27	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Mortality (2015)	5.4	7.7	--1	--1	--1	--1	--1	--1	7.8	MA Vital Records 2015
Assault										
Mortality (2015)	2.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	3.2	MA Vital Records 2015
Behavioral Health										
Total number of people served in BSAS Contracted/Licensed Facilities in FY2014	85,823		161	101	126	223	253	0-100	4915	MA Bureau of Substance Abuse Services (BSAS)
Client Characteristics										
White (%)	81		90.7	94.1	90.6	91.3	91.4	97.3	69.5	MA Bureau of Substance Abuse Services (BSAS)
Black of African American (%)	6.6		3.7	M/U	M/U	M/U	M/U	M/U	6.3	MA Bureau of Substance Abuse Services (BSAS)
Multi-Racial or Other (%)	12.4		4.3	M/U	M/U	7.8	6.7	M/U	24.1	MA Bureau of Substance Abuse Services (BSAS)
Hispanic (%)	11.7		M/U	M/U	5.5	3.5	4.3	M/U	24.6	MA Bureau of Substance Abuse Services (BSAS)
Less Than High School Diploma (%)	23.7		14.6	22.4	25.6	15.4	12.7	9.6	25.2	MA Bureau of Substance Abuse Services (BSAS)
More than High School (%)	28.7		38.2	27.6	31.4	36.7	44.1	50.7	25.4	MA Bureau of Substance Abuse Services (BSAS)
Under 18 (%)	1.6		M/U	M/U	M/U	M/U	M/U	M/U	0.6	MA Bureau of Substance Abuse Services (BSAS)
18-25 (%)	21.4		32.5	42.6	58.5	22.5	47.4	28.4	16	MA Bureau of Substance Abuse Services (BSAS)
26-30 (%)	20.9		15.6	15.8	9.8	16.3	17.8	20.3	20.4	MA Bureau of Substance Abuse Services (BSAS)
31-40 (%)	25.9		26.6	22.8	14.6	35.7	15	24.3	28	MA Bureau of Substance Abuse Services (BSAS)
41-50 (%)	18.7		16.9	8.9	10.6	18.5	10.3	14.9	22.4	MA Bureau of Substance Abuse Services (BSAS)
51 and older (%)	11.6		7.1	8.9	6.5	7	8.7	10.8	12.5	MA Bureau of Substance Abuse Services (BSAS)
Homeless (%)	17.6		7.5	9.1	13.7	7.2	4.8	11.3	25	MA Bureau of Substance Abuse Services (BSAS)
Unemployed (%)	76.3		71	74.7	78.3	76	64.3	68.2	87.2	MA Bureau of Substance Abuse Services (BSAS)
Had Prior Mental Health Treatment (%)	43.9		36.9	48.5	34.9	45.3	43.9	50	45.3	MA Bureau of Substance Abuse Services (BSAS)
Primary Drug of Use										
Alcohol (%)	31.9		34.2	28.7	30.2	27.8	35.2	35.1	24.8	MA Bureau of Substance Abuse Services (BSAS)
Heroin (%)	53.1		55.9	55.4	43.7	61.9	53.8	56.8	62.3	MA Bureau of Substance Abuse Services (BSAS)
All Other Opioids - *Rx Methadone, Other Opiates, Oxycodone, Non-Rx Suboxone, Rx Opiates, Non-Rx Opiates* (%)	5.8		5.6	9.9	12.7	5.4	4.7	M/U	5	MA Bureau of Substance Abuse Services (BSAS)
Crack/Cocaine (%)	3.4		M/U	M/U	M/U	3.1	2.8	M/U	4.4	MA Bureau of Substance Abuse Services (BSAS)
Marijuana (%)	4		M/U	M/U	9.5	M/U	2.8	M/U	2.6	MA Bureau of Substance Abuse Services (BSAS)
Other - *PCP, Hallucinogens, Methamphetamine, Amphetamines, Stimulants, Benzodiazepines, Tranquilizers, Barbituates, Sedatives, Inhalants, OTC, Club Drugs, Other* (%)	1.7		M/U	M/U	M/U	M/U	M/U	M/U	0.8	MA Bureau of Substance Abuse Services (BSAS)
Alcohol/substance use (age adjusted per 100,000)										
Related hospitalizations, 2008-2012	337.58	225.9	136.93	145.54	194.7	198	122.01	164.72	338.82	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Related ED discharges, 2008-2012	858.83	660.81	426.62	389.64	426.34	649.24	372.32	488.09	1209.27	MA Hospital Emergency Visit Discharges, 2008-2012 (accessed through MassCHIP)
Opioids (age-adjusted per 100,000)										
Hospitalizations (2008-2012)	315.55	236.38	150.61	118.43	170.61	224.19	122.21	158.36	452.8	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Related ED discharges (2008-2012)	259.63	204.19	158.22	125.34	166.47	203.75	148.87	184.15	315.68	MA Hospital Emergency Visit Discharges, 2008-2012 (accessed through MassCHIP)
Opioid-related fatal overdose (2015)	24.6	26.7	--1	--1	--1	--1	--1	0.0	43.6	MA Vital Records 2015
Mental Disorders (age adjusted per 100,000)										
Hospitalizations (2008-2012)	837.85	807.33	508.89	447.16	479.76	747.8	437.93	543.86	1298.04	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Related Hospitalizations (2008-2012)	3839.51	3786.58	2693.34	2522.67	3229.25	3710.43	2518.26	2941.25	5289.2	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
ED discharges (2008-2012)	2091.86	1968	1355.13	1114.28	1295.42	1741.58	1119.77	1278.82	2784.36	MA Hospital Emergency Visit Discharges, 2008-2012 (accessed through MassCHIP)
Related ED discharges (2008-2012)	4990.42	6154.44	3520.97	3205.8	4472.43	5536.06	3011.95	3927.51	8299.96	MA Hospital Emergency Visit Discharges, 2008-2012 (accessed through MassCHIP)
Mortality (2015)	62.9	61.3	80.6	76.5	97	58.1	49.1	86.1	85.2	MA Vital Records 2015
Suicide Deaths (2015)	9.0	10.4	--1	--1	--1	--1	--1	--1	11.6	MA Vital Records 2015

			Primary Service Area							
	MA	*Worcester County*	*Grafton*	*Holden*	*Leicester*	*Millbury*	*Shrewsbury*	*West Boylston*	*Worcester*	*Source*
Chronic Disease (age-adjusted rates per 100,000)										
Diabetes										
Hospitalizations (2008-2012)	135.03	130.77	71	79.02	155.12	123.22	89.6	96.48	180.15	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Related Hospitalizations (2008-2012)	1845.55	1833.67	1144.28	1288.71	1922.54	1662.02	1391.85	1362.28	2450.69	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
ED discharges (2008-2012)	133.4	130.66	48.86	69.12	107.72	85.09	84.95	102.43	185.41	MA Hospital Emergency Visit Discharges, (accessed through MassCHIP)
Mortality (2015)	16.8	17.9	--1	--1	--1	0.0	16.4	--1	26.1	MA Vital Records 2015
Chronic Liver Disease										
Hospitalizations (2008-2012)	29.07	30.47	NA	21.51	49.1	25.18	16.29	26.83	46.07	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Mortality (2015)	8.1	9.4	--1	0.0	--1	--1	--1	0.0	16.5	MA Vital Records 2015
Hypertension										
Hospitalizations (2008-2012)	45.49	33.52	21.86	19.97	17.64	24.97	42.47	36.2	56.5	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Related Hospitalizations (2008-2012)	4025.13	3896.63	2958.65	3170.69	3813.05	3901.84	3568.96	3362.16	4766.26	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
ED discharges (2008-2012)	121.49	97.82	66.32	71.27	81.39	78.58	81.96	56.76	141.73	MA Hospital Emergency Visit Discharges, 2008-2012 (accessed through MassCHIP)
Related ED discharges (2008-2012)	2831.29	3335.29	1963.12	2025.61	2478.01	2588	2520.45	2713.9	4553.17	MA Hospital Emergency Visit Discharges, 2008-2012 (accessed through MassCHIP)
Mortality (2015)	6.9	8.4	--1	--1	--1	--1	--1	0	10.1	MA Vital Records 2015
Major cardiovascular disease										
Hospitalizations (2008-2012)	1343.98	1335.27	1053.17	1154.29	1366.74	1367.22	1215.58	1134.6	1420.71	MA Hospital Inpatient Discharges (UHDDS), (accessed through MassCHIP)
ED discharges (2008-2012)	402.11	392.25	228.97	216	302.17	258.27	283.86	263.45	323.67	MA Hospital Emergency Visit Discharges, 2008-2012 (accessed through MassCHIP)
Mortality (2015)	180.8	201.7	210.1	151	215.6	253.9	188.4	145.4	208.1	MA Vital Records 2015
Heart Disease										
Hospitalizations (2008-2012)	980.37	979.61	771.8	859.18	1015.2	930.55	933.89	869.34	1022.34	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
ED discharges (2008-2012)	214.98	229.43	138.64	126.36	187.9	145.24	179.18	168.11	152.12	MA Hospital Emergency Visit Discharges, 2008-2012 (accessed through MassCHIP)
Mortality (2015)	138.7	151.8	170.9	121.5	149.6	173.6	146.5	106.3	161.5	MA Vital Records 2015
Coronary Heart Disease										
Hospitalizations (2008-2012)	320.8	324.04	288.58	254.68	361	311.01	272.73	266.85	322.8	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Mortality (2015)	82.3	89	93.9	64.5	91.3	111.8	80.7	48.5	92.6	MA Vital Records 2015
Heart Failure										
Hospitalizations (2008-2012)	273.09	268.45	147.06	196.29	251.83	223.1	258.14	237.13	313.57	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Related Hospitalizations (2008-2012)	1191.58	1225.99	757.66	1008.8	1341.85	1096.49	1139.29	1011.71	1452.03	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Cerebrovascular Disease										
Hospitalizations (2008-2012)	227.67	224.32	165.53	200.32	222.43	269.06	170.24	172.75	236.41	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Mortality (2015)	28.4	35.8	--1	--1	--1	57.8	29.6	33.6	31.7	MA Vital Records 2015
COPD										
Hospitalizations (2008-2012)	364.35	376.89	206.84	176.93	350.62	344.66	218.79	211.68	498.73	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Mortality (2015)	33	41.2	--1	29.5	100.1	65.3	30.2	--1	53.3	MA Vital Records 2015
Asthma										
Hospitalizations (2008-2012)	151.92	150.39	91.67	74.91	137.23	112.68	81.62	88.35	226.42	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Related Hospitalizations (2008-2012)	899.18	953.81	765.94	584.61	846.86	839.61	638.61	615.04	1372.8	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
ED discharges (2008-2012)	573.49	586.13	329.96	312.82	444.63	367.62	319.11	356.88	888.56	MA Hospital Emergency Visit Discharges, 2008-2012 (accessed through MassCHIP)
Related ED discharges (2008-2012)	1443.98	2159.18	1077	1088.32	1510.99	1513.89	1053.16	1298.04	3147.13	MA Hospital Emergency Visit Discharges, 2008-2012 (accessed through MassCHIP)
Mortality (2015)	1	1.3	0.0	--1	0.0	--1	0.0	0.0	--1	MA Vital Records 2015
Cancer (age-adjusted rates per 100,000)										
All-cause										
Hospitalizations (2008-2012)	371.3	358.59	355.07	359.55	347.48	423.4	336.8	269.36	378.38	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
ED discharges (2008-2012)	15.58	13.06	NA	NA	NA	NA	9.48	NA	13.05	MA Hospital Emergency Visit Discharges, 2008-2012 (accessed through MassCHIP)
Mortality (2015)	152.8	171	200.2	186.1	123.8	194.9	145.7	135.6	187.8	MA Vital Records 2015
Breast (invasive, female)										
Hospitalizations (2008-2012)	39.08	27.62	32.47	21.44	NA	31.87	25.58	NA	23.73	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
ED discharges (2008-2012)	1.93	1.77	0	NA	0	NA	0	0	2.9	MA Hospital Emergency Visit Discharges, 2008-2012 (accessed through MassCHIP)
Mortality (2015)	9.9	10.10	--1	--1	--1	--1	11.7	0	13.9	MA Vital Records 2015
Colorectal										
Hospitalizations (2008-2012)	38.41	34.99	30.28	35.48	39.78	32.73	31.39	NA	34.34	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
ED discharges (2008-2012)	0.83	0.57	0	0	0	0	0	0	NA	MA Hospital Emergency Visit Discharges, 2008-2012 (accessed through MassCHIP)
Mortality (2015)	12.0	12.50	--1	32.2	0	--1	--1	0	11.4	MA Vital Records 2015
Lung										
Hospitalizations (2008-2012)	47.86	47.66	51.02	35.23	50.74	61.06	36.45	49.63	51.74	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
ED discharges (2008-2012)	2.66	2.12	NA	0	NA	NA	NA	NA	1.35	MA Hospital Emergency Visit Discharges, 2008-2012 (accessed through MassCHIP)
Mortality (2015)	39.0	46.00	67.4	49.5	--1	51.2	30.5	42.4	47.3	MA Vital Records 2015
Prostate										
Hospitalizations (2008-2012)	58.15	61.81	66.29	61.69	36.59	85.45	65.17	47.13	53.35	MA Hospital Inpatient Discharges (UHDDS), (accessed through MassCHIP)
ED discharges (2008-2012)	1.18	0.88	0	0	0	0	0	0	NA	MA Hospital Emergency Visit Discharges, (accessed through MassCHIP)
Mortality (2015)	7	6.3	--1	--1	--1	0	--1	--1	11.1	MA Vital Records 2015

			Primary Service Area							
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Maternal and Child Health										
Infant Mortality, 2015 (rate per 1,000)	4.3	6.2	--1	--1	0	--1	0	--1	6.2	MA Vital Records 2015
Low Birth Weight (<2500 grams/5.5 lbs), 2014 (%)	7.5	7.8	8.8	5	8.2	6.8	5.5	NA	13.4	MA Vital Records 2015
Preterm births (<37 weeks), 2015	6001		8.8	6.1	8.2	10.3	7.6	NA	10.6	MA Vital Records 2015
Number of resident births to mothers 15-19, 2015	2140		Between 1-4	Between 1-4	Between 1-4	Between 1-4	Between 1-4	Between 1-4	130	MA Vital Records 2015
Infectious Disease										
Chlamydia cases (lab confirmed), 2016	26448	2687	59	35	32	30	78	33	1156	MDPH Bureau of Infectious Disease and Laboratory Sciences, Office of Integrated Surveillance and Informatics Services
Gonorrhea cases (lab confirmed), 2016	4617	288	<5	6	<5	5	7	<5	151	MDPH Bureau of Infectious Disease and Laboratory Sciences, Office of Integrated Surveillance and Informatics Services
Syphillis cases (probable and confirmed), 2016	1033	81	NA	<5	<5	<5	<5	NA	37	MDPH Bureau of Infectious Disease and Laboratory Sciences, Office of Integrated Surveillance and Informatics Services
Hepatitis C cases (confirmed and probable, past or present), 2015	8986	NA	6	13	7	11	17	8	330	MDPH Bureau of Infectious Disease and Laboratory Sciences, Office of Integrated Surveillance and Informatics Services
Lyme Disease Cases (confirmed and probable), 2015	4352	558	31	15	10	13	23	10	45	MDPH Bureau of Infectious Disease and Laboratory Sciences, Office of Integrated Surveillance and Informatics Services
Pneumonia/Influenza										
Confirmed Influenza cases, 2015	15869	1308	19	15	12	19	50	<5	244	MDPH Bureau of Infectious Disease and Laboratory Sciences, Office of Integrated Surveillance and Informatics Services
Hospitalizations (2008-2012)	322.16	345.43	264.95	316.63	282.65	290.07	283.87	283.23	386.45	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Mortality (2015)	17.1	17.9	--1	--1	--1	--1	9.8	34.9	27.9	MA Vital Records 2015
HIV/AIDS (age-adjusted rate per 100,000)										
Hospitalizations (2008-2012)	12.43	12.18	NA	NA	NA	0	NA	NA	42.36	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Mortality (2015)	1.1	0.7	--1	0.0	0.0	0.0	0.0	0.0	--1	MA Vital Records 2015
Infectious and Parasitic Disease (age-adjusted rate per 100,000)										
Hospitalizations (2008-2012)	396.88	399.38	312.66	393.77	423.57	358.64	388.02	386.08	545.49	MA Hospital Inpatient Discharges (UHDDS), 2008-2012 (accessed through MassCHIP)
Mortality (2015)	18.9	20.9	--1	--1	--1	--1	27.3	--1	31.8	MA Vital Records 2015

Notes:

1. Demographics: Each American Community Survey (ACS) estimate is accompanied by the upper and lower bounds of the 90 percent confidence interval. A 90 percent confidence interval can be interpreted roughly as providing 90 percent certainty that the true number falls between the upper and lower bounds.

2. Clinical indicators: All data provided by MassCHIP are estimates associated with some margin of error. Percentages are accompanied by 95% confidence intervals, meaning the true value of the measure falls within the range 95% of the time. The difference between two groups is statistically significant if the 95% confidence intervals surrounding these two estimates do not overlap

For CHIA data, confidence intervals for year over year reflect change within geography rather than difference from statewide benchmark

Appendix C:
Resource Inventory

Worcester Regional Community Health Assessment
Resource Inventory by Town and Resource Type

Multi-sector Collaboratives & Community Health Partnerships
Central Massachusetts Regional Public Health Alliance (CMRPHA)
Coalition for a Healthy Greater Worcester
Central MA Tobacco Free Community Partnership
Regional Response to Addiction Partnership
Healthy Grafton Coalition
Millbury Opioid Taskforce
UMass Memorial Task Force on Opioids
Walk Bike Worcester
Worcester Coalition Against Bias and Hate
Worcester Healthy Baby Collaborative
Worcester Mayor's Taskforce on Homelessness
Worcester Mayor's Taskforce on Mental Health
Worcester Partnership for Racial and Ethnic Health Equity
Local Public Health Departments
Elder Services Departments / Councils on Aging / Senior Centers
Health and Human Services Departments
Housing Departments / Authorities
Human Rights and Disability Offices / Commissions
Police and Fire Departments
Public School Departments
Recreation Departments
Veterans Offices / Officers
Workforce Development, Employment, and Training Departments
Worcester Regional Transit Authority
Private, Community-based Social Service & Community Health Agencies
Adult Education
Worcester Adult Education
Worcester Community Action Council
Services for the Formerly Incarcerated
Dismas House
Ex-Prisoners and Prisoners Organizing for Community Advancement (EPOCA)
Early Childhood, Youth, and Adolescent Services
Disability Services
Center for Living and Working
My Choice Programs
Seven Hills Foundation

Early Childhood Services
Edward Street Child Services
Head Start / Early Head Start Programs
Pernet Family Services
Shrewsbury Youth & Family Services
WIC Programs
Worcester ACTs Program
Worcester Area Early Intervention
Elder Services
Central Massachusetts Agency on Aging
Fallon Health PACE Program
Local Councils on Aging / Senior Centers and Departments of Elder Services
NaviCare / Fallon Health
Summit Eldercare / Fallon Health
Worcester Senior Center
Employment Services
Grafton Jobs Corp
Quinsigamond Community College
Worcester Business Development Corporation
Workforce Central Career Center
Faith-based Organizations
Worcester Interfaith
Food Security and Healthy Eating
Community Garden Programs
Community Harvest Project
Regional Environmental Council
Veggie Mobile Program
Food Bank
Worcester County Food Bank
Food Pantries
AIDS Project Worcester
Carty Cupboard
Catholic Charities Food Pantry
Centro Las Americas
Fountain of Life
Friendly House Pantry
Friends of Millbury Seniors
Good Samaritan Food Pantry
Jeremiah's Inn Food Pantry
John Street Baptist Church
Leicester Food Pantry

Loaves and Fishes Food Pantry
Orthodox Food Center
Pernet Family Health Services
Quinsigamond Village Community Center
Salvation Army Citadel-Sally's Place
St. Anne's Human Services
St. Anthony's Pantry
St. James Church
St. Paul's Outreach
St. Peter's Church
South Worcester Neighborhood Center
Veteran's Inc. Food Pantry
Legal Aid Services
Community Legal Aid Services
Central West Justice Center
Multi-Service Agencies
South Worcester Neighborhood Improvement Corporation
Worcester Community Action Council
Worcester Community Connections
Multi-Service Cultural Agencies
African Community Education
Ascentria Care Alliance
Centro Las Americas
Indigenous People’s Network / Affiliated Tribes of Northwest Indian
Massachusetts Alliance for Portuguese Speakers (MAPS)
Muslim Community Link
Refugee and Immigrant Assistance Program
South East Asian Coalition
Recreational Services
Boys and Girls Club of Worcester
Recreation Worcester
YMCA of Central Massachusetts
YWCA of Central Massachusetts
Shelter & Domestic Violence Services
Abby's House
Day Break YWCA - Shelter
Friendly House
Laura's House
New Hope
Pathways for Change
Veterans Inc. Homeless Shelter

Youville House - Catholic Charities - Shelter
YWCA Central Massachusetts - Domestic Violence Services
Transportation
Tasks for Transit
Youth and Adolescent Services
Girls, Inc.
HOPE Coalition
Youth Connect
Worcester Child and Family Services
Worcester Youth Center
UNITEY
Other Community-Based Organizations
Worcester Roots (Green / Environmental Initiatives)
Health Care Services
Behavioral Health Services (Mental Health and Substance Use)
Private BH Outpatient Solo and Group Practice Sites (Too numerous to list)
AdCare
Clean Slate Outpatient Addiction Medicine
Community Health Link
Edward M. Kennedy Community Health Center
Fallon Health Primary Care Network
Family Health Center of Worcester
Hector Reyes House
Institute for Health and Recovery
Island Counseling
Jeremiah's Inn
Luk
Multicultural Wellness Center
Real You Revolution
Reliant Medical Group
Saint Vincent Hospital
South Bay Mental Health
Spectrum Health Systems
The Bridge of Central Massachusetts
The Shine Initiative
UMass Memorial Medical Center
Worcester Recovery Center and Hospital
You, Inc.
Hospital Services (Inpatient and Emergency Services)
UMass Memorial Medical Center
Saint Vincent Hospital

Worcester Recovery Center and Hospital
Primary Care and Medical Specialty Care Services (Including Oral Health)
Private Primary Care Solo and Group Practice Sites (Too numerous to list)
Edward M. Kennedy Community Health Center
Fallon Health Primary Care Network
Family Health Center of Worcester
Planned Parenthood - Central Massachusetts Health Center of Worcester
Reliant Medical Group
UMass Memorial Medical Center Affiliated Primary Care Practices
UMass Memorial Ronald McDonald Care Mobile (Medical and Preventive Oral Health)
Worcester Free Clinic Coalition
Post-Acute Services
Home-based Services
Century Home Care
Visiting Angels
VNA Care of Worcester
Nursing Home and Rehabilitation Services
A Caring Touch Nursing and Home Care
Beaumont Rehabilitation and Skilled Nursing Center
Benchmark Senior Living at Shrewsbury Crossings
Blaire House of Worcester
Briarwood Continuing Care Retirement Community
Bright Star Care Worcester
Christopher Heights
Christopher House
Colony Retirement Homes
Dodge Park Rest Home
Eisenberg Assisted Living Residence
Goddard/Homestead
Holy Trinity Nursing and Rehabilitation Center
Independence Healthcare
Jewish Healthcare Center
Knollwood Nursing Center
Lutheran Rehabilitation and Skilled Care Center
Notre Dame Long Term Care Center
Oakdale Rehabilitation of West Boylston
Parsons Hill Rehabilitation & Health Care Center
St Mary Health Care Center
Saint Francis Rehabilitation and Nursing Center
Southgate of Shrewsbury
Spring Valley Center - Nursing Home

The Hermitage HealthCare
The Willows Retirement Community
West Side House of Worcester
Wingate at Worcester
Worcester Health Center
Worcester Rehabilitation & Health Care Center
Ambulance Services
Eascare
Medstar Ambulance
Ruggerio Ambulance
Vital Emergency Services
UMass Memorial EMS
Education, Advocacy, Research, and Planning Organizations
Academic
Assumption
Becker College
Clark University
College of Holy Cross
Massachusetts College of Pharmacy
Quinsigamond Community College
Wheelock
Worcester State University
Business and Community Development
Oakhill Community Development Corporation
RECAP Solutions
Main South Community Development Corporation
Worcester Chamber of Commerce
Worcester Common Ground C DC
Worcester Community Housing Resources
Worcester East Side CDC
Health Education and Advocacy
AIDS Project Worcester
Alcoholics Anonymous
American Cancer Society
American Heart Association
American Lung Association
Center for Health Impact
Center for Living and Working
Central Massachusetts Workforce Investment Board
Central West Justice Center
Coalition Finder / Community Health Training Institute

Easter Seals Massachusetts
March of Dimes
Parent Professional Advocacy League
Planned Parenthood League of Massachusetts
Regional Environmental Council of Worcester
Women in Action
Worcester ACTs (Childhood Trauma)
Worcester Bottom Line
Worcester County Commission on the Status of Women
Worcester Food & Active Living Policy Council
Worcester Healthy Baby Collaborative
Worcester Impact on Sexual Health (W.I.S.H. Task Force)
Worcester Pride
Worcester Regional Research Bureau (WRRB)
Philanthropy
Angels Net Foundation
Fallon Health
Greater Worcester Community Foundation
Harvard Pilgrim Health Care Foundation
Health Foundation of Central Massachusetts
Reliant Foundation
Seven Hills Foundation
United Way of Central Massachusetts
Planning
Central MA Regional Planning Commission
Resource Inventories
2-1-1
CommunityHelp

Appendix D:

UMass Memorial Medical Center:
Summary of Community Benefit Impact Measures
2015-2018

Public Health

Prevent. Promote. Protect.



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