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Massachusetts State Health Assessment

October 2017

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Letter from the Commissioner

October 2017



I am proud to present to you the 2017 Massachusetts State Health Assessment. Over the past several months, Department of Public Health staff worked in collaboration with other state agencies, along with a diverse set of stakeholders and organizations from across the state to develop this comprehensive narrative on the health status of the residents of Massachusetts.

As with any health assessment, we take stock in many positive aspects that illustrate why Massachusetts regularly ranks high in national surveys and is generally regarded as a very healthy state. Our world-class health care system, commitment to health care reform and access to care, and strong public health policies and programs all contribute to a culture that values the many factors crucial to maintaining and improving the health of our residents. Still, despite that commitment and our many improvements, it is clear that some populations in Massachusetts do not have the same opportunities to achieve optimal health and well-being. This assessment highlights many disparities in health outcomes among low-income communities, people of color, women, persons with a disability, lesbian, gay, bisexual, transgender and queer/questioning (LGBTQ) individuals, and older residents. Just a sample of those data disparities include:

- While Massachusetts has one of the lowest infant mortality rate (IMR) in the nation, racial/ethnic disparities remain. In 2014, the IMRs for Black non-Hispanic and Hispanic infants were 2.1 and 1.5 times higher than that of White non-Hispanics.

- Despite significant declines in homicide rates among youth and young adults 15-24 years of age between 2006 and 2013, disparities persist. Young Black non-Hispanic males have the highest homicide rate that is 30 times higher than that for young White non-Hispanic males.
- Lower income communities and communities of color have higher prevalence of childhood blood lead levels at or above 5 µg/dL. In particular, Black non-Hispanic and American Indian populations are disproportionately impacted and have rates of high blood lead levels almost twice those of the White non-Hispanic population.
- While the number of diagnosed HIV infections decreased by 31% from 2005 to 2014, among men, the rate of newly diagnosed HIV infection was almost 28 times higher among men who have sex with men (MSM) than among non-MSM between 2012 and 2014.
- Pregnant and postpartum women with substance use disorders are at higher levels of risk for viral infections, adverse birth outcomes, co-occurring mental health diagnoses, and fatal opioid-related overdoses. Mothers with evidence of opioid use disorder (OUD) have an opioid-related death rate more than 300 times higher than mothers without evidence of OUD.

The Massachusetts Department of Public Health, in collaboration with our colleagues across the Commonwealth, is dedicated to understanding the social determinants that contribute to these disparities and taking action to eliminate the resulting health inequities that we see in too many communities across Massachusetts. The social determinants of health are the conditions and environments in which people are born, live, learn, work, play, and age, which affects a wide range of health risks and outcomes. Collecting data on how these factors shape existing and emerging health issues helps us understand what we can do as a Commonwealth to make Massachusetts an even healthier place to live.

Massachusetts has always been a leader in tackling some of our toughest public health problems through the use of innovative, evidence-based strategies. Recent examples include our comprehensive response to the current opioid epidemic, our reform of the Determination of Need Program to infuse public health priorities into the process, and our continued support for the wider use of Community Health Workers. The hallmark of all these initiatives has been collaboration, community partnerships and a shared commitment to improving the health of all.

This assessment is a foundation for developing the next set of great ideas and strategies to ensure optimal health for all residents of this great Commonwealth, particularly for those in our most vulnerable communities.

I look forward to using this assessment and taking that next step in partnership with our sister agencies and many local partners to make improved public health possible for every community in Massachusetts.

Sincerely,



Monica Bharel, MD, MPH
Commissioner



Preface

Where individuals and families age, work, and play profoundly shapes their health.¹ In addition, disparities in health outcomes are linked with socioeconomic status, race/ethnicity, gender, sexual orientation, immigration history, and other social characteristics.² Understanding how these social, geographic and economic factors shape health is necessary to identify areas for intervention to meet the needs of the Commonwealth. Understanding the current health status of Massachusetts residents and the multitude of factors that influence health enables the identification of priorities for public health planning, existing strengths and assets upon which to build, and areas for further collaboration and coordination. The 2017 Massachusetts State Health Assessment provides a foundation for this work by presenting a broad set of prioritized indicators that paint a comprehensive portrait of the health of Massachusetts residents.

The Massachusetts Department of Public Health (MDPH) has been collecting and using data to inform policy makers and the public since 1842, the year the first statewide registration of vital records began. Since then, MDPH has implemented many interventions which brought about huge reductions in death from infectious disease, tracked the emergence of heart disease and cancer as the most prevalent causes of death today, and studied the causes and treatment of newly emerging diseases, such as eastern equine encephalitis (EEE), Lyme disease, H1N1 influenza, and others.

Today, MDPH is focused on improving access to and utilization of data for making decisions, understanding health disparities and understanding the social determinants of health, all to ensure health equity across the Commonwealth. While disparities are significant differences in outcomes between populations, inequities are the unjust distribution of resources and power between populations. Addressing inequities is an upstream approach to reducing disparities. Surveillance activities include monitoring for disparities in age, gender, race/ethnicity, and other demographic characteristics that are markers for social differences in health status. The State Health Assessment applies a Social Determinants of Health lens to its presentation, allowing the reader to understand major challenges and opportunities for achieving better health equity across all social groups.

Organization of the State Health Assessment

The MDPH State Health Assessment Coordinating Team identified the following areas of concentration for this report based upon prior experience with the 2010 State Health Assessment known as the 2010 Health of Massachusetts, and with feedback from the MDPH data team, bureau and office directors, subject matter experts as well as representatives from a variety of sectors. The content of the State Health Assessment is broken down into the following major topical categories:

1. Population Characteristics
2. Maternal, Infant, and Child Health
3. Environmental Health
4. Infectious Disease
5. Injury and Violence Prevention
6. Addiction
7. Health Systems and Health Care Access
8. Wellness and Chronic Disease

The State Health Assessment begins with an introduction, then follows providing insight into the development and how future Massachusetts State Health Assessments will be updated. It also describes the conditions impacting health, which are shaped by the social determinants. These conditions include: housing, education, employment, the built environment, the social environment, and violence/trauma.

Chapter 1 provides an overview of the demographic, social, and economic characteristics that shape the health of Massachusetts residents. Chapters two through eight describe health patterns for Massachusetts as a whole and across racial, ethnic, socioeconomic, age, gender, and/or geographic subgroups. Each chapter provides an introduction to the health topic, followed by subtopics examining trends over time, identifying where improvements have been achieved, and pinpointing where health issues remain or are emerging. A trend is the general direction of a measure, condition, or output over a period of time. Trends can go up, down, or stay the same. Each chapter identifies where racial, ethnic, socioeconomic, and geographic disparities persist to help MDPH focus and enhance strategic actions to improve the health of communities and populations with the greatest needs.

For example, Chapter 4 presents information about infectious disease including foodborne disease, healthcare-associated infections, sexually transmitted diseases, HIV, tuberculosis, vectorborne diseases, and immunization. For each subtopic, the chapter identifies selected state initiatives, programs, services or other resources that are aimed at improving health, decreasing disparities, and reducing the overall disease burden on residents. Each chapter ends by highlighting selected resources, services and programs and references cited in the narrative. There are many programs at state and local levels working to improve health. Some resources and programs are mentioned here but not all and this is not meant to be a comprehensive overview of all programs in these areas.

The appendices include a list of partners who contributed to the assessment, an abstract and a list of community health assessments and community health needs assessments completed by local public health departments and health systems, the instruments used for focus groups and key informant interviews used to inform this report.

With the guidance of the Statewide Partnership Advisory, the MDPH takes stock of the health of all people in Massachusetts every four to five years by updating the Massachusetts State Health Assessment. The 2017 Massachusetts State Health Assessment tells the story of our health today and how that has been shaped over time by our opportunities, our belonging, and our interactions with the environment. In each section of the assessment we link data on social, economic and environmental conditions with rates of disease or individual health behaviors to strengthen our understanding of what creates health and health equity.

Content for the State Health Assessment was developed with an eye toward ensuring a comprehensive overview, it's important to note that there are challenges to any such assessment of health. A few of these important considerations are described below.

Saying A Little About A Lot of Things

The assessment provides snapshots of many topics to provide an overall picture of health and the conditions that influence it. Most of the topics raised here have been studied and written about in greater detail elsewhere which can often be found in the linked references. Each chapter was written by a team of experts in the field, focusing on health indicators selected through a collaborative process of prioritization and contains links to specific cited documents where additional information about the subject matter can be found.

The Need for Categorization

Each individual population and community is unique – and each has value. Quantitative research methods, however, require creating categories for analysis and grouping people, populations, and communities in such a way that enables comparisons, but hides some of their real and important differences.

For example, we use the following mutually exclusive categories to describe race/ethnicity: White, Black, American Indian, and Asian. The Hispanic category includes persons of Hispanic ethnicity regardless of their race. The full expression of these categories is White non-Hispanic, Black non-Hispanic, American Indian, non-Hispanic, Asian non-Hispanic, and Hispanic. The only exception is when using data from some national surveys like the American Community Survey that categorize race as Latino.

In addition, each of the main topic sections contains topics that could also be categorized in one of the other sections. Many issues overlap, or have different dimensions, such that they could fit in multiple places or could form a topic of their own. For example mental health has been recognized as a leading health priority in the Commonwealth through a crosswalk of 42 community health assessments and community health needs assessment but does not have its own chapter. Instead, the content pertaining to mental health can be found throughout the assessment including in chapters 2, 5, 6, 7, and 8. Similarly, occupational health had its own chapter in the 2010 Health of Massachusetts but has been woven throughout the 2017 Massachusetts State Health Assessment specifically in chapters 3, 5, 7, and 8.

This state assessment can only start the conversation about health in the community, using broad categories to shape the story of health in the state. The work of advancing health equity requires engaging with people and communities to more fully understand their unique circumstances and shape action for change.

Using Technical Language

Every effort was made with this report to use plain language whenever possible, but technical language is necessary in certain cases. Terms such as “age-adjusted”, “amenable mortality”, “confidence intervals”, “premature mortality”, “incidence,” and “life expectancy” are examples of these kinds of terms. Many of these terms are defined near the text, in the endnotes, or in the data sources section in the Appendix.

Figures, Sources, and Figure Notes

All figures and maps are called “Figures” in the State Health Assessment. Below the figure information is provided on the source of the data and, when applicable, whether the data shown have statistically significant differences or applicable notes.

Data Sources

Data for the State Health Assessment were obtained from a variety of sources. Unless otherwise noted, the indicators are for calendar years. Hospitalization data is for fiscal year, unless otherwise noted. The indicators included in the State Health Assessment were prioritized by Bureaus within MDPH and were selected based upon the impact of each indicator on the health and well-being of the Commonwealth as well as feedback from the Statewide Partnership Advisory.

Data from MDPH programs, disease registries, survey data, to facilities data and specific program records were included. Major sources of data for the 2017 Massachusetts State Health Assessment include:

- Demographic, social, and economic indicators from the 2011-2015 American Community Surveys (ACS), which were conducted by the US Census Bureau.
- Data on births, deaths, environmental risk factors, infectious diseases, injuries, and the supply of primary care physicians, nurses, pharmacists, emergency medical technicians, community health workers, and dental health providers are from data sources managed by the MDPH.
- Data on hospitalizations and emergency department visits are obtained from the Center for Health Information and Analysis.
- Self-reported chronic conditions and health behavior indicators are drawn from three main health surveys, the Massachusetts Behavioral Risk Factor Surveillance System (BRFSS) survey of adults 18 years of age and older and the Youth Risk Behavior Surveillance System (YRBSS) and Massachusetts Youth Health Survey (YHS) survey of students in grades 9 to 12. These datasets are run by MDPH and Massachusetts Department of Elementary and Secondary Education (ESE). When analyzed by the MDPH, there will be no source cited; however, ESE will be cited when they have conducted the analysis.
- Data on reportable infectious diseases and other conditions are captured by the Massachusetts Virtual Epidemiologic Network (MAVEN), an integrated, web-based surveillance and case management system.
- Environmental data are captured by the Environmental Public Health Tracking (EPHT) data portal.
- Data on women's health before, during, and after pregnancy are collected using the Massachusetts Pregnancy Risk Assessment Monitoring System (PRAMS) survey.

- Data on children's health are drawn from national surveys administered by the Centers for Disease Control and Prevention including the National Survey of Children's Health (NSCH), National Survey of Children with Special Health Care Needs (NS-CSHCN), and the National Immunization Survey (NIS)

Limitations

The health indicators in the 2017 Massachusetts State Health Assessment provide an important lens into the health and wellbeing of Massachusetts residents. However, as with most health assessments, the indicators included in this assessment have several limitations.

- There is a delay between time of data collection or reporting, analysis, and availability of data for public reporting. Indicators presented in this assessment are from the most recent year(s) available. While some health indicators may be based upon older data, they are the best available data at the time that this assessment was written and provide an important snapshot into the health of the residents of the Commonwealth.
- A health condition may be characterized by several indicators drawn from different data sources. To provide a comprehensive state health assessment, decisions had to be made regarding which indicators to report.
- For some health conditions for which a direct measure is not available, several indicators may be useful for characterizing the magnitude, severity, and/or distribution of the health condition. For example, the total number of Massachusetts residents with heart disease is not available. To provide an assessment of the prevalence and distribution of heart disease across the Commonwealth, this assessment includes several measures of heart disease: self-reports of being diagnosed with heart disease, high blood pressure, and cholesterol collected as part of the Massachusetts BRFSS and data from reported hospital emergency department visits and hospitalizations.
- Some health indicators are not available for some vulnerable populations, such as homeless individuals, persons with a disability, tribal nations, sexual minorities, racial and ethnic groups, and/or town populations. When health indicators are available for a specific population of interest, these data are usually presented for a multi-year period in order to generate stable estimates. Recognizing this limitation of these secondary data, key informant interviews and focus group discussions with representatives of these vulnerable populations provided valuable insights into the health experiences and concerns that may not be available through secondary data sources.
- Additional data limitations by chapter can be found in **Appendix F**.

Main Limitations to this Assessment

- Data availability time lag
- Lack of available indicators
- Indicators not included due to limited space
- Data unavailable for specific populations

Throughout the assessment, additional considerations of specific health indicators or gaps in the data or knowledge about the topic are presented below the figure presenting the indicator.

Abbreviations

Each chapter includes abbreviations defined in that individual chapter. Below is a list of the most common abbreviations used in this State Health Assessment.

ACS	American Community Survey
BCHAP	Bureau of Community Health and Prevention
BFHN	Bureau of Family Health and Nutrition
BHCSQ	Bureau of Health Care Safety and Quality
BHPL	Bureau of Health Professions Licensure
BIDLS	Bureau of Infectious Diseases and Laboratory Science
BORIM	Board of Registration in Medicine
BRFSS	Massachusetts Behavioral Risk Factor Surveillance System
BSAS	Bureau of Substance Addiction Services
CDC	Centers for Disease Control and Prevention
CHIA	Center for Health Information and Analysis
MAVEN	Massachusetts Virtual Epidemiologic Network
MDMH	Massachusetts Department of Mental Health
MDPH	Massachusetts Department of Public Health
ODMOA	Office of Data Management and Outcomes Assessment
OHE	Office of Health Equity
OLRH	Office of Local and Regional Health
OPEM	Office of Preparedness and Emergency Management
PRAMS	Pregnancy Risk Assessment Monitoring System
WIC	Special Supplemental Nutrition Program for Women, Infants, and Children
YHS	Youth Health Survey
YRBS	Youth Risk Behavior Survey

*Name Change: The Bureau of Substance Abuse Services was changed to the Bureau of Substance Addiction Services (BSAS) as a result of language included in the Massachusetts State Fiscal Year 2018 budget.

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MDPH led a collaborative and inclusive process to develop this State Health Assessment. Overall responsibility for planning and coordination rested with the Commissioner's Office under the direction of Antonia Blinn, Director of Performance Management and Quality Improvement. Ms. Blinn led a Coordinating Team charged with developing the State Health Assessment. Members of the Coordinating Team included:

Eileen Sullivan, Office of the Commissioner

Antonia Blinn, Performance Management and Quality Improvement

Natalie Nguyen Durham, Office of Data Management and Outcomes Assessment

Candace Nelson, Office of Data Management and Outcomes Assessment

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Paul Oppedisano, Performance Management and Quality Improvement

Glynnis LaRosa, Bureau of Infectious Disease & Laboratory Sciences and Performance Management and Quality Improvement

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Bureau of Community Health and Prevention

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Bureau of Environmental Health

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Bureau of Family Health and Nutrition

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Interns

MDPH would also like to thank the graduate level interns for their assistance with the SHA:

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Brianna Brooks	Boston University School of Public Health
Jonathan Morely	University of Massachusetts Amherst School of Public Health and Health Sciences

Other State Agencies

In addition to MDPH staff and interns, several sister agencies contributed external sources of data to enrich the report including the following entities:

Center for Health Information and Analysis
Massachusetts Department of Elementary and Secondary Education
Massachusetts Department of Mental Health
Massachusetts Department of Transportation
Massachusetts Department of Environmental Protection

Statewide Partnership Advisory, Key Informants and External Stakeholders

A variety of statewide stakeholders, advisors, and key informants provided guidance on process and content, and assisted with the dissemination of both the draft and final State Health Assessment. MDPH would like to thank these individuals and organizations, Commissions, coalitions, and stakeholder groups listed in **Appendix E**. Finally, MDPH would like to acknowledge North Passage Associates and Health Resources in Action (HRiA) for their assistance with compiling the 2017 Massachusetts State Health Assessment.

References

¹ Robert Wood Johnson Foundation. A new way to talk about the social determinants of health. Available at: <http://www.rwjf.org/content/dam/farm/reports/reports/2010/rwjf63023>. Accessed July 2, 2017.

² Centers for Disease Control and Prevention. CDC health disparities and inequalities report: United States, 2013. *Morbidity and Mortality Weekly Report*. 2013; 62(3); 1-187. Available at: <https://www.cdc.gov/mmwr/pdf/other/su6203.pdf>. Accessed July 2, 2017.



Introduction





What is a State Health Assessment?

A State Health Assessment (SHA) uses a collaborative, systematic process to collect, analyze, and interpret a prioritized subset of available state-level data to provide context for the health of residents across Massachusetts and identifies the key assets--resources, programs, and services--that promote and protect the public's health. The SHA process also includes many methods of data collection and a variety of data sources to help ensure diversity in perspectives outside of the health department. Accordingly, the Massachusetts Department of Public Health (MDPH) and partner organizations, agencies, and initiatives will use the SHA when conducting state-level health improvement planning. Individuals, organizations, and coalitions may also leverage the SHA as a source of data when applying for state, federal, and private funding to promote the well-being of residents across the Commonwealth.

It is also important to remain attuned to emerging health concerns of residents to ensure that state, regional, and local public health initiatives address public health needs. Towards this end, SHAs are conducted on a regular basis not only to assess the health of the population but also to ensure that state-level planning processes are responsive to the most current health needs identified in the assessment.

Why Conduct a State Health Assessment?

The Massachusetts Department of Public Health and its partners will use this assessment to inform state health improvement planning.

About Us: Massachusetts Department of Public Health

Public health in Massachusetts is a statewide commitment to ensure that all residents have the opportunity to experience the best health and well-being regardless of race, ethnicity, socioeconomic status, geographic location, or physical ability. This vision is supported by a strong public health infrastructure and health care delivery system. Using a wide variety of approaches including screenings, education, research, regulations, inspections, and the provision of funding to numerous local programs and interventions to promote health for all residents and vulnerable populations, MDPH works to prevent illness, injury, and premature death; ensure access to high quality health and health care services; respond quickly to emerging public health threats; and promote wellness and health equity for all 6.8 million residents of the Commonwealth.

Massachusetts is a national leader in public health in many ways. The health of Massachusetts residents exceeds national averages in many areas and Massachusetts leads the country in providing health insurance coverage to our residents due to health care reforms.

The success of the Commonwealth's efforts to promote public health would not be possible without the leadership and support of essential partners. These include the Public Health Council, the Massachusetts Legislature, other state and federal agencies, public health authorities representing 351 cities and towns, over 700 community-based service providers, MDPH commissions, learning institutes and thousands of dedicated public health professionals across the Commonwealth.

MDPH works to ensure quality public health services are provided consistently. The National Public Health Performance Standards identify ten essential public health services for public health systems and provide a foundation for quality and performance improvement efforts.³ These essential public health services include:

1. Monitoring health status to identify and solve community health problems
2. Diagnosing and investigating health problems and health hazards in the community
3. Informing, educating, and empowering people about health issues
4. Mobilizing community partnerships and action to identify and solve health problems
5. Developing policies and plans that support individual and community health efforts
6. Enforcing laws and regulations that protect health and ensure safety
7. Linking people to needed personal health services and assuring the provision of health care when otherwise unavailable

Major Services Provided by the Massachusetts Department of Public Health

- Operating four public health hospitals, the State Laboratory Institute, and the State Office of Pharmacy Services
- Collecting, maintaining, and publishing vital records and health statistics
- Licensing, certifying, or accrediting hospitals, clinics, laboratories, and thousands of health professionals
- Interpreting and enforcing public health laws
- Providing outcome-driven, evidence-based programs to promote wellness, and prevent and control disease and disability through the management of state and federal resources
- Providing 24/7 coverage to detect, prevent, and resolve threats to the health of the public
- Preventing, protecting against, mitigating, responding to, and recovering from disasters

- 8.** Assuring a competent workforce
- 9.** Evaluating effectiveness, accessibility, and quality of personal and population-based health services
- 10.** Researching for new insights and innovative solutions to health problems

Overview and History

Established in 1869, MDPH was the first state board of health in the United States. With over 3,000 employees, MDPH operates four public health hospitals and numerous divisions and regulatory bodies focused on a broad range of public health services including: Family-centered services to help children and prevent maternal and infant risks; cancer, heart disease, and other chronic disease prevention, injury prevention, and promotion of rural health; Environmental health including community sanitation and childhood lead poisoning prevention; Infectious disease control and prevention of vaccine-preventable diseases, and sexually transmitted diseases; the licensure of many health professionals and the promotion of access to safe and effective pharmaceuticals; and patient safety and the licensure and certification of health care facilities. Throughout its history, MDPH has been a pioneer in the development and implementation of public health programs and strategies.

The dedicated staff at MDPH work across fourteen locations throughout the Commonwealth. Their duties are diverse: nurses, doctors and other clinicians care for some of the state's most vulnerable patients at MDPH's four public health hospitals; epidemiologists and nurses monitor diseases and the risk factors that cause them, and investigate clusters of illness; inspectors protect the public by enforcing public health regulations and laws; administrators provide guidance to more than 700 community-based agencies that receive funding from MDPH; educators and outreach workers enroll clients in WIC and Early Intervention; and laboratorians work to identify strains of illness across the state. MDPH employees are located all across the Commonwealth to protect and improve the health of all residents.

MDPH has a history of tackling significant and challenging public health issues. Today, MDPH is leading the nation in its response to the current opioid epidemic. Access to prevention, intervention, treatment, and recovery support services for individuals, families, and communities affected by opioid use disorder across the Commonwealth is a key priority of the Baker-Polito Administration. Accordingly, MDPH is working in partnership with state, regional, and local leaders to build upon and advance statewide strategies to address the current opioid epidemic.

Governance

Massachusetts Department of Public Health

MDPH is led by the Commissioner of Public Health and supported by the Public Health Council. It is organized into seven bureaus: Community Health and Prevention, Environmental Health, Family Health and Nutrition, Health Care Safety and Quality, Health Health Professions Licensure, Infectious Disease and Laboratory Sciences, and Substance Addiction Services; four public health hospitals: Lemuel Shattuck Hospital, Pappas Rehabilitation Hospital for Children, Tewksbury Hospital, and Western Massachusetts Hospital; the State Office of Pharmacy Services; and six offices: Data Management and Outcomes Assessment, Population Health, Health Equity, Local and Regional Health, Preparedness and Emergency Management, Office of the General Counsel, and the Registry of Vital Records and

Statistics. Additionally, the following core functions are also integral supports across all bureaus: Communications, Constituent Services, Government Affairs, Operations, Performance Management and Quality Improvement, and Policy and Regulatory Affairs.⁴

Massachusetts: A History of American Public Health “Firsts”

The following partial list of Massachusetts “firsts” reflects the scope and impact of public health in the state’s history:

- First use of smallpox inoculation pioneered
- First food purity legislation enacted
- First public clinics/federally qualified health center in the United States opened
- First state board of health to conduct broad health promotion programs
- First food and drug laboratory in the nation
- First school health law
- First childhood lead poisoning prevention program and universal screening for lead poisoning
- First to provide state funding for WIC
- First statewide registry for Amyotrophic Lateral Sclerosis (ALS)
- First universal newborn screening program to detect life-threatening but treatable conditions
- First requirement for health warnings on smokeless tobacco products
- First Sexual Assault Nurse Examiner (SANE) program that provides specially trained nurses to provide compassionate care in hospital emergency departments for adolescent and adult victims and Children’s Advocacy Centers for pediatric victims
- First public drug formulary that includes both generic and brand names
- First statewide pediatric palliative care program
- First public surveillance of work-related injuries and occupational illnesses
- First state to incorporate substance misuse prevention and management education for all medical, dental, physician assistant, and advanced practice nursing students
- First state to allow many existing disparate data to be linked together in order to study the opioid epidemic in support of pressing health policy development and more effective decision making.

Executive Office of Health and Human Services

The Executive Office of Health and Human Services (EOHHS) is the largest executive agency in Massachusetts state government, overseeing a \$22 billion state budget, twelve agencies and 22,000 employees. MDPH is one of twelve agencies that sit within EOHHS.

Public Health Council

The Massachusetts Public Health Council (PHC) is a Governor-appointed board that advises the Massachusetts Commissioner of Public Health. The PHC has had an important role in public health since it was established by legislation in the nineteenth century. The PHC was reinvigorated in 2007 as part of Health Care Reform, has fifteen members, and is

chaired by the Commissioner of Public Health. The Commissioner is responsible for the executive management of the Department and has the statutory authority to take certain actions during a public health emergency (M.G.L. c. 17 § 2A).

Responsibilities of the Public Health Council

- Approving most MDPH regulations prior to promulgation
- Voting whether to approve Determination of Need (DoN) applications
- Advising MDPH on major policy decisions, at the discretion of the Commissioner
- Granting the Commissioner authority to take necessary actions to protect the public's health upon a declaration of a public health emergency by the Governor

Massachusetts Department of Public Health State Health Priorities

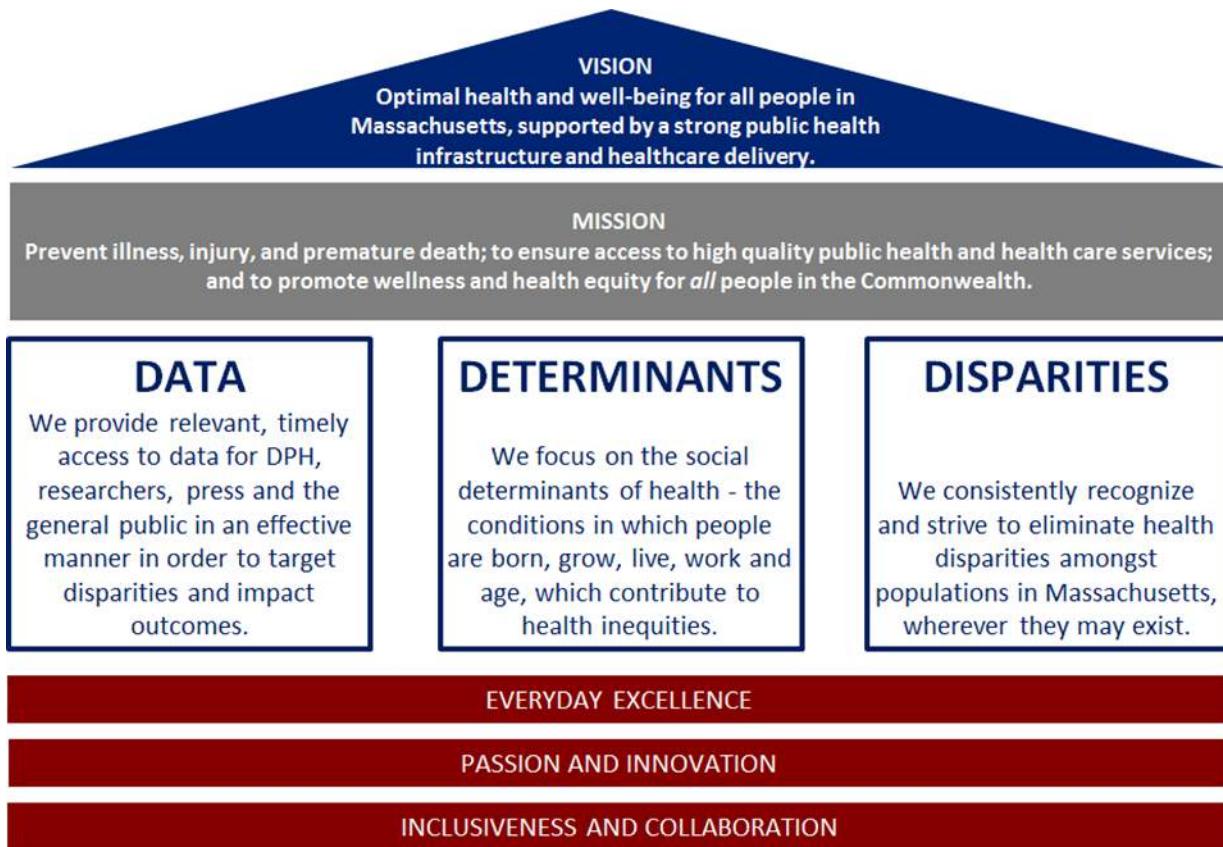
EOHHS and MDPH have prioritized addressing substance use disorders, housing instability and homelessness, promoting mental health and well-being, and reducing chronic disease with a focus on cancer, heart disease, and diabetes. These priorities were identified because they are trending negatively, increasing morbidity, mortality, and health care costs; and are social determinants of health or can be addressed using a social determinant of health perspective.

The “MDPH House”

The “MDPH House” (**Figure 1**) represents the foundation on which the MDPH works to achieve its vision and mission. Core drivers of MDPH’s vision and mission include: a sharp focus on using data effectively, addressing the social determinants of health, and a firm commitment to eliminate health disparities. The MDPH House is built on the foundational principles of Everyday Excellence, Passion and Innovation, Inclusiveness and Collaboration. At the core, **Everyday Excellence** refers to a culture of continuous improvement and performance management where everyone can contribute to the mission of MDPH and make a difference in a unique way. **Passion and Innovation** include passion about MDPH’s work and an intense focus on performing at the highest levels. Success requires thinking outside the box in order to solve the most challenging public health issues. MDPH values strong subject matter expertise and developing and integrating creative solutions to complex policy issues as well as population health management strategies. **Inclusiveness and Collaboration** focusing on the values of clear communication and learning from each other by collaborating across bureaus and offices, sharing information and resources with each other and externally to the public, having people with diverse experiences and skills at the table, and considering other ideas with an open mind. Together, these principles lay a solid foundation to achieve MDPH’s mission and vision.

Figure 1

Massachusetts Department of Public Health “House”



Framework Guiding the State Health Assessment Process

Development of the SHA is an iterative and collaborative process that has engaged organizations, agencies, and residents from all sectors across the state as well as staff within the MDPH. The following section provides an overview of the framework (**Figure 2**) that guided the development of the SHA and signals the next step in the journey of continuous quality improvement to public health in Massachusetts. The 2017 Massachusetts State Health Assessment (SHA) process framework is founded upon three main pillars of the MDPH House: Data, Determinants and Disparities. Following the six steps outlined ensures the inclusion of MDPH staff and external stakeholders with multiple points for input. This framework ensures that the result of the process—The 2017 Massachusetts State Health Assessment—will be able to inform improvement plans, policies, and practices. The framework is intended to be replicable every four to five years by MDPH. A more detailed description of the collaborative process of framing the SHA is described.

Figure 2

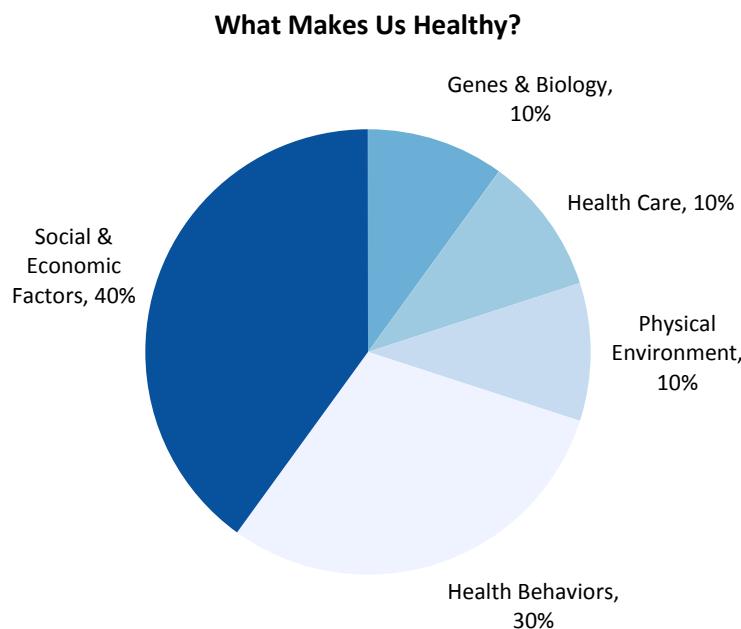
Massachusetts State Health Assessment Process



Health Equity and Social Determinants of Health

An individual's health is influenced by many factors. Research shows that genetics and health care represent only a small fraction of what makes us healthy (see Figure 3).⁵ The majority of what contributes to our health is the social, economic, behavioral, and physical factors that we experience where we work, live, and play. In Massachusetts, we group these types of factors into six Determinants of Health: Built Environment, Education, Employment, Housing, Violence, and Social Environment (see Figure 4). Because many of these factors are driven by policies, institutions, and systems beyond an individual's control, not all residents of the Commonwealth experience the same opportunities for good health. For example, some populations in Massachusetts experience inequitable living conditions and unequal treatment in many aspects of life such as job opportunities, sustainable wages, transportation options, quality education, discrimination-free workplaces, quality housing, affordable healthy foods, and social supports. Additionally, historical, institutional, and interpersonal racism have contributed substantially to these inequities, which can lead to poorer health outcomes. These unjust and unfair, socially-determined circumstances that lead to better opportunities for some populations and worse opportunities for others are defined as structural inequities.

Figure 3



SOURCE: ADAPTED FROM R TARLOV, A. (1999). PUBLIC POLICY FRAMEWORKS FOR IMPROVING POPULATION HEALTH. ANNALS OF THE NEW YORK ACADEMY OF SCIENCES. 896. 281-93.

Figure 4
Massachusetts' Six Social Determinants of Health Categories



Structural inequities directly impact individuals' quality of life and influence their health. Persons of certain races, education levels, geographic areas, genders, and income levels experience vastly different and often higher rates of chronic disease, violence, substance use, hospitalizations, and premature death when compared to the general population. These unjust and preventable differences in health outcomes are defined as ***health inequities***.

The good news is that because most health inequities result from socially-determined structural inequities, change is possible. We can begin to improve health for a whole community when systems and structures, such as structural racism or gender bias, are acknowledged and explicitly addressed. By transforming inequitable policies, cultural norms, and structural barriers, we can move towards a Commonwealth where all people have the same opportunities to be healthy, regardless of race, ethnicity, income, ability, sexual orientation, gender identity, or age.

The following sections describe in more detail the six categories of health determinants as defined by the MDPH and the manner in which they impact the citizens of the Commonwealth.

Built Environment

The built environment includes the human-made elements of where we live, learn, work, travel, and play.⁶ It includes transportation systems, buildings, environmental exposures, streets, open spaces, infrastructure, and the systems that connect them. Built environment characteristics impact available resources and services across communities, as well as the environmental exposures individuals encounter. As a result it directly impacts individual risk behaviors (eg. tobacco use, physical activity, etc.), morbidity (eg. injury, hospitalizations, mental health, chronic diseases) as well as mortality (death).

Communities with more resources, services, and supportive policies often have a built environment that promotes health; however, some municipalities and neighborhoods were designed to include barriers maintaining racial or socioeconomic segregation. Segregation is "the physical separation of the races by enforced residence in certain areas that was designed to protect Whites from social interaction with Blacks." Although racially-explicit segregation is no

longer legal, the US continues to be largely segregated by race because of historical patterns and current policies and practices, such as where public housing is located, lending patterns, and transportation options. This reinforces disparities in access to healthy foods, for example, communities of color generally have lower access to grocery stores and higher access to retailers that offer unhealthy items, such as fast food restaurants and liquor stores.^{7,8}

Education

Education includes formal education in schools, educational activities in community groups or organizations, and informal education through interactions with people and institutions. It is one of the strongest predictors of lifetime health. The more education an individual has, the more likely they are to live longer and healthier lives.⁹

Healthy children learn better, get better grades, and experience fewer behavioral problems. While in the education system, students often have access to resources that promote good health, such as physical activity breaks, school lunches, after-school programs and health-based resources such as screenings and management of chronic conditions. These programs have been shown to improve health outcomes, like childhood obesity, and mental health as well as school performance and learning outcomes. Unfortunately not all school systems have the resources to provide these vital programs. As students spend a significant portion of their day in school, schools also provide basic necessities such as shelter, sanitary facilities, food and water, and opportunities for socialization. All of these exposures while in school are directly associated with both better health and learning outcomes.

Even after leaving the education system, educational attainment continues to impact individuals' health. Education is associated with better jobs, higher incomes, and economic stability. Education can also provide a greater sense of control over one's life and stronger social networks, which again are linked to ability to engage in healthy behaviors and better overall health.

Unfortunately, educational attainment in Massachusetts is not equitable. Students from low-income communities and communities of color may face challenges in getting to school, differential public school resources, inequitable discipline practices, resources, and afterschool programming.

Employment

Employment provides income, benefits, and stability necessary for good health. Income, poverty, and unemployment are each profoundly linked with health.¹⁰ Income influences where people choose to live, to purchase healthy foods, to participate in physical and leisure activities, and to access health care and screening services. Having a job and job-related income provide individuals the opportunities to make healthy choices, engage in healthy behaviors, access necessary health care services, and enjoy a long life.

While being employed is important for economic stability, employment affects our health through more than economic drivers alone. Physical workspace, employer policies, and employee benefits all directly impact an individual's health. The physical workplace can influence health through workplace hazards and unsafe working conditions which lead to injuries, illness, stress, and death. Long work hours and jobs with poor stability can negatively impact health by increasing stress, contributing to poor eating habits, leading to repetitive injuries, and limiting sleep and leisure time. Job benefits such as health insurance, sick and personal leave, child and elder services and wellness programs can impact the ability of both the worker and their family to achieve good health.

Unemployment is also associated with poor health, including increased stress, hypertension, heart disease, stroke, arthritis, substance use, and depression; and the unemployed population experiences higher mortality rates than the employed.^{11,12} The financial stresses connected with unemployment can lead to eviction, foreclosure, or homelessness, which have additional negative health consequences.

Underemployment is linked to chronic disease, lower positive self-concept, and depression.¹³ Workers with incomes below the poverty line are part of the working poor, who are more likely to have low-paying, unstable jobs, have health constraints, and lack health insurance.¹⁴

Discriminatory hiring practices have limited the ability of people of color to secure employment. Those who have been arrested, have a conviction, felony or have been incarcerated are severely limited in their ability to find employment due to policies placing limitations on individuals who have interacted with the criminal justice system.

Housing

Housing is defined as the permanent or temporary dwelling unit that serves as a family's or household's residence. Housing has many characteristics, including stability, homelessness, quality, affordability, and many others. Housing is linked to certain health risk behaviors (tobacco and drug use), exposure to harmful elements (secondhand smoke, toxins, carbon monoxide, and asbestos), mental health, chronic conditions (obesity, cancers, infectious diseases, elevated lead levels, hypertension, allergies, etc.) as well as injuries and death.

Affordability is important, as people who spend more on housing have less to spend on education, transportation, health care, and food. Access to quality housing improves mental health and reduces stress. Unstable housing can lead to malnourishment in children, developmental disabilities, poor access to health care, use of illicit drugs, and negative mental health outcomes.

For those with housing, the location of a home also greatly impacts health and well-being, in part due to neighborhood conditions. Homes in neighborhoods that provide residents access to social and cultural opportunities, safe green spaces and parks, fresh and affordable produce, employment opportunities, and transportation, can promote health.¹⁵ Conversely, housing instability in a neighborhood can reduce the likelihood of forming strong local social support systems, which adversely impacts health. Housing near environmental hazards such as highly-trafficked roads and polluting industries can be more affordable but may lead to poor health outcomes.¹⁶

Violence

Violence is the intentional use of physical force or power, threatened or actual, against a person or a community, likely to cause physical or psychological harm.^{17,18} A safer community is linked with better health outcomes. Violence influences the health of victims, their families, and the surrounding community. Violence can be self-directed (suicide or self-harm), interpersonal (directed towards individuals including family members, acquaintances or strangers, classmates, children, youths, and elders, and/or specific community members) or collective (resulting from social, political, and economic factors). Collective violence can occur on a large scale due to conflicts between groups or countries (such as war) but can also include other less explicit forms of violence (such as repression and neglect). Unequal access to power and resources (such as wealth), along with social inequality, can also lead to collective violence.¹⁹

Suicide and self-harm are correlated with increased rates of injury, mental illness (PTSD, depression), substance use disorders, the experience of interpersonal violence or discrimination, and other hardships.

Interpersonal violence has been shown to have a significant negative impact on lifetime health outcomes. For example, experience of child abuse or neglect increases the likelihood of later involvement in the criminal justice system, poor academic performance, mental illness, and poor physical health, including heart disease, cancer, lung disease, alcoholism, drug use, depression, and smoking.

Other examples include intimate partner violence (IPV) and sexual violence (SV), which disproportionately affect women, transgender individuals and persons with disabilities. They can lead to death as well as injury and are associated with a number of adverse health outcomes such as sexually transmitted diseases, asthma, bladder and kidney infections, cardiovascular disease, circulatory conditions, central nervous system disorders, joint disease, and more. Victims of IPV and SV also face reproductive, psychological, and social consequences and may be more likely to engage in negative health behaviors such as high-risk sexual behavior, using harmful substances, unhealthy diet-related behaviors, and overuse of health services leading to increased health care costs.^{20, 21, 22}

Collective violence is linked to injury, death, depression, anxiety, suicidal behavior, substance abuse, and post-traumatic stress disorder. Unequal access to power, social inequality, and rapid changes in demographics have led to increased violence in communities of color and low socioeconomic status. Communities of color and low-income communities face low property values and poor housing conditions; resource-lacking educational systems and low levels of educational attainment; low-paying jobs and high unemployment rates; poor neighborhood conditions; and limited social capital. When such basic human needs are not being met, there is increased risk of income-generating crimes like burglary and robbery, stress, conflict, and substance use among residents, all of which ultimately increase the risk for violence.

But all types of violence do not impact all populations equally. Communities with lower socioeconomic status, communities of color, lesbian, gay, bisexual, transgender, and queer (LGBTQ) communities, people with disabilities, children, and the elderly are at increased risk for being impacted by or involved with all types of violence across the lifespan. Historical and present-day systems and policies have contributed to this inequity.

Social Environment

Who we are directly impacts how we interact with our community and society. Our race, gender identity, age, disability status, etc. influences the social environment that we experience. Our social environment impacts many mental and physical health outcomes, including: mental health, violence, risk behaviors (tobacco and drug use), physical health and well-being, and disease morbidity and mortality. We are influenced by the social environment on three levels: interpersonal, community, and society.

Across all three levels, systems of oppression such as structural racism and gender bias lead to social isolation, social exclusion, poor mental health, increased risk of violence, increased rates of poverty, higher hospitalizations, longer recovery times, and higher mortality rates for many conditions. Social isolation, social exclusion, racism, discrimination and poverty disproportionately affect low-income communities and communities of color and all negatively impact many aspects of health. Communities of color are more likely to have lower levels of resources and connectedness with other neighborhoods and higher levels of racial segregation. They also face more challenges when engaging in group action in neighborhoods to shift these conditions.²³

It is important to note that for individuals who belong to multiple disproportionately impacted populations, these adverse impacts are compounded. This concept is called ***intersectionality***. It is only by looking at the additive impacts of each set of risks, that we can identify the most egregious inequities in the Commonwealth. For example, only when considering the intersection of age, race, ***and*** gender in Massachusetts, do we see patterns of increased risk of homicide for young Black men, increased risk of suicide for adult White men, and increased risk of dying during pregnancy for adult Black women.

Commitment to a just and equitable public health framework is essential for improving health at the individual, community, and society levels. In Massachusetts, individuals, institutions, and systems must work together to improve these determinants of health in order to create healthy communities for all residents of Massachusetts regardless of race, income, creed, gender identity, geography, sexual orientation, ability, or age.

Health inequities in Massachusetts are linked with socioeconomic status, race/ethnicity, gender, immigration status, geographic area, and other social determinants of health. Understanding how these factors impact individual's life course and communities across the Commonwealth is important for identifying areas for intervention and tailoring public health and health care systems to meet the needs of Massachusetts' residents.²⁴

Ensuring Stakeholder and Community Partnership

MDPH created a collaborative SHA process that involved coordination between MDPH leadership, data analysts, and programmatic staff, and their external partners, stakeholders, and community members that represented diverse populations and state health challenges. These partners, stakeholders, and community members included a statewide partnership advisory and MDPH's existing commissions and advisory bodies that address public health issues such as ongoing identification and collection of health data and information, identification of health challenges, and evaluation of state assets and resources.

Key Working Groups and SHA Process Steps

In order to implement the SHA framework using its guiding principles, MDPH senior leadership established two key working groups -- a Coordinating Team and a Data Team -- to direct MDPH program staff and data analysts during the SHA process. These groups met regularly to coordinate the SHA process presented in **Figure 2** above. The entire process consisted of the following six steps:

1. Setting priorities and context of SHA health indicators (internal & external input)
2. External data collection (Key Informant Interviews, Focus Groups, Advisory Bodies, etc.)
3. Data analysis
4. Writing the narrative (includes reviewing and incorporating edits)
5. External review of final internal draft (and incorporation of edits)
6. Distribution of the SHA to general public and community partners/stakeholders

Step One: Setting Priorities and Context of SHA Health Indicators

The MDPH Data Team convened Bureau leadership and key staff in May 2017 for a planning session to identify and prioritize the health indicators presented in the SHA. Bureau Directors were given ownership over specific chapters and organized teams of epidemiologists and Bureau subject matter experts to recommend an initial set of health indicators for possible inclusion in the Assessment. During the planning meeting, each Bureau worked in teams to refine their health indicator list under the guidance of facilitators, and chapter owners were identified. Each chapter owner then worked with the SHA Coordinating Team to finalize the indicator list. The process was designed to enable timely input from data experts from across MDPH and to ensure a comprehensive picture of the current health status of Massachusetts residents.

In order to carry out the prioritization process, a group of data analytic leaders and programmatic staff met regularly to coordinate the data analysis and associated narrative for the SHA. Bureaus were asked to provide an initial set of topics (high level headings), as well as health indicators/subtopics within each topic, to review and prioritize for possible inclusion in the SHA. The guidelines to consider when compiling the initial list were:

- What's the compelling story for this indicator?
- Are there any notable trends or populations affected (e.g., age, gender, geography, race/ethnicity, time, etc.)

- Are there any notable disparities?

MDPH already measures and has collected data for most of the health indicators included. Some indicators were included because the scan and crosswalk describes the impact of these indicators on health even though MDPH does not collect the data (eg. certain environmental and mental health data).

During a data prioritization meeting organized by chapter, teams of epidemiologists, subject matter experts, and Bureau Directors reviewed the health indicator list, prioritized, and refined what to include in the SHA through three rounds of discussions. Below are the details on the three rounds to prioritize the indicators and what questions were used to guide the process. The process concluded with the Bureaus choosing the indicators that told the most compelling story.

Data Indicator Selection Process

Round 1: Choose Topics

- Do the topics in our list help tell a comprehensive story about the health status of Massachusetts residents?
- Do any topics overlap with other chapters?
- What topics are missing from this list?
 - Should anything be added?
 - What topics can be omitted from the SHA without losing the big picture of the chapter?

Round 2: Review Initial List of Health Indicators/Subtopics

- What indicators align best with the story of the topics selected for the chapter?
- Could the story be told with fewer indicators included? (And what is lost by dropping them?)

Final Round: Refine and Prioritize Health Indicators/Subtopics

- Vote for 1-2 indicators/subtopics per topic for inclusion in the SHA, then select top 5 “must have” indicators.

Steps Two and Three: External Data Collection and Data Analysis

The next two steps in the process consisted of obtaining and analyzing external, qualitative data through key informant interviews and focus groups and synthesizing community health and needs assessments from across the Commonwealth. Secondary data sources were compiled for the SHA and analyzed.

Key Informant Interviews

To enhance understanding of health priorities, trends, and concerns, 30 key informant interviews were conducted with community leaders across the Commonwealth. Key informants represented the following areas: education, transportation, nutritional assistance, housing, policy makers, minority serving populations, health care, oral health, mental health and philanthropy. Additionally, key informants represented the following communities disproportionately affected by health disparities: veterans, racial and ethnic minorities, children, and older adults. Interview topics focused on informants’ perspectives on current and emerging health concerns in Massachusetts, existing initiatives to address these health needs, and recommendations for improving the health of residents across the Commonwealth. The

perspectives of key informants are included throughout the report to provide greater context to the health indicators presented.

Key informants described several health priorities for Massachusetts. The most frequently discussed were mental health, access to health care, addiction, elder health, and injury prevention. They also discussed the barriers to achieving health, including lack of funding, lack of awareness of the pressing health priorities, presence of stigma (specifically around mental health and addiction), lack of care coordination, and lack of health care services. Participants mentioned health insurance coverage and the multitude of programs and organizations in the Commonwealth as strengths supporting health. All six social determinants of health utilized in the Determination of Need Program were mentioned multiple times by nearly every key informant (housing, education, employment, violence/trauma, built environment, and social environment) but, of that list, the most common were housing, the built environment (specifically transportation), and employment.

Themes and illustrative quotes from the interviews are included throughout the SHA. **Appendix A** presents the interview guide used to facilitate the key informant interviews.

Focus Groups

Eleven targeted focus group discussions with a total of 129 individuals were conducted across the Commonwealth to identify community health concerns, priorities and barriers to good health. Populations represented in the focus groups included homeless youth, a tribal nation, HIV care providers, primary care providers, mental health providers, maternal and child health practitioners, rural health experts, and substance abuse service providers and users and/or persons in recovery representing cities and towns across the Commonwealth. Discussion topics included residents' community health concerns; existing community assets, services, and initiatives; recommendations to address community health priorities; and residents' vision for the future. Focus group participants' perspectives are included throughout the SHA to enhance understanding of the context affecting the health of residents and to provide insight into the health status of populations experiencing health disparities. As a result of the focus groups, a few additional themes were added, including information about community health workers, rural health and local public health.

Appendix B presents the discussion guide used to facilitate focus groups.

MDPH Commissions, Advisories, and Stakeholder Groups

One MDPH commission, fourteen advisory bodies, and one stakeholder group included the SHA on their meeting agendas during this process. This provided MDPH an opportunity to present an overview of the SHA process, engage community stakeholders in discussion, and to obtain feedback that informed the development of the SHA. These commissions, advisories, and stakeholder groups convene regularly. Individual representatives provide insight, input, and feedback on matters related to a broad range of public health topics which made them ideal for inclusion in the development of the SHA. **Figure 5** describes the primary sectors represented in the SHA process. These groups were consulted in the development of this assessment and vary in their purpose and expertise including HIV/AIDS, disabilities, rural health, emergency preparedness, occupational health, suicide prevention, the LGBTQ community, youth, local public health, school wellness, public health, and prescription monitoring. (See **Appendix C** for a full list and description of Commissions, Advisory Bodies, and Stakeholder Groups.)

Crosswalk of Community Health Assessments and Community Health Needs Assessments

To further understand health priorities across the state, a scan of municipal and health system Community Health Assessments (CHA) and Community Health Needs Assessments (CHNA) was conducted. All assessments which had been authored within the past five years (a total of 42) were included in this scan. These assessments describe the prominent community health issues, barriers to health, barriers to health care, health disparities, priority populations, strategies, strengths, weaknesses and resources for 339 municipalities representing 99% of the Commonwealth's population. Data was collected from these documents and a crosswalk was created for analysis.

Figure 5
Primary Sectors Engaged in the State Health Assessment



The top ten health priorities identified in the scan of community health and needs assessment were: mental health; alcohol and substance use; chronic disease (including obesity, diabetes, heart disease, asthma, etc.); cancer; lack of physical activity; poor nutrition; tobacco use; reproductive health (including maternal, prenatal and infant health); sexual health (including sexually transmitted infections and teen pregnancy); and public safety (including crime, violence and motor vehicle accidents). The top ten barriers to health or health care were: cost of care or insurance; transportation; lack of affordable housing; health literacy issues; insurance coverage; lack of services or providers; general access to care; lack of cultural humility; language barriers; and access to healthy food. The top four disparities were based on geography, race, economic status, and age. The top four priority populations were the elderly, youth, poor, and immigrant communities. The scan and crosswalk confirmed the topical areas that the SHA addresses. (See Appendix D for summary of the methods and analysis.)

Steps Four, Five, and Six: Writing, External Review, and Distribution of the SHA

The final three steps in the process include writing the analysis from steps one and two and circulating the draft SHA to statewide external stakeholders and to the public. Following this review, the SHA was made available through distribution of the link to local health departments and on the MDPH website. This section describes in detail MDPH's strategy to engage partners and obtain external feedback on the SHA.

Statewide Partnership Advisory

Effective and accountable public health leadership and practice requires a comprehensive health assessment that authentically engages a range of partners. The SHA Statewide Partnership Advisory (MA-SHA-SPA) and MDPH worked in collaboration to create the State Health Assessment. The MA-SHA-SPA is an external group of advisors who are concerned about health and represent a variety of sectors across the Commonwealth. Members were identified as representing a variety of statewide perspectives and were available during the time period. (See **Appendix E** for a full list of MA-SHA-SPA Partners and the organizations they represent.) The MA-SHA-SPA was charged with ensuring transparency and accountability to community stakeholders in the assessment process. Advisory members participated in the assessment planning process, providing recommendations on the health topics, health indicators, and referred the department to data and data sources included in the assessment. Additionally, the MA-SHA-SPA members provided feedback on the assessment and facilitated connections with other key informants and this group will continue to expand.

Sectors Represented on the Statewide Partnership Advisory Board

- Businesses/Industry
- Education/Academia
- Health Care System
- Residents
- Non-Profit Organizations & Coalitions
- Health Care System

General Public Feedback on Massachusetts State Health Assessment

In September 2017, a draft of the preliminary findings for the SHA was made publicly available for a two-week public review and feedback period. What's more, an email which included links to the draft report and a survey was sent to all MDPH staff, key informants, focus group participants, each related advisory body and all statewide partnership advisory members. Feedback was incorporated into the report where possible and additional recommendations and next steps will be addressed when the state health improvement plan work begins.

Achieving and Maintaining National Public Health Accreditation Status

The MDPH has applied for national public health accreditation through the Public Health Accreditation Board (PHAB). In order to achieve and maintain accreditation, a state health department must complete a rigorous, multi-faceted peer-reviewed state health assessment process. After achieving accreditation, PHAB also requires annual reports and reapplication for reaccreditation every five years. PHAB's main goal is to advance quality and performance within public health departments in order to ensure the value and accountability to the communities they serve.

The completion and regular updating of the SHA represents an important foundation for obtaining and maintaining national public health accreditation status. For example, the MDPH State Health Improvement Plan, Strategic Plan, and Workforce Development Plan incorporates strategies, partners' recommendation and staff training modules to address the health priorities, disparate health outcomes, and utilization of community assets identified in this SHA.

Consequently, the value and accountability to Massachusetts residents from pursuing accreditation begins with and continuously relies upon successful completion and regular updating of the SHA.

In addition to state health departments, PHAB also recognizes local and tribal health departments with accreditation. To date, one regional public health system, the Worcester Division of Public Health/Central Massachusetts Regional Public Health Alliance has been accredited by PHAB, and three other local public health departments are in the process of pursuing accreditation from PHAB.

Appendices Related to this Chapter

- A. Key Informant Interview Guide**
- B. Focus Group Discussion Guide**
- C. Advisory Bodies & Descriptions**
- D. Scan and Analysis of Community Health and Community Needs Assessments**
- E. Statewide Partnership Advisory Board Partners and Organizations, Commissions, Advisory Bodies, and Stakeholder Groups Engaged for the State Health Assessment**

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CHAPTER 1

Population Characteristics





Population Characteristics

This chapter provides an overview of the population characteristics in Massachusetts. While Massachusetts is ranked first overall state, first in education and second in health care by *US News and World Report*, health disparities and inequities persist. This helps provide context to the data that follows. Since there is no widely accepted consensus on which elements best describe population characteristics, the following topic areas provide some context:

- Demographics
- Social and Economic Factors
- Mortality

Chapter Data Highlights

- Massachusetts ranked #1 overall state by US News
- Massachusetts is ranked #1 in education and #2 in health care
- Massachusetts is ranked among the top 10 states for the economy
- The rate of population increase of people of color in Massachusetts is increasing at four times the national rate
- The elder population in Massachusetts is growing at a faster rate than the national average

Overview

Where individuals, families, and communities live, age, work, and play profoundly shapes their health.²⁵ In addition, disparities in health outcomes are linked with socioeconomic status, race/ethnicity, gender, immigration, and other social characteristics.²⁶ Understanding how these social, geographic and economic factors shape health is necessary to

identify areas for intervention to meet the needs of the Commonwealth. Consequently, the characteristics of Massachusetts' residents and changes in the population over time are important for understanding the Commonwealth as a whole and for particular population groups.

Diversity and education are two aspects of the state's population worth noting as strengths. With two in five residents identifying as immigrants or racial/ethnic minorities, the diversity of the Commonwealth is an important asset. Education also represents a strength. The Commonwealth has the highest proportion of college graduates in the nation. Average household incomes are higher than in most other states. Yet, while Massachusetts overall has a favorable social and economic profile, disparities remain.

Demographics

Who lives in Massachusetts? How large is the population and how has the demographic composition of the Commonwealth changed over time? This section addresses these questions.

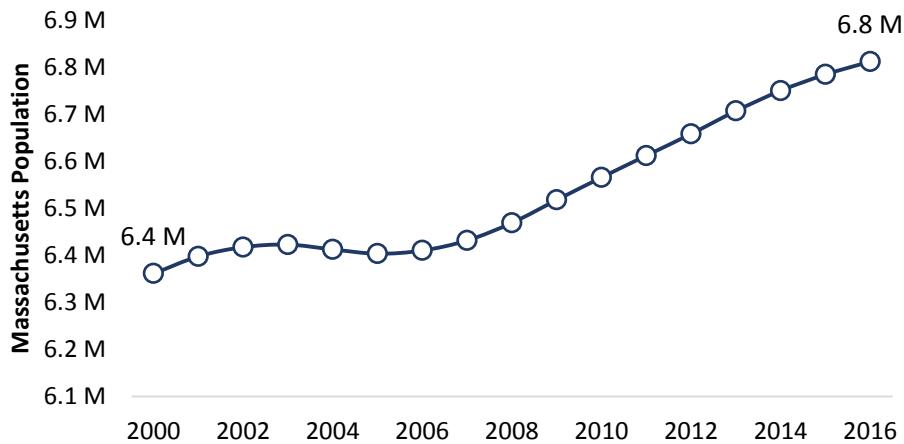
Population Size and Growth

Massachusetts remains the third most densely populated state in the US and ranks 15th in population size²⁷ with 6.8 million residents. The Commonwealth's population grew 3.5% from 2006-2010 to 2011-2015, below the national average of 4.1% for the same time period (**see Figure 1.1**).

Boston is the largest city in the state, with 667,137 residents or 9.8% of the total population. Franklin, Berkshire, and Barnstable counties are the only counties in the state that have lost population since 2010.

Figure 1.1

Massachusetts Population, 2000 - 2016



SOURCE: US CENSUS BUREAU, POPULATION DIVISION

As part of this health assessment, MDPH conducted 11 focus groups and 30 key informant interviews with stakeholders across the Commonwealth. Several of these participants observed that the growth of their communities, especially in the more populous areas, has led to a strain in affordable housing and an increase in gentrification.

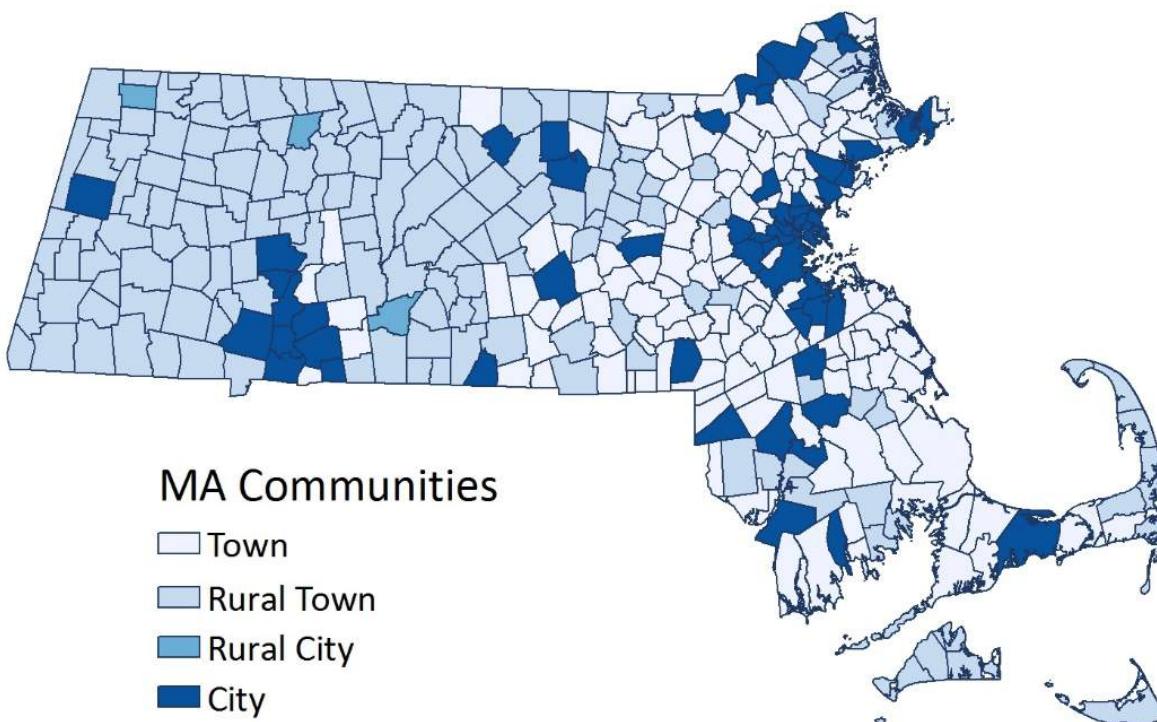
As one focus group participant shared: “*Western Mass is growing and people who have been here for generations are being priced out of their homes.*” However, focus group participants in Cape Cod worried about a declining population. One shared that: “*There aren’t a lot of opportunities out here for people in their 30’s and younger. People leave the Cape when they graduate high school and don’t come back because they feel like nothing is here.*”

Population Density

Massachusetts is often thought of as urban because of the dense concentration of people in metro-Boston and other cities. But 52% of Massachusetts’ landmass is classified as rural, including 56% of the state’s cities and towns. Residents of these rural communities total 679,911, which is about 10% of the state’s total population. Since 2010 three counties have decreased in size, all of them rural.

Figure 1.2

Massachusetts Rural Cities and Towns, 2017



As shown in **Figure 2.1** above, rural Massachusetts spans the entire length of the state from the Berkshires to the Islands and includes mountains, farm land, rolling hills, seaside coasts, islands, and dense forest. These rural areas are known for their scenic beauty, outdoor recreation, vacation destinations, abundance of farms, communities of artists, well-known educational institutions, quintessential town centers, and New England charm.

Massachusetts’ seasonal tourist destinations, former mill towns, and agricultural economies face many challenges and tend to be more economically distressed than their urban neighbors. Often the leading industry has moved, leaving these communities with a shortage of employment opportunities and living wages. Rural communities often lack the infrastructure (e.g., broadband internet) needed to attract businesses and the expenses associated with development

can be high. The costs per capita associated with health and human services delivery tend to be higher in rural areas because of their lower population density.

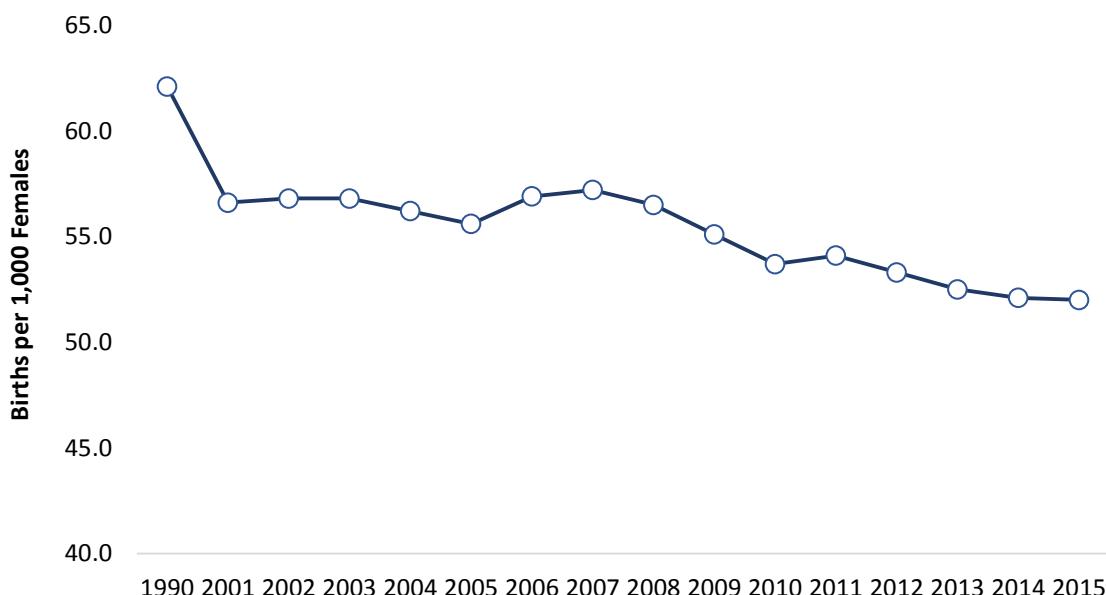
Tourism communities see a seasonal growth in employment, but employment in this sector carries lower wages for short periods of time during the year. Some year-round residents may need to earn a salary to live on for a year in only a few months. This seasonal bloom in population places a great strain on affordable housing and health services. Limited public transportation in these areas can create additional barriers for employment and health access.

Births

The birth rate in Massachusetts has been steadily declining over the past several decades, as shown in **Figure 1.3**. In 2015, there were 71,484 births to Massachusetts resident mothers, a decline of 0.5% from 71,867 in 2014 and a decline of 22.7% since 1990. In 2015, the number of births to mothers under the age of 30 (2015 – 28,890; 2014 – 29,858) decreased by 3.2% whereas the number of births to mothers ages 30 and older increased by 1.4% from 2014 (2015 – 42,594; 2014 – 42,009).

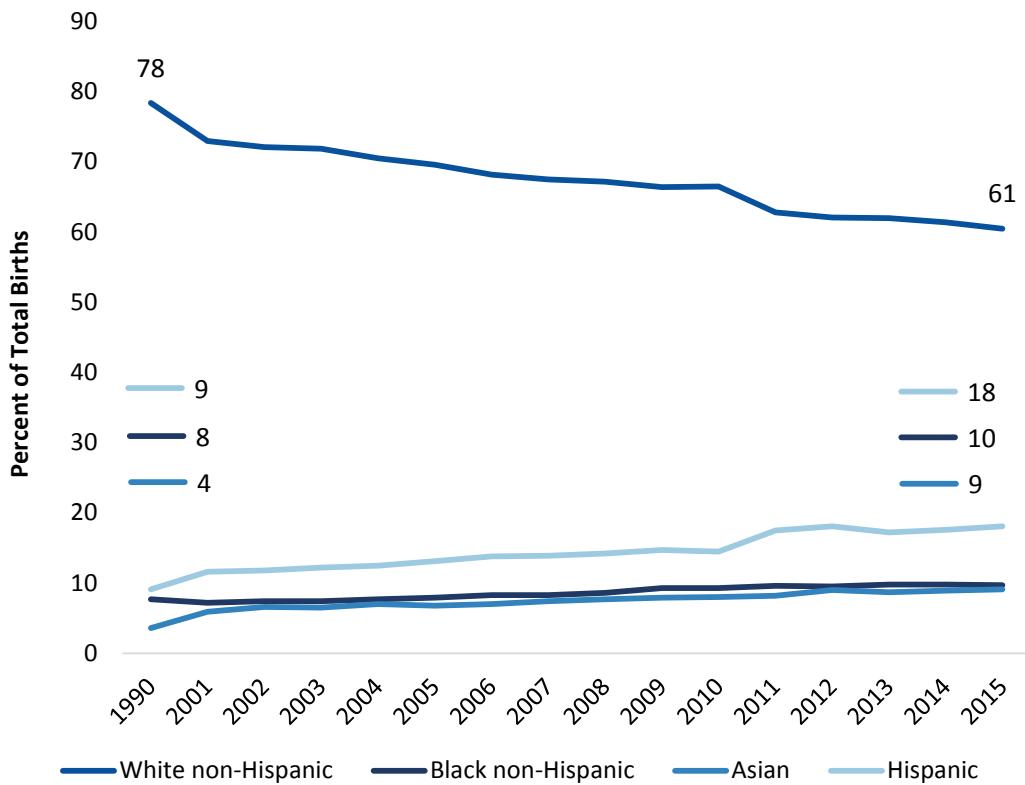
Figure 1.3

Massachusetts Birth Rate Trends, Total Population, 1990, 2001-2015



In birth trends by race, the proportion of births to White non-Hispanic mothers has declined, while births to Black non-Hispanic, Asian non-Hispanic, and Hispanic mothers has increased since 1990 (**see Figure 1.4**). Most recently, the proportion of births to White mothers declined by 1.5% (from 61.4% in 2014 to 60.5% in 2015) and the proportion of births to Hispanic mothers increased by 2.8% (from 17.6% in 2014 to 18.1% in 2015). The proportion of births to Asian non-Hispanic mothers increased by 2.2% (from 8.9% in 2014 to 9.1% in 2015).

Figure 1.4
Percent of Total Births by Race, Massachusetts, 1990, 2001-2015



Gender

From birth to middle age, the proportion of boys and men in the Commonwealth exceeds that of girls and women. However, for the oldest group, those 65 years of age or older, the population of women (16.4%) exceeds that of men (12.9%). Among those 85 years of age and older, women outnumber men two to one. As a result, women represent the majority population at 51.5%.

LGBTQ

Data on lesbian, gay, bisexual, transgender, and queer (LGBTQ) populations in Massachusetts are slowly becoming more available. The only major source of statewide data is the Youth Risk Behavior Surveillance System (MA YRBS). In 2013, a question was added to the MA YRBS asking whether students identify as transgender. Further, a question asking about Gender Expression was added to the MA YRBS in 2017.

According to the Massachusetts Department of Elementary and Secondary Education analysis of the 2011-2015 MA YRBS data, 14.8% of Massachusetts youth identified as Sexual and/or Gender minority. Due to data limitations, MDPH believes that this is an undercount of actual rates. Among Sexual and/or Gender Minority Youth, 63% are White, 20% are Hispanic, 9% are Black, 5% are Asian, and 3% are Multi-Ethnic.

Age

The Commonwealth's population is aging. More than one-third of residents are 45 years or older (43%). The median age of Massachusetts residents increased, from 38.7 years in 2006-2010 to 39.3 years in 2011-2015. This exceeds the median age for adults across the US (37.6 years). Two-thirds of Massachusetts counties (10 out of 14) have a median age of 40 or older. Mirroring national patterns, the proportion of Massachusetts residents from birth to 18 years of age has decreased and the percent of the population 65 years of age or older has increased.

Key informant interviewees and focus group participants mentioned that there is a growing and vibrant senior community. Concerns about meeting the needs of this rapidly growing population also emerged. Interviewees identified critical issues such as health security (e.g. support for family caregivers, access to affordable medication, long-term care services), and financial security (e.g. work and employment protection, retirement savings issues, housing stability). One interviewee commented, *"When we're thinking about who our employers, businesses, and educators are – breaking down the barriers and changing the perceived discrimination against getting old, that needs to start as a fundamental piece of how we educate people."*

Statewide initiatives such as the Massachusetts Healthy Aging Collaborative, which aims to create age-friendly livable communities, were noted as strengths that can be leveraged moving forward. In 2011-2015, 11.3% of Massachusetts residents 65 years of age or older lived alone, slightly more than the proportion in 2006-2010 (10.6%) and across the US in 2011-2015 (10.1%).

"Recognizing that demographic shift towards older adults is happening, the Governor created the State's first advisory council on aging that will guide administration policy to support healthy aging."

Key Informant Interviewee

Race/Ethnicity

The Commonwealth is less diverse than the US as a whole. Races and ethnicities other than the White non-Hispanic population comprise 27% of the total state population compared to 39% in the US. However, the minority population in Massachusetts has been increasing at a faster rate than the US average. From 2010 to 2016, races and ethnicities other than White non-Hispanic increased 4%, from 23% to 27%, compared to a 2.6% increase nationally.

Geographically, Nantucket, Essex, and Norfolk counties experienced the largest increases in minority populations between 2010 and 2016 compared to other Massachusetts counties. Franklin, Barnstable, and Berkshire counties were the least diverse in terms of race/ethnicity during the same time period.

Across the Commonwealth, population growth among Hispanics increased faster than the national rate. Similar to national data, the median age of the Hispanic population in Massachusetts is younger (27.9 years) compared to the non-Hispanic population (41.5 years).

According to the most recent available Census data (2010 US Census), 50,705 people in Massachusetts identified themselves as American Indian/Alaska Native (AI/AN alone or in combination). American Indian communities and individuals lag behind the general population in terms of educational attainment, economic status and health. For example, self-identified American Indian people in New England are less likely to have college degrees and more likely to hold lower-paying jobs, suffer from more chronic diseases such as diabetes, and live shorter lives.²⁸

Qualitatively, while numerous focus-group participants described diversity as a community strength, many participants also voiced concerns about gentrification, notably in Boston, Northampton, and Worcester. One focus group participant described the community as “*very diverse*”, mentioning wide cultural diversity. They noted that diverse residents are a strength of the community, but also noted that some residents faced barriers receiving culturally-competent services.

Participants perceived that many providers were not taking cultural aspects of health into account when treating people, including religion, stigma, language, and culinary norms. As one participant noted, “*We need to educate mainstream providers and hospitals and teach them what it means to treat communities of color. It's about cultural sensitivity.*”

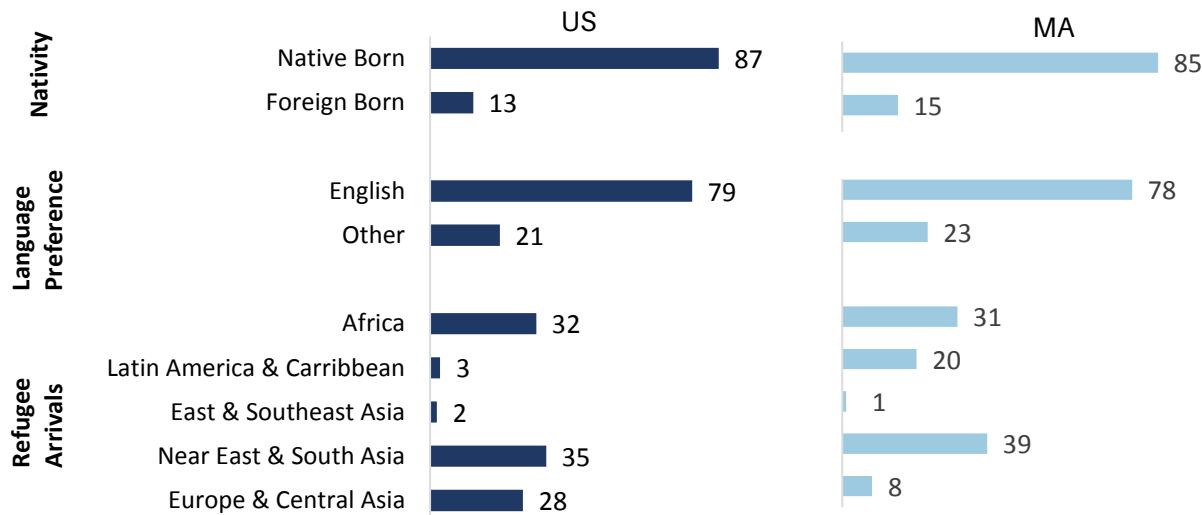
Immigration and Growing Diversity

Massachusetts ranks eighth in the nation for the percentage of the population that are immigrants or refugees. A total of 15.5% of Massachusetts residents were born outside of the US, compared to 13.2% across the nation.²⁹ This represents a slight increase in the immigrant population from 2006 to 2010 (14.5%). Similar to national trends, the majority of immigrants in Massachusetts are from Latin American and Caribbean countries, followed by Asian and European countries.

Diversity in terms of place of birth, language spoken at home, and country of origin are evident in Massachusetts (**see Figure 1.5**). In 2011-2015, more than one in every five residents reported speaking a language other than English at home (22.5%), slightly more than that for the United States (21%). The majority of refugees to Massachusetts are from near East and South Asia (39%), followed by African countries (31%), and Latin American and Caribbean countries (20%).

Figure 1.5

Immigrant Population Characteristics, US vs. MA, 2011-2015



NOTE: PERCENTAGES MAY NOT ADD UP TO 100 PERCENT DUE TO ROUNDING

Focus group and interview participants reported that some populations face challenges to accessing health care services, especially communities of color, elders, homeless residents, and those suffering with mental illness.

Numerous participants stressed that more needs to be done to address the needs of undocumented residents, who were described as an essential part of the community. However, the inability of this group to obtain services threatens

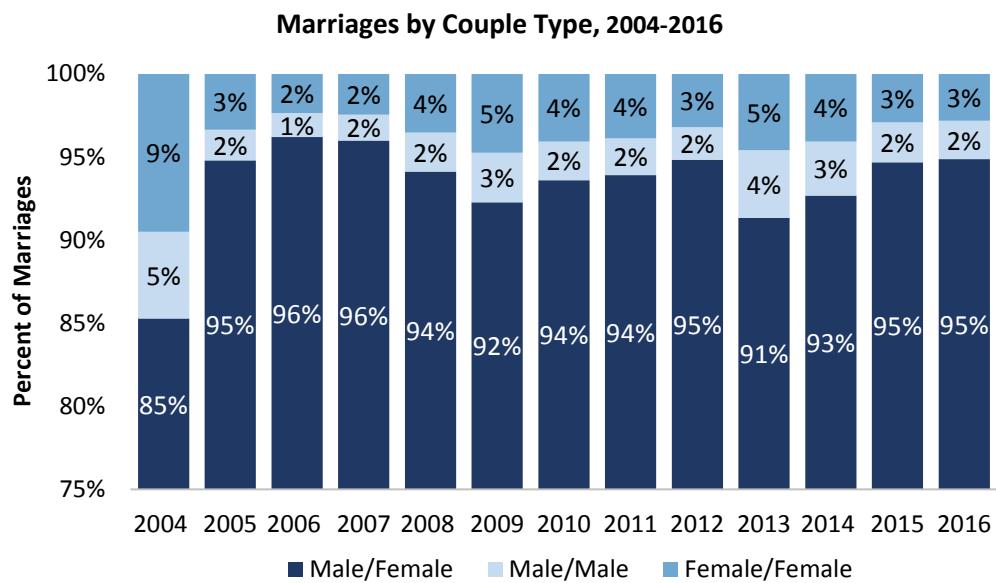
their health and raises costs for the overall system. As one focus group participant shared, “*There’s a lot of seasonal work in Massachusetts, and many workers come from other countries and are undocumented. They work very hard and often get injured but can’t seek medical care because of their status.*”

Marital Status

From 2000 to 2015, the number of marriages across the Commonwealth declined. In 2005, the number of marriages increased which was attributed to the 2004 law that enabled same-sex couples to marry in Massachusetts. In 2016, the number of marriages declined slightly to 39,297, of which 2,017 (5.1%) were to same-sex couples. From May 2004 through the end of 2016, there have been more than 32,456 marriage licenses to same-sex couples. **Figure 1.6** shows the relative change in marriages by couple type during this time period.

In 2011-2015, more than one-quarter (28.7%) of households had a single parent, a slight increase from 2006-2010 (27.4%), but lower than the national average (31%) in 2011-2015.

Figure 1.6



Persons with a Disability

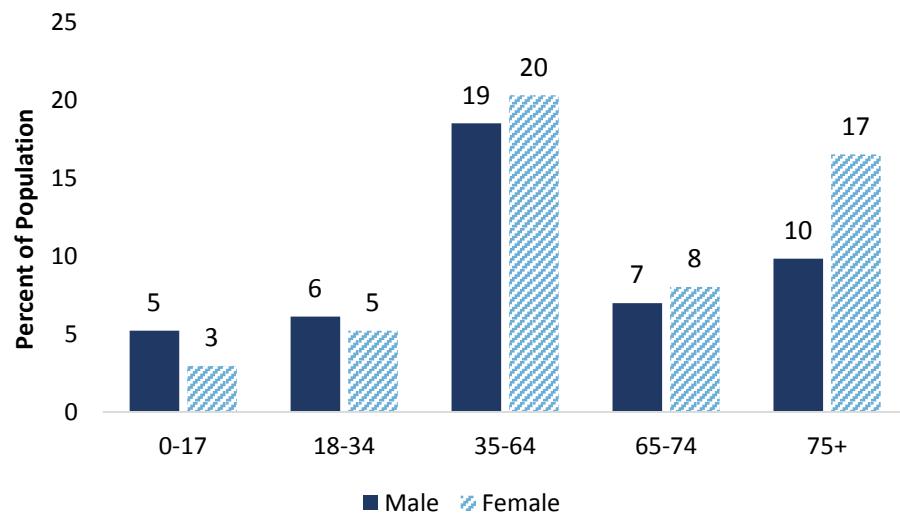
A disability is defined as a physical or mental condition that limits a person’s movement, senses, or activities. People with disabilities live daily with challenges that include a lack of adequate accessible transportation, limited housing, unequal physical and programmatic access to public and private facilities, barriers to education and employment and reduced income. People with disabilities also have disparities in health outcomes. Unfortunately, many of the data sources consulted for this assessment do not include a category for disability. Where that information is available it is noted. Approximately 11.5% of Massachusetts residents have a disability, including sensory, physical, mental, self-care, and go-outside-home disabilities. This proportion is slightly below the nation (12.4%), but this may be due to underreporting.

Massachusetts ranks 21st in the nation for the population 5 to 17 years of age with a disability and 39th in the nation for the population over 65 years of age with a disability.³⁰ As shown in **Figure 1.7**, residents 35 to 64 years of age account for the highest percentage of the Massachusetts population with a disability (39%). Given that the state's population of older adults is projected to rise, the number and percentage of persons with a disability is also expected to grow.

"We currently think about people with disabilities as an outcome, a preventable outcome. For people with disabilities – it's not about preventing them, it's about including them. A shift in the framework is needed. It's about shifting people's thinking about disabilities as a health outcome to include persons " with disabilities in the conversation.

Key Informant Interviewee

Figure 1.7
Percent of the Population with a Disability by Age and Gender, Massachusetts, 2011- 2015



SOURCE: US CENSUS BUREAU, AMERICAN COMMUNITY SURVEY 5-YEAR ESTIMATES

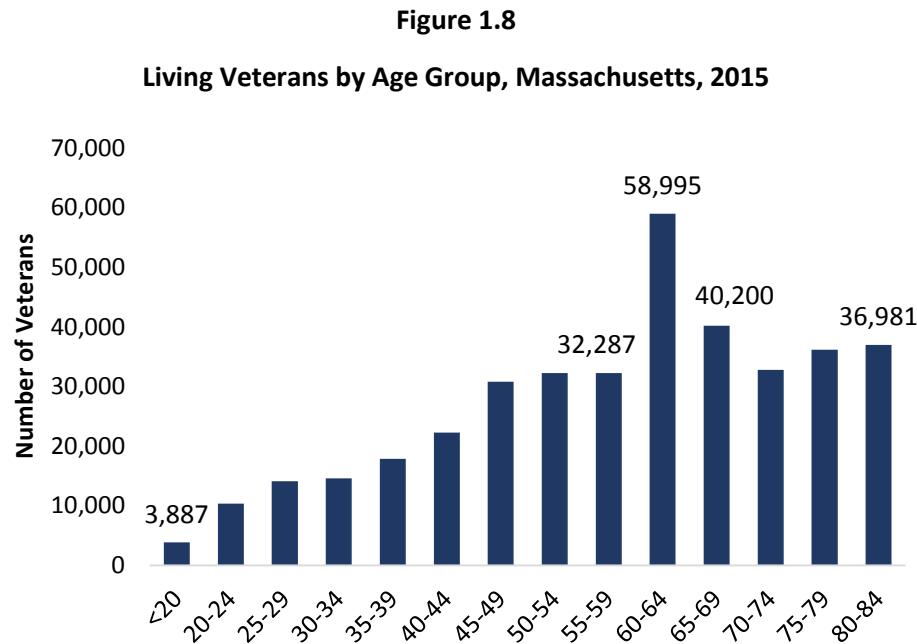
NOTE: DUE TO ROUNDING, MAY NOT ADD UP TO 100%

Veteran Status

According to the National Center for Veterans Analysis and Statistics, 368,000 veterans lived in Massachusetts in 2015. The same year, approximately 85,000 received health and mental health services in a VA facility meaning that more than 283,000 seek treatment in other parts of the health care system. While the total population of veterans is projected to decrease nationally in the next two decades, the female veteran population is expected to increase from nine percent in 2013 to approximately 17% in 2043.

This upward trend is also true for minority veteran populations. For example, in 2010 approximately 10% of veterans identified as Black non-Hispanic and 6% identified as Hispanic. By 2040, Black non-Hispanic and Hispanic veterans are expected to make up almost one third of the total veteran population (30%). In terms of percent of population by period of service, the post-9/11 veteran population is expected to show the biggest population growth, increasing by approximately 33% between 2015 and 2020. Those 60-64 years old represent the largest veterans age cohort (see

Figure 1.8). Veterans' mental health needs present differently and require treatment appropriate to their special needs. The number of veterans with a service-connected disability is on the rise as well.



SOURCE: NATIONAL CENTER FOR VETERANS ANALYSIS AND STATISTICS

Social and Economic Factors

While the US spends more per person on health care than other high-income countries, we have the lowest life expectancy and lag behind these same countries in several health indicators.³¹ Quality health care is important for ensuring the well-being of families and communities, but the steps to take for ensuring good health take place long before an illness occurs and before medical care is needed.

When asked about social determinants of health (see definitions in the Introduction), focus group and key informant interviewees stressed the importance of attending to key barriers, such as transportation, housing, and employment, that prevent Massachusetts residents from achieving optimal health. Numerous focus group and interview participants saw the lack of these basic needs as a substantial barrier to improved health for low-income residents and reported that addressing these determinants of health was critical. Participants suggested greater investments in transportation, anti-poverty, and affordable housing initiatives.

The sections following provide an overview of the socio-economic characteristics of Massachusetts residents and the opportunities for health.

"Health inequities are systematic differences in the opportunities that groups have to achieve optimal health, leading to unfair and avoidable differences in health outcomes."

National Academies of Sciences,
Engineering, and Medicine

Income

Just as an individual's income is important to health, a community's average household or individual income also affects its residents' health. The Commonwealth's per capita income in 2014 was \$50,330. This puts Massachusetts fourth in the nation, behind Connecticut, North Dakota, and Wyoming.³² In 2011-2015, the median household income in Massachusetts was \$68,563, a 6.3% increase over the median household income of \$64,509 in 2006-2010 and 24% higher than that for the US (\$53,889).

"The most important determinant of health is income. Eradicate poverty. Once we do that everything else will follow."

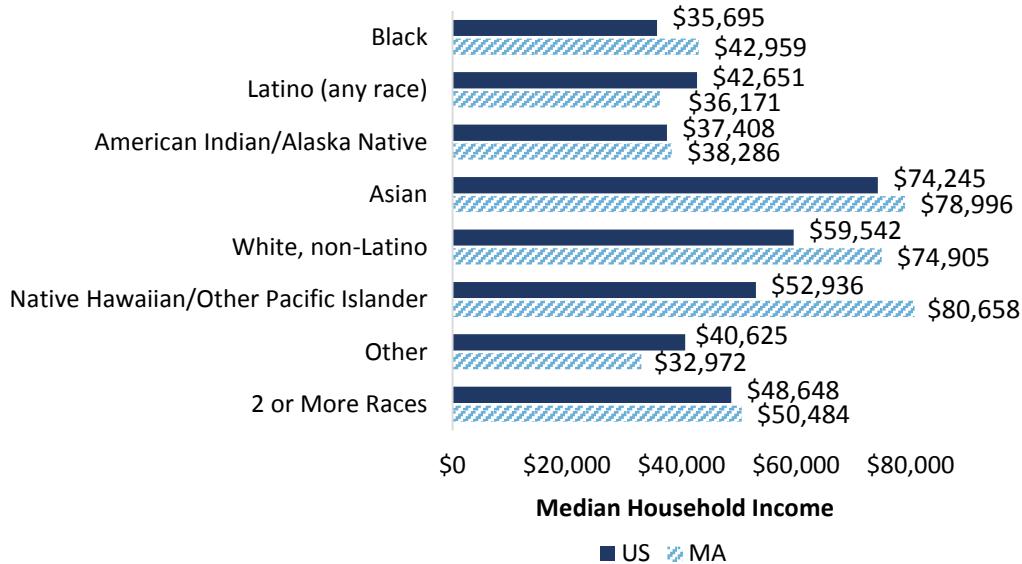
Key Informant Interviewee

While Massachusetts ranks third in the nation for median family income³³, we are 5th for being the most expensive state to live in.³⁴

Economic successes are not shared evenly among racial/ethnic groups. In 2011-2015, the median household income for White non-Hispanics was approximately two times that for Hispanic and American Indian/Alaskan Native residents, and 1.7 times that for Black non-Hispanic residents (see Figure 1.9). While most racial/ethnic groups in Massachusetts have higher median household incomes than the national average, the median household income for Hispanics in Massachusetts (\$36,171) was 16% lower than that for Hispanics nationally (\$42,651) in 2011-2015.

Figure 1.9

Median Household Income, by Race/Ethnicity, US and Massachusetts, 2011-2015



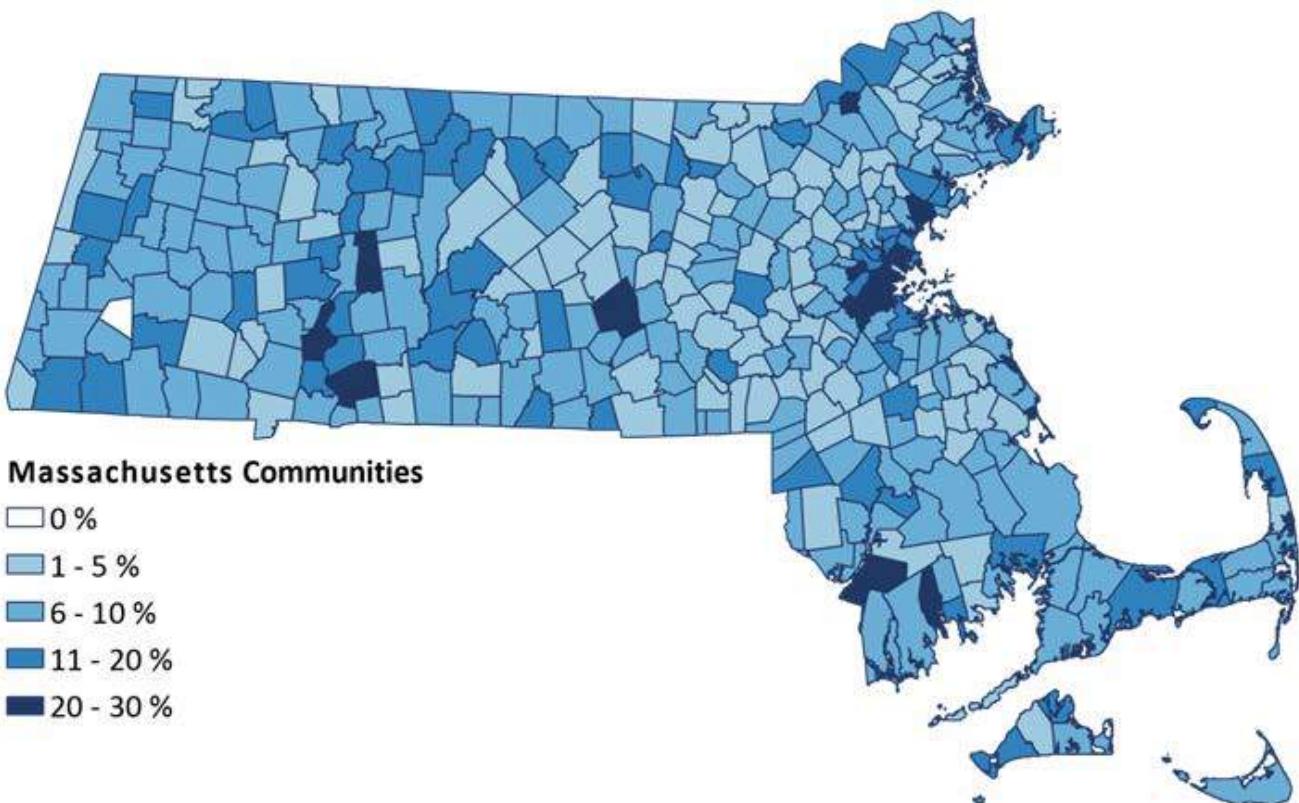
SOURCE: US CENSUS BUREAU, AMERICAN COMMUNITY SURVEY 5-YEAR ESTIMATES; NOTE: US CENSUS DATA REFERS TO HISPANICS AS LATINO

Poverty

Despite relatively high income figures for the state, there is considerable poverty among some demographic and geographic groups. In 2011-2015, approximately 14.9% of individuals had incomes that are 125% of the federal poverty level, reflecting a slight increase over 2008-2010 (14%). According to Figure 1.10, residents with incomes below the federal poverty level are concentrated in several darkened areas of the state, in particular the metro Boston area.

Figure 1.10

Individuals with Incomes Below 125% of the Federal Poverty Level, Massachusetts, 2011-2015



SOURCE: US CENSUS BUREAU, AMERICAN COMMUNITY SURVEY 5-YEAR ESTIMATES

As shown in **Figure 1.12**, stark racial disparities exist in poverty rates across Massachusetts. In 2011-2015 approximately one in three (29.3%) Hispanic residents and one in five Black non-Hispanic (22%), American Indian or Alaska Native (22.9%), or Native Hawaiian or other Pacific Islander (22.4%) residents recorded incomes below the federal poverty level. These patterns stand in dramatic contrast to less than one in 10 (7.8%) White non-Hispanic and one in seven (14.6%) Asian non-Hispanic residents with incomes below the federal poverty level. Some people's housing costs exceed 30% of their income, leaving less money to cover other necessities.

Environmental Justice

Environmental justice communities are defined as populations where 25% of the households have an annual median income that is equal to or less than 65% of the statewide median or 25% of its population is minority or identifies as a household that has English Isolation.³⁵ Environmental justice is based on the principle that all people have a right to be protected from environmental hazards and to live in a clean and healthful environment, regardless of race, color, national origin, income, or English language proficiency. Environmental justice is the equal protection and meaningful involvement of all people and communities with respect to the development, implementation, enforcement of energy, climate change, environmental laws, regulations, policies; and the equitable distribution of energy, environmental benefits and burdens. **Figure 1.11** shows the extent of Environmental Justice Population across the state. **Figure 1.12** illustrates the extent of individuals with incomes below the poverty level.

Figure 1.11
Individuals Living in Environmental Justice Communities, 2010

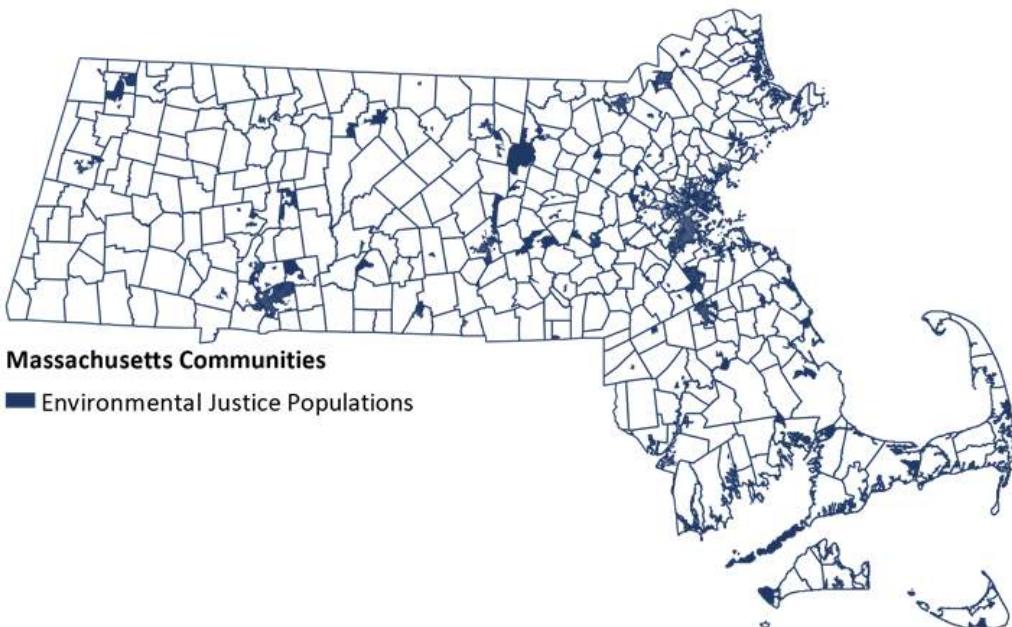
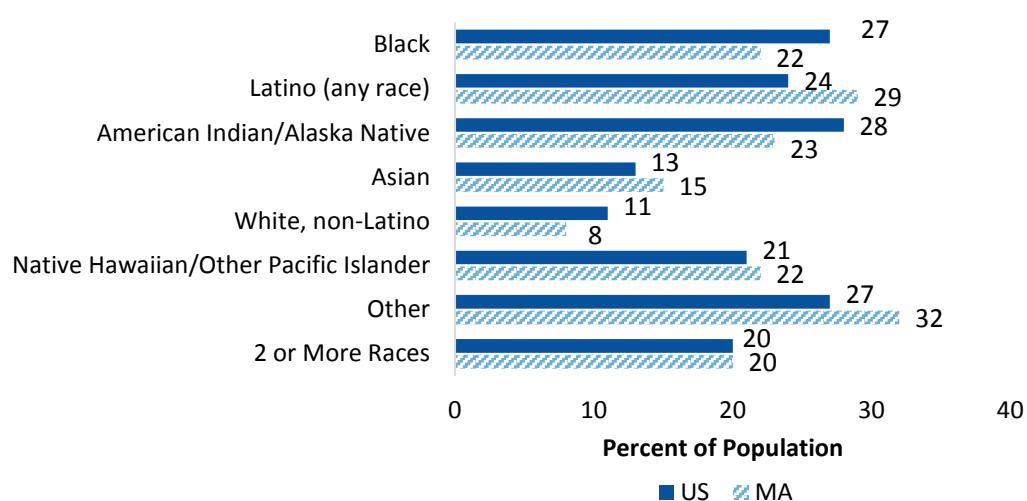


Figure 1.12
**Individuals with Incomes Below the Federal Poverty Level, by Race/Ethnicity
US and Massachusetts, 2011-2015**



SOURCE: US CENSUS BUREAU, AMERICAN COMMUNITY SURVEY 5-YEAR ESTIMATES
 NOTE: DUE TO ROUNDING, MAY NOT ADD UP TO 100%

Poverty was reported as a common concern across all focus groups and interviewees, with residents increasingly concerned about the wealth disparity in areas such as Boston and Worcester. As one focus group participant shared, “*You have a clash of classes in many neighboring communities.*” Participants indicated that poverty was the root cause

of stress in community members' lives, reporting challenges meeting basic needs such as food and shelter and difficulty balancing multiple, low-wage jobs.

Unemployment

The proportion of unemployed residents declined from 10.2% in 2010 to 5.8% in 2015, reflecting a 43% decrease over this period. From 2010 to 2015, the percentage of Massachusetts residents who were unemployed was lower than the national average (see Figure 1.13). In 2015, 5.8% of Massachusetts residents 16 years of age or older were unemployed, compared to 6.3% for the US.

"We need to recognize that the **future workforce** has unique needs when it comes to training and education.

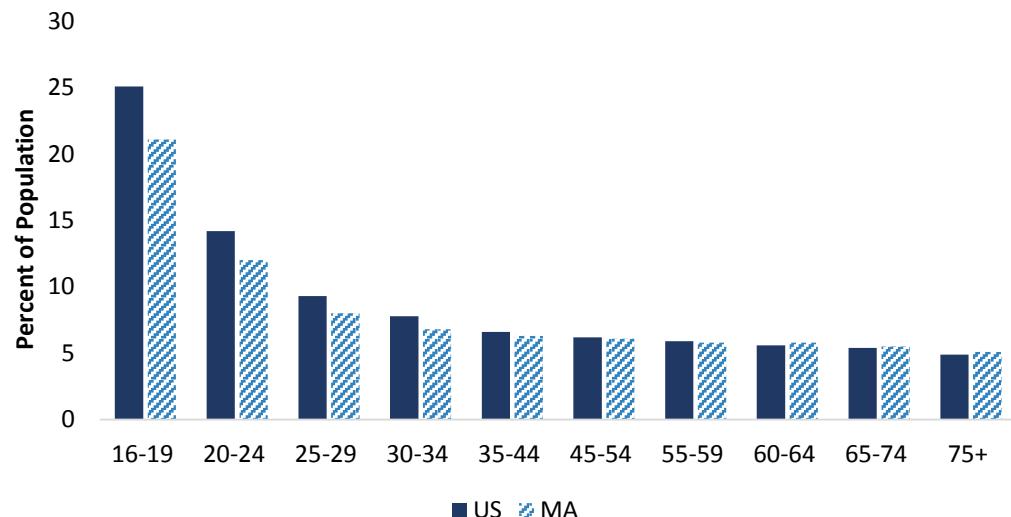
Key Informant Interviewee

Following national patterns, a greater share of younger individuals were unemployed in 2011-2015. A total of 21.1% of Massachusetts residents 16-19 years of age were unemployed and 12% of persons 20-24 years of age were unemployed.

Overall, several key informant interview and focus group participants expressed concern that even though the state enjoys relatively low unemployment and economic growth has occurred in depressed communities, employment challenges for low-wage workers still exist.

Figure 1.13

Percent of the Population Ages 16 or Older who are Unemployed, by Age Group, US and Massachusetts, 2011-2015



SOURCE: US CENSUS BUREAU, AMERICAN COMMUNITY SURVEY 5-YEAR ESTIMATES

As one key informant interviewee stated, "*We have low levels of unemployment in our county - but the problem is sustainable employment for low-wage workers, who often face barriers to transportation and childcare.*"

Education

With 40.5% of adults 25 years of age and older having a college education or higher in 2011-2015, Massachusetts ranks first in the nation in percentage of individuals who have at least a bachelor's degree.³⁶ Another quarter (25.4%) of Massachusetts residents have graduated from high school, and 23.9% have attended some college or completed an associate's degree (AD).

As shown in **Figure 1.14**, these educational achievements are not shared equally across racial/ethnic groups. While more than half (57.5%) of Asian non-Hispanic residents and two in five (43.1%) White non-Hispanic residents have a college education or higher, only 23.4% of Black non-Hispanic and 17.5% of Hispanic residents have at least a college education.

Education was noted as a strength in several areas of the state. One theme that emerged frequently was the need for more community education on health and prevention, at the appropriate health literacy level, specifically for school-aged children.

Figure 1.14

Educational Attainment among Population 25 Years of Age or Older, by Race/Ethnicity, Massachusetts, 2011-2015

	Less than HS Diploma	HS Diploma/GED	Some college/ AD degree	Bachelor's degree or higher
Black non-Hispanic	17.2%	28.8%	30.6%	23.4%
Latino (any race)	31.9%	28.9%	21.8%	17.5%
American Indian/Alaska Native	21.2%	31.0%	28.9%	18.9%
Asian	15.8%	15.0%	11.7%	57.5%
White non-Hispanic	6.9%	25.4%	24.5%	43.1%
Native Hawaiian/Other Pacific Islander	13.3%	14.0%	44.4%	28.3%
Other	34.8%	31.5%	21.6%	12.1%
2 or More Races	22.6%	25.1%	23.5%	28.8%

SOURCE: US CENSUS BUREAU, AMERICAN COMMUNITY SURVEY 5-YEAR ESTIMATES

Housing and Homelessness

Where individuals, families, and communities live is intimately related to their health and well-being.³⁷

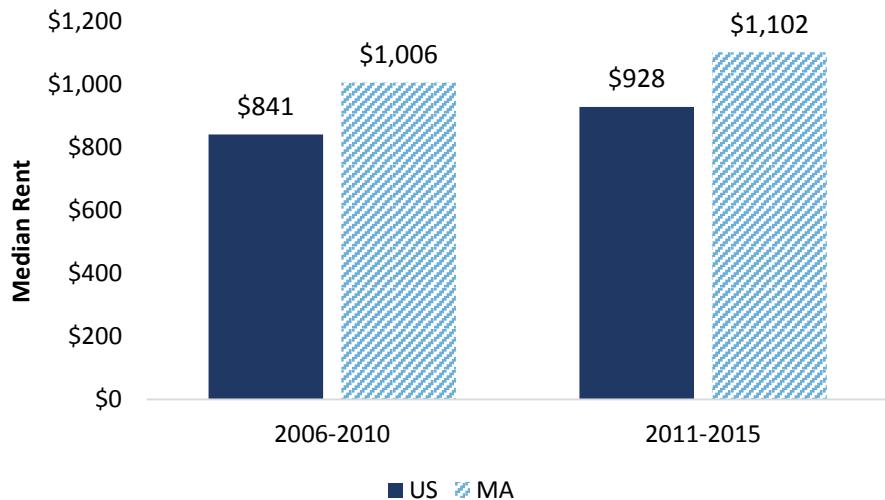
The age of housing is particularly important because older homes are more likely to contain substances that are harmful to health.³⁸ The Commonwealth's housing stock is older than the average across the US with half (51.1%) constructed before 1960 and only 8.5% constructed since 2000.

Similar to national patterns, in 2011-2015 62.1% of Massachusetts' housing stock was owner-occupied, and 37.9% was rented. In 2011-2015, the median rent across the Commonwealth was \$1,102, a 9.5% increase from 2006-2010 (\$1,006) and 17.1% higher than the national average (\$928) (see Figure 1.15)

"We need wrap-around training supports at community-based organizations that take into account the stressors of life: single parents, domestic violence, caring for aging parents, not enough food, and lackluster living conditions."

Key Informant Interviewee

Figure 1.15
Median Rent, US and Massachusetts, 2006-2010 vs 2011-2015



SOURCE: US CENSUS BUREAU, AMERICAN COMMUNITY SURVEY 5-YEAR ESTIMATES

The number of people experiencing homelessness and housing instability in Massachusetts remains very high. According to the US Department of Housing and Urban Development's 2015 Annual Homeless Assessment Report, more than 21,000 people in Massachusetts experienced homelessness. Adolescents are at higher risk for homelessness than adults.³⁹ From 2009-2010 to 2015-2016, the total number of homeless public school students in Massachusetts increased 62%. These students took shelter at night in a variety of settings, primarily doubling up, such as sleeping on a friend's couch, and in shelters. As of June 2017, there were more than 3,500 families living in Massachusetts emergency assistance shelter program. Sexual minority populations experience homelessness at much higher rates than those who identify as heterosexual.⁴⁰

"Are we addressing housing as a challenge to peoples' ability to be healthy...to the extent at which housing is a barrier to health? Because housing affordability affects health."

Key Informant Interviewee

Lack of affordable housing emerged as a prominent theme in key informant interviews and focus groups. As one interviewee stated, “*Affordable housing is a huge problem in our community; prices keep rising every year and people aren’t making ends meet.*” According to participants, housing costs comprise a large part of spending for lower income households, leaving few resources for other needs such as health care, medicines, or nutritious food.

Those working with seniors expressed concern about seniors on fixed incomes who are not able to remain in their homes and experience long wait lists for affordable senior housing. Other participants observed that the high cost of housing contributes to homelessness in the region. Concerns over rising homelessness were mentioned in almost all focus groups and key informant interviewees. Interviews identified elders, residents in recovery, and those suffering from mental illness among the most vulnerable for becoming homeless. They also explained that patients with addiction issues faced significant challenges qualifying for housing because of restrictive eligibility and criminal records. Additionally, one key interviewee acknowledged an emerging population at risk for homelessness – college students, a population not typically considered prone to homelessness.

Social Environment Influences

How an individual operates and the experiences they have in their social environment influence healthy behaviors and outcomes. The personal history of the individual – such as experiencing discrimination or trauma – impacts health. Social isolation and lack of social support also shape health.^{41,42}

Community consists of neighborhoods and institutions; while community can be defined in many different ways, it is focused on those elements for the purposes of this health assessment. Communities have different institutions and varying neighborhood characteristics that can help or harm health. As the population of Massachusetts increases, so has the number of registered voters. Between 2012 – 2017 there was an 8.4% increase in the number of registered voter.

“Social factors play a big part in **inequity** in access to health care.”

Key Informant Interviewee

Many interview participants described trauma as an unintended consequence of community violence. One said that, “*Kids are seeing things in their communities and at school and they carry that trauma with them.*” A prominent theme across participants was the need to better understand how trauma affects all aspects of community health including prevention, violence, and behavioral health. Interviewees described youth and the immigrant community as the most vulnerable groups impacted by trauma. Chronic trauma such as community violence and abuse were described as especially concerning.

Historical trauma faced by the Native American community was also reported as a barrier to a healthy life. As one participant shared, “*Nipmuc people have a story of indigenous people under occupation. For us, it’s been centuries since we’ve been the first contact people. Mental health issues, self-esteem issues, and alcohol issues all stem from this trauma and legacy.*”

Lastly, key informant interview participants expressed the need to better understand how systemic issues such as racism and other forms of oppression impact trauma in communities of color.

Further, a common theme that emerged was the need to integrate more trauma-informed care in health services. The impacts of trauma, according to several interviewees, greatly affect health outcomes for youth and adults.

Key informant interview participants cited the need for more provider training around trauma: One participant said, “*We can’t treat substance use if we aren’t targeting the trauma that triggered it. Providers need to be equipped to deal with these traumas and take into account how they’re affecting a patient’s health.*”

Built Environment Influences

The built environment is the human-made elements of where we live, work, worship, travel, and play. It includes open spaces, transportation systems, infrastructure, and the systems that connect them. Built environment characteristics have an impact on available resources and services across communities. Access to healthy food and safe places to exercise and play influence a person’s ability to be healthy.

Open Spaces

Open space resources include 29 State Parks, 78 State Forests, one State Fish Hatchery, four State Wildlife Management Areas, one National Park, four National Historic Sites, two National Historic Parks, four National Wildlife Refuges, and one National Seashore.⁴³

Transportation

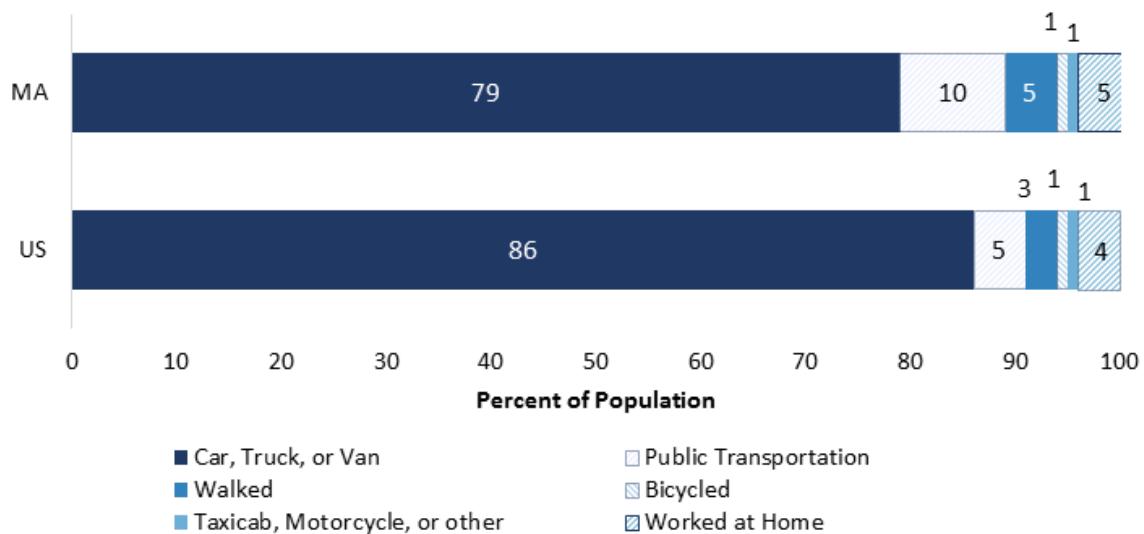
Features of the built environment, such as transportation, are important for fulfilling caregiving and employment responsibilities and for accessing health-promoting resources and health care.⁴⁴ Transportation choices are impacted by community design. Yet, community transportation planning does not typically include health impacts in a cost-benefit analysis. Health impacts can be measured as a cost from lost productivity from premature death, health care costs, lost wages, and decreased quality of life. Research nationally is beginning to place an economic value on those transportation-related health outcomes. Transportation systems designed to primarily consider vehicle traffic movement can contribute to physical inactivity. The likelihood of obesity increases 6% for every additional hour per day spent in a car.⁴⁵

As shown in **Figure 1.16**, in 2011-2015, 9.8% of Massachusetts residents relied on public transportation to get to work, a proportion that was nearly double the national average (5.1%). Nearly eight in ten (79.1%) Massachusetts residents drove to work, a percentage that is lower than that for the nation (85.9%). Another 5.6% of Massachusetts residents used active transportation, such as cycling or walking, to get to work.

In 2011-2015, 94.2% of households across the Commonwealth had at least one vehicle. This rate is similar to the prevalence in 2006-2010 (94.3%) and slightly below that for the US in 2011-2015 (95.6%). A total of 43.2% of Massachusetts households had two vehicles, while 23.9% of households had one vehicle and 27.1% of households had three or more vehicles in 2011-2015.

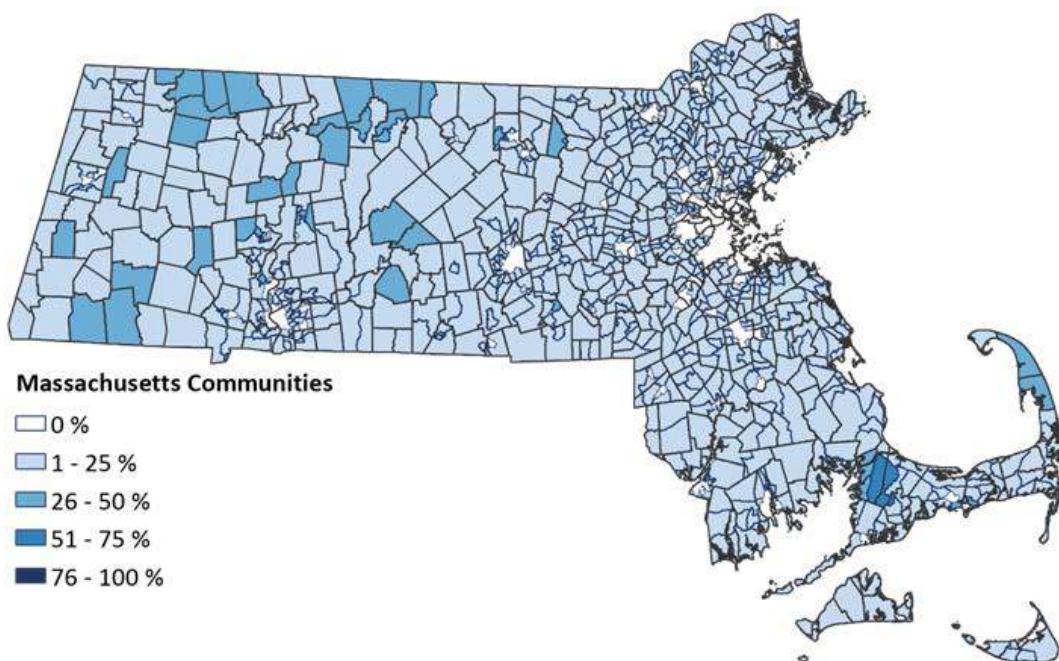
Transportation allows for access to critical goods and services including supermarkets. However, in many neighborhoods, nutritious, affordable, and high-quality food is not accessible, particularly in low-income communities.⁴⁶ In Massachusetts, low-income communities in the central and western regions as well as Cape Cod are more likely to have less access to supermarkets (**see Figure 1.17**).

Figure 1.16
Means of Transportation to Work, US and Massachusetts, 2011-2015



SOURCE: US CENSUS BUREAU, AMERICAN COMMUNITY SURVEY 5-YEAR ESTIMATES; NOTE: DUE TO ROUNDING, MAY NOT ADD UP TO 100%

Figure 1.17
Low-income Access to Supermarkets By Community, 2015



SOURCE: US DEPARTMENT OF AGRICULTURE ECONOMIC RESEARCH SERVICE FOOD ACCESS RESEARCH ATLAS

Concerns about transportation were discussed in nearly every focus group and key informant interview. As one interviewee summarized, “*Transportation is an issue that looks different depending on the area. In rural areas there are no public options, in urban areas like Springfield there's public transit but there are challenges that limit the access to it.*” Walking and bicycling may be viewed as unsafe because of traffic and lack of sidewalks, crosswalks, and bicycle facilities.

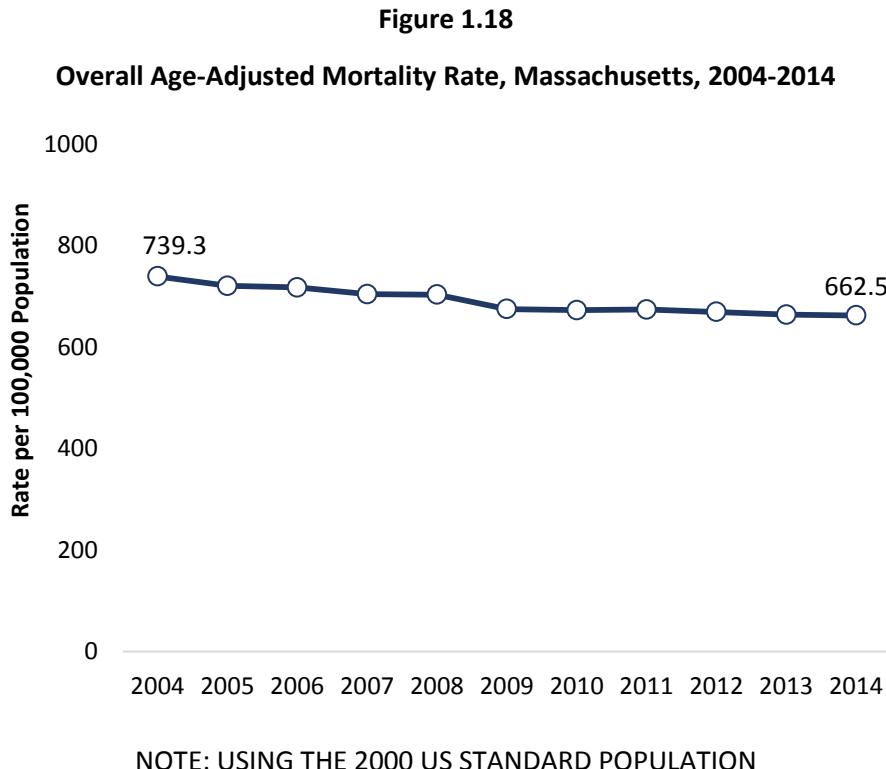
Mortality

The overall mortality rate in Massachusetts continues to decline, reaching a low of 662.5 per 100,000 population in 2014, a 10.4% decrease from the overall mortality rate a decade prior (see **Figure 1.18**).

Massachusetts death certificates show causes of death, age, race/ethnicity, sex, educational attainment, marital status, and occupation among other characteristics. MDPH uses this information to monitor mortality trends in the Commonwealth, identify population groups at greatest risk of death from diseases and injuries, and to design and implement programs to promote health.

In order to understand the impact of mortality, both the number of deaths and death rates are important. The number of deaths provides insight into the overall public health burden of specific diseases. Mortality rates presented in this section adjust for the age of each individual.⁴⁷ Mortality rates are presented per 100,000 population.

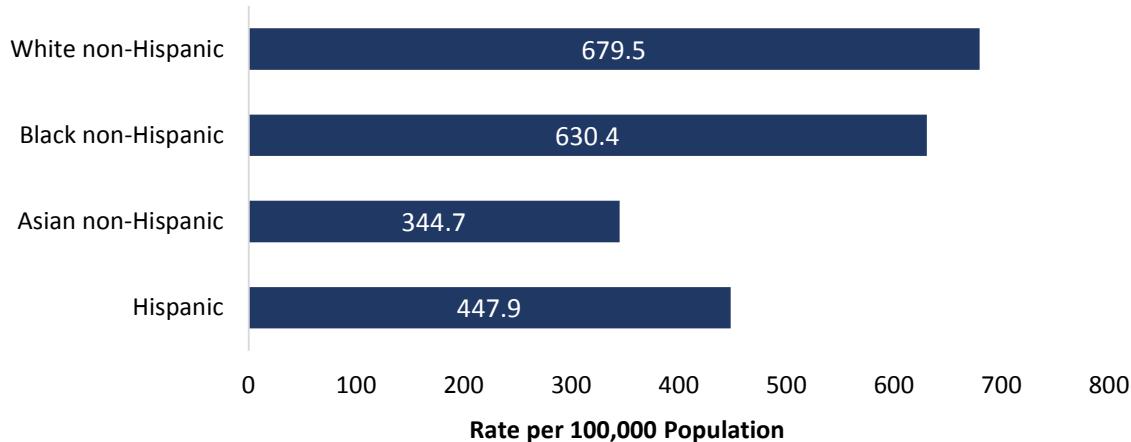
In addition to assessing risk factors, variations in death rates may also reflect differences in socioeconomic status, access to health care resources, geography, and other factors.



As shown in **Figure 1.19**, mortality rates vary by race/ethnicity. Contrary to patterns from previous years, in 2014 the mortality rate for White non-Hispanic residents exceeded that for Black non-Hispanic, Hispanic, and Asian non-Hispanic

residents. From 2013 to 2014, the mortality rate for Black non-Hispanics declined 7.2%. The mortality rate for Asian non-Hispanic residents continues to be the lowest for each of the largest racial/ethnic groups across the Commonwealth.

Figure 1.19
Age-Adjusted Mortality Rate, by Race/Ethnicity, Massachusetts, 2014



NOTE: USING THE 2000 US STANDARD POPULATION

Leading Causes of Death

Leading causes of death are ranked according to the number of deaths rather than the mortality rate.⁴⁸ Consistent with previous years, in 2014 cancer and heart disease were the leading causes of death in Massachusetts (see Figure 1.20).

Figure 1.20
Leading Causes of Death, Massachusetts, 2014

RANK	CAUSE OF DEATH	NUMBER OF DEATHS	% OF TOTAL MORTALITIES
1	Cancer	12,797	23.2%
2	Heart Disease	11,845	21.5%
3	Unintentional Injuries	2,859	5.2%
4	Chronic Lower Respiratory Disease	2,596	4.7%
5	Stroke	2,459	4.5%
6	Alzheimer's Disease	1,685	3.1%
7	Influenza and Pneumonia	1,363	2.5%
8	Nephritis	1,229	2.2%
9	Diabetes	1,214	2.2%
10	Ill-defined conditions, signs, and symptoms	996	1.8%

Leading causes of death also differ by age. In 2014, as with previous years, injuries were the leading cause of death for persons ages one to 44. Among older age groups, chronic diseases such as cancer and heart disease were the leading causes of death.

In 2014, the three leading causes of death were cancer, heart disease, and unintentional injuries including opioid related overdose for all racial/ethnic groups, but some variations occur in other leading causes of death across racial/ethnic groups (see Figure 1.21). For example, while stroke was the fourth leading cause of death for racial/ethnic minorities, chronic lower respiratory disease was the fourth leading cause of death for White non-Hispanics. Diabetes was among the leading causes of death for Black non-Hispanics and Hispanics.

Figure 1.21

Leading Causes of Death, by Race/Ethnicity, Massachusetts, 2014

Rank	White non-Hispanic	Black non-Hispanic	Asian non-Hispanic	Hispanic
1	Cancer	Cancer	Cancer	Cancer
2	Heart disease	Heart disease	Heart disease	Heart disease
3	Unintentional injuries	Unintentional injuries	Unintentional injuries	Unintentional injuries
4	Chronic lower respiratory disease	Stroke	Stroke	Stroke
5	Stroke	Diabetes	Nephritis	Diabetes

Life Expectancy

Life expectancy is a commonly used measure of the health status of a population. This is expressed as the expected number of years of life at a given age.⁴⁹ A person born in Massachusetts in 2014 should expect to live 80.8 years, indicating a 1.5% improvement in life expectancy over the past decade.

Life expectancy is higher for women (83.4 years) than for men (78.3 years). Within each racial/ethnic group, women are expected to live longer than men. For individuals born in 2014, Hispanic women could expect to live 89.6 years, the longest life expectancy across racial/ethnic and sex-specific groups (see Figure 1.22). Black non-Hispanic women (84.3 years), Hispanic men (84.3 years), and White non-Hispanic women (83.0 years) had the next highest life expectancies. Black non-Hispanic men had a life expectancy of (77.5 years) and White non-Hispanic men (78.1 years) had the lowest life expectancies.

Premature Mortality

The premature mortality rate indicates how many individuals die before reaching 75 years of age. The premature mortality rate is highly correlated with morbidity indicators (measures of “sickness” rather than death).⁵⁰ The premature mortality rate reflects the health status of a population, and the need for systematic public health approaches to health promotion and disease prevention.⁵¹

Premature mortality may be related to socioeconomic status and its correlates, such as neighborhood, social and economic environment, and exposure to stressors.^{52,53,54}

In 2014, Black non-Hispanics in Massachusetts had the highest premature mortality rate, experiencing 1.1 times the rate of premature deaths as White non-Hispanics (see Figure 1.23). Asian non-Hispanics had the lowest.

Figure 1.22
Life Expectancy at Birth, by Race/Ethnicity and Sex, Massachusetts, 2014

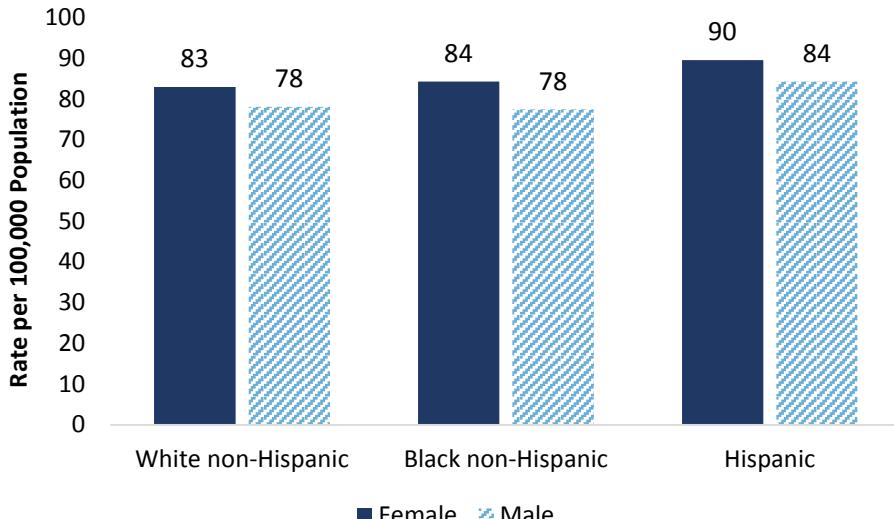
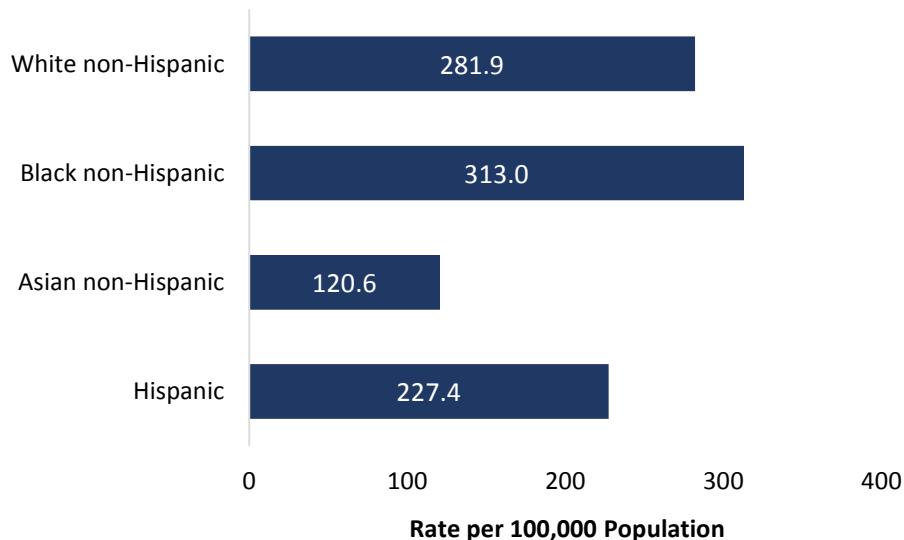


Figure 1.23
Premature Mortality Rate, by Race/Ethnicity, Massachusetts, 2014



Amenable Mortality

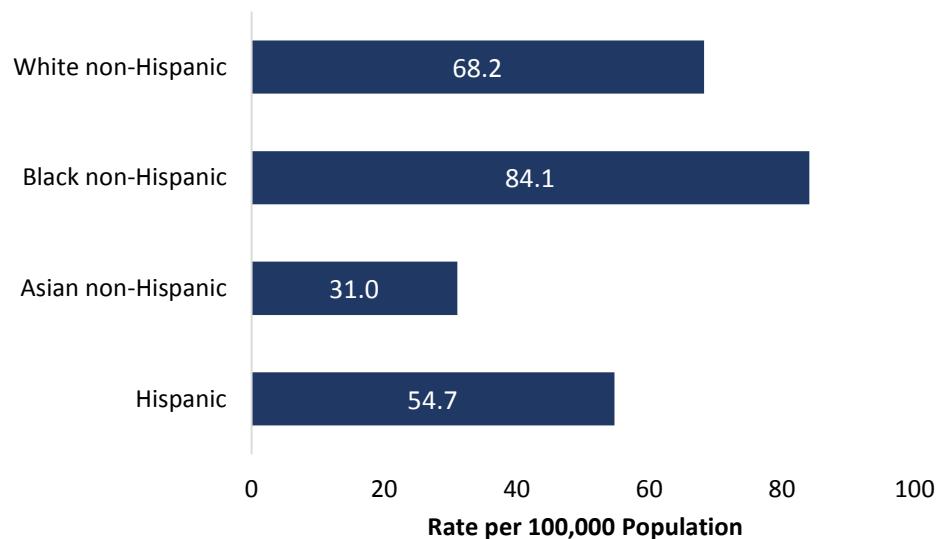
Amenable mortality are deaths that may have been prevented by timely and effective health care. This concept has been implemented by many countries as a tool to track changes over time and assess the performance of health care systems.⁵⁵

The categorization of amenable mortality allows policy-makers, community advocates, and public health professionals to consider more effective and cost-efficient approaches to improving the quality of life and health of the public.

In Massachusetts, Black non-Hispanics had the highest amenable mortality rate, 1.2 times that of White non-Hispanics in 2014 (see Figure 1.24).

Figure 1.24

Age-Adjusted Amenable Mortality Rate, by Race/Ethnicity, Massachusetts, 2014



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- ⁴⁷ Also called age standardization, adjusting for age is a technique used to better allow populations to be compared when the age profiles of the populations are quite different.
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CHAPTER 2

Maternal, Infant, and Child Health





Maternal, Infant, and Child Health

This chapter presents information about trends, disparities and resources related to maternal, infant, and child health in Massachusetts.

This chapter addresses the following topics:

- Infant Health
- Child Health
- Children and Youth with Special Health Care Needs
- Women's Health
- Selected Resources, Services, and Programs

Chapter Data Highlights

- Preterm births are declining, but disparities remain
- The infant mortality rate is the lowest in the nation, but disparities remain
- Among pregnant women enrolled in addiction treatment, opioids are the most common substance used in the past year
- Childhood overweight and obesity are declining, but disparities remain
- Receipt of adequate prenatal care is down for all racial and ethnic groups
- Massachusetts has the lowest teen birth rate in the US, but disparities remain

Overview

Health outcomes for women, infants, and children in Massachusetts are some of the best in the nation; however, some racial, ethnic, and socioeconomic disparities persist.

Massachusetts devotes substantial resources to protecting and improving the health of these populations, offering nearly 50 programs and services targeted at pregnant women, infants, and children.

Infant Health

Infant mortality is the best indicator of the health and well-being of a community or state, because the same biological, social, economic, and environmental risk factors that contribute to infant health also affect the health of the broader population.

MDPH tracks and responds to trends and disparities in infant health with a multi-faceted approach that includes preventive services, screening programs, and intervention strategies.

Preterm Birth

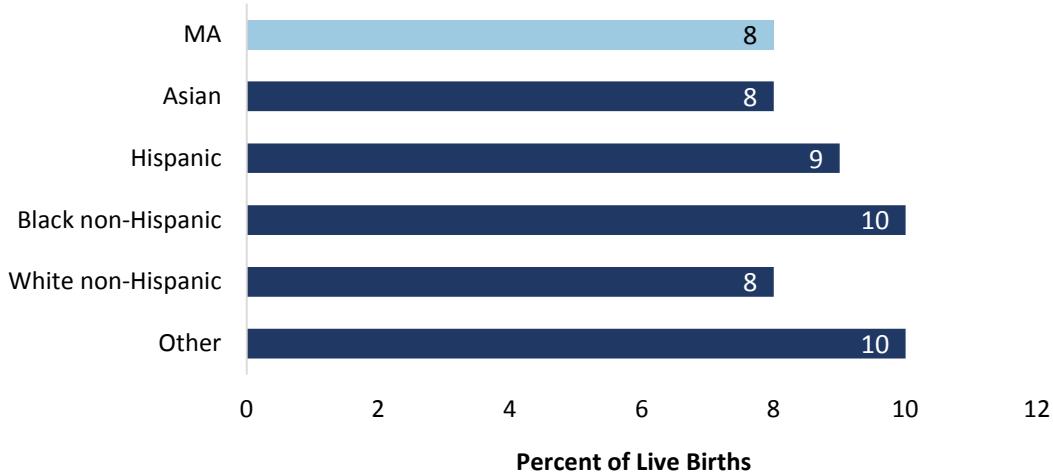
Preterm birth refers to the birth of an infant that occurs before the 37th week of gestation. Preterm birth is a major contributor to infant mortality; two-thirds of all infant deaths occur among infants born preterm.⁵⁶ Preterm birth is also a major cause of infant morbidity and long-term neuro-developmental and behavioral disabilities, particularly if the birth occurs before 34 weeks of gestation.⁵⁷ Additionally, infants who are born preterm are more likely to be re-hospitalized in the first year of life.⁵⁸

Women of lower socioeconomic status, those who receive poor care during pregnancy, and those of younger or older ages are at increased risk of preterm birth. Other risk factors for preterm birth include elevated stress in the second trimester; behavioral risk factors such as smoking, drug use, or alcohol consumption; heavy physical labor; malnutrition; obstetric history including a previous preterm birth and multiple births; and pregnancy complications in the current pregnancy.^{59, 60, 61, 62}

Trends/Disparities

From 2006 to 2015, the proportion of preterm births in Massachusetts before 34 weeks declined by 0.6%. Late preterm births (between 34-36 weeks of gestation) comprised 72% of all preterm births. In 2015, preterm birth was highest among Black non-Hispanics, followed by Hispanics, Asian non-Hispanics, and White non-Hispanics (**Figure 2.1**).

Figure 2.1
Percent of Live Births That Were Preterm Births, By Race/Ethnicity, 2015



NOTE: OTHER INCLUDES AMERICAN INDIAN AND OTHER NOT SPECIFIED

Breastfeeding

Breastfeeding has proven benefits for both mothers and infants. Breastfeeding lowers the incidence of sudden infant death syndrome (SIDS); infant respiratory infections; and necrotizing enterocolitis, a serious intestinal disease among infants.⁶³ Exclusive and extended breastfeeding is also associated with reduced risk of obesity, certain cancers, and diabetes.⁶⁴

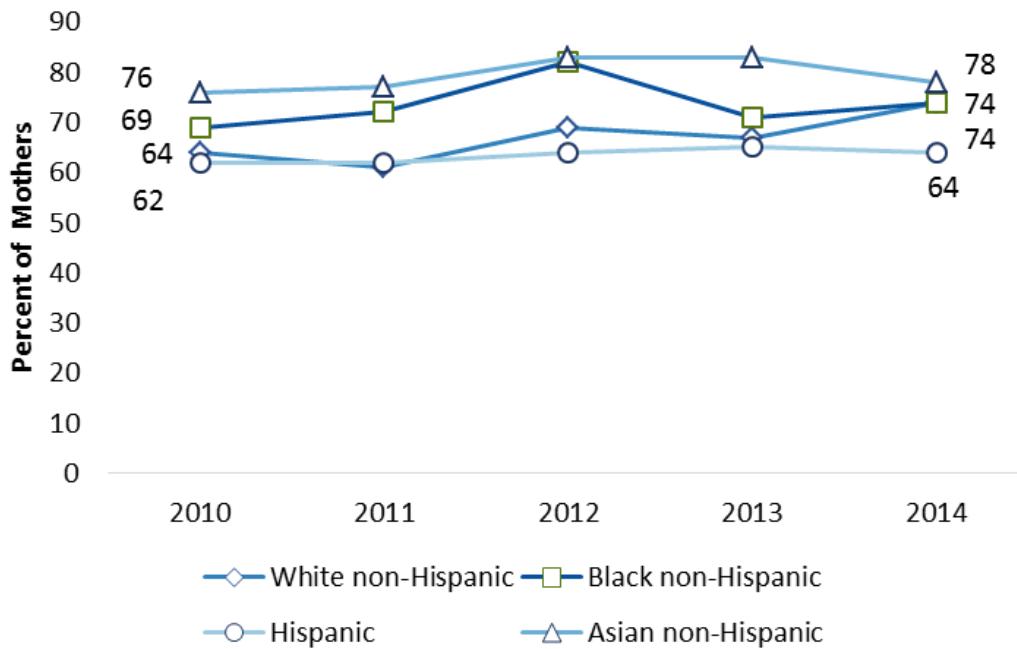
Many low-income mothers, including many who receive support from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), need to return to work earlier than higher income women. This makes it difficult for them to continue breastfeeding.

Trends/Disparities

According to Massachusetts birth certificate records, breastfeeding at the time of hospital discharge increased from 83% in 2011 to 87% in 2015. In 2015, Asian non-Hispanic women (92%) had the highest prevalence of breastfeeding initiation, followed by Black non-Hispanic (88%), Hispanic (87%), and White non-Hispanic women (86%).

Breastfeeding at eight weeks postpartum, as measured on the Massachusetts Pregnancy Risk Assessment Monitoring System (PRAMS) survey, increased from 65% in 2010 to 73% in 2014. Over this period, Asian non-Hispanic women maintained the highest prevalence of any breastfeeding at eight weeks postpartum (**Figure 2.2**).

Figure 2.2
Any Breastfeeding at Eight Weeks Postpartum, By Race/Ethnicity, 2010-2014



There also are important socioeconomic disparities in breastfeeding. According to Massachusetts PRAMS survey estimates, in 2014 only 59% of mothers with MassHealth were breastfeeding at eight weeks postpartum, compared with 81% of mothers with private health insurance.

Additionally, data from the 2016 National Immunization Survey indicate that only 28% of WIC participants in Massachusetts were breastfeeding at six months postpartum, compared to 68% of Massachusetts mothers overall, falling short of the Healthy People 2020 goal of 60.6%.

Infant Mortality

Infant mortality refers to the death of an infant prior to one year of age. The infant mortality rate (IMR) is calculated as the number of infant deaths per 1,000 live births.

The decline in the US infant mortality rate during the 20th century is one of the country's greatest public health victories. However, currently 25 other developed nations have a lower IMR than the US.^{65,66}

Trends/Disparities

While Massachusetts has achieved a 2.6% annual decline in the IMR from 2005 to 2014 and currently has the lowest IMR in the nation, racial/ethnic disparities persist. In 2014, the IMRs for Black non-Hispanics and Hispanics were 2.1 and 1.5 times that of White non-Hispanic infants, respectively (**Figure 2.3**).

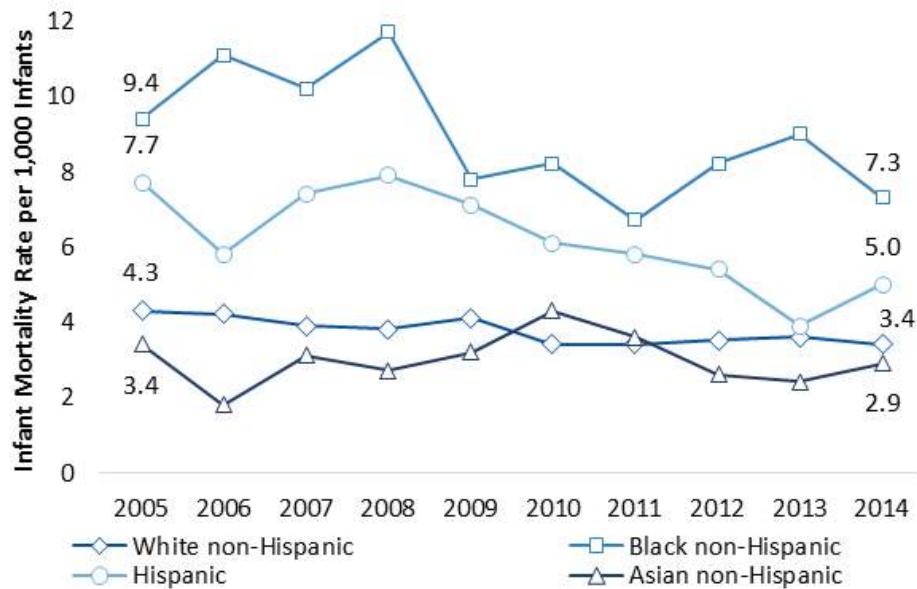
IMRs also vary by city or town. In 2014, the communities of Fitchburg (9.9 per 1,000 live births), Chelsea (8.5 per 1,000), and Worcester (7.4 per 1,000) had some of the highest IMRs in the state.

Disparities in infant mortality result from differential developmental pathways shaped by early life experiences and cumulative wear and tear on the body as an individual is exposed to repeated or chronic stress over time.

To reduce disparities in birth outcomes and infant mortality, MDPH is addressing differential exposures to risk factors not only during pregnancy but over the life course.

Figure 2.3

Infant Mortality Rate by Race/Ethnicity, Massachusetts, 2005-2014



Perinatal Substance Exposure

Substance use disorder can negatively affect maternal and child health and place substantial burden on federal and state health and human service systems. Risks to children prenatally exposed to substances and/or exposed to parental addiction in the home can include adverse developmental, behavioral, and psychosocial outcomes.⁶⁷

Women who use substances may experience health risks from these substances and accompanying behaviors. They may also experience stress while interacting with health care providers, child welfare agencies and the criminal justice system.⁶⁸

Trends/Disparities

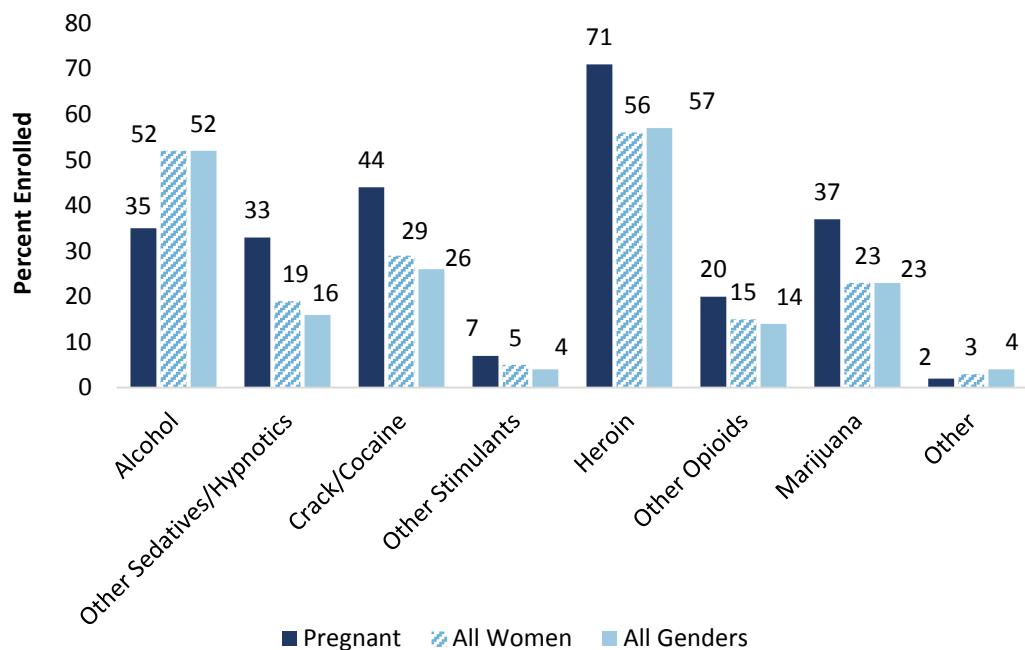
Substance use disorders affect pregnant women across Massachusetts, but the burden varies by region. For example, Charlton Memorial Hospital in Fall River, St. Luke's Hospital in New Bedford, Cape Cod Hospital in Hyannis, Melrose-Wakefield Hospital in Melrose, and Berkshire Medical Center in Pittsfield have the highest rates of infants diagnosed with neonatal abstinence syndrome, a collection of symptoms related to substance exposure in the womb that can include low birth weight, respiratory distress, feeding difficulty, tremors, increased irritability, diarrhea, and seizures.⁶⁹

Across the Commonwealth, mothers with opioid use disorder are more likely to be younger than 30 years of age, White non-Hispanic, US-born, unmarried, unemployed, of low educational attainment, receiving prenatal care at a hospital clinic, and covered by MassHealth.⁷⁰

In 2016, among pregnant women enrolled in the Bureau of Substance Addiction Services (BSAS) treatment system, opioids, including pain relieving medications and heroin, were the most common substance used in the past year. Seventy-one percent of pregnant women reported use of heroin and 20% reported use of other opioids (**Figure 2.4**). Crack/cocaine use was reported by 44%, marijuana use by 37% and alcohol use by 35% of pregnant women.

Figure 2.4

Bureau of Substance Addiction Services Enrollees Reporting Past Year Use, by Substance, 2016



NOTE: BSAS TREATMENT DATA DO NOT INCLUDE WOMEN WHO BECOME PREGNANT WHILE IN TREATMENT AND DO NOT REFLECT ALL TREATMENT PROGRAMS IN THE STATE.

Sudden Unexpected Infant Death

MDPH classifies sudden unexpected infant death (SUID) as the death of an infant less than one year of age due to sudden infant death syndrome (SIDS), accidental suffocation and strangulation in bed, or from an undetermined cause and manner.

Unsafe infant sleep practices, including placing infants to sleep on their stomachs or sides or in places other than cribs/bassinet/play yards -- such as adult beds, baby slings, car seats, couches or armchairs -- are known modifiable risk factors for SUID.⁷¹ Preterm birth is also a risk factor⁷² along with prenatal and secondhand smoke exposure,⁷³ low access to prenatal care,⁷⁴ prenatal substance use,⁷⁵ soft bedding,⁷⁶ parental alcohol use,⁷⁷ and overheating.⁷⁸ In addition to supine sleep position, firm sleep surface, and separate sleep space, known protective factors for SUID include breastfeeding,⁷⁹ pacifier use,⁸⁰ and parental exposure to educational interventions.⁸¹

Trends/Disparities

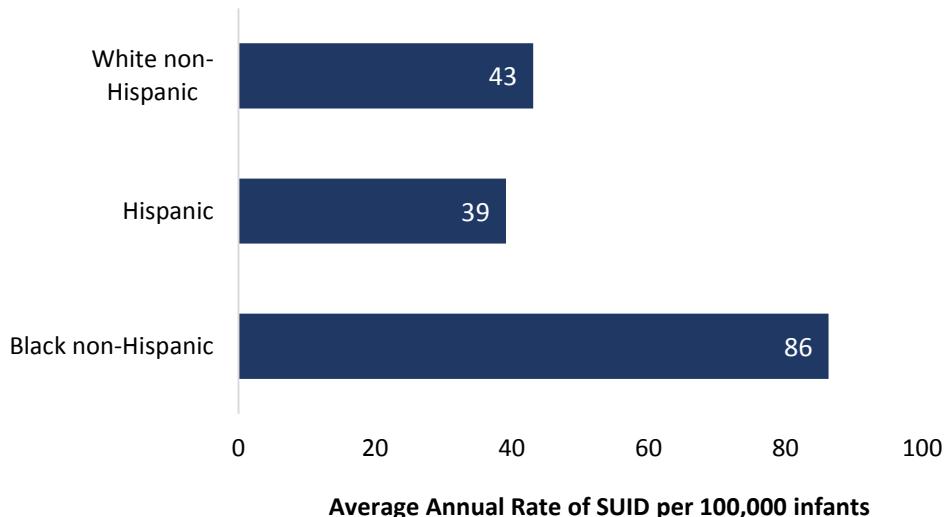
SUID rates decreased in Massachusetts during the 10-year period from 2005 to 2014. The three-year average annual SUID rate in Massachusetts declined 24.2%, from 54.2 per 100,000 infants in 2005-2007 to 41.1 per 100,000 infants in 2012-2014.

Yet despite this overall reduction in SUID, racial and ethnic disparities persist. The five-year average annual SUID rate (2010-2014) among Black non-Hispanic infants was two times the rate of White non-Hispanic infants (**see Figure 2.5**).

According to data from MA PRAMS, while the prevalence of supine (back) sleep positioning has increased from 77% in 2010 to 85% in 2014, disparities persist as well. For example, in 2014, fewer WIC participants (76%) placed their infant on his/her back to sleep compared with non-WIC participants (90%). Further, Black non-Hispanic (70%) and Hispanic (74%) infants had a lower prevalence of supine sleep position than White non-Hispanic infants (91%).

Figure 2.5

Average Annual Rate of Sudden Unexpected Infant Death (SUID), by Race/Ethnicity, 2010-2014



Child Health

A child's physical, social, and emotional health has important implications for health later in life.⁸² As children develop, they have unique health care needs and may require specialized services and interventions. Protecting and promoting the health of children and adolescents is a key mission of MDPH as the Commonwealth's Title V Maternal and Child Health Block Grant Agency.

Nutrition

Healthy eating in childhood and adolescence is important for proper growth and development and the prevention of various health conditions including cancers and heart disease.^{83,84} Additionally, poor diet can increase the risk of obesity.⁸⁵ Childhood obesity has important implications for the physical and emotional well-being of children and youth. Children who are obese are more likely to develop risk factors for chronic disease early in life, such as high blood sugar, high triglycerides, and high blood pressure. Children who are obese are also more likely to develop chronic diseases,

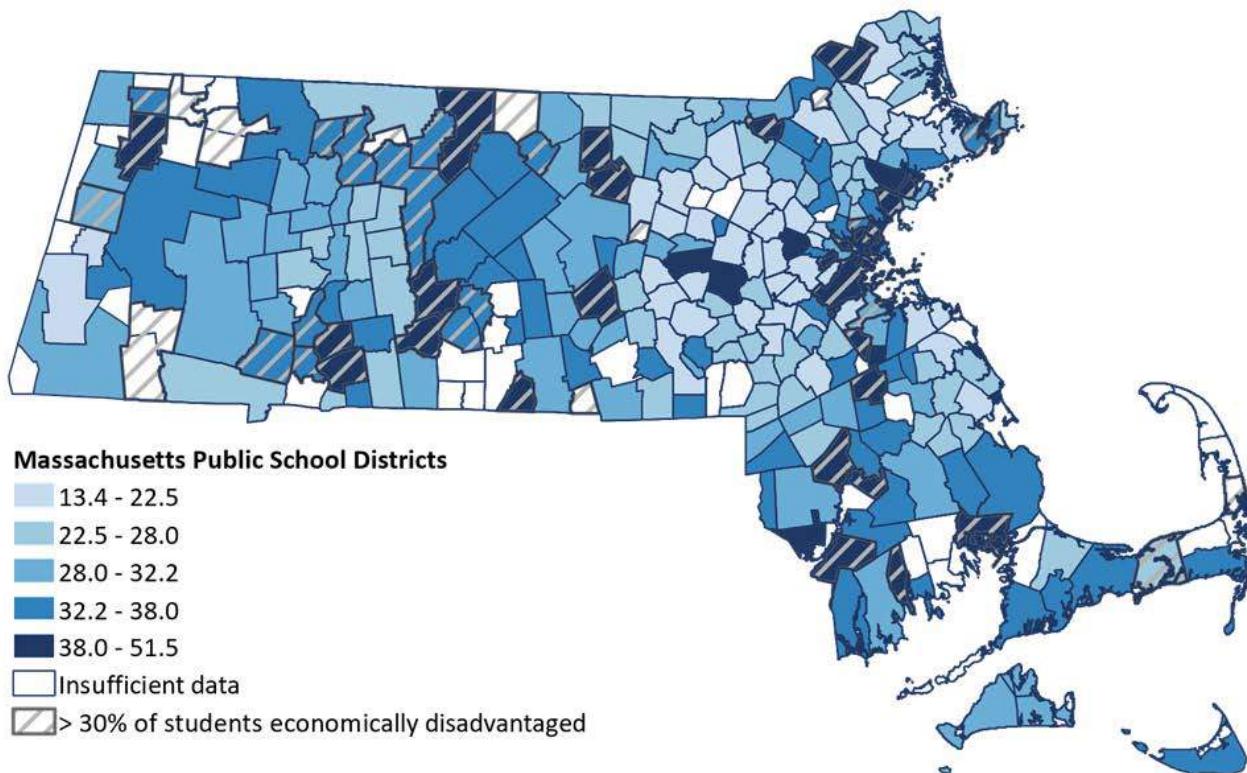
such as type 2 diabetes, before becoming adults. In addition, children who are obese are more likely to experience bullying and weight-based discrimination.⁸⁶

Trends/Disparities

Body mass index (BMI) screening data in Massachusetts indicate that the prevalence of overweight and obesity declined across the Commonwealth, from 34% in 2009 to 32% in 2015. While school districts with higher median household incomes (>\$37,000) experienced significant reductions in the prevalence of overweight and obesity during this period, data from 2014-2015 show that districts with lower median household incomes have disproportionately higher prevalence of overweight and obesity (see Figure 2.6).

Figure 2.6

Prevalence of Overweight and Obesity among Public School Children, Massachusetts Public School Districts, School Year 2014-2015



Social/Emotional Health

Emotional well-being is shaped by a variety of factors, including biological factors, life experiences, family and community supports, education, and environmental factors. Social connections are an important source of support for children and adolescents that can buffer the effects of stress, connect children with resources, and shape health behaviors.⁸⁷ Early detection and intervention to address social and emotional risk factors can greatly improve outcomes

for children and adolescents. Promoting emotional wellness and social connectedness across the life course is a Title V priority for MDPH, including during early childhood and adolescence.

Trends/Disparities

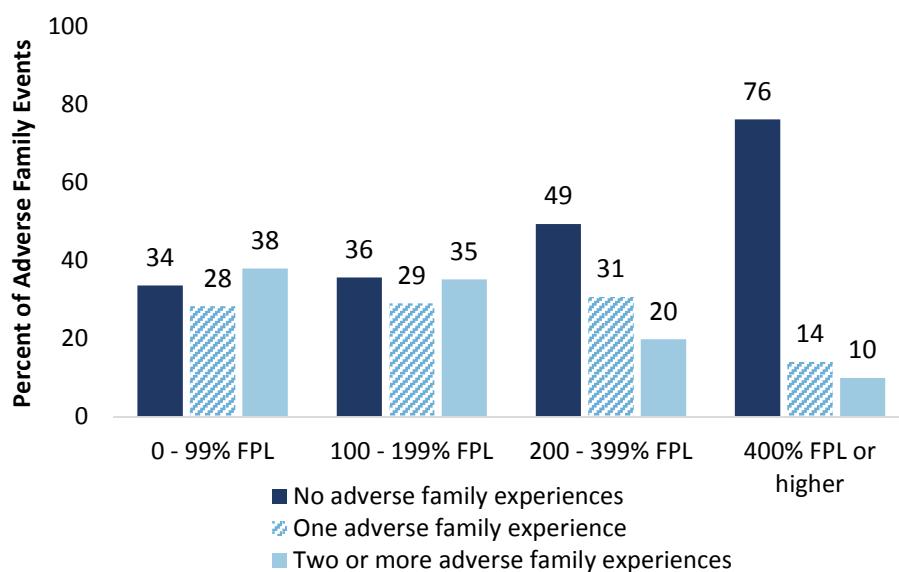
Massachusetts data show an increase in the proportion of high school students who reported feeling sad or hopeless, from 22% in 2013 to 27% in 2015.⁸⁸

Among Massachusetts high school students, in 2015 racial, ethnic, and sexual minority students were less likely to report supportive relationships with adults in their family or at school. During the same time period, 65% of high school students who identified as gay, lesbian, or bisexual reported having a parent or adult with whom they could talk about important matters compared with 84% of students who identified as heterosexual.⁸⁹

Children from households with incomes below the federal poverty level were 1.9 and 3.8 times as likely to experience two or more adverse family experiences as children in households with incomes 200-399% of the federal poverty level and those with household incomes $\geq 400\%$ of the federal poverty level, respectively (**Figure 2.7**).

Figure 2.7

Prevalence of Adverse Family Experiences among Children 17 Years and Younger, by Federal Poverty Level, 2011-2012



SOURCE: NATIONAL SURVEY OF CHILDREN'S HEALTH

Immunizations

Immunizations are the cornerstone of communicable disease prevention and have led to the elimination of many diseases in the US. Immunizing children against diseases such as whooping cough, measles, mumps, and chickenpox before they enter kindergarten remains critical. Human papillomavirus (HPV) vaccination for all pre-teens (11-12 years old) is also an important primary prevention strategy against a variety of cancers, particularly cervical cancer. Increasing skepticism about vaccines in certain communities in the US has led to a resurgence of domestic outbreaks of diseases like measles. Social norms surrounding vaccination are important for encouraging parents to vaccinate their children.

Trends/Disparities

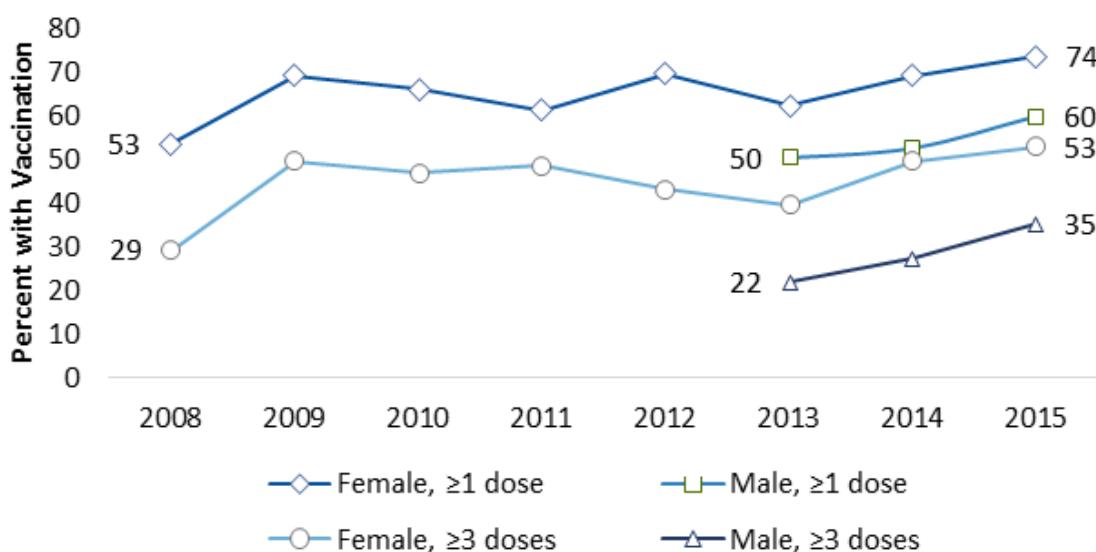
Since 2011, the proportion of children in Massachusetts meeting vaccination requirements before entering kindergarten has increased. In 2015-2016, Massachusetts met or surpassed the Healthy People 2020 goal of 95% coverage for MMR, DTP/DTaP/DT, varicella, hepatitis B, and polio vaccines.

From 2008 to 2015, HPV vaccination coverage increased among female Massachusetts teenagers 13-17 years old from 53% to 74% receiving at least one dose and from 29% to 53% for those receiving three doses (**Figure 2.8**). As of December 2016, Centers for Disease Control and Prevention (CDC) recommends two doses of HPV vaccine for 11-12 year-olds who initiate the series between 9 and 14 years of age – rather than the previously recommended three doses.⁹⁰

Male teens have lower HPV vaccination rates compared to female teens. Between 2013 and 2015, HPV vaccination coverage increased among male Massachusetts teenagers 13-17 years old from 50% to 60% receiving at least one dose (**Figure 2.8**).

Figure 2.8

Human Papillomavirus Vaccination Coverage among Massachusetts Teenagers Aged 13 to 17 Years, by Gender, 2008-2015



SOURCE: NATIONAL IMMUNIZATION SURVEY – TEEN

NOTE: THE HPV VACCINE WAS NOT RECOMMENDED FOR MALES UNTIL 2011 AND COVERAGE ESTIMATES PRIOR TO 2013 ARE NOT AVAILABLE FOR MALES. USE OF A 2-DOSE SCHEDULE FOR 11-12 YEAR-OLDS WHO INITIATE THE SERIES BETWEEN 9-14 YEARS OF AGE WAS RECOMMENDED IN DECEMBER 2016, REPLACING THE PREVIOUS 3-DOSE RECOMMENDATION.

Immunizing teenagers against meningococcal disease helps prevent outbreaks in schools, dormitories, and other densely populated settings. Meningococcal vaccine coverage among Massachusetts teenagers (13-17 years old) has increased from 56% in 2008 to 90% in 2015.⁹¹

Children and Youth with Special Health Care Needs

Children and youth with special health care needs (CYSHCN) include those who have or are at increased risk for a chronic physical, developmental, behavioral or emotional condition and who also require health-related and other services beyond that required by children generally.⁹²

In 2009-2010, the National Survey of Children with Special Health Care Needs (NS-CSHCN) indicated that approximately 18% of Massachusetts children from birth to 17 years have a special health care need. Among them, 48% had two or more of 18 listed chronic health conditions and 3% had complex conditions that led to 11 or more missed school days and required at least two medications daily.⁹³

In the NS-CSHCN, 28% of parents reported reducing work hours or stopping work altogether to care for their children and youth with special health care needs. Further, one in three (34%) families with health insurance had coverage that was not sufficient to meet their children's needs and one in four (25%) families had incomes below 200% of the federal poverty level.

Family engagement -- the intentional practice of working with families toward positive outcomes across the life course -- is increasingly recognized as a key strategy to improve systems of care, health care quality, and safety for CYSHCN. Strategic family engagement is at the core of the vision, mission, and activities of the MDPH Division for Children and Youth with Special Health Care Needs.

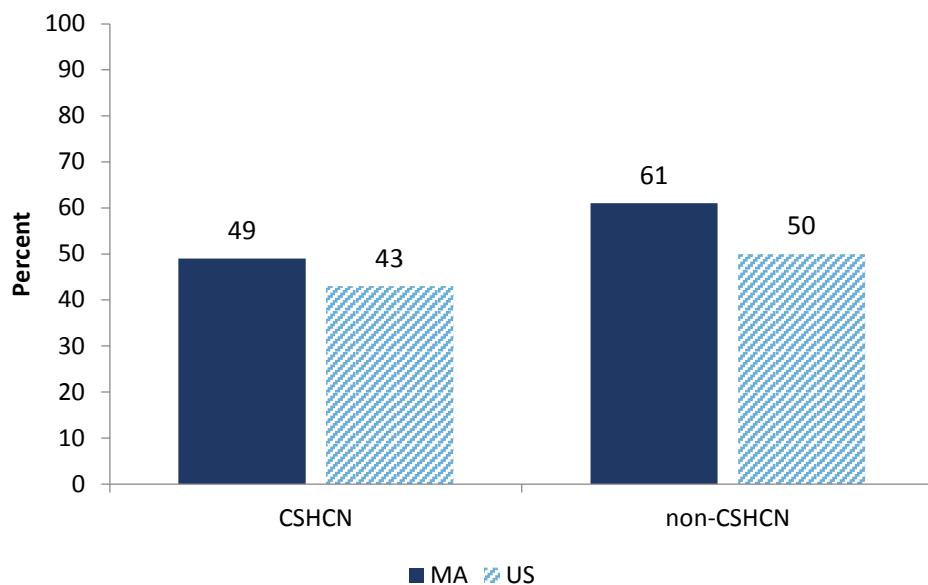
Care within a Medical Home

The medical home is a model of delivering primary care that is accessible, continuous, comprehensive, family-centered, coordinated, compassionate, and culturally sensitive to every child and adolescent.⁹⁴ To meet medical home criteria, CYSHCN from birth to age 17 should have a personal doctor or nurse, a usual source of care, and family-centered care, referrals, and care coordination if needed. Access to a pediatric medical home is associated with increased quality of care, improved health outcomes, and decreased unmet medical needs.⁹⁵ Medical homes for CYSHCN have a positive impact on reducing health care costs through decreased utilization of unnecessary services, such as visits to the emergency department and inpatient hospitalizations.

Trends/Disparities

The National Survey of Children's Health (NSCH) has provided population-based estimates of the proportion of children connected to a medical home since 2003 from three administrations: 2003, 2007, and 2011/12. The newly-revised 2016 NSCH results are similar to medical home estimates from previous years, indicating that only about half (49%) of Massachusetts CYSHCN receive care in a medical home, lower than their counterparts without special health needs (61%) (**Figure 2.9**).

Figure 2.9
Percentage of Massachusetts Children Receiving Care in a Medical Home, By Special Health Care Need Status, 2016



SOURCE: NATIONAL SURVEY OF CHILDREN'S HEALTH

Future NSCH data for Massachusetts CYSHCN will enable monitoring of statewide estimates of medical home connection according to insurance coverage, income level, and race/ethnicity, using 2016 data as the new baseline.

Support for Effective Care Transition

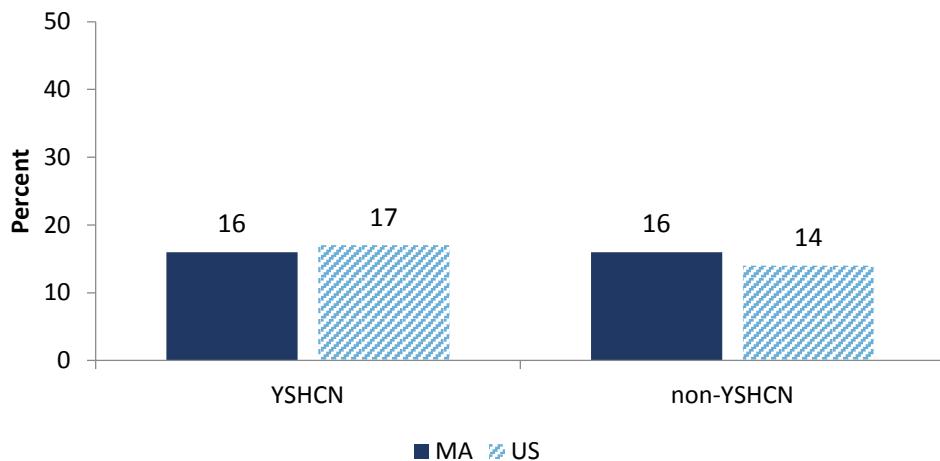
The transition of youth between 12 to 17 years of age with special health care needs (YSHCN) to adulthood has become a priority nationwide.⁹⁶ More than 90% of YSHCN now live to adulthood but are less likely than non-YSHCN to complete high school, attend college, or be employed. Health and health care are cited as two of the major barriers to successful transitions.

Trends/Disparities

The NSCH defines the components of a successful transition as whether the health care provider actively worked with the youth to think about and plan for the future, make positive choices about the future, gain skills to manage health and health care, and understand the changes in health care that happen at age 18. According to 2016 NSCH data, only 16% of Massachusetts YSHCN received the services necessary to transition to adult health care compared to only 17% of US YSHCN (Figure 2.10).

Figure 2.10

Percentage of Massachusetts Children who Received Services Necessary to Make Transitions to Adult Health Care, By Special Health Care Need Status, 2016



SOURCE: NATIONAL SURVEY OF CHILDREN'S HEALTH

As mentioned above for the medical home estimate, future administrations of the NSCH will enable monitoring of statewide estimates of health care transition with 2016 data serving as the new baseline.

Women's Health

Poor maternal health is associated with adverse child health outcomes with implications for neonatal survival, birth weight, cognitive development, child behavior, school performance, and adult health and productivity.^{97,98,99,100,101,102} It is important to provide opportunities for deliberate family planning and to promote the health of mothers before, during, and after childbirth. Reducing preventable maternal morbidity and mortality can improve health outcomes for mothers and infants and is critical to the promotion of health across the lifespan.¹⁰³

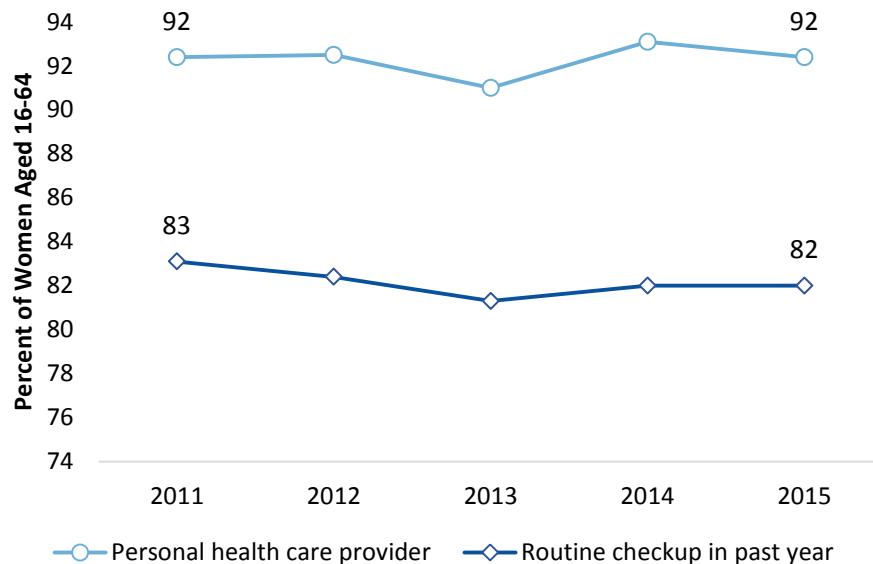
Access to Routine Preventive Care and Personal Health Care Provider

Increasing access to preventive health care remains a longstanding public health goal.^{104,105} Women's preventive health care services provide an opportunity to screen for high blood pressure; high cholesterol; breast, cervical, and colorectal cancers; depression; gonorrhea and chlamydia; diabetes; HIV and human papilloma virus; substance use and misuse; obesity; and intimate partner violence.¹⁰⁶

Trends/Disparities

From 2011 to 2015, the proportion of women reporting a personal health care provider and a routine check-up in the past year remained stable (**Figure 2.11**). In 2015, 82% of women had a routine check-up in the past year and 92% had a personal health care provider. Hispanic women were significantly less likely than White non-Hispanic women to have a personal health care provider, even after adjusting for age (87% vs. 93%). Black non-Hispanic women were the most likely to receive a routine check-up in the past year, significantly more likely than White non-Hispanic women when adjusting for age (87% vs. 80%).

Figure 2.11
**Women's Access to a Personal Health Care Provider and Routine Check-Up Visit by Year,
Massachusetts, 2011-2015**



Prenatal Care

Prenatal care is one of the most frequently used preventive health care services in the US.¹⁰⁷ Prenatal care is important for preventing maternal mortality and morbidity as well as infant mortality by allowing for detection and management of potential complications. Prenatal care also provides a setting for health education and behavioral interventions.

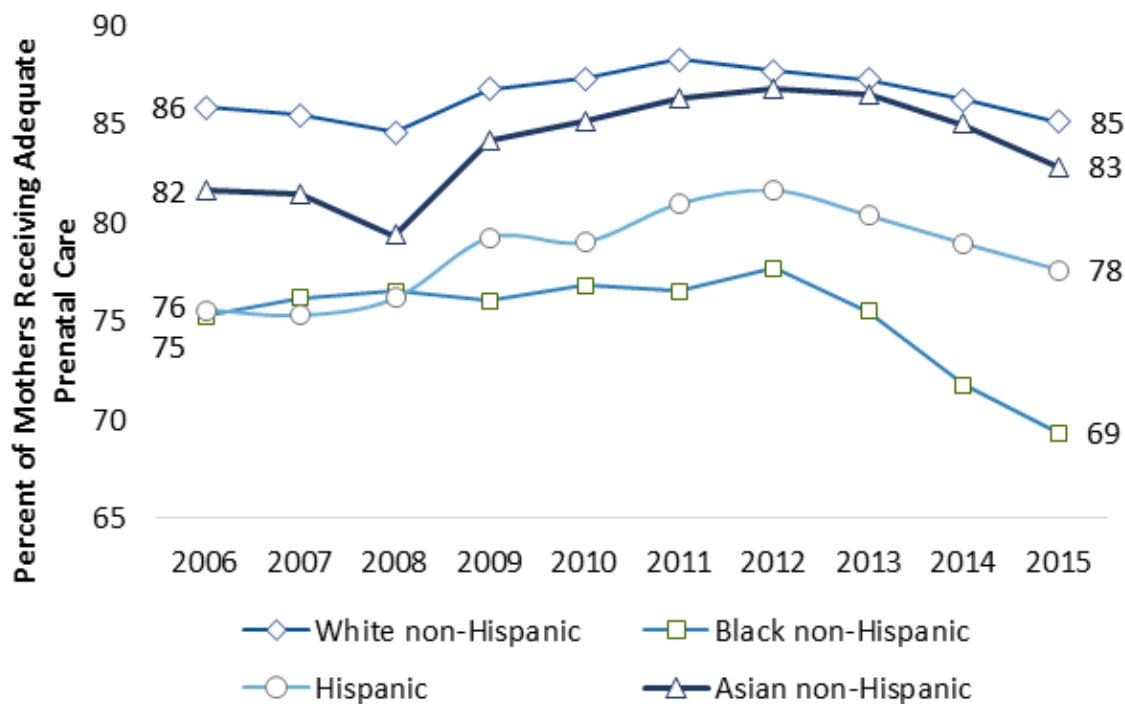
Trends/Disparities

MDPH measures the adequacy of prenatal care utilization by considering gestational age, number of prenatal health care visits completed, and timing of entry into prenatal care.

The proportion of Massachusetts mothers receiving adequate prenatal care has long exceeded the national Healthy People 2020 goal of 78% (**Figure 2.12**). While the prevalence of adequate prenatal care improved from 2006 to 2012, it has declined from 2012 to 2014.

Figure 2.12

Trends in Adequacy of Prenatal Care, by Race/Ethnicity, Massachusetts, 2006-2015



Persistent disparities remain in the percentage of mothers receiving adequate prenatal care by race/ethnicity. While the percentage declined during 2012-2014 in all racial and ethnic groups, the largest decline occurred among Black non-Hispanic mothers. The underlying causes are complex and multifactorial.

Initiation of prenatal care services during the first trimester has declined over the last decade in Massachusetts. Findings from the 2011 PRAMS survey indicate that about 10% of mothers reported not receiving prenatal care as early as they had wanted. Among those who did not receive prenatal care as early as wanted and entered prenatal care after the first trimester of pregnancy, the top four reasons included: not knowing about the pregnancy (24%); not having a MassHealth card (14%); lack of money or insurance (14%); and lack of transportation, childcare, or inability to take time off from work or school (13%).

Pregnancy Intention

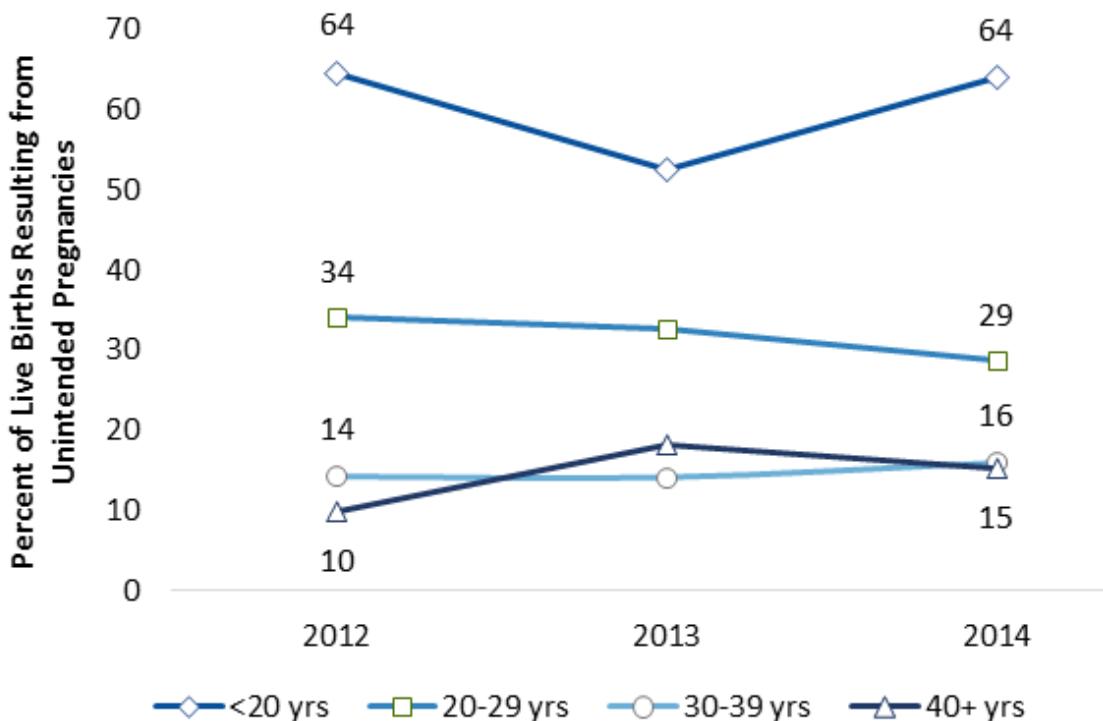
Women's control over their own fertility, through access to contraception and family planning, is crucial for advancing their opportunities for higher education and employment.¹⁰⁸ Unintended pregnancy is associated with inadequate prenatal care, substance use during pregnancy, and low birth weight.^{109,110,111,112}

Trends/Disparities

Massachusetts Behavioral Risk Factor Surveillance System (BRFSS) data indicate that during 2012-2014, 21% of women 18 to 44 years of age had an unintended pregnancy. Trends in unintended pregnancy have remained relatively stable over this period. Among women who had a live birth from 2012 to 2014, women less than 20 years of age had a higher prevalence of unintended pregnancy than older women (Figure 2.13).

Figure 2.13

Trends in Unintended Pregnancies Resulting in a Live Birth by Maternal Age, Massachusetts, 2012-2014



Additionally, in 2014 women with MassHealth coverage (32%) were twice as likely as women with private health insurance (16%) to have an unintended pregnancy that resulted in a live birth. In 2014, Black non-Hispanic and Hispanic women were 2.3 and 1.7 times as likely as White non-Hispanic women to have an unintended pregnancy resulting in a live birth, respectively.

Teen Pregnancy

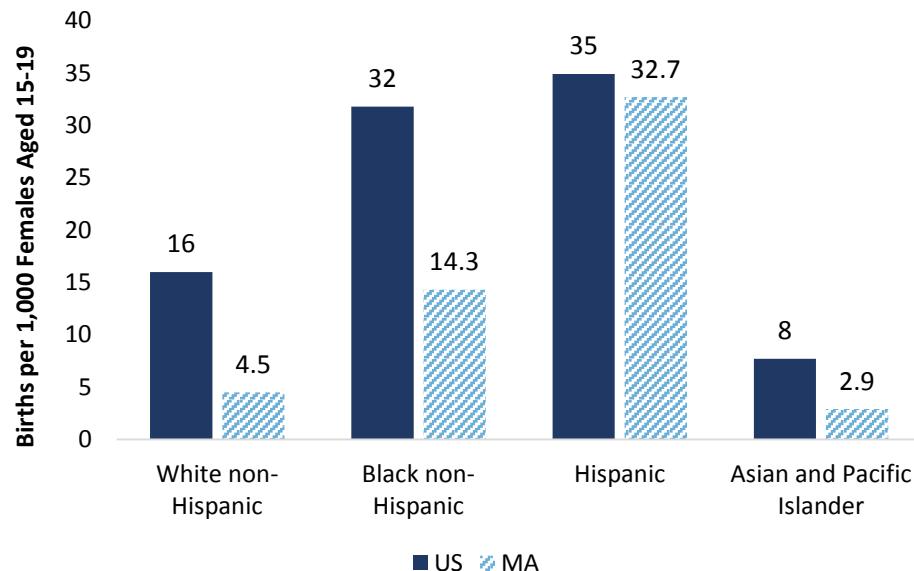
Adolescent childbearing is associated with lower educational attainment for teen mothers and fathers.^{113,114} Children of teen parents are also more likely to experience a range of adverse health outcomes, including low birth weight, infant mortality, and barriers to educational attainment and employment.¹¹⁵ With appropriate support and access to services, teen parents can complete their education, successfully achieve employment, and provide for their children.¹¹⁶

Trends/Disparities

Teen birth rates have been declining across the US and in Massachusetts. While teen birth rates have been declining in all racial/ethnic groups, in 2015 Hispanic teens 15-19 years of age were still seven times as likely to give birth as White non-Hispanic teens (Figure 2.14).

In 2015, lesbian, gay, and bisexual high school students were three times as likely to report ever having been pregnant or gotten someone pregnant, compared to heterosexual students.¹¹⁷ In 2015, the communities of Holyoke, Southbridge, Chelsea, Lawrence, Lynn, New Bedford, Springfield, Fall River, Fitchburg, West Springfield, and Brockton had teen birth rates that exceeded the state average.

Figure 2.14
Teen Birth Rates, by Race/Ethnicity, US and Massachusetts, 2015



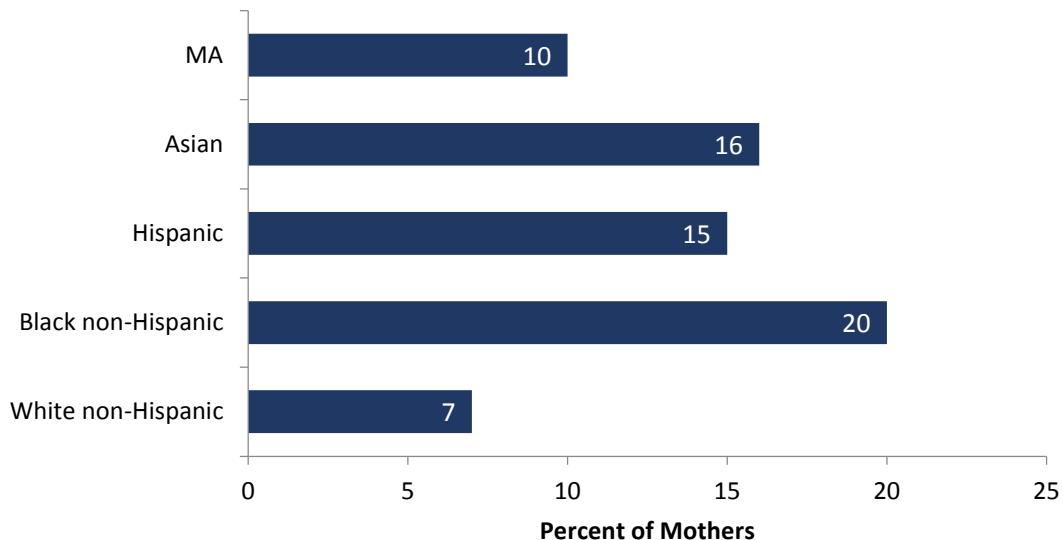
Postpartum Depression

Postpartum depression is a mood disorder that can affect women after childbirth. Mothers with postpartum depression experience feelings of extreme sadness, anxiety, and exhaustion that may make it difficult for them to complete their daily activities.¹¹⁸ Postpartum depression can be a serious and debilitating condition for new mothers, affecting both maternal and infant health, and potentially interfering with infant development and mother-child bonding.^{119,120} Screening for and early detection of depression are important to ensure women receive timely and appropriate treatment.

Trends/Disparities

Data from Massachusetts PRAMS indicate that the percentage of new mothers reporting depressive symptoms in the postpartum period decreased from 12% in 2012 to 10% in 2014. However, racial and ethnic disparities in the prevalence of postpartum depressive symptoms exist. Mothers who are non-Hispanic black (20%), Asian (16%) or Hispanic (15%) had higher prevalence of postpartum depressive symptomology than non-Hispanic white mothers (7%) (Figure 2.15). Women with household incomes at 100% of the federal poverty level or lower were twice as likely to report postpartum depressive symptoms (16%) as women with incomes above 100% of the federal poverty level (8%).

Figure 2.15
Postpartum Depression Symptoms, by Race/Ethnicity, Massachusetts, 2014



Severe Maternal Morbidity

Severe maternal morbidity (SMM) includes unexpected outcomes of labor and delivery that result in significant short or long-term consequences to a woman's health. While maternal deaths are extremely rare in Massachusetts, SMM events are more common and, similar to the national trend, the rate of SMM is on the rise. Studying SMM events is crucial for identifying close calls and improving obstetric care.

Several co-morbidities including obesity, diabetes, and heart disease are associated with increased risk for delivery complications.¹²¹ These chronic conditions are intimately linked with the built environment and social and economic factors.

Trends/Disparities

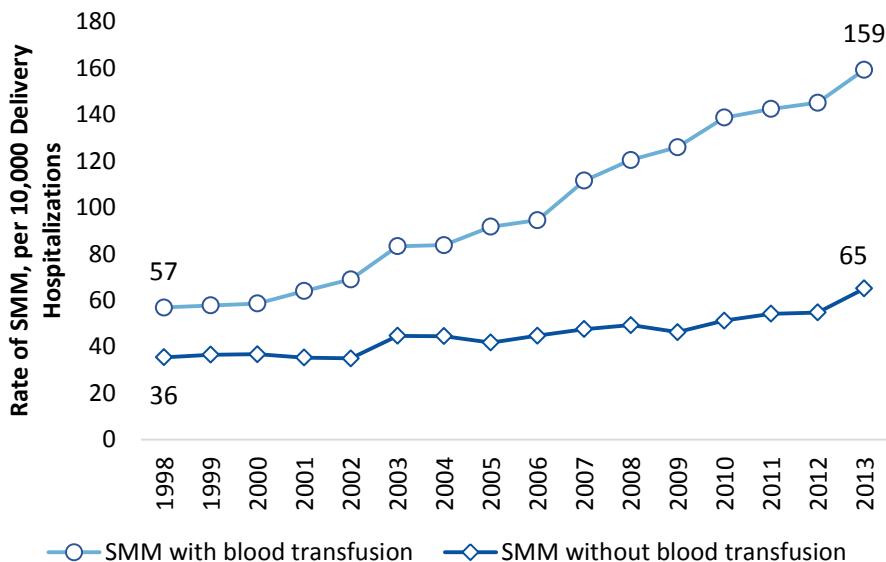
Massachusetts monitors SMM using hospital discharge data to identify 25 indicators associated with life-threatening events or life-saving procedures. Women who received blood transfusions account for the greatest percentage of women with SMM. Because the procedure code for blood transfusion does not include information on the number of units transfused, it is difficult to judge the severity of hospitalizations with only that indication. Therefore rates of SMM are typically examined both with and without transfusion codes to better assess trends over time.

The rate of SMM including blood transfusion increased 179%, from 57 per 10,000 delivery hospitalizations in 1998 to 159 per 10,000 delivery hospitalizations in 2013 (**Figure 2.16**).

The rate of SMM not including blood transfusion increased 81%, from 36 per 10,000 delivery hospitalizations in 1998 to 65 per 10,000 delivery hospitalizations in 2013.

Figure 2.16

Severe Maternal Morbidity (SMM) Rate, With and Without Blood Transfusion, By Year, 1998-2013



From 1998-2013, Black non-Hispanic women (175 per 10,000 hospitalizations) had twice the rate of SMM including blood transfusion during delivery hospitalization as White non-Hispanic women (83 per 10,000 hospitalizations). Over this same period, SMM rates were higher among older women (40-44 years of age: 163 per 10,000 hospitalizations) than younger women (20-24 years of age: 93 per 10,000 hospitalizations) and for women with MassHealth (122 per 10,000 hospitalizations) compared with women with private health insurance (84 per 10,000 hospitalizations). These patterns were similar when comparing women without blood transfusions.

Pregnancy-Associated Mortality

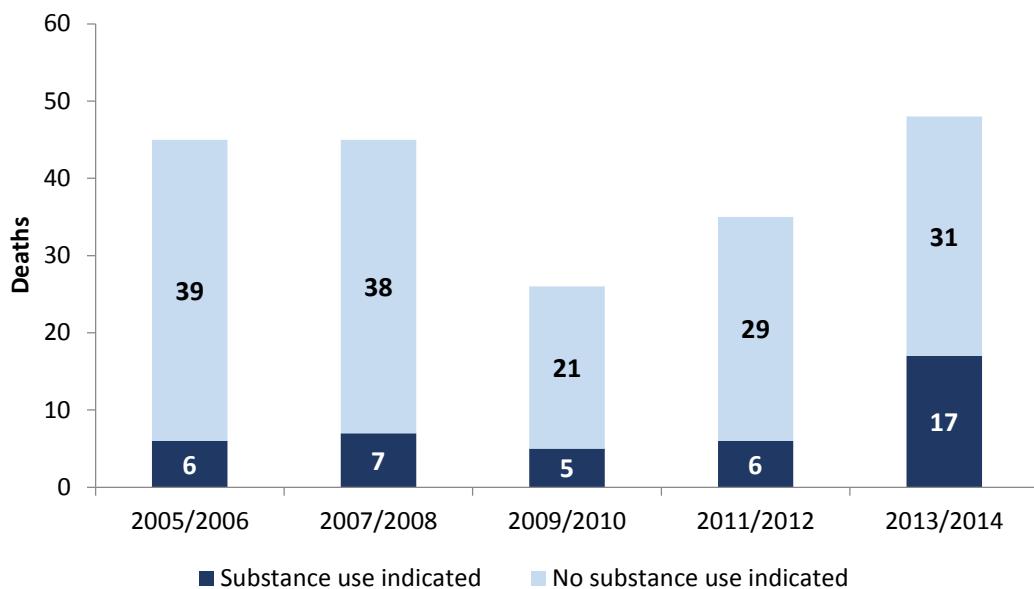
A pregnancy-associated death is the death of a woman while pregnant or within a year of the end of pregnancy from any cause, including obstetric causes (e.g., postpartum hemorrhage), non-traditional obstetric causes (e.g., suicide in the setting of postpartum depression), and accidental or injury-related causes such as opioid overdose months after delivery.

Trends/Disparities

The biennial proportion of pregnancy-associated deaths with any indication of substance use has increased from 13.3% in 2005/2006 to 35.4% in 2013/2014, reflecting the effects of the growing opioid epidemic in Massachusetts and nationwide (**Figure 2.17**). During 2000-2007, Black non-Hispanic women were twice as likely to experience pregnancy-associated death compared to White non-Hispanic women.¹²² Additionally, compared to women who had private health insurance, those with MassHealth were almost three times as likely to experience a pregnancy-associated death.¹²³

Figure 2.17

Pregnancy-Associated Deaths with Any Indication of Substance Use in Massachusetts, 2005-2014



NOTE: INDICATION OF SUBSTANCE USE INCLUDES ANY MENTION OF SUBSTANCE USE ON THE DEATH CERTIFICATE AND IS NOT LIMITED TO OVERDOSE DEATHS

Selected Resources, Services, and Programs

Following are selected resources, services, and programs that support the topics discussed in this chapter.

Infant Health

- The Neonatal Quality Improvement Collaborative (NeoQIC) of Massachusetts is an organization of health care providers and institutions to support quality improvement in the health care of newborns through the open sharing of information and practices
- The Infant Mortality Collaborative Improvement and Innovation Network (IM CollIN) is a national movement of federal, state and local leaders, public and private agencies, professionals, and communities to employ quality improvement, innovation, and collaborative learning to reduce infant mortality and improve birth outcomes
- The Massachusetts WIC Program provides prenatal nutrition counseling, breastfeeding support and education, and advances the professional development of WIC staff to increase availability of expert lactation care for participants
- The Massachusetts Maternal, Infant and Early Childhood Home Visiting (MA MIECHV) Program and the Early Intervention Partnerships Program (EIPP) provide education, intervention, and referrals to improve breastfeeding initiation and duration rates to high risk mothers/infants
- The Welcome Family Program provides a universal, one-time nurse home visit to caregivers with newborns in five Massachusetts communities (Boston, Fall River, Lowell, Holyoke and Springfield), including breastfeeding education and related referrals as needed
- The Massachusetts Breastfeeding Coalition supports hospitals that promote breastfeeding and assists hospitals to become Baby Friendly based on a core set of evidence-based maternity care practices that support positive breastfeeding outcomes
- The NeoQIC Human Milk Quality Improvement Collaborative project brings together Massachusetts Neonatal Intensive Care Units (NICU) to increase the percentage of very low birth weight infants that receive their mother's own milk throughout their hospitalization
- Baby Cafes are a free drop-in resource for pregnant and breastfeeding mothers to get support from International Board Certified Lactation Consultants (IBCLCs) and Certified Lactation Counselors (CLCs) and to share experiences with other mothers
- MDPH and other state agencies are working together to address the current opioid crisis and its impact on perinatal populations. Current activities include:
 - Forming the Massachusetts Interagency Task Force on Newborns with neonatal abstinence syndrome (NAS) and Substance-Exposed Newborns to inventory services, identify, and address gaps
 - Participating in the Policy Academy to Improve Outcomes for Pregnant and Postpartum Women with Opioid Use Disorders, and their Infants, Families and Caregivers sponsored by SAMHSA and led by the National Center on Substance Abuse and Child Welfare¹²⁴
 - Committing \$3.5 million for eligible birthing hospitals to develop and/or enhance programs designed to improve care for infants with NAS and for women in treatment for opioid use disorder during and after pregnancy
 - Selecting substance use as a priority for Title V, the major federal block grant that funds maternal and child health programs, and selecting as the state performance measure the percentage of infants diagnosed with NAS in Massachusetts hospitals who are receiving EI services

- SAMHSA continues to fund grant programs to expand medication-assisted treatment and peer support for pregnant women with opioid use disorder, and to provide peer and clinical parenting support through recovery centers in the Commonwealth
- MDPH collaborated with numerous stakeholders to develop an Infant Safe Sleep Policy aligned with the American Academy of Pediatrics (AAP) 2011 safe sleep guidelines
- Massachusetts IM CoIN team has worked to improve infant safe sleep practices through modeling safe sleep at Massachusetts birthing hospitals; training home visitors to counsel their clients on safe sleep; training local WIC office staff; revising the Department of Early Education and Care's safe sleep training for child care providers; and training NICU staff to implement safe sleep practices in NICUs
- Birthing Hospital Safe Sleep Forums were held with the goal of increasing awareness of SUID and infant safe sleep among labor and delivery staff
- A Sudden Unexplained Infant Death investigation database is used by state and municipal police officers to collect information on the circumstances of sudden unexpected deaths among children less than 3 years of age

Child Health

- The Massachusetts WIC Nutrition Program offers children a healthy food package containing whole grains, low-fat dairy, fruits, and vegetables and provides caregivers with nutrition counseling and education to help them choose and prepare healthy foods. WIC also promotes the Farmers' Market Coupon Program, through which approximately 20,000 WIC participants receive \$20 in Farmers' Market coupons to use through the growing season
- Massachusetts school nurses are required to screen students in grades, 2, 4, 7 and 10 for healthy weight
- Massachusetts Project LAUNCH is a program to ensure early childhood mental health prevention practices are integrated into pediatric primary care practices to support families with children identified by primary care providers as showing early signs of social and emotional difficulties or who experience risk factors known to lead to poor social and emotional development outcomes (located in Springfield, Worcester, and Chelsea)
- Massachusetts Early Childhood Comprehensive Systems (MECCS) develops systems-level approaches to promote young children's emotional wellness
- Massachusetts Early Intervention Program provides screening and services from birth to age three years to improve social emotional skills (including social relationships)
- The Vaccines for Children (VFC) Program is a federal program that provides vaccines free of cost for children whose parents cannot afford them

Children and Youth with Special Health Care Needs

- The Massachusetts Title V Division for Children and Youth with Special Health Needs (DCYSHN) Community Support Line at 1-800-882-1435 provides information, technical assistance and resources to families of CYSHN and providers serving them
- The Division of Children and Youth with Special Health Care Needs offers a variety of programs to support CYSHN and their families such as Care Coordination, the Catastrophic Illness in Children's Relief Fund, Family TIES, MassCARE, MASSTART, Pediatric Palliative Care Network, Universal Newborn Hearing Screening, and several others
- Through a federally-funded Systems Integration Project, MDPH has developed an interactive searchable online platform for families of CYSHN and professionals to access reliable resources and services for CYSHN and their families
- Since 2010, MassHealth requires behavioral health screening for children and youth less than 21 years of age as part of the Early and Periodic Screening, Diagnosis, and Treatment Program

- Massachusetts has mandatory private health insurance coverage for the diagnosis and treatment of Autism Spectrum Disorder (ASD)
- The 2016 Massachusetts Healthy People 2020 Autism Roadmap report serves as a blueprint for better data collection and monitoring across the system of care serving children and youth with ASD and other developmental disabilities and their families in Massachusetts¹²⁵

Women's Health

- The Massachusetts Maternal Mortality and Morbidity Review Committee reviews all pregnancy-associated deaths and makes recommendations to improve clinical practice, health care systems, and public health in Massachusetts
- The Massachusetts Perinatal Quality Collaborative is a voluntary organization of Massachusetts birthing hospitals and key perinatal stakeholders that focuses on quality improvement initiatives to reduce pregnancy-related mortality by reducing obstetric complications
- Massachusetts WIC Program conducts screening of all pregnant and postpartum participants by nutrition staff to assess utilization of prenatal care and provides referrals to health care providers
- The Massachusetts Maternal, Infant, and Early Childhood Home Visiting Program and the Early Intervention Partnerships Program contract with local agencies to conduct community outreach to pregnant women to encourage early enrollment into programs for women at risk of late entry to prenatal care
- The Boston Healthy Start Initiative provides services to self-identifying Black non-Hispanic and Hispanic women in three Boston neighborhoods in which disparities in birth outcomes are most pronounced
- The Sexual and Reproductive Health Program provides counseling on reproductive life planning and promotes access to all FDA-approved contraceptive methods while focusing on geographic areas with adverse reproductive health outcomes
- Through in and out of school settings the MDPH Adolescent Sexuality Education (ASE) Program partners with community-based organizations to deliver evidence-based sexuality education, educational programming backed by preliminary research, and youth development programming for youth aged 11-19 build connectedness with a trusted adult
- The Personal Responsibility Education Program (PREP) works with community-based organizations to deliver evidence-based sexuality education in middle school, high school, and out of school settings
- The Massachusetts Pregnant and Parenting Teens Initiative (MPPTI) supports multidisciplinary teams to provide wrap-around services for pregnant and parenting teens
- Postpartum Depression (PPD) regulations require health care providers to report their data to MDPH annually if they conduct a PPD screen using a validated screening tool during a clinical encounter with a postpartum woman
- MDPH home visiting programs screen women prenatally and postpartum for depression utilizing a validated screening tool and provide education, brief intervention, and referral to treatment as needed
- Effective May 16, 2016, MassHealth began paying for the administration of standardized depression screening during pregnancy and the postpartum period

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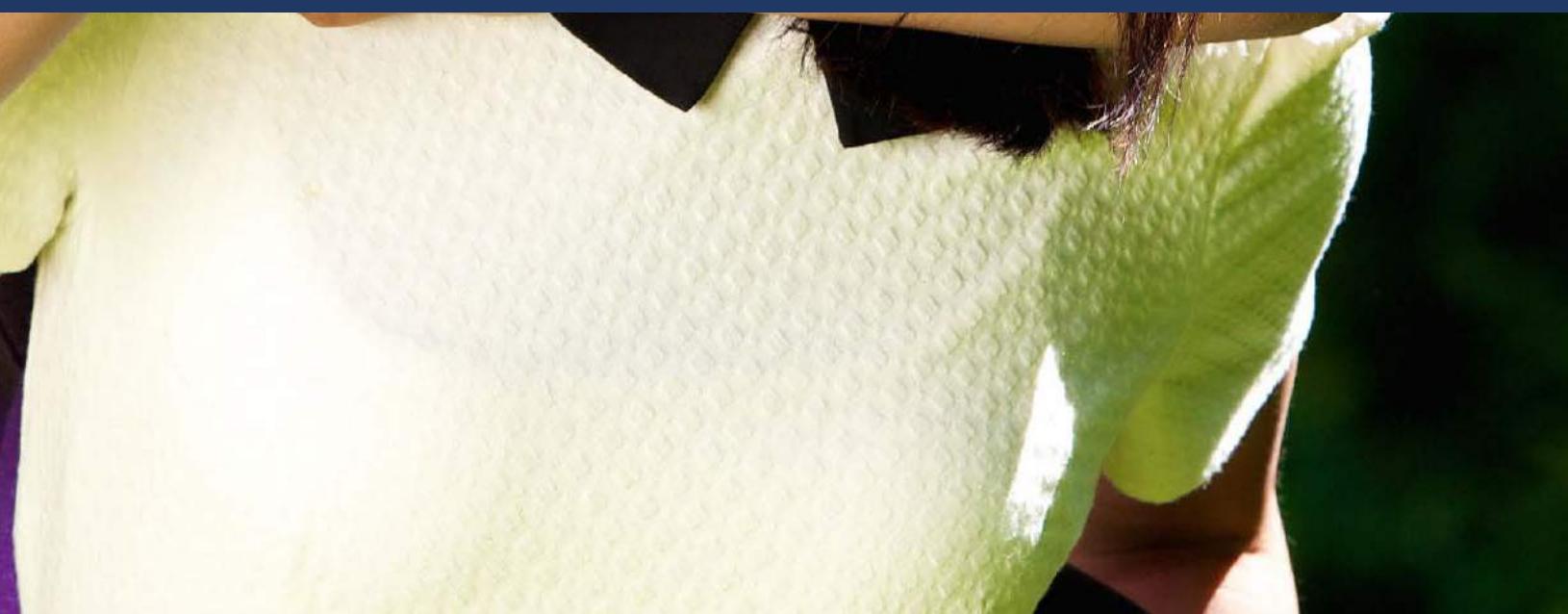
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CHAPTER 3

Environmental Health





Environmental Health

This chapter provides an overview of several environmental health issues in Massachusetts and related trends, disparities, and resources. It addresses the following environmental topic areas that affect the health of residents:

- Environmental Exposures
- Childhood Lead Exposure
- Climate and Health
- Environmental Justice Populations and Health
- Occupational Exposures and Disease
- Selected Resources, Programs, and Services

Chapter Data Highlights

- High rates of childhood lead exposure due to old housing stock with greatest risk among low-income and populations of color
- Temperatures rising due to climate change and expected to impact children, elderly, disabled, homeless, and low-income residents the most
- Poor health outcomes are more common in Environmental Justice populations
- Rates of mesothelioma are higher in Massachusetts than in the US

Overview

Environmental health risks can come from exposure to contaminants in air, water, soil, and food as well as workplace hazardous chemicals.¹²⁶ MDPH reduces and prevents environmentally-related risks by tracking and evaluating potential exposure pathways and disease, and supports policies and programs to reduce exposure to environmental hazards and provide communities with healthier environments.

In Massachusetts, some populations are affected more than others by environmental exposures and associated health problems. These populations include:

- Younger or older individuals and those with pre-existing respiratory and cardiovascular diseases who may be more susceptible to health problems linked with environmental risk factors
- Individuals who live close to sources of environmental contamination
- Individuals who work with hazardous chemicals
- Individuals with higher exposures to air pollution and higher prevalence of social stressors (e.g., poverty, violence) may also be more susceptible to the health impacts of environmental contaminants.

Through collaborations with local health departments, community partners, and others, MDPH manages health and environmental information to identify opportunities for prevention and to reduce environmental exposures that can lead to health disparities and health inequities.

Environmental Exposures

Environmental exposure includes results from contact with physical, chemical, biological, and radiological substances. Many factors are important in determining whether environmental exposures can lead to health risks. These include:

- The amount of exposure
- Whether individuals are exposed through eating, drinking, breathing, or touching a substance
- Whether the type of substance can cause harm

Public Health Fish Advisories

Due to pollution, eating fish from Massachusetts streams, rivers, lakes, ponds, and some coastal waters may cause possible health risks. Developing fetuses, nursing infants, children less than 12 years of age, pregnant women, nursing mothers and women who may become pregnant are at highest risk.¹²⁷

The Massachusetts Department of Environmental Protection (MassDEP) collects and analyzes fish from fresh bodies of water annually and provides the data to MDPH for evaluation. MDPH reviews the samples for chemicals to provide guidance on safety for consumption.

Trends/Disparities

Since the early 1980s, MDPH has issued more than 200 waterbody-specific fish advisories. Most of the advisories resulted from elevated levels of mercury. Other chemicals detected include polychlorinated biphenyls (PCBs) and the pesticides dichlorodiphenyltrichloroethane (DDT) and chlordane.

MDPH has identified public health fish advisories by Environmental Justice (EJ) areas where Black, Asian and Hispanic populations and/or non-English speaking and/or low-income populations are more prevalent. Greater health risks from consuming contaminated fish occur more often in EJ areas because residents often depend on locally-caught fish as a regular part of their diet.

Many urban rivers have advisories that recommend limiting or refraining from all fish consumption from these sources. Areas safe for fishing (e.g., in more rural areas) may be difficult to get to for individuals with limited transportation options or income.

Ambient Air Quality

Exposure to ambient (or outdoor) air pollution has been linked to a wide range of cardiovascular and respiratory health problems. Higher, short-term exposure to air pollutants is associated with asthma attacks and increased hospital admissions.¹²⁸ Long-term impacts of exposure to air pollutants include decreased lung function, increased sensitivity to asthma triggers, and increased susceptibility to infections, cardiovascular harm, and premature death.^{129,130}

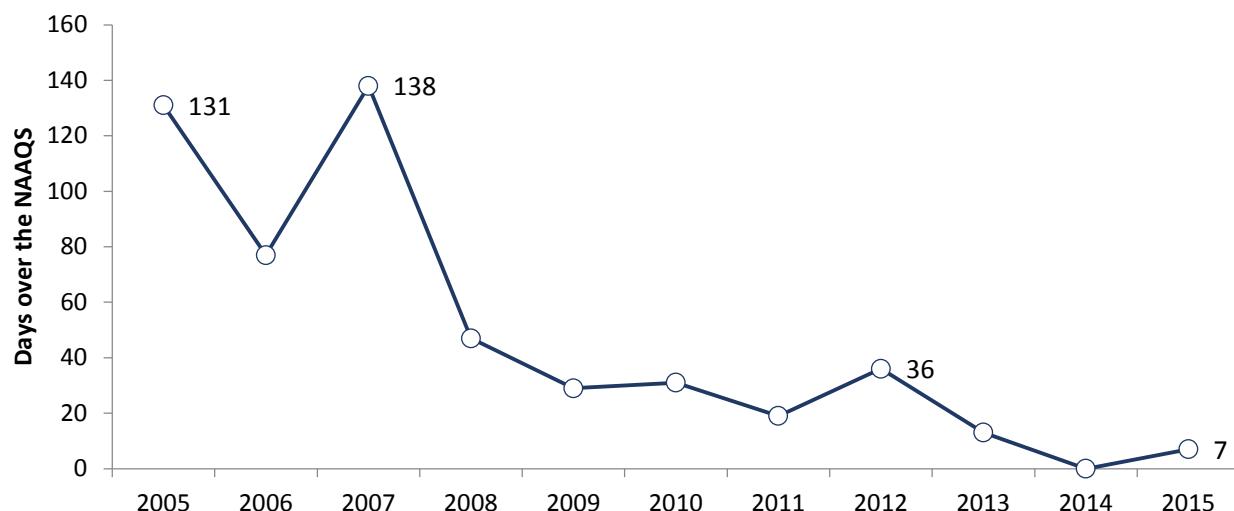
Under the Clean Air Act, the US Environmental Protection Agency (EPA) sets National Ambient Air Quality Standards (NAAQS) for pollutants to limit concentrations in ambient air. Ozone is one important measure of air quality in Massachusetts. Ground-level ozone is a gas created when pollutants from cars and power plants react with each other in the presence of heat and sunlight. Ozone formation is weather dependent, and levels are typically higher during the summer.

Trends/Disparities

From 2005 to 2015, Massachusetts experienced a 21% decrease in ozone levels. **Figure 3.1** shows the number of days in Massachusetts where ozone levels exceeded the 2008 ozone standard of 0.075 parts per million (ppm), from 2005 to 2015. (The NAAQS for ozone was revised to 0.070 ppm in December 2015.)

- The numbers of days when ambient ozone concentrations have exceeded the NAAQS has decreased in Massachusetts over time (131 days in 2005 and 7 days in 2015) (**see Figure 3.1**).
- Climate change models predict that by 2050, the increase in temperature will contribute up to seven parts per billion (ppb) of ozone pollution above summer daily averages.¹³¹
- MDPH estimates an average 4.75% increase in emergency room visits in Massachusetts in 2050 compared to 2011 (approximately 2,150 additional visits) for a seven ppb increase in ozone.

Figure 3.1
Trends in Ozone, Massachusetts, 2005-2015



NOTE: OZONE DATA FOR DAYS OVER THE NAAQS ARE MEASURED BY AIR MONITORS. MONITORS ARE NOT PRESENT IN ALL COUNTIES. STATEWIDE AMBIENT OZONE CONCENTRATIONS HAVE DECREASED OVER TIME. ABOVE AVERAGE TEMPERATURES AND BELOW AVERAGE HUMIDITY IN 2012 CONTRIBUTED TO INCREASED NUMBER OF DAYS OBSERVED WHERE OZONE LEVELS EXCEED THE NAAQS. IN 2014, THERE WERE NO DAYS WHERE OZONE LEVELS WERE MORE THAN THE NAAQS IN COUNTIES WHERE MONITORS WERE PRESENT. THE TRENDLINE SHOULD NOT BE USED FOR ASSESSING NAAQS ATTAINMENT. METHODS FOR CALCULATING ANNUAL TRENDS CAN BE FOUND ON THE MA EPHT PORTAL.¹³²

The potential public health impact of ozone exposure is due to its role in making existing asthma worse, resulting in increased emergency department visits and hospitalizations.

- Massachusetts has one of the highest rates of asthma in the United States. The prevalence in 2015 was 10.2% versus a national prevalence of 9.2% for individuals reporting that they currently have asthma. The prevalence in Massachusetts children was 12.9% in 2015.
- Adults age 65 years and older have the second highest rate of hospitalization due to asthma.
- Black non-Hispanics and Hispanics consistently have had significantly higher age-adjusted rates of hospitalization due to asthma than White non-Hispanics.
- Children younger than five years of age have had the highest rates of emergency department visits, outpatient observation stays, and hospitalization due to asthma.

Exposure to air pollutants often varies geographically. The consequence of different exposures to sources of air pollutants is that health risks associated with environmental factors can be heightened for Black, Hispanic and Asian families with lower income levels as well as for children, the elderly, and people with pre-existing heart or lung diseases. For example:

- Power plants that emit gases like nitrogen oxide are typically located in lower income communities.¹³³

- Proximity to traffic and living in urban areas have been shown to contribute to both increased ozone exposure and asthma.
- Adults with asthma living near roads with heavy traffic are at increased risk for hospitalization for asthma attacks and lung cancer.
- Individuals who rely on open windows for cooling during summer months are at greater risk for adverse health impacts than those with air conditioning.
- People working or exercising outside breathe more deeply, resulting in ambient air pollutants penetrating deeper into the respiratory tract.

Recreational Water Quality

Swimming at Massachusetts beaches is one of the most popular and low-cost recreational activities in the Commonwealth. Swimming and beach-related activities can improve overall physical, mental, and social well-being. However, swimming in polluted water can lead to illnesses such as fever, gastrointestinal distress, skin problems, and ear, nose, throat irritation or infections. Good water quality is important for public health, especially for those most vulnerable, such as the young, sick, and elderly.

Testing recreational water quality is important to help reduce the number of swimming-associated illnesses. Massachusetts beaches are required to be tested for fecal indicator bacteria (FIB) and are closed if these levels exceed water quality standards. FIB levels and closures are required to be reported to MDPH.

Trends/Disparities

In 2016, 3% of freshwater and 3.5% of marine beach samples in Massachusetts exceeded FIB regulatory levels. Exceeding FIB standards is often associated with rainfall, reflecting the impact of land-based pollution (e.g., dog waste, bird droppings) and sewage. In 2016, FIB levels and/or unsafe conditions such as rip tides, shark sightings, and harmful algae blooms required the closing of beaches on 274 occasions. In 2016, the highest number of FIB exceedances at marine beaches occurred in three cities in the greater Boston metropolitan area: Boston, Lynn, and Quincy as shown in **Figures 3.2 and 3.3**.

In 2016, the number of freshwater beaches that exceeded the FIB standard varied among communities across the state with many communities having at least one beach that did not meet the standard. Overall, the highest number of FIB exceedances occurred in Brimfield, Templeton, and West Tisbury.

Figure 3.2

Number of Marine Fecal Indicator Bacteria (FIB) Exceedances, Massachusetts, 2016

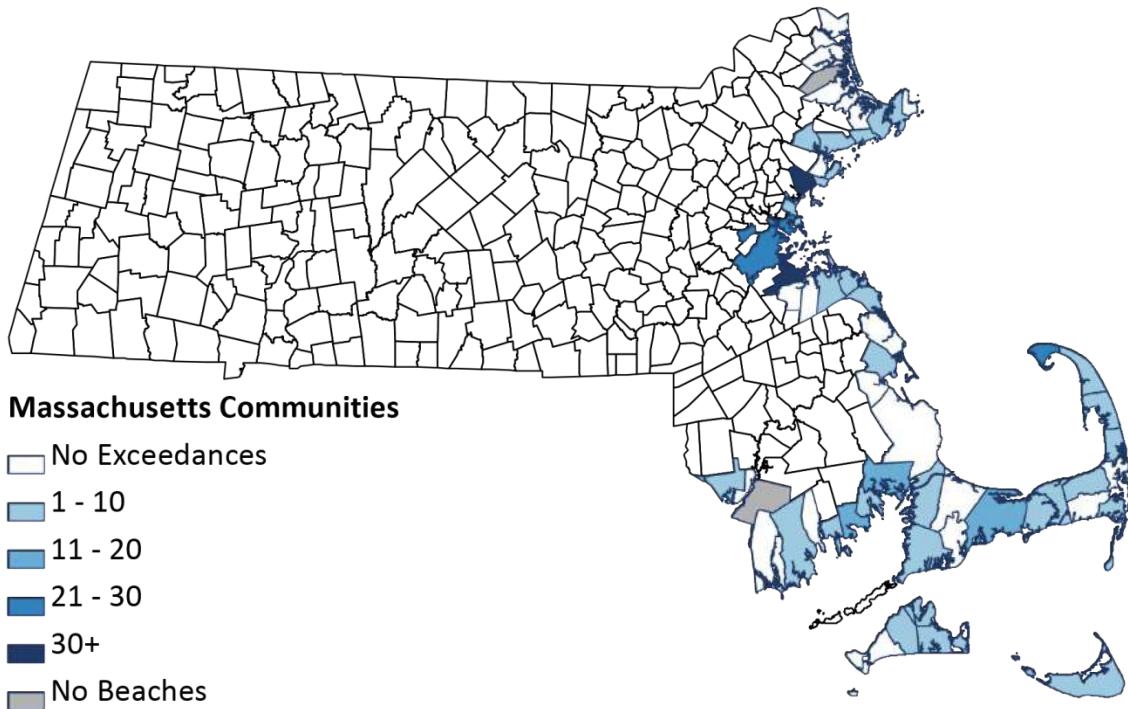
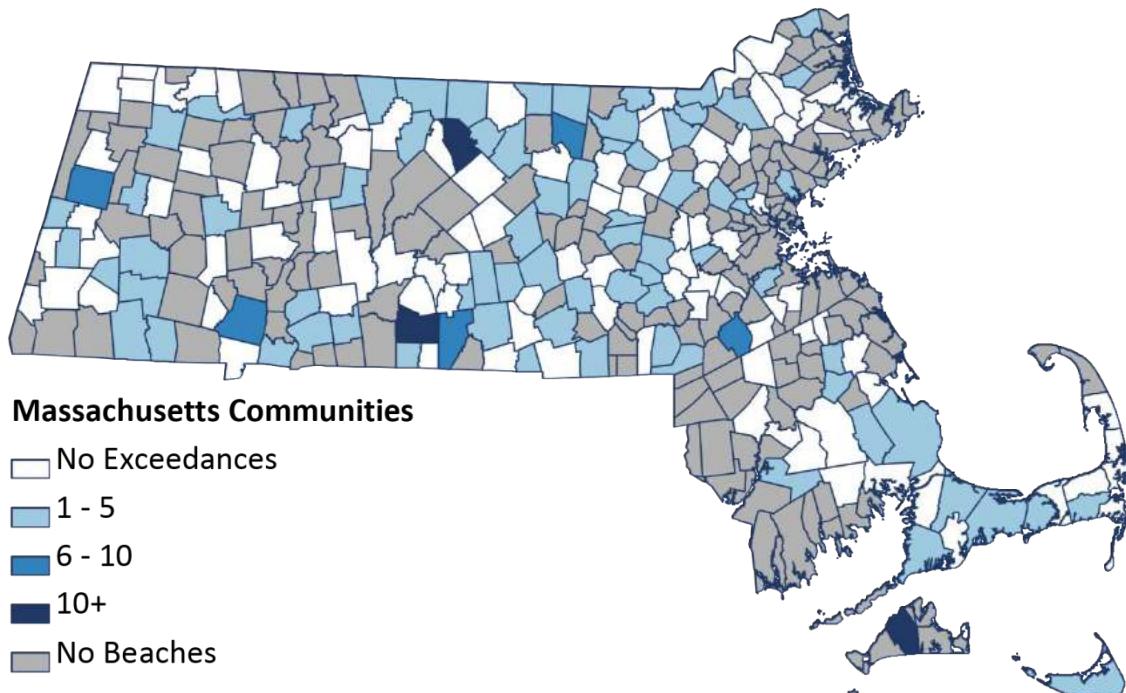


Figure 3.3

Number of Freshwater Fecal Indicator Bacteria (FIB)Exceedances, Massachusetts, 2016



Public Drinking Water Quality

Approximately 93% of Massachusetts residents rely on public supplies for their drinking water. People can become exposed to contaminants in drinking water by drinking, eating foods prepared with water, breathing water droplets or chemicals released from the water while showering, and absorbing chemicals through the skin while bathing.

In Massachusetts, the MassDEP has statutory responsibility to oversee and implement federal and state Safe Drinking Water Act requirements. MDPH collaborates with MassDEP to assist communities in understanding the health risks associated with contaminants in drinking water. Health-based drinking water standards and guidelines exist for over 100 chemical, radiological, and biological substances.

Trends/Disparities

Massachusetts drinking water is generally considered high quality. However, a particular public water supply or private well may contain a contaminant(s) at a level above MassDEP's standards or guidelines. Residents can obtain information on their particular drinking water source by visiting this linked website or by calling their local water department. Private well owners can obtain information on how to have their well water tested by visiting this website as well.

Childhood Lead Exposure

There is no safe level of exposure to lead and even relatively low levels of lead can cause severe and irreversible health effects, including damage to a child's mental and physical development.^{134,135} Numerous studies have documented correlations between childhood lead poisoning and future school performance, unemployment, crime, violence, and incarceration, making lead exposure an important social determinant of health.^{136,137,138,139}

While the Commonwealth has made substantial gains in mitigating the harmful effects of lead, lead exposure remains a significant health risk for children across the state. Massachusetts has the fourth oldest housing stock in the country: approximately 71% of the Commonwealth's housing was built before 1978, the year lead was banned in residential paint. Children are most often exposed to lead through ingestion of dust or soil contaminated by loose or deteriorated lead paint, often on windows and exterior surfaces, or disturbed by unsafe renovations.

The Massachusetts Lead Law (see MGL c. 111, §§ 189A-199B and 105 CMR 460.000) is one of the nation's most comprehensive for lead poisoning prevention by requiring the de-leading of any dwelling unit where a child under six years of age resides, regardless of a child's blood lead level (BLL) or whether the property is owner-occupied. Massachusetts law requires that all children be tested for blood lead between nine and 12 months of age, again at two and three years of age, and also at age four in communities designated at high risk. MDPH's Bureau of Environmental Health enforces the Commonwealth's Lead Law and collects and analyzes data based on childhood blood lead screening and environmental housing records.

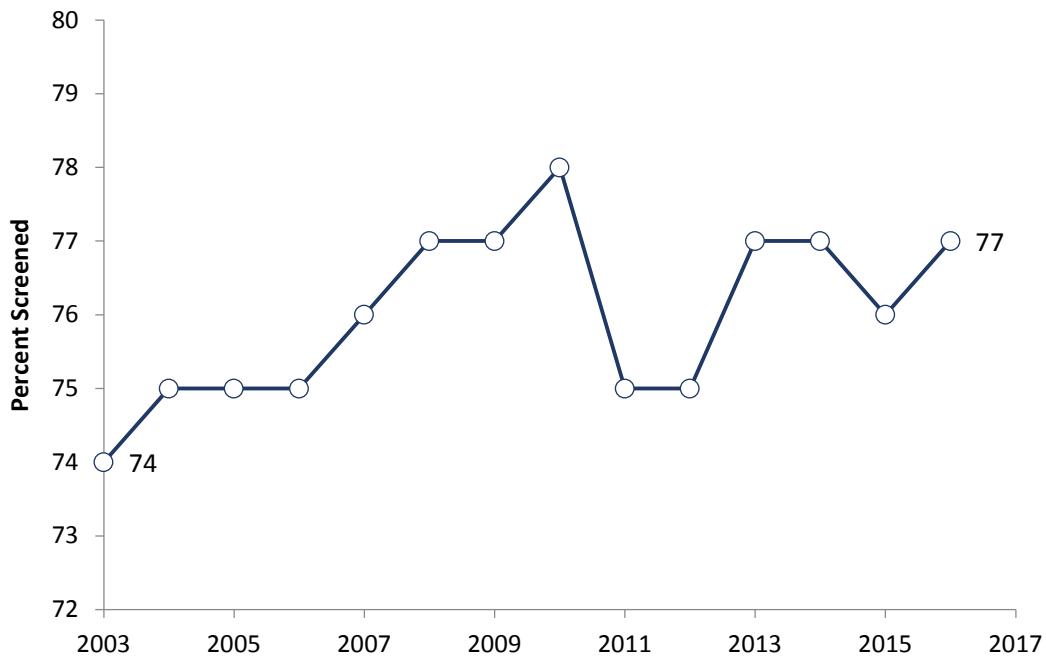
Trends/ Disparities

Blood lead levels have historically declined across the Commonwealth. Blood lead levels at or above the CDC reference value (of 5 µg/dl) among children nine months to 4 years of age show a continued decrease since 2011.

- In 2016, the Massachusetts prevalence of childhood blood lead levels at or above the CDC reference value (of 5 µg/dL) was 2%.
- Lead screening data from 2016 indicate that 3,500 children in Massachusetts may have blood lead levels \geq 5 µg/dL. Of those 3,500 children, 651 had blood lead levels prompting immediate MDPH response, case management services ,(blood lead levels \geq 10 µg/dL) and 57 children were identified having blood lead levels legally considered “lead poisoned” pursuant to current regulation (blood lead level of 25 µg/dL or greater).

In Massachusetts, the prevalence of blood lead screening among children nine months to four years of age has averaged 76% for the past six years as seen in **Figure 3.4**. Lead exposure impacts all areas of the Commonwealth, including rural and urban communities, but blood lead screening rates tend to be lower in some rural, central, and western areas of the state.

Figure 3.4
Massachusetts Blood Lead Screening Rate, Children Aged 9-47 months, 2003-2016



A wide geographic variation in childhood lead exposure exists across the state with some communities in western, central, and cape cod areas experiencing two or three times the state average prevalence of higher blood lead levels, as seen in **Figure 3.5**.

Data show a higher prevalence of childhood blood lead levels \geq 5 µg/dL in lower income communities and among Black, Asian non-Hispanic, and Hispanic children making lead exposure a critical health equity issue. In particular, Black non-Hispanic and American Indian populations are disproportionately impacted and have rates of high blood lead levels almost twice those of the White non-Hispanic population.

As seen in **Figure 3.6**, communities with a higher than average percentage of low- to moderate-income families have more than twice the percentage of blood lead levels at or above 5 µg/dL compared to communities with a lower percentage of low- to moderate-income families.

Figure 3.5

**Massachusetts Prevalence of Confirmed Blood Lead Levels $\geq 5 \mu\text{g}/\text{dL}$ by Community,
among Children aged 9-47 months, 2016**

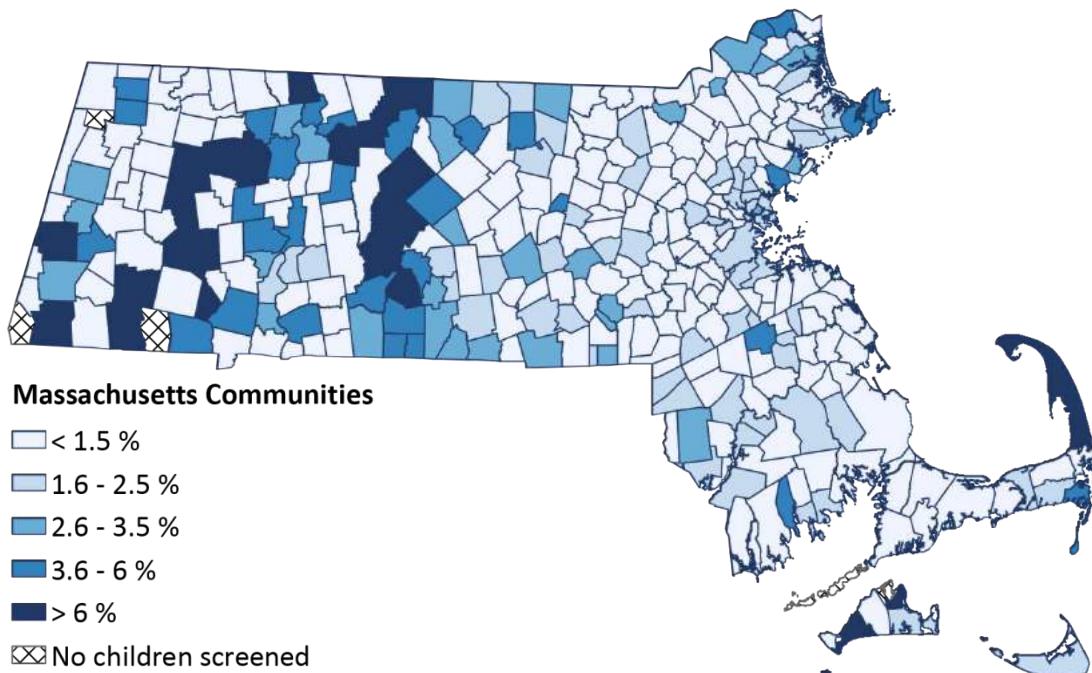
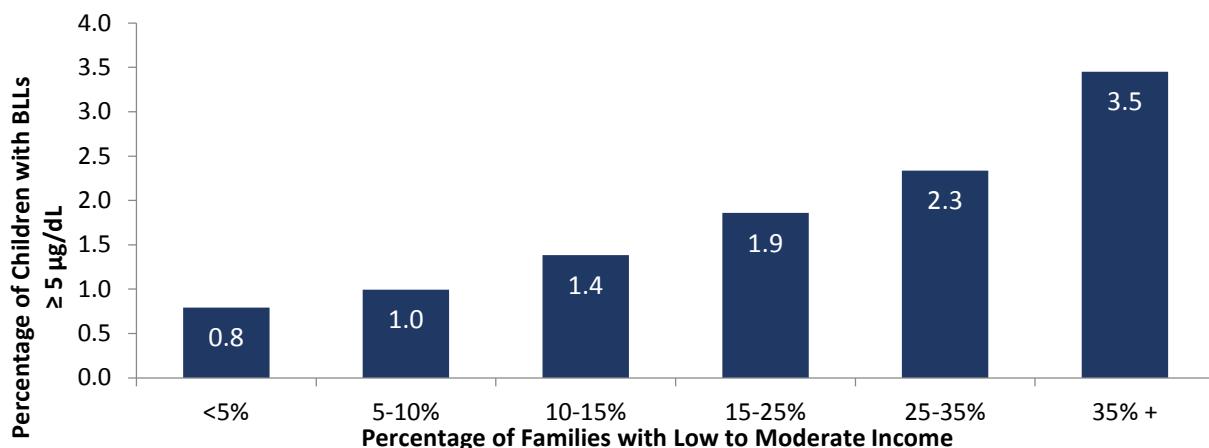


Figure 3.6

Massachusetts Community Prevalence of Childhood Blood Lead Levels $\geq 5 \mu\text{g}/\text{dL}$ by Percentage of Families with Low to Moderate Income, 2011-2015



SOURCE: MA CHILDHOOD LEAD POISONING PREVENTION PROGRAM AND US CENSUS BUREAU.

NOTES: 1. INCLUDES CONFIRMED BLOOD LEAD LEVELS (ONE VENOUS OR TWO CAPILLARY BLOOD SAMPLES $\geq 5 \mu\text{g}/\text{dL}$ WITHIN 84 DAYS) AND A PROPORTION OF UNCONFIRMED TESTS BASED ON THE POSITIVE PREDICTIVE VALUE OF CAPILLARY TESTS $\geq 5 \mu\text{g}/\text{dL}$. 2. LOW TO MODERATE INCOME DEFINED AS LESS THAN 200% OF POVERTY USING POVERTY TO INCOME RATIO (PIR) FROM THE 2011-2015 AMERICAN COMMUNITY SURVEY OF THE US CENSUS BUREAU.

Climate and Health

Climate change is expected to adversely affect human health and welfare in Massachusetts due to increased heat, sea-level rise, increased intensity and frequency of rainfall, more intense storms, and degraded air and water quality.

Massachusetts is one of the first states in the country to recognize the importance of implementing strategies to mitigate and prepare for the potential impacts of climate change. Strategies intended to reduce the impact of climate can also address the need to reduce health disparities and increase community resilience. For example, emission control strategies to reduce greenhouse gas emissions required by Governor Baker's 2016 Executive Order *Establishing an Integrated Climate Change Strategy for the Commonwealth* may also reduce health impacts associated with exposure to ozone pollution. Tracking emissions, climate, and health data can help document changes over time and place, monitor vulnerable populations, and evaluate the results of local climate-adaptation strategies.

Heat Stress

The Northeast region of the US is especially vulnerable to the impacts of extreme summer temperatures due to urbanization "heat islands", low air conditioner prevalence, and substantial numbers of elderly residents. Heat stress increases the risk of a range of potential adverse health outcomes, including dehydration, heat cramps, heat exhaustion, and heat stroke/sunstroke and can cause adverse effects in people with existing chronic conditions, including cardiovascular disease, diabetes, and obesity.

Many adverse heat outcomes can be prevented through planning, preparation, and education. MDPH's collaboration with local and state health departments and its role in emergency preparedness can help reduce health impacts during heat events by notifying the public of steps they can take to reduce exposure and by opening cooling centers.^{140,141,142,143,144,145}

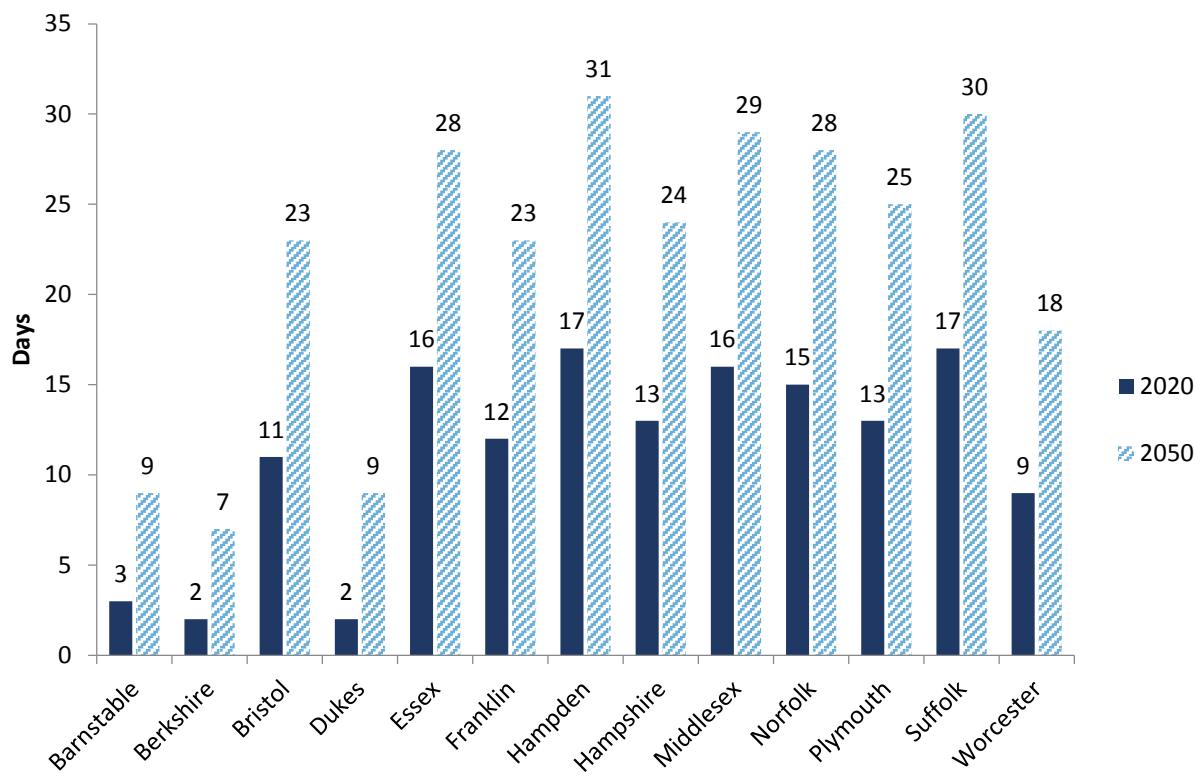
Trends/Disparities

Emergency department visits and hospitalization rates for heat stress in Massachusetts include all cases where heat stress was explicitly listed. However, heat stress may not be listed as the primary diagnosis for some heat-related hospitalizations such as increased hospital admissions for cardiovascular, kidney, and respiratory disorders.¹⁴⁶

- In 2012, there were 13.1 emergency department visits for heat stress per 100,000 population (95% confidence interval: 12.2-13.9 per 100,000 population) and 1.4 hospital admissions per 100,000 population (95% confidence interval: 1.2-1.7 per 100,000 population).¹⁴⁷
- As shown in **Figure 3.7**, it is estimated that the projected number of days with temperatures above 90 degrees fahrenheit across most of Massachusetts will double from 2020 to 2050.
- Some residents are more susceptible to heat impacts due to socioeconomic status, health, age, or geographic location. The most vulnerable groups are children, elderly living alone, persons with a disability, low-income residents, homeless individuals, and persons living in urban areas with higher exposures to heat.
- Communities of color, lower socioeconomic populations , and homeless populations are more likely to have limited adaptive capacity to address heat-related impacts. This may be due to various factors such as lack of access to emergency health care and cooling centers.

Figure 3.7

Projected Number of Days Over 90 Degrees Fahrenheit in Counties in Massachusetts, 2020 and 2050



SOURCE: NATIONAL ENVIRONMENTAL PUBLIC HEALTH TRACKING PORTAL; HIGH EMISSION SCENARIO

Environmental Justice Populations and Health

According to the Environmental Justice (EJ) Policy of the Massachusetts Executive Office of Energy and Environmental Affairs (EEA), environmental justice is based on the principle that all people have a right to be protected from environmental pollution and to live in and enjoy a clean and healthful environment regardless of race, ethnicity, income, national origin or English language proficiency.

Trends/Disparities

Minority and low-income populations are more likely to live in close proximity to contaminated and abandoned sites, regulated facilities, and sources of pollution.¹⁴⁸ The Massachusetts EEA EJ Policy of 2002 was designed to build on federal environmental justice guidelines to reflect the needs and circumstances specific to Massachusetts. It targets EEA resources to service those high-minority/Hispanic ethnicity/low-income communities in Massachusetts where the residents are “most at risk of being unaware of or unable to participate in environmental, energy, or climate change decision-making.” These neighborhoods are defined as US Census block groups that meet one or more of the following criteria:

- The median annual household income is at or below 65% of the statewide median annual household income for Massachusetts.

- 25% or more of the residents are minority (US Census population of those who self-identify as Latino/Hispanic, Black/African-American, Asian, Indigenous people, or otherwise identify as non-White).
- 25% or more of the residents have English Isolation (US Census American Community Survey population of households where no adults speak English very well).

MDPH collaborates with EEA to identify existing health burdens among EJ populations. In 2017, EEA released a revised EJ Policy including the addition of four health criteria recommended by the MDPH Bureau of Environmental Health to identify Vulnerable Health EJ Populations: childhood asthma, low birth weight, childhood lead poisoning, and heart disease morbidity. Vulnerable Health EJ Populations are those that have evidence of higher than average rates of environmentally-related health outcomes, making them particularly vulnerable to adverse environmental exposures.

In comparing the prevalence of these health outcomes between EJ and non-EJ populations, the disparities are evident, as seen in **Figure 3.8**.

- While only 4% of non-EJ communities had a rate of childhood asthma emergency department (ED) visits greater than 110% of the state rate, 27% of EJ communities (those with at least one EJ block group), had a rate of asthma ED visits greater than 110% of the state rate (2009-2013).
- A high prevalence of children with elevated blood lead levels and an elevated rate of heart disease morbidity were both present in nearly double the proportion of EJ populations compared to non-EJ (42% v. 19% and 40% v. 22%, respectively).
- From 2010 to 2014, 49% of EJ block groups had a rate of low birth weight above 110% of the state rate, while 31% of non-EJ block groups had a rate of low birth weight above 110% of the state rate.

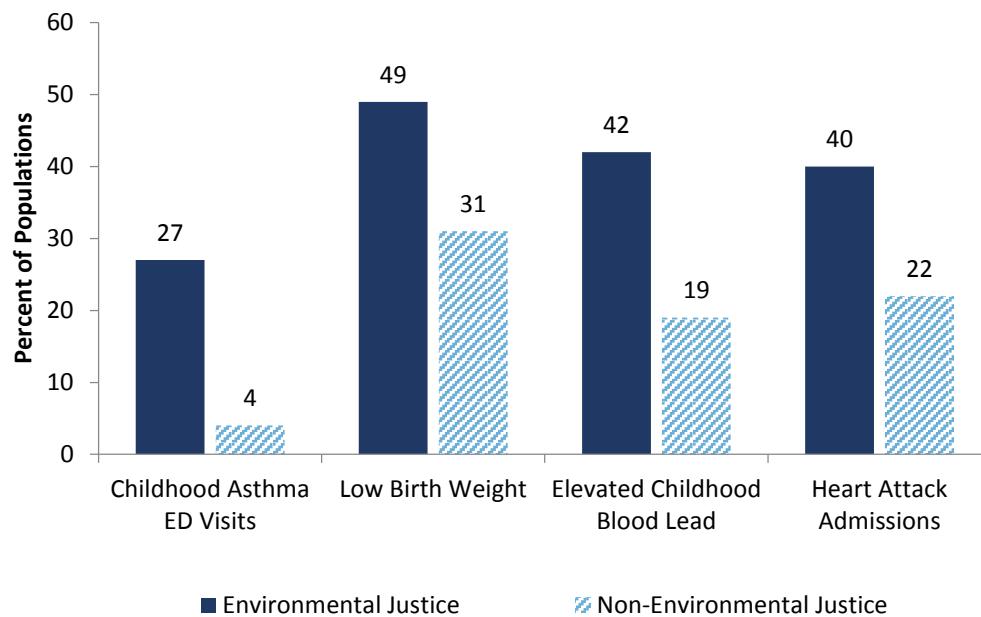
Occupational Exposures and Disease

Conditions in the workplace, including chemicals, may impact health. Workers may breathe in dust, fumes, and vapors or absorb them through the skin. Some of the chemicals can have short-lived acute health effects; other chemicals can have long-lasting health implications. Some chemical exposures can contribute to common chronic diseases, such as asthma, chronic obstructive pulmonary disease, lung and other cancers, and cardiovascular disease.

This section includes information about health outcomes associated with two chemicals that have long been recognized as workplace hazards that can have serious health effects: lead and asbestos.

Figure 3.8

Prevalence of Vulnerable Health Criteria in Massachusetts among Environmental Justice and non-Environmental Justice Populations, 2010-2014



NOTES: CHILDHOOD ASTHMA MEASURE DEFINED AS A FIVE-YEAR AVERAGE RATE OF EMERGENCY DEPARTMENT VISITS FOR CHILDHOOD ASTHMA GREATER THAN OR EQUAL TO 110% OF THE STATE RATE. LOW BIRTH WEIGHT MEASURE DEFINED AS A FIVE-YEAR AVERAGE RATE OF (FULL-TERM) LOW BIRTH WEIGHT ABOVE 110% OF THE STATE RATE. ELEVATED CHILDHOOD BLOOD LEAD MEASURE DEFINED AS A FIVE-YEAR AVERAGE PREVALENCE OF CONFIRMED ELEVATED BLOOD LEAD LEVELS ($\geq 10\mu\text{G}/\text{DL}$) GREATER THAN 110% OF THE STATE PREVALENCE. HEART DISEASE MORBIDITY MEASURE DEFINED AS A FIVE-YEAR AVERAGE AGE-ADJUSTED RATE OF HOSPITALIZATIONS FOR MYOCARDIAL INFARCTION GREATER THAN 110% OF THE STATE RATE. EJ POPULATIONS DEFINED AT THE BLOCK GROUP LEVEL FOR LOW BIRTH WEIGHT AND CHILDHOOD LEAD EXPOSURE MEASURES AND AT THE COMMUNITY LEVEL FOR CHILDHOOD ASTHMA AND HEART DISEASE MORBIDITY MEASURES. COMMUNITIES WITH AT LEAST ONE EJ BLOCK GROUP WERE DEFINED AS EJ COMMUNITIES.

Adult Lead Exposure

Lead can harm nearly every system in the body, even at levels previously thought to be safe. Exposure to lead in adults can cause anemia, nervous system dysfunction, high blood pressure, kidney damage, cognitive impairment, and adverse reproductive outcomes.^{149,150,151,152}

The blood lead level (BLL) is the best biological indicator of recent lead exposure. Previously, a blood lead level of 25 micrograms per deciliter ($\mu\text{g}/\text{dL}$) or greater was considered by CDC as "elevated" for adults. This has recently been lowered to 5 $\mu\text{g}/\text{dL}$, the same as the CDC's reference level for blood lead in children.¹⁵³ Clinical laboratories in Massachusetts are required to report all adult blood lead test results electronically to the Massachusetts Occupational Lead Poisoning Registry in the Department of Labor Standards (DLS).¹⁵⁴ Federal and state laws require employers to protect their employees from exposure to lead in the workplace.^{155,156,157}

Most adults with high BLL are exposed to lead at the workplace.¹⁵⁸ Adults may also be exposed through other sources such as hobbies and at firing ranges. Lead on the job may be brought home and affect family members, including pregnant women and children less than six years of age who are at high risk.¹⁵⁹

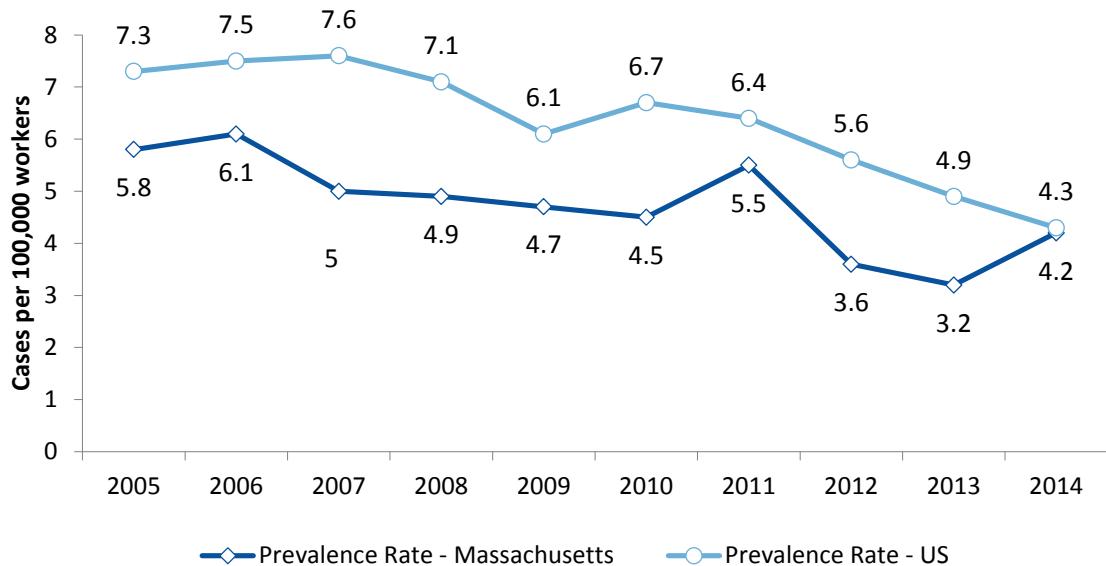
Trends/Disparities

According to the Massachusetts Occupational Lead Poisoning Registry, from 2005 to 2014, for each of these years, on average, 154 adults were reported with blood lead levels $\geq 25 \mu\text{g}/\text{dL}$.

- The prevalence of blood lead levels $\geq 25 \mu\text{g}/\text{dL}$ among adults in Massachusetts was significantly lower than that reported for the US in six of the last ten years (2005, 2007, 2008, 2010, 2012, and 2013).
- The prevalence of blood lead levels $\geq 25 \mu\text{g}/\text{dL}$ among adults both in Massachusetts and the nation has declined significantly since surveillance began in the early 1990s.¹⁶⁰

Figure 3.9

Prevalence of Elevated Blood Lead Levels (BLL $\geq 25 \mu\text{g}/\text{dL}$) in Adults, by Year, US & Massachusetts, 2005 – 2014¹⁶¹



SOURCES: NUMERATOR: MA: MA DEPARTMENT OF LABOR STANDARD'S OCCUPATIONAL LEAD POISONING REGISTRY, US: ADULT BLOOD LEAD EPIDEMIOLOGY SURVEILLANCE SYSTEM (ABLES). DENOMINATOR: ESTIMATES FOR THE NUMBER OF EMPLOYED ADULTS OBTAINED FROM THE GEOGRAPHIC PROGRAM (GP) AND LOCAL AREA UNEMPLOYMENT STATISTICS (LAUS), US BUREAU OF LABOR STATISTICS, AND US DEPARTMENT OF LABOR

NOTES: BASED ON MA RESIDENTS, AGED 16 AND OLDER; ANNUAL CRUDE RATE IS EXPRESSED PER 100,000 WORKERS. US RATES BASED ON THE NUMBER OF STATES REPORTING DATA TO NIOSH IN A GIVEN YEAR (AVERAGE # OF STATES REPORTING OVER THIS PERIOD WAS 39 STATES)

Other trends/disparities include:

- In Massachusetts, the largest numbers of workers with the highest blood lead levels (40 µg/dL) were employed in the construction industry, primarily as painters and de-leaders.¹⁶²
- Hispanic workers have been found to be over-represented among adults reported with elevated blood lead levels.^{163,164} From 2003-2009, the most recent time period for which data on ethnicity is available, Hispanic workers in Massachusetts accounted for 10% of cases with the highest blood lead levels ($\geq 40 \mu\text{g}/\text{dL}$), whereas Hispanic residents made up 6% of the Massachusetts workforce.
- Low-income residents, racial/ethnic minorities, and immigrants are often employed in more hazardous jobs with higher exposures to lead and other chemical, physical and psychosocial hazards.¹⁶⁵
- In addition to higher risks of being exposed to lead both at work and in the communities where they live, low-income, minority and immigrant workers may not have access to the resources, health and safety training, and benefits available through more secure employment and be unaware of their rights in the workplace. Poverty and economic insecurity contributes to these workers remaining in high-risk, low-paying jobs, increasing their risk for occupational injury and decreasing the likelihood that they will report these workplace hazards to their employers.¹⁶⁶ Discrimination, or the fear of discrimination, among this population also deters them from speaking out about hazards in the workplace.^{167,168,169,170,171}

Asbestos-Related Disease

Exposure to asbestos most often occurs in occupational settings.^{172,173,174} Breathing in dust that contains asbestos can damage the lungs and other organs causing diseases such as mesothelioma, asbestosis, and lung cancer.^{175,176} Asbestos is the only well-established risk factor for mesothelioma, a usually fatal cancer of the lining of the lung and abdomen.

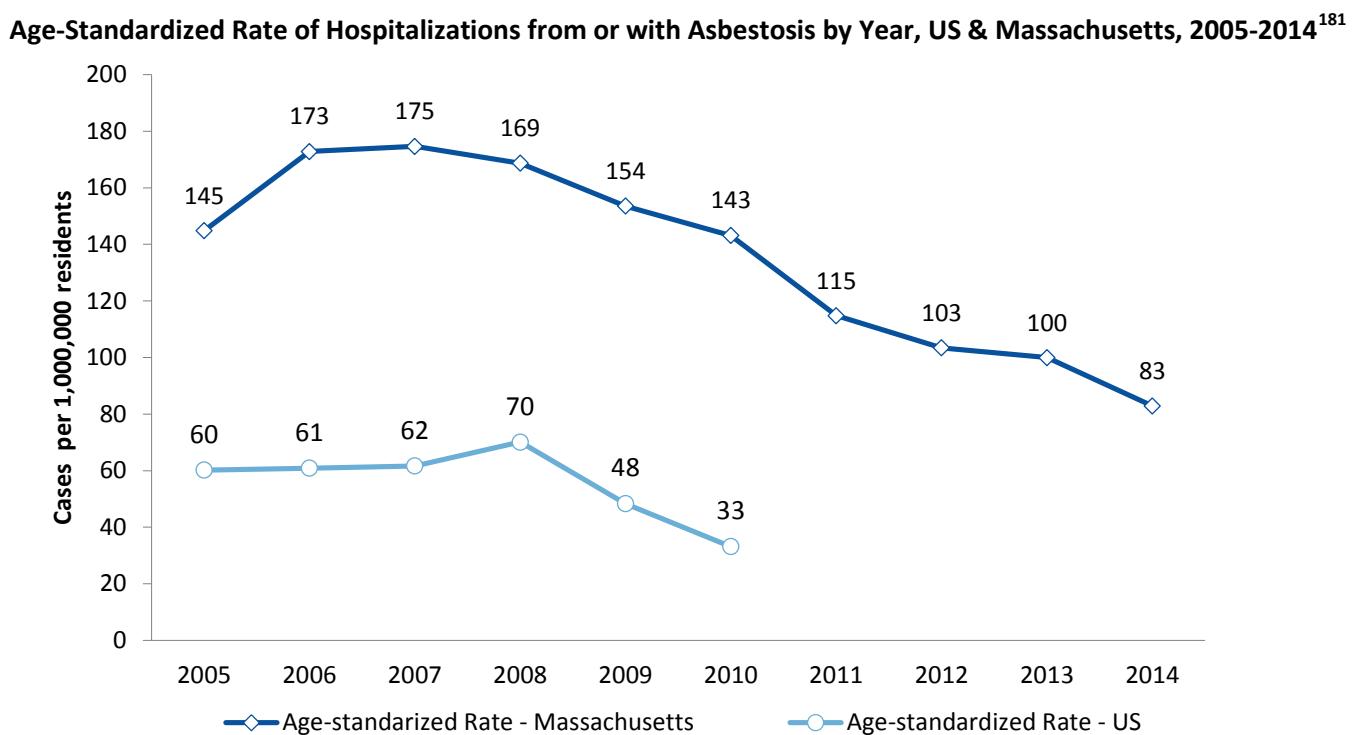
Trends/ Disparities

From 2005-2013, an average of 93 cases of mesothelioma was reported to MDPH each year, and the incidence rate of mesothelioma exceeded that for the nation for all but two years (2008 and 2011). There was a downward trend in the Massachusetts mesothelioma incidence rate over time, ranging from 19.4 cases per million in 2005 to 14.6 cases per million in 2013.¹⁷⁷

From 2005-2014, there was an average of 799 hospitalizations of individuals with a diagnosis of asbestosis each year, with a hospitalization rate that consistently exceeded the national rate. There has been a significant decline in hospitalizations from asbestosis in Massachusetts since 2007. Almost all of the individuals with mesothelioma or hospitalized with asbestosis were male and over 50 years of age.

In 2015, there were more than 23,000 registered asbestos removal projects in Massachusetts. Many of the workers potentially exposed to asbestos during abatement activities are foreign-born.¹⁷⁸ A study of Cambodian asbestos abatement workers in Lowell found that they, like other recent arrivers, accepted jobs in hazardous industries, such as asbestos abatement, hazardous waste and other temporary employment.¹⁷⁹ Discrimination and economic insecurity that make workers hesitant to speak up about workplace hazards may also contribute to disparities in occupational health risks.¹⁸⁰

Figure 3.10



SOURCE: MA INPATIENT HOSPITAL DISCHARGE DATASET; NATIONAL CENTER FOR HEALTH STATISTICS' NATIONAL HOSPITAL DISCHARGE SURVEY (DISCONTINUED AFTER 2010); POPULATION ESTIMATES FROM US CENSUS

NOTE: RATES ARE AGE-ADJUSTED (STANDARDIZED) TO THE 2000 US STANDARD POPULATION AND EXPRESSED PER MILLION MA RESIDENTS 15 YEARS OR OLDER

Selected Resources, Programs, and Services

Following are selected resources, services and programs that support the topics discussed in this chapter.

Public Health Fish Advisories

- The MDPH fish advisory website provides guidance on the safe consumption of fish and information on fish advisories for specific waterbodies.¹⁸²
- Individuals can request testing of fish for contaminants in Massachusetts waterbodies.¹⁸³

Ambient Air Quality

- The MassDEP provides daily air quality and pollution forecasts to help Massachusetts' residents understand current ambient air conditions and their health impacts.¹⁸⁴

Recreational Water Quality

- Local boards of health and the Massachusetts Department of Conservation and Recreation are required by law to regularly monitor beach water quality. The MDPH Beaches and Algae website provides daily updated information on fecal indicator bacteria levels and closures at marine beaches as well as historical test results.¹⁸⁵

Public Drinking Water Quality

- Consumer confidence reports (CCRs) are annual reports required by law and distributed to consumers by water suppliers. They contain information on the source of a community's drinking water, the quality of the water, and compliance with state and federal drinking water regulations.
- Information on drinking water quality is available at MassDEP's website¹⁸⁶ (or through your local water department) and also at the Massachusetts Environmental Public Health Tracking (EPHT) website¹⁸⁷.
- The MassDEP Assistance Program for Lead in School Drinking Water provides financial and technical assistance to schools to test drinking water for the presence of lead and copper.

Childhood Lead Exposure

- Community Progress Report Initiative¹⁸⁸ addresses the wide variation in blood lead screening and prevalence rates at the community level, MDPH developed a direct mailing tool for physician outreach that provides community-specific indicators of childhood lead screening and exposure, highlights areas of needed improvement, and encourages clinicians to screen all children and educate parents on available resources.
- Case Management and Primary Prevention services available when a child is identified with a high blood lead level. MDPH provides services to the family including a code enforcement inspection of the property to identify and eliminate sources of exposure, culturally and linguistically appropriate family advocacy, clinical case management, and community health worker assistance.
- Primary Prevention Services available through the MDPH Childhood Lead Poisoning Prevention Program. Private lead inspectors obtain licenses and training on inspections and compliance activities for property owners.

- The Lead Law is designed to protect children from harmful exposures by requiring lead safe housing wherever a child under the age of six resides. Frequently, families are illegally steered away from apartments that may contain lead, a practice that disproportionately impacts lower-income families and can lead to homelessness. Fair housing laws prohibit owners from refusing to rent to families because they have young children.
- Regulations for Lead Poisoning Prevention and Control: The Childhood Lead Poisoning Prevention Program (CLPPP) has proposed amendments to lower the definition of lead poisoning to 10 µg/dL with mandatory code enforcement inspection and remediation of the child's home, strengthen confirmatory screening with venous blood, and reduce the cost of de-leading by refining lead hazard criteria.
- Financial help for lead abatement is available through tax credits, grants, and loans to help with the cost of lead abatement and reduce housing discrimination. Detailed information is available on the MDPH Childhood Lead Poisoning Prevention Program (CLPPP) website.

Climate and Health

- The MDPH Bureau of Environmental Health (BEH) supports local health department and municipal efforts to develop adaptation plans to reduce health impacts from climate change. The EPHT has information on this work.¹⁸⁹

Environmental Justice Populations and Health

- Vulnerable Health Environmental Justice population identification can be used as a screening tool to evaluate existing health burdens and vulnerabilities among Environmental Justice populations.

Occupational Exposures and Disease

- The MDPH Occupational Health Surveillance Program collaborates with other agencies to ensure that adults exposed to lead have appropriate medical treatment and to promote workplace changes to reduce occupational exposures to lead.
- The Massachusetts Occupational Lead Poisoning Registry (OLPR): follows up with adults with higher blood lead levels, their health care providers, and employers to ensure adequate medical treatment and removal from exposure and to control exposures to protect others at risk, disseminates educational materials in multiple languages about adult and childhood lead poisoning, and coordinates with the Childhood Lead Poisoning Prevention Program to address potential cases of take home lead exposures.
- Massachusetts Department of Labor Standards oversees licensing and training of lead abatement workers.
- The Massachusetts Department of Labor Standards and the Massachusetts Department of Environmental Protection enforce laws requiring control of asbestos exposure during removal projects and the training and licensing of asbestos abatement supervisors and certification of workers.
- The MDPH Cancer Registry Program and the Occupational Health Surveillance Program are collaborating with the Centers for Disease Control and Prevention to analyze cancer registry data by industry and occupation for five states, including Massachusetts, in an effort to identify previously unrecognized settings in which workers and community members may be at risk of exposure to hazards such as asbestos which can lead to cancers such as mesothelioma and lung cancer.

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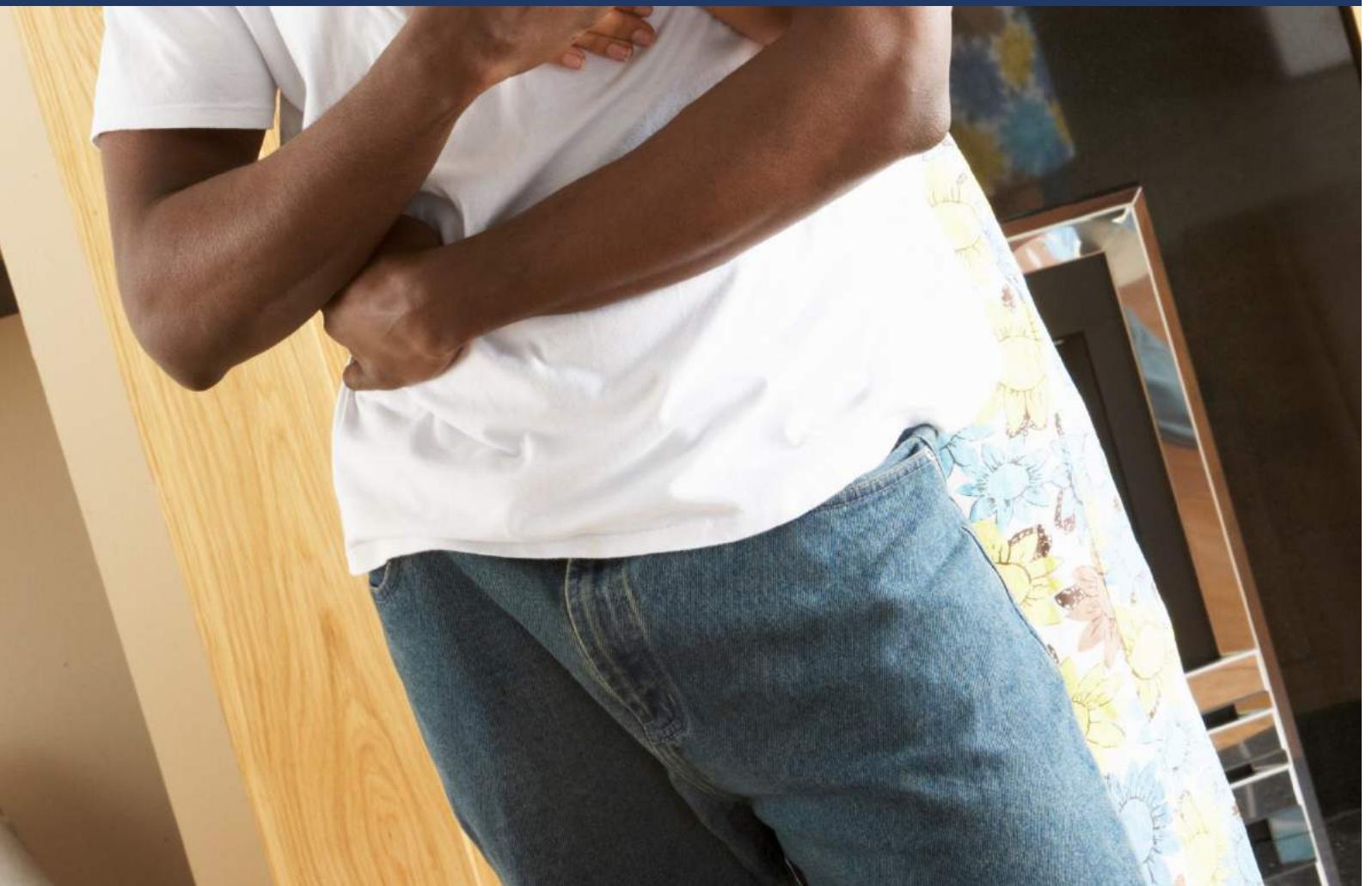
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CHAPTER 4

Infectious Disease





Infectious Disease

This chapter provides information on preventing and controlling infectious diseases, and related trends, disparities, and resources in the Commonwealth of Massachusetts. It addresses the following infectious disease topic areas:

- Foodborne Diseases
- Healthcare-Associated Infections
- Sexually Transmitted Infections
- Human Immunodeficiency Virus
- Viral Hepatitis
- Tuberculosis
- Vectorborne Diseases
- Immunization
- Selected Resources, Services, and Programs

Chapter Data Highlights

- Over 4,200 confirmed cases of foodborne disease in 2015
- HIV infections decreased by 31% from 2005 to 2014
- In 2015, hepatitis C case rates were 26 and 10 times higher, respectively, among White non-Hispanics compared to Asian non-Hispanics and Black non-Hispanics
- In 2016, 190 cases of TB were reported in Massachusetts
- Tickborne babesiosis increased 15% from 2015 to 2016
- Influenza and pneumonia ranked in the top ten leading causes of death among Massachusetts residents in 2014

Overview

Infectious diseases have been causing human illness and death since the dawn of human existence. The effective prevention and control of these diseases is one of the major reasons for increases in life expectancy.

In 1701, Massachusetts passed legislation requiring the isolation of the sick “for better preventing the spread of infection.”¹⁹⁰ Since then, Massachusetts has led the nation in infection prevention and control.

For example, Massachusetts was the only state to achieve a score of 10 out of 10 in Health Security Ranking which includes reducing healthcare-associated infections (HAIs), biosafety training in public health laboratories, public health funding commitment, national health security preparedness, public health accreditation, flu vaccination rates, climate change readiness, safety as well as a biosafety professional on staff and emergency health care access.

Reportable conditions are captured by the Massachusetts Virtual Epidemiologic Network (MAVEN). MAVEN is an integrated, web-based surveillance and case management system that enables state and local health departments to appropriately share public health, clinical, and case management data efficiently and securely over the Internet.¹⁹¹ MAVEN provides automatic notifications 24/7/365 to state and local officials of any event requiring immediate attention.

While many infections are endemic and require relatively routine follow-up for their prevention and control, the Massachusetts Department of Public Health’s (MDPH) Bureau of Infectious Disease and Laboratory Sciences (BIDLS) must maintain vigilance and surge capacity to respond at all times. Micro-organisms can be transmitted from person to person, and by vectors (e.g., animals, insects), food, water, and air. In their own effort to survive, micro-organisms evolve and create new, and unforeseen challenges. The response to emerging pathogens (e.g., antibiotic resistant organisms, Ebola virus, Zika virus) demands immediate and resilient resources, including a state of the art and responsive public health laboratory.

Foodborne Diseases

Foodborne illnesses¹⁹² are common, costly, and preventable public health hazards. Food can become contaminated with bacteria, viruses, parasites, or prions at different stages of food processing, preparation, or storage. Massachusetts recorded more than 4,200 confirmed cases of foodborne disease in 2015.

Salmonellosis

Salmonellosis is a diarrheal disease caused by many bacteria of the genus *Salmonella*. Salmonellosis is the most frequently identified bacterial infection transmitted through food and water. Salmonellosis results in more hospitalizations than any other foodborne bacterial pathogen.¹⁹³

The state public health laboratory is part of a national network of 83 laboratories (PulseNet) that perform molecular characterization of bacteria DNA which has caused foodborne illness. Once a DNA fingerprint is created, specialized software allows scientists in BIDLS to upload its pattern to the national PulseNet database. This helps investigators to find the source, alert the public, and identify gaps in food safety systems that would otherwise go unrecognized. Because results are shared within the network, public health scientists can determine whether cases within a cluster are related to each other and whether the strain might be causing illness in other states.

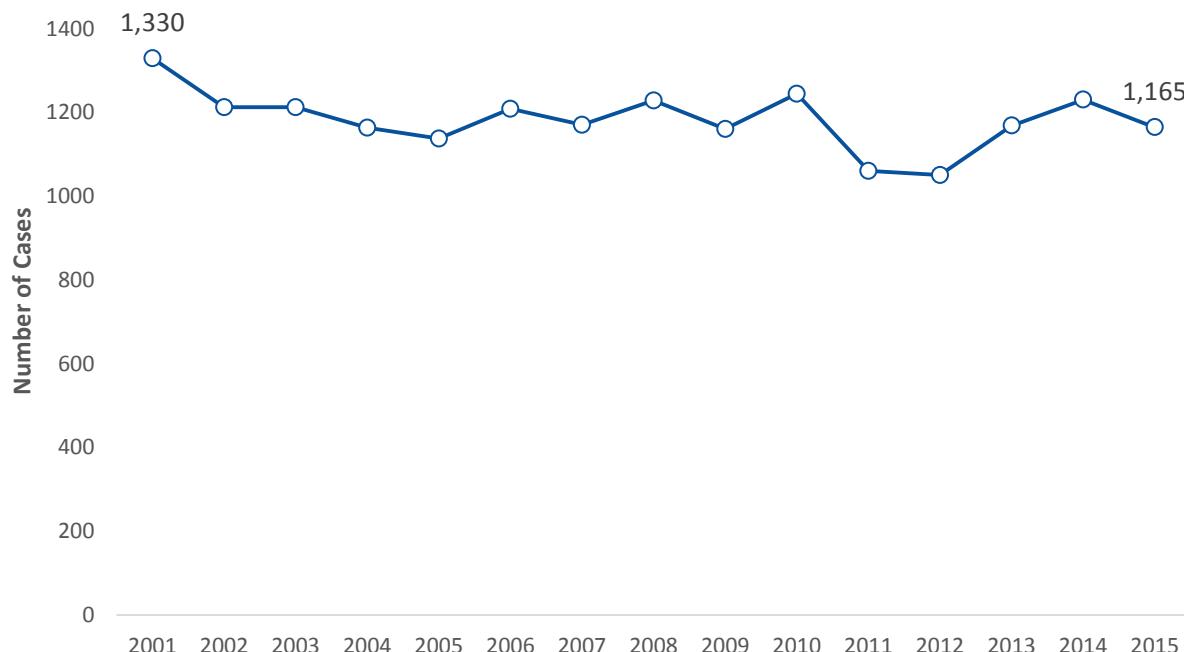
Trends/Disparities

In Massachusetts, over 1,000 cases of salmonellosis are reported each year (**Figure 4.1**). The rate of salmonellosis among children under five years of age is 2.8 times the rate among adults more than 30 years of age (45 per 100,000 population versus 16 per 100,000 population, respectively).

In 2016, 14 cases were reported nationally of a new strain of *Salmonella* (*Salmonella* Oslo) associated with Persian mini cucumbers. Two (14%) of these cases were detected and investigated in Massachusetts.¹⁹⁴

Figure 4.1

Number of Cases of Salmonellosis, Massachusetts, Fiscal Years 2001-2015



Shiga Toxin-Producing E. Coli (STEC)

Escherichia coli, commonly known as *E. coli*, are bacteria commonly found in the gut of humans and animals. *E. coli* can cause disease in several ways, but some strains cause disease by producing a chemical called 'Shiga-toxin' and are called Shiga-toxin producing *E. coli* (STEC). The most common symptoms of STEC infection are severe stomach cramps and diarrhea. STEC infection can occur when individuals eat or drink something that contains these organisms without proper cooking or pasteurization (e.g., ground beef or apple cider).

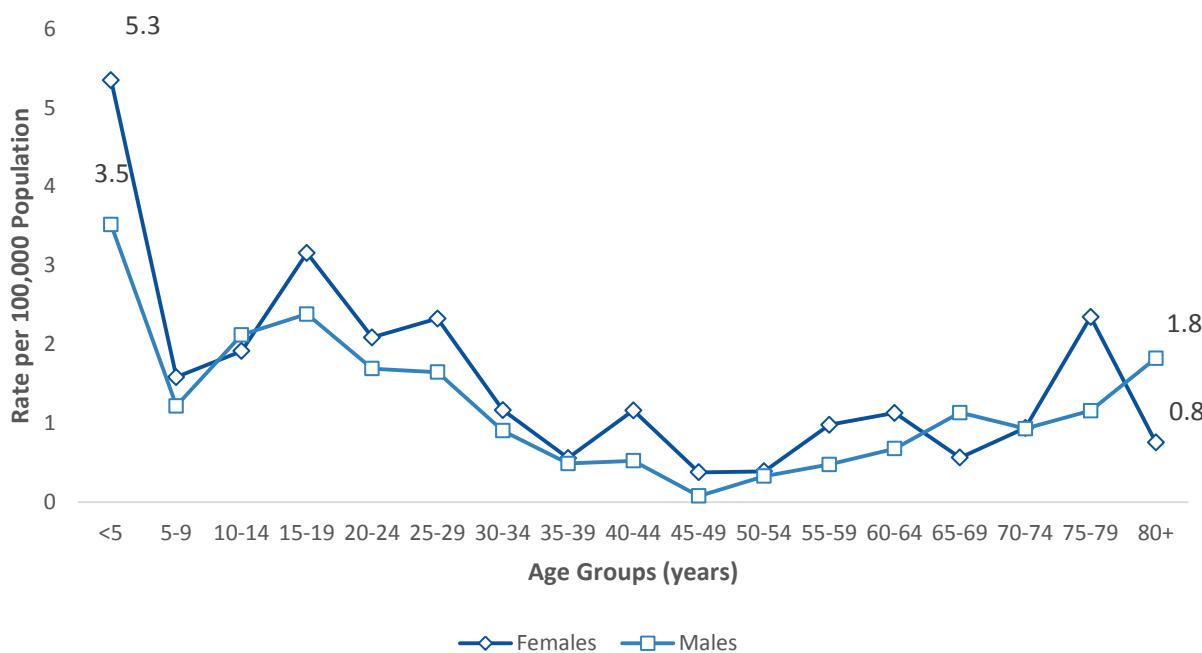
STEC can cause bloody diarrhea and a rare but serious and sometimes life-threatening problem called hemolytic uremic syndrome. Treatment of this complication requires hospitalization and can result in permanent damage or death.

Trends/Disparities

From 2011-2015, approximately 100 cases of STEC were reported and investigated annually in Massachusetts. Children younger than 5 years of age were the most frequently affected group (females: 5.3 per 100,000 population; males: 3.5 per 100,000 population). Older children and older adults had higher incidence rates of STEC infection than adults aged 30-70 years (**Figure 4.2**).

Figure 4.2

Average Annual Incidence Rate of Shiga-Toxin Producing *E. coli* (STEC) by Sex and Age Group, 2011-2015



Healthcare-Associated Infections (HAI)

Healthcare-associated infections (HAIs)¹⁹⁵ are infections people contract while they are receiving health care for another condition. HAIs can happen in any health care facility, including hospitals, ambulatory surgical centers, dialysis facilities, long-term care facilities, and outpatient settings. HAIs can be caused by bacteria, fungi, viruses, or other organisms. It has been estimated that in 2011 there were more than 720,000 HAIs, involving 1 in every 25 patients in US acute care hospitals.

Clostridium difficile

Clostridium difficile (*C. difficile*) is a bacterium that causes inflammation of the colon (colitis). This can result in severe and relapsing diarrhea that can be disabling and life-threatening. *Clostridium difficile* can cause HAIs because susceptible persons - especially those who have taken antibiotics recently- can be infected through contact with contaminated surfaces at a health care facility or from a health care provider's contaminated hands. The CDC classifies *Clostridium difficile* infections as an urgent threat, and a consequence of the general overuse of

antibiotics. Genetic diversity of *C. difficile* suggests that transmission occurs both inside and outside of health care facilities. Programs to prevent and control *C. difficile* infections require improving the use of antibiotics across the spectrum of health care settings.

Trends/Disparities

In 2014, Massachusetts recorded 8,746 confirmed and suspected cases of *C. difficile* through MAVEN. Females accounted for 57% (5,022 cases) and 52% (4,532 cases) were among persons aged 65 years or older.

A total of 7,222 *C. difficile* events in Massachusetts acute care hospitals were reported to the National Healthcare Safety Network (NHSN) in 2014, the surveillance system for HAI. This number increased 10% to 7,917 events in 2015.

The Massachusetts rate of death associated with *C. difficile* in 2014 was 4.3 per 100,000 population according to death certificate reports. Of these, 56% (165 deaths) were female and 89% (262 deaths) were among persons aged 65 years or older.

There were 7,293 acute care hospital admissions in Massachusetts due to or associated with *C. difficile* infection in 2014 (primary diagnoses: 2,348 cases; associated diagnoses: 4,945 cases).

Methicillin-Resistant *Staphylococcus aureus*

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a bacterium that is resistant to many antibiotics. Staphylococcal infections, including those due to MRSA, can have a variety of manifestations, ranging from skin infection to bacteremia, sepsis, and pneumonia that can cause both health care and community infections.

In health care settings, MRSA is usually spread by direct contact with an infected wound, environmental contamination or from contaminated hands including those of health care providers. Additionally, individuals who carry MRSA on their skin or in their nose but do not have signs of infection, can spread the bacteria to others. Anyone can get MRSA from contact with an infected wound or by sharing personal items such as towels or razors that have touched infected skin. MRSA infection risk is heightened when a person is involved in activities or is present in places with crowding, skin-to-skin contact, and shared equipment or supplies. Athletes, children in daycare, students, military personnel in barracks, inmates in jails or prisons, and those who recently received inpatient medical care are at higher risk of MRSA infection.¹⁹⁶

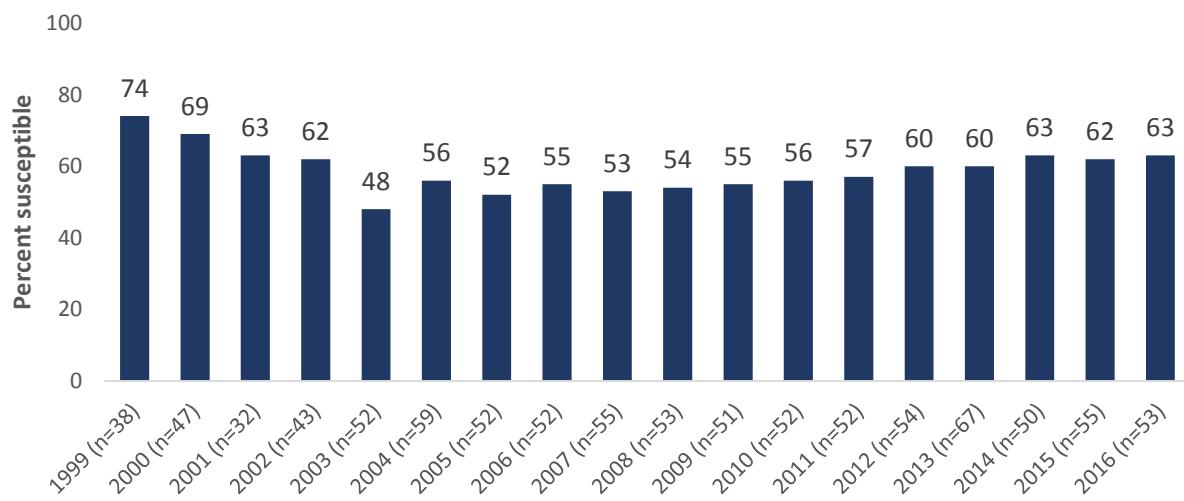
Trends/Disparities

Since 1999, aggregated test results of antibiotic susceptibility (called antibiograms) have been submitted by acute care hospitals in Massachusetts to MDPH for surveillance purposes. These data represent the antibiotic susceptibility of 11 bacteria isolated in acute care hospitals in Massachusetts. Since 2003, there have been slight improvements in the overall reported susceptibility of *S. aureus* to oxacillin/methicillin (**Figure 4.3**).

MRSA infections decreased in number from 484 in 2014 to 429 in 2015 (an 11% decrease) but increased from 5% to 7% as a percentage of causes of surgical site infections monitored by NHSN. The unadjusted rate of all MRSA infections in acute care hospitals was 4.9 per 100,000 patient days in 2015, a rate that exceeds previous years (2013: 4.0 per 100,000 patient days; 2014: 3.6 per 100,000 patient days).

Figure 4.3

Mean Susceptibility of *S. aureus* Isolates to Oxacillin among Reporting Facilities, Massachusetts, 1999-2016



Sexually-Transmitted Infections (STI)

A number of bacteria, viruses, and parasites can be transmitted through sexual contact because sexual activity involves close contact with skin and mucous membranes of the genitals, mouth, or rectum. Some sexually-transmitted infections (STIs) cause inflammation or ulceration, which predispose to transmission of other infections. However, infections often occur without symptoms and are not detected by the affected individual or surveillance unless screening is conducted.

Prevention and control of STIs requires treatment of the infected individual and their sexual partners. With the exception of vaccines for hepatitis A, hepatitis B, and human papillomavirus virus (HPV) infections, vaccines are unavailable for most STIs. However, all STIs are preventable. In some cases, such as syphilis and gonorrhea, fear and stigma add difficulty to obtaining adequate sexual histories needed for effective prevention and control. In the US, an estimated 20 million new cases of STIs occur each year, but many more infections go undetected.¹⁹⁷

According to the 2013-2014 Massachusetts Behavioral Risk Factor Surveillance System survey, among males and females 18–64 years of age, 9% reported two or more sexual partners in the previous year, 69% reported one partner, and 22% reported no sexual partners. Among sexually active respondents, 25% reported using a condom at last sexual encounter (males: 27%; females: 24%).

Chlamydia

Chlamydia is an infection caused by the bacterium *Chlamydia trachomatis* and is the most frequently reported infectious disease in Massachusetts. While most infections are treatable with any of several antibiotics, complications such as pelvic inflammatory disease, ectopic pregnancy, and infertility can particularly affect women.

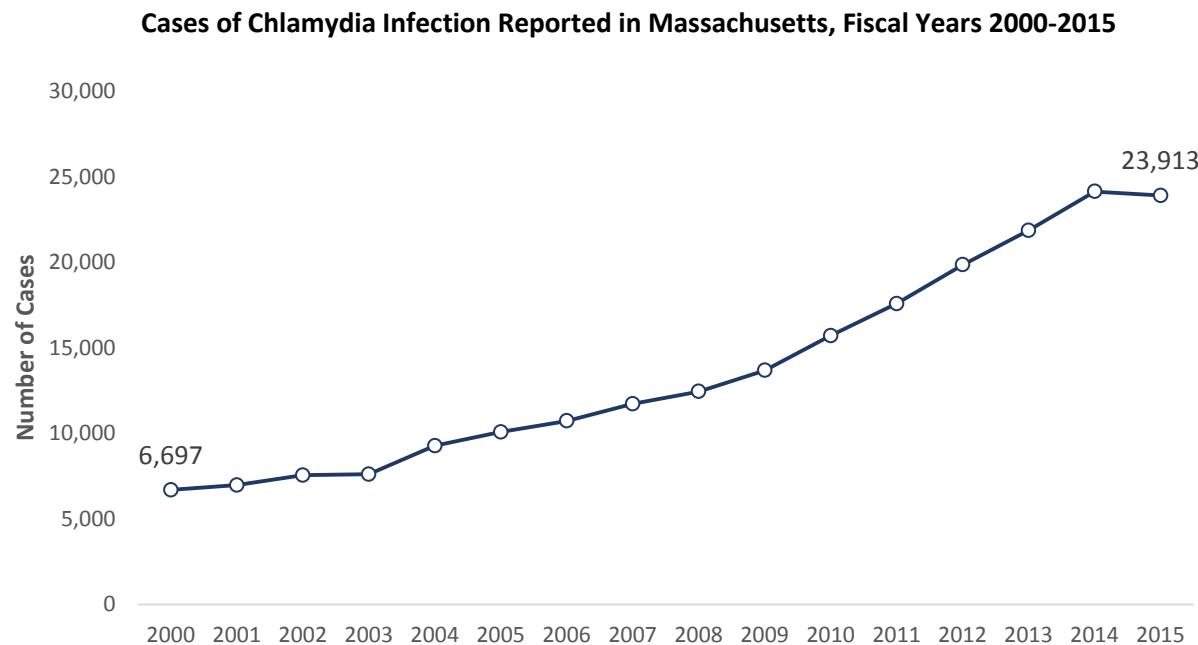
Trends/Disparities

In Massachusetts, the number of chlamydia cases increased over threefold from 2000 (6,697) to 2015 (23,913) (Figure 4.4). In 2015, the chlamydia incidence rate among women was 1.7 times the rate among men (442.9 per 100,000 population versus 255.5 per 100,000 population, respectively).

The chlamydia incidence rate for young adults (20–24 years of age) was 5.5 times higher than the statewide rate across all age groups in 2015 (1,933.0 per 100,000 population vs. 352.0 per 100,000 population, respectively).

Among adolescents 15 to 19 years of age, the chlamydia incidence rate was 3.3 times higher than the statewide rate across all age groups (1,150.1 per 100,000 population vs. 352.0 per 100,000 population, respectively).

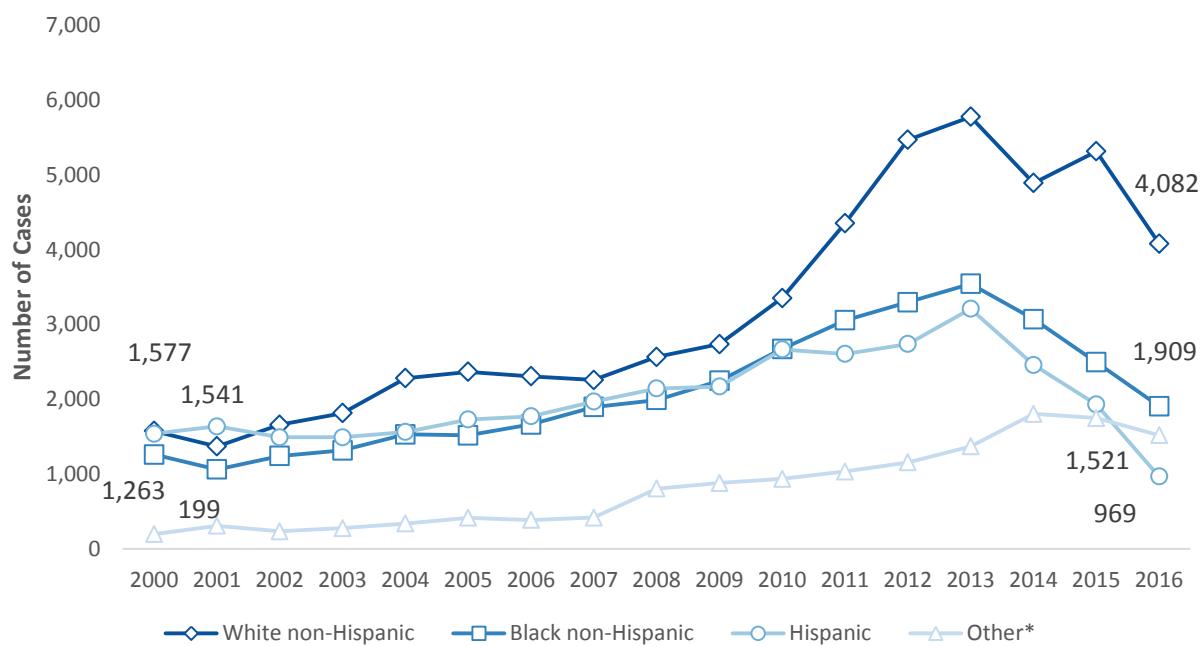
Figure 4.4



Significant racial and ethnic disparities exist in chlamydia incidence. The estimated incidence rate of chlamydia per 100,000 populations among Black non-Hispanics was 5.3 times higher and 1.6 times higher among Hispanics in 2016 than among White non-Hispanics.

Figure 4.5

Laboratory Confirmed Chlamydia Case Counts Per Year, by Race/Ethnicity, Massachusetts, 2000-2016



NOTE: * THE OTHER TOTAL INCLUDES THE SUM OF THOSE REPORTED WITH RACE AND ETHNICITY AS ASIAN/PACIFIC ISLANDER, AMERICAN INDIAN/ALASKAN NATIVE, MULTI-RACIAL, AND REPORTED OTHER.

NOTE: UNKNOWNS WERE REMOVED. PLEASE SEE DATA LIMITATIONS.

Gonorrhea

Gonorrhea is caused by infection with the bacterium *Neisseria gonorrhoeae*. If left untreated in women, gonorrhea can cause pelvic inflammatory disease and other serious reproductive complications, including infertility, ectopic pregnancy, and chronic pelvic pain.

The bacteria that cause this infection have progressively developed resistance to the antimicrobials used for its treatment. Centers for Disease Control and Prevention (CDC) treatment guidelines now require a two-antibiotic treatment regimen for effective therapy.

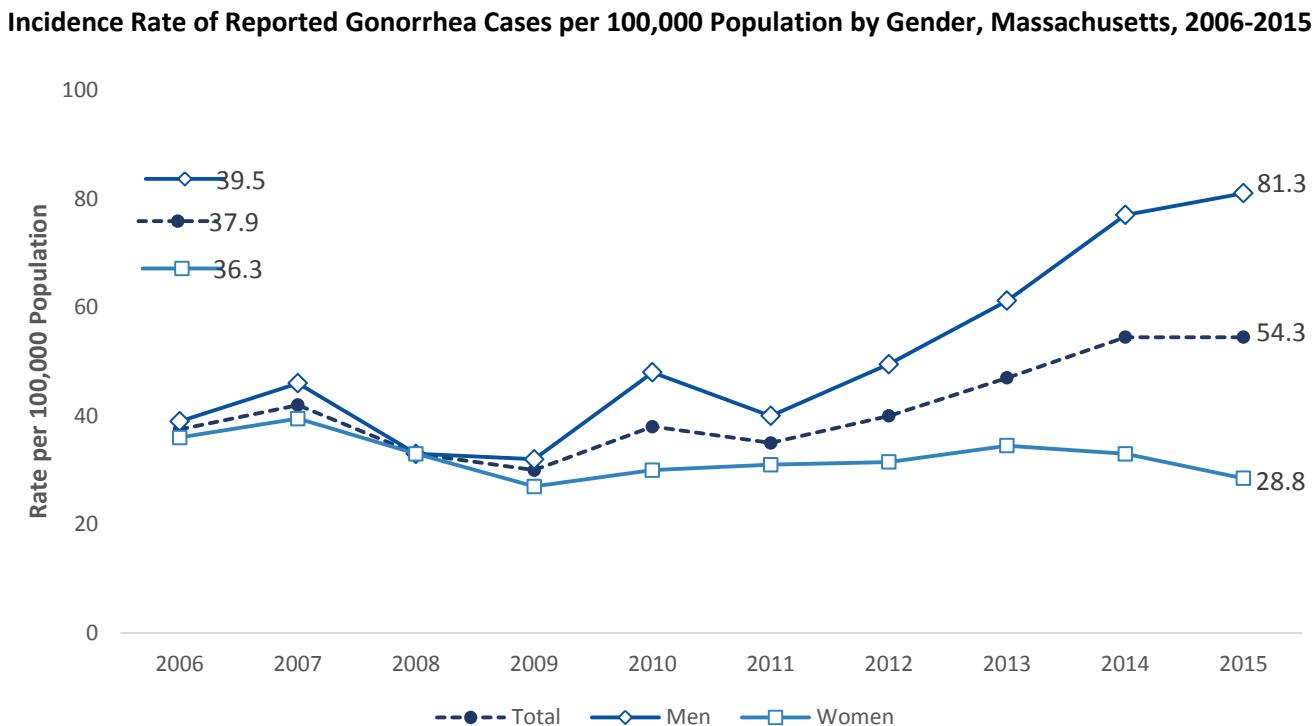
Trends/Disparities

In Massachusetts, the number of reported gonorrhea cases increased 52% from 2006 to 2015 (2,428 vs. 3,688 cases, respectively).

Between 2006 and 2015, the gonorrhea incidence rate reported among men doubled (from 39.0 per 100,000 population to 81.0 per 100,000 population). The gonorrhea incidence rate among men is now 2.8 times higher than the rate among women (28.5 per 100,000 population), and is mostly associated with men who have sex with men (Figure 4.6). In 2015, the gonorrhea incidence rate among young adults (20–24 years of age) was 3.9 times the

statewide incidence rate in all ages (211.9 per 100,000 population vs. 54.3 per 100,000 population, respectively). The burden of gonorrhea incidence is higher among racial/ethnic minorities, including men who have sex with men.

Figure 4.6



Syphilis

Syphilis is a sexually-transmitted bacterial infection that affect many bodily systems through several stages of infection. Penicillin has been used to effectively treat syphilis for more than 70 years.

Left undiagnosed and untreated, syphilis can cause complications including permanent visual impairment, hearing loss, and other neurologic problems. If syphilis is undetected or untreated in pregnant women, there is a high risk of poor outcomes, including congenital abnormalities or fetal death.

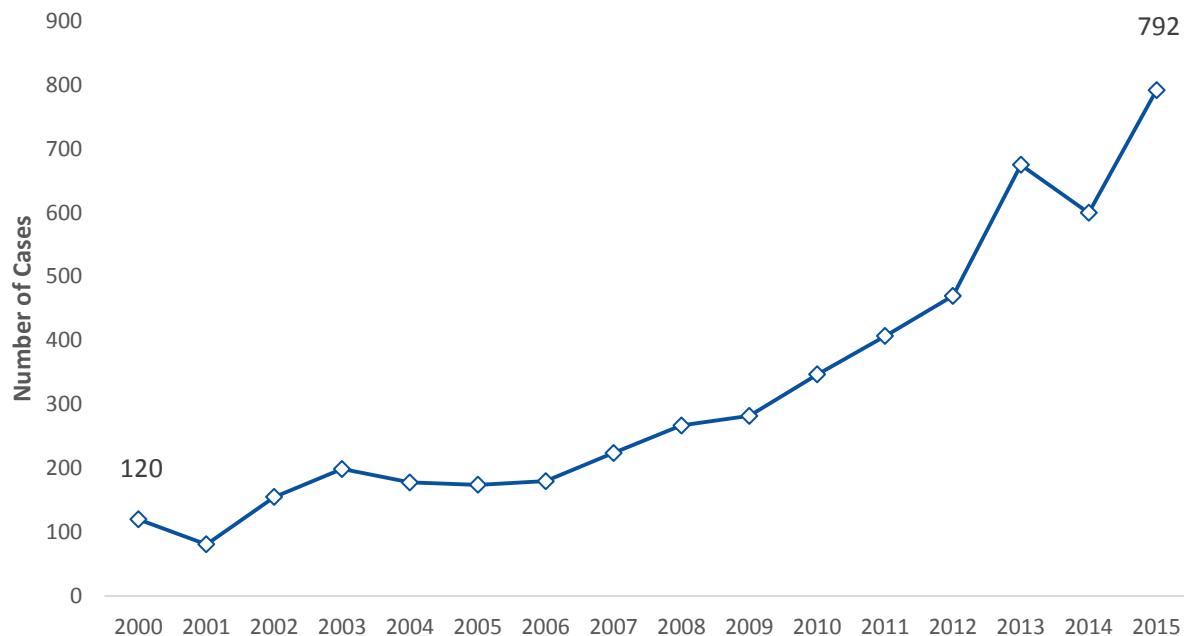
Trends/Disparities

In Massachusetts, the number of reported infectious syphilis cases in 2015 was 6.6 times higher than reported in 2000 (792 cases vs. 120 cases, respectively) (**Figure 4.7**).

Between 2006 and 2015, the syphilis incidence rate reported among men more than tripled (from 6.4 per 100,000 population to 22.4 per 100,000 population, respectively). The syphilis incidence rate among men is now 14.0 times higher than the rate among women (22.4 per 100,000 population vs. 1.6 per 100,000 population, respectively).

Figure 4.7

**Number of People Diagnosed with Infectious Syphilis by Year of Diagnosis,
Massachusetts, Fiscal Years 2000-2015**



The proportion of self-identified men who have sex with men among reported infectious syphilis cases ranged from a low of 66% in 2014 to a high of 83% in 2008 and 2010.

In 2015, the infectious syphilis incidence rates among individuals aged 20 to 24 years, 25 to 29 years, and 30 to 39 years were each approximately twice the statewide incidence rate across all age groups (28.3, 25.7, and 24.5, respectively, compared to 11.7 per 100,000 population).

In 2015, the infectious syphilis incidence rate was 3.7 times higher for Hispanic residents (28.7 cases per 100,000 population) and 3.0 times higher for Black non-Hispanic residents (23.1 cases per 100,000 population) compared to White non-Hispanic residents (7.8 cases per 100,000 population).

HIV

HIV infection has evolved from a nearly universally fatal disease to a manageable chronic infection. In the US, the populations most impacted are men who have sex with men, persons who inject drugs (PWID), and non-US born populations.

No effective cure exists for HIV infection, but with proper medical care, it can be controlled. Prevention efforts require a comprehensive strategy, starting with prevention of infection through personal preventive behaviors, use of pre-exposure prophylaxis (PrEP), screening, and universal access to treatment. Stigma and fear still play a role in preventing some people at-risk for HIV infection from getting tested and into health care that could provide them with enhanced health and survival.

The MDPH plan to end the HIV/AIDS epidemic in the Commonwealth¹⁹⁸ includes four goals:

1. Reduce population health disparities by optimizing services and using data-to-care initiatives to improve linkage and retention in care;
2. Strengthen the public health response to HIV, hepatitis C, and sexually transmitted infections by promoting high-quality laboratory services and access to testing and treatment;
3. Improve service system quality and sustainability; and
4. Promote collaborations that improve health outcomes by strengthening partnerships and community engagement.

Trends/Disparities

The number of diagnoses of HIV infection decreased 31% from 913 in 2005 to 629 in 2014.¹⁹⁹ But the number of persons known to be living with HIV/AIDS (PLWHA) increased 26% from 15,666 in 2005 to 19,747 in 2014.

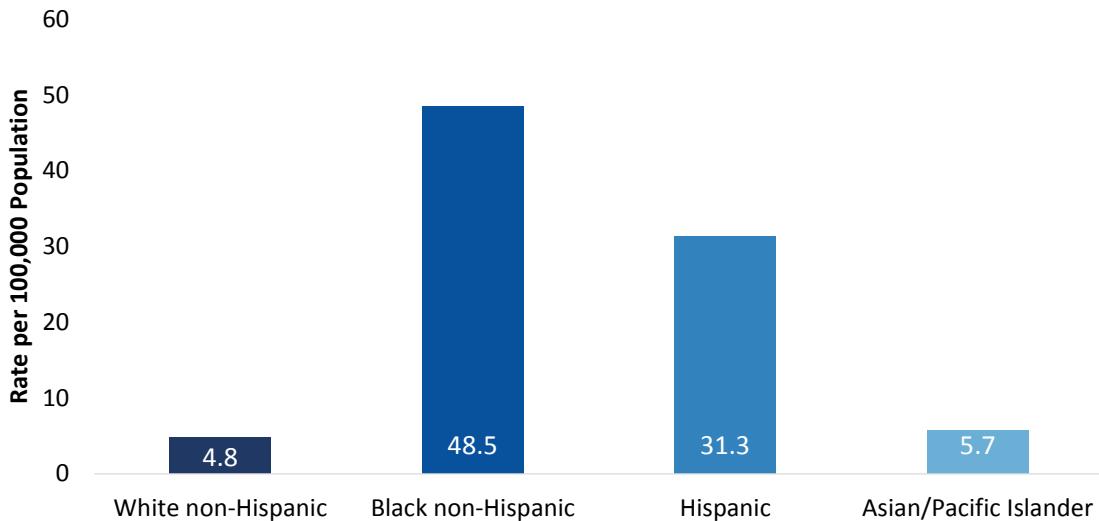
Male-to-male sex was the reported mode of exposure for 45% of all recently reported HIV infections, and men who have sex with men represented 61% of newly diagnosed cases among men from 2012 to 2014.

Among men, the rate of newly diagnosed HIV infection was 27.8 times higher among men who have sex with men (MSM) than among non-MSM for the time period 2012 to 2014 (241.9 per 100,000 population versus 8.7 per 100,000 population, respectively) (**Figure 4.9**).

The racial and ethnic disparities in HIV infection, demonstrated in **Figure 4.8**, indicate a 10-times higher rate of newly diagnosed cases in Black non-Hispanics and more than 6 -times higher rate in Hispanics than White non-Hispanics. Among newly diagnosed women, 78% identified as Black non-Hispanic or Hispanic; and 69% of Black non-Hispanic women, 36% of Hispanic women, and 8% of White non-Hispanic women were born outside the US.

Figure 4.8

Average Annual Age-Adjusted Rate of HIV Infection Diagnosis, by Race/Ethnicity, Massachusetts, 2012-2014

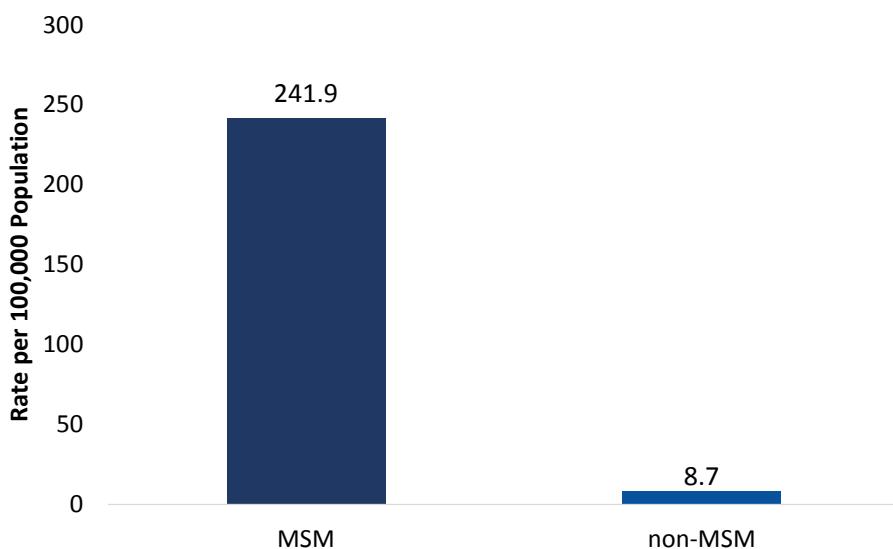


Levels of engagement in health care and viral suppression were higher among White non-Hispanic PLWHA compared to Black non-Hispanic and Hispanic PLWHA.

A higher proportion of White non-Hispanic PLWHA (69%) were virally suppressed compared to Black non-Hispanic (63%) and Hispanic (60%) PLWHA.

Figure 4.9

**Estimated Average Annual HIV Diagnosis Rate per 100,000 Population,
Men who have Sex with Men (MSM) Compared to non-MSM, Aged 18-84, Massachusetts, 2012-2014**



Viral Hepatitis

Hepatitis is an inflammation of the liver that can impair vital liver functions. Viral hepatitis is most frequently caused by hepatitis A, B, or C viruses. Damage to the liver among persons with viral hepatitis is exacerbated by heavy alcohol use, and certain medications and other conditions.

The various types of viral hepatitis present with similar signs and symptoms. Laboratory testing is required to identify the virus causing the infection. This distinction is critical because outcome and treatment varies by virus.

Hepatitis C Virus (HCV) Infection

Hepatitis C virus is an RNA virus most effectively transmitted through blood-to-blood contact. Infection is often asymptomatic for decades.

In Massachusetts, almost half of individuals infected with hepatitis C virus may be undiagnosed. Because hepatitis C is not generally associated with symptoms, surveillance for hepatitis C is based on when a diagnosis is made, not when infection occurs. Since 2011, treatment options have become more effective, tolerable, and convenient.

"Substance use and infectious diseases are interconnected; we're seeing an increase in hepatitis C lately."

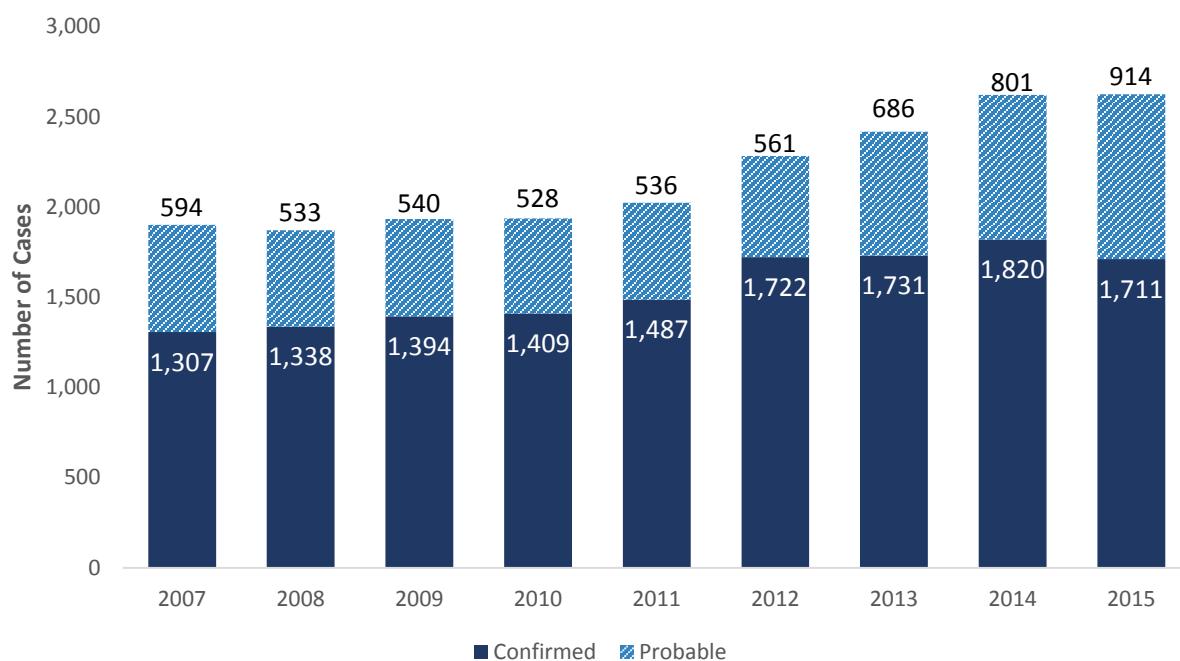
Key Informant Interviewee

Trends/Disparities

Since 2007 there have been almost 20,000 confirmed and probable cases of hepatitis C reported in Massachusetts among persons aged 15-29 years. The number of confirmed and probable cases among persons 15 to 29 years of age increased 35% from 2007 to 2015 (from 1,901 cases to 2,625 cases) (**Figure 4.10**). The rate of acute hepatitis C cases increased by 26% from 2007 to 2015 (1.4 per 100,000 population to 5.1 per 100,000 population, respectively).

Figure 4.10

Number of Confirmed and Probable HCV Cases among Persons Aged 15-29 Years, Massachusetts, 2007-2015



NOTE: DATA ARE CURRENT AS OF 11-15-2016 AND ARE SUBJECT TO CHANGE

In 2015, the rate of confirmed and probable hepatitis C cases was 26 times higher among White non-Hispanic residents compared to Asian non-Hispanic residents, and 10 times higher than among Black non-Hispanic residents.

The majority of new hepatitis C virus infections in persons younger than 30 years of age were attributable to blood exposure in the context of injection drug use.

Tuberculosis

Tuberculosis is an infection caused by *Mycobacterium tuberculosis* and is a major global cause of disability and death. Among infectious diseases, tuberculosis is the leading killer of adults in the world, with an estimated 1.8 million tuberculosis-related deaths in 2015.

Two tuberculosis-related conditions exist: latent tuberculosis infection (LTBI) and tuberculosis disease (TB). LTBI represents infection with the TB organism without disease. Among people with LTBI, 5-10% will develop active TB disease in their lifetime if they are not treated for LTBI. Diagnosis of LTBI requires a skin test or a blood test

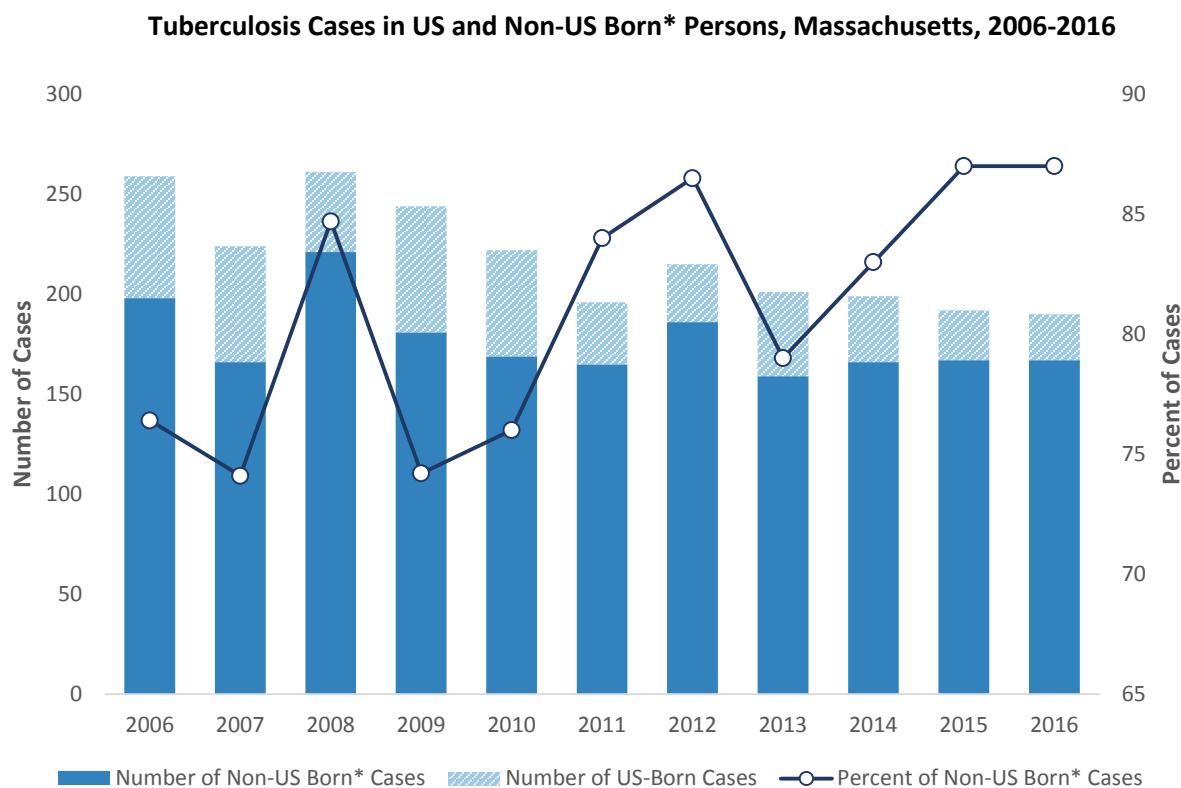
indicating TB infection. TB disease is preventable by treatment of LTBI, and TB disease is curable with anti-tuberculosis medications. Ongoing emergence of resistance to anti-tuberculosis medications is a growing challenge. State and local efforts to focus on high-risk populations and treat those with tuberculosis infection are key to tuberculosis elimination efforts in Massachusetts.

Trends/Disparities

The year 2016 was the fourth year in a row that the tuberculosis case count has decreased in Massachusetts, contributing to an overall decrease of approximately 12% since 2012. In Massachusetts, the 2016 tuberculosis case rate was 2.8 per 100,000 population (similar to the US national case rate of 2.9 per 100,000 population).

The number of cases of tuberculosis has declined to the current low of 190 cases in 2016. Of cases with bacteriologically confirmed TB disease and drug susceptibility testing performed, 27 out of 126 cases (21%) were resistant to one or more anti-tuberculosis medications.

Figure 4.11



NOTE: NON-US BIRTH DEFINED AS OUTSIDE THE UNITED STATES AND ITS TERRITORIES

In 2016, 166 out of 190 cases (87%) of tuberculosis disease were reported in non-US born persons (Figure 4.11). Ten out of 190 or 5% of total cases were known to be co-infected with human immunodeficiency virus (HIV) and 6 out of 190 (3%) were in persons experiencing homelessness within the previous year.

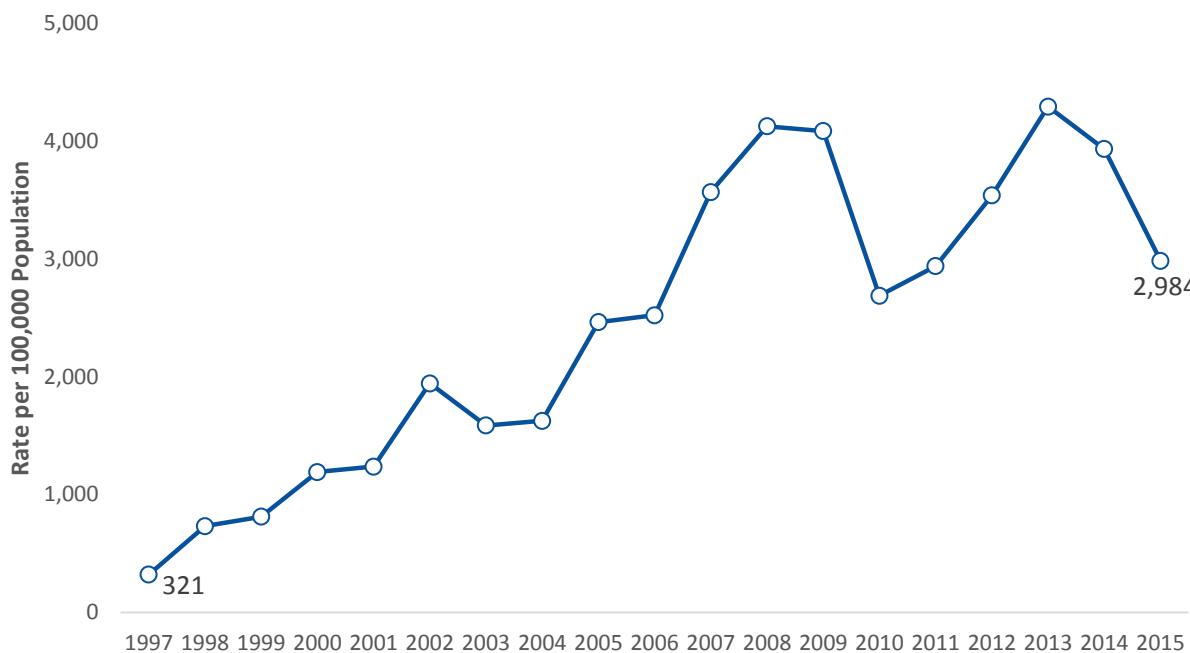
Vietnam, India, and Haiti were the top three countries of origin among Massachusetts residents with tuberculosis who were born outside of the United States.

Vectorborne Diseases

Vectorborne diseases²⁰⁰ include infections transmitted by bites from mosquitoes, flies, ticks, or fleas. These vectors can transmit bacteria, viruses, and parasites, and cause mild to severe disease. Sometimes vectorborne diseases can be fatal. Since its emergence as a human disease in 1938, the mosquito-borne virus of eastern equine encephalitis (EEE) has caused 100 identified human cases, 55 deaths and left 80% of survivors with permanent neurological damage in Massachusetts. West Nile virus, which first appeared in the US in 1999, has caused at least 148 cases of clinical disease in Massachusetts. Lyme disease has become hyperendemic (**Figure 4.12**) and two other vectorborne diseases have increased in Massachusetts in recent years: human granulocytic anaplasmosis and babesiosis.

Figure 4.12

Reported Cases of Lyme Disease, Massachusetts, Fiscal Years 1997-2015



Human Granulocytic Anaplasmosis (HGA)

Human granulocytic anaplasmosis (HGA) is a tickborne disease caused by the bacterium *Anaplasma phagocytophilum*. Anaplasmosis is transmitted to humans through bites by *Ixodes scapularis* ticks, also called blacklegged ticks or deer ticks.

Of the four distinct phases in the tick life cycle (i.e. egg, larvae, nymph, adult), nymphal and adult ticks are associated with transmission of anaplasmosis to humans.

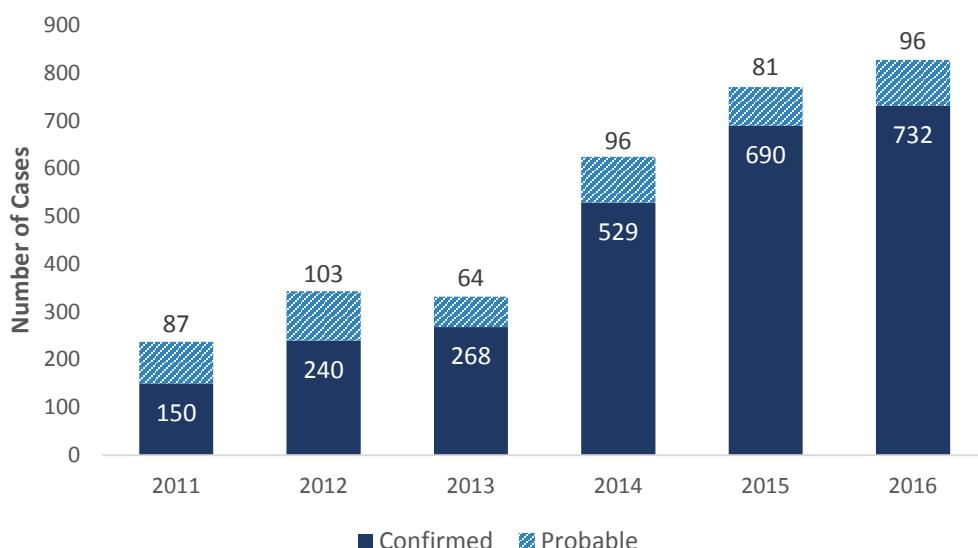
Typical symptoms of anaplasmosis include fever, headache, chills, and muscle aches. Usually, these symptoms occur within one to two weeks of a tick bite.

Trends/Disparities

In Massachusetts, 1,624 suspect cases of anaplasmosis were investigated in 2016. A total of 828 of these were confirmed or probable cases, a 3.4 fold increase from 237 in 2011 (**Figure 4.13**).

Figure 4.13

Number of Confirmed and Probable Anaplasmosis Cases Reported, Massachusetts, 2011-2016



Massachusetts counties with the highest anaplasmosis incidence include Barnstable, Berkshire, Dukes, Nantucket, and Plymouth.

The majority of anaplasmosis cases occur in May and June. Only 38% of cases reported awareness of a recent tick bite. Approximately one third of individuals with anaplasmosis (34%) were hospitalized. The symptoms most commonly reported included fever (93%), malaise (70%), muscle aches, and pain (64%). There were at least two anaplasmosis-related fatalities in 2016.

People 60 years of age and older were at greatest risk for clinical HGA disease; 54% of patients identified with HGA were 60 years of age or older. More than half (54%) of all HGA cases were male.

Babesiosis

Babesiosis is caused by several microscopic parasites that infect red blood cells. In Massachusetts, all cases are caused by the parasite *Babesia microti*. The babesiosis is spread by the same tick as lyme disease and HGA. Tickborne transmission is most common in particular regions and seasons. Disease usually peaks during warm months. *Babesia* infection can range in severity from asymptomatic to life threatening. The infection is both treatable and preventable.

Because most people with babesiosis are unaware of their infection and do not have symptoms, it is possible for them to be blood donors. Babesiosis has become the number one cause of transfusion-transmitted infection in the United States. Efforts are underway to introduce donor screening to prevent transmission.

Trends/ Disparities

In 2016, Massachusetts had 513 confirmed and probable cases of babesiosis, a 15% increase from 2015. Overall, 1,104 suspected cases of babesiosis were investigated in 2016.

Incidence of babesiosis increased in the counties of Berkshire, Dukes, Hampshire, Nantucket, Essex, Franklin, Hampshire, Norfolk, and Worcester. Counties with the highest incidence are Barnstable, Dukes, and Nantucket. The majority of babesiosis cases occurred in June, July, and August (**Figure 4.14**).

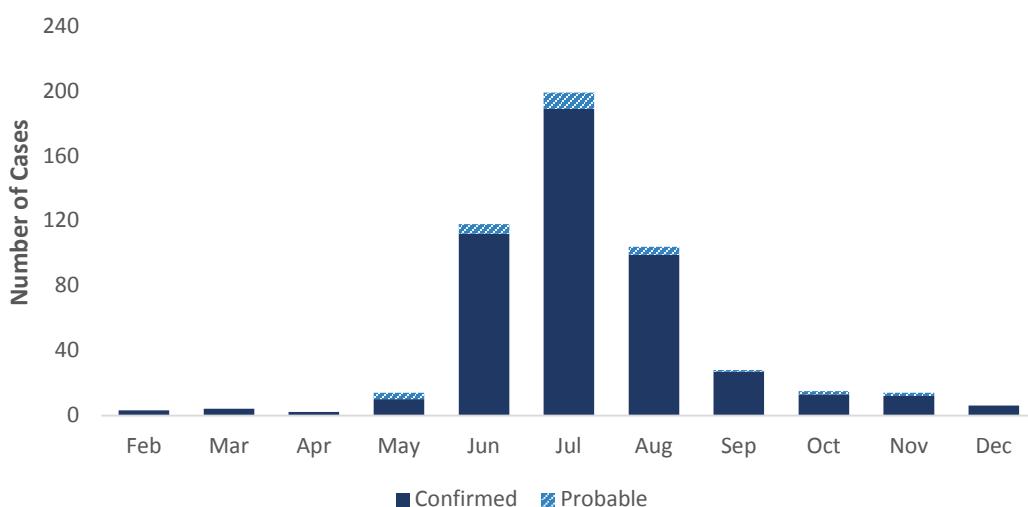
Only 24% of babesiosis cases reported awareness of a recent tick bite. A total of 8 confirmed cases (2%) received a blood transfusion in the six months prior to becoming ill, and three of those were confirmed or likely transfusion-transmitted cases.

Approximately one out of three (35%) reported cases were hospitalized. The symptoms most commonly reported included fatigue (78%), fever (67%), malaise (65%), muscle aches and pain (59%), and chills (54%). There were at least four babesiosis-related fatalities in 2016.

Residents 60 years of age and older continue to be at greatest risk for clinical disease; 57% of all patients identified with babesiosis were aged 60 years of age or older. Two thirds (66%) of babesiosis cases were among males.

Figure 4.14

**Number of Confirmed and Probable Babesiosis Cases Reported in Massachusetts,
by Month of Onset, 2016**



Immunization

Immunization against disease is one of the 10 greatest public health achievements in the 20th century. It is responsible for adding 25 years to the life expectancy US residents.²⁰¹ In Massachusetts, BIDLS promotes the health of Massachusetts residents by reducing the burden of vaccine-preventable diseases.

Adult Influenza Vaccination

Influenza or “flu” is a contagious respiratory illness caused by one of several influenza viruses. Infection ranges from asymptomatic or mild to severe illness. Serious outcomes of flu infection can result in hospitalization or death.

Pneumonia, bronchitis, sinus infections, and ear infections are examples of flu-related complications. The flu can exacerbate chronic health conditions. For example, people with asthma may experience asthma attacks while they have the flu, and people with chronic congestive heart failure may experience a worsening of this condition triggered by flu. Among adults, the flu can have a substantial economic impact in terms of outpatient visits and loss of work days.²⁰²

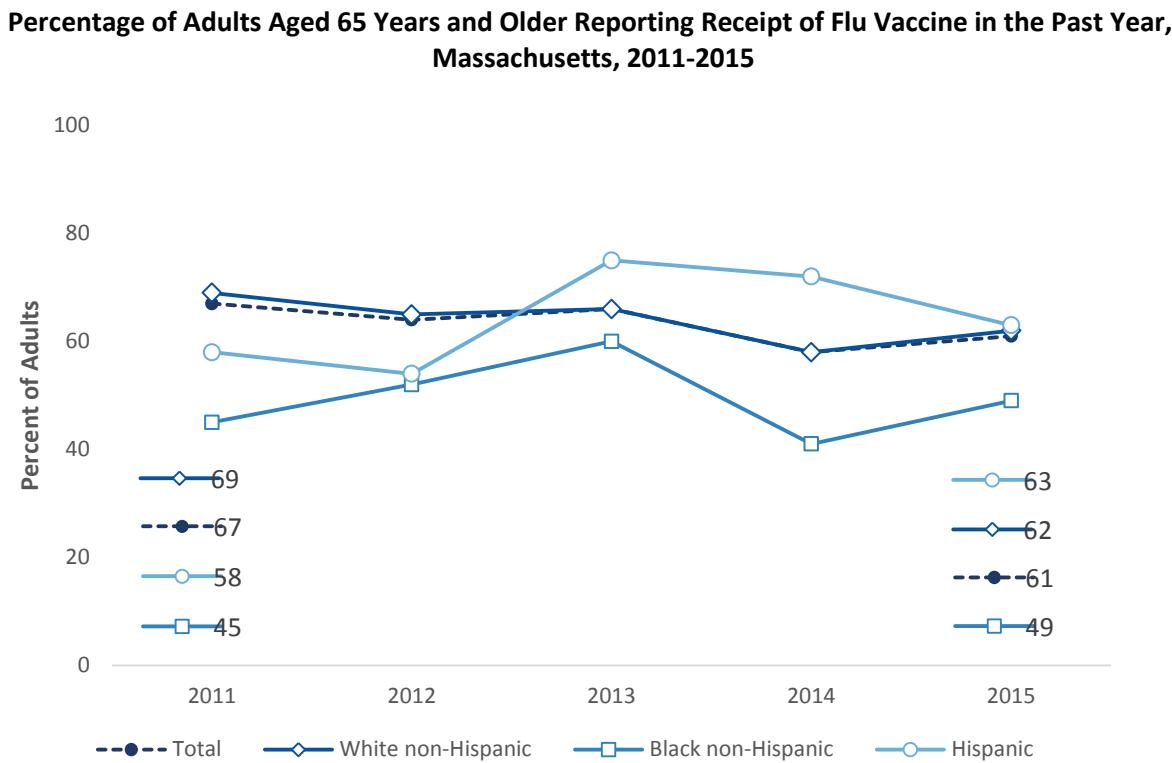
Flu and pneumonia ranked in the top ten leading causes of death among Massachusetts residents in 2014. Flu was the sixth leading cause of death among persons 85 years of age and older. The best way to prevent the flu is by getting vaccinated each year.

Trends/Disparities

Certain population groups, including older individuals, young children, and people with select health conditions, are at greatest risk for serious flu complications.

In 2015, 61% of adults 65 years of age and older in Massachusetts self-reported receiving a flu vaccine in the past 12 months. The percentage was highest among Hispanic adults (63%) and lowest among Black non-Hispanic adults (49%).

Figure 4.15



Selected Resources, Programs, and Services

Following are selected resources, services and programs that support the topics discussed in this chapter.

Foodborne Disease

- MDPH's Bureau of Infectious Disease and Laboratory Sciences (BIDLS) is implementing culture-independent diagnostic tests to detect the presence of a specific part or genetic sequence of a microorganism without first requiring culture and identification, reducing the result time for public health and clinical action.

Clostridium difficile Infections

- BIDLS and the Bureau of Health Care Safety and Quality collaborate on a program to prevent healthcare-acquired infection and antimicrobial resistance.
- The *C. difficile* Infection Prevention Collaborative is a partnership between acute and long-term care facilities to: 1) improve care coordination and communication; 2) promote implementation of infection prevention strategies; 3) improve surveillance; and 4) reduce rates of healthcare-facility onset of *C. difficile* infection.

MRSA Infection

- The Massachusetts Antibiotic Resistance Subcommittee is a technical advisory group of local, national and international experts in the field of antimicrobial resistance that provides guidance, and support to the BIDLS in combating antimicrobial resistance.
- BIDLS works with computer modeling experts at Worcester Polytechnic Institute to analyze temporal trends and develop predictive models of antibiotic resistance using statewide antibiogram program data.

Sexually Transmitted Infection

- Implementation of sexually-transmitted infection testing and treatment in MDPH Office of HIV/AIDS funded sites will increase the rates of testing for HIV, Hepatitis C Virus, and sexually-transmitted infection among men who have sex with men.

Chlamydia Infection

- BIDLS is improving electronic reporting directly from electronic health records (EHR) to learn whether individuals with chlamydia infection are getting recommended treatment and whether infected females are pregnant.
- Expedited partner therapy is a program to promote health care providers treatment for chlamydia infection among the sexual partners of individuals with infection without having to see them in person as patients.

Gonorrhea Infection

- The MDPH Division of STD Prevention participates in the Centers for Disease Control and Prevention funded Sexually Transmitted Disease Surveillance Network (SSuN) that allows for enhanced surveillance with additional information collected on a sample of gonorrhea cases.
- BIDLS targets education and counseling efforts directed at men who have sex with men, and works to enhance awareness of current epidemiology, and treatment recommendations among health care providers.

Syphilis Infection

- BIDLS implements the Centers for Disease Control and Prevention (CDC) program *Call to Action: Let's Work Together to Stem the Tide of Rising Syphilis in the United States.*

HIV/AIDS Infection

- The Office of HIV/AIDS initiatives work with clinical and non-clinical community programs, people living with HIV/AIDS, and other stakeholders to advance HIV prevention and care services.
- The HIV Drug Assistance Program provides medications for all eligible people with HIV infection.

Hepatitis C Virus Infection

- BIDLS promotes using surveillance data to develop and inform strong community and provider partnerships for policy, planning and response.

Tickborne Disease

- BIDLS supports an outreach program that provides information on tickborne diseases and prevention through a dedicated website with printed materials that can be downloaded or ordered through the Massachusetts Health Promotion Clearinghouse.

Flu Infection

- The Massachusetts Adult Immunization Coalition (MAIC), is an organization with members from more than 200 organizations who have committed to increasing adult immunization coverage and decreasing immunization disparities through education, networking, and sharing innovative and best practices.
- Public sector billing improves access to immunization by providing billing services that allow municipal health departments, public schools and visiting nurse associations to operate seasonal influenza or other vaccine clinics and receive payment for administrative and direct costs.
- BIDLS is implementing a lifespan immunization registry (the Massachusetts Immunization Information System or MIIS) which receives immunization data from more than 1,000 pharmacies as well as workplaces, health departments, community health centers, specialists, and primary care sites to consolidate adult immunization records and help providers use electronic reminders to identify and communicate with persons who have not received flu vaccine.

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CHAPTER 5

Injury and Violence Prevention





Injury and Violence Prevention

This chapter provides information about injury and violence issues and prevention in the Commonwealth of Massachusetts and related trends, disparities and resources.

This chapter addresses the following topics:

- Unintentional Injury
- Occupational Injury
- Suicide
- Violence
- Selected Resources, Services and Programs

Chapter Data Highlights

- Massachusetts has the lowest rate of unintentional child injury deaths in the US
- In 2015, half of teens continued to play in a sporting event after reporting concussion symptoms
- From 2006 to 2014, death by falls for older adults increased 41%
- Motor vehicle traffic injuries are the leading cause of death for people 15 to 24
- From 2009-2013, Hispanic workers were 1.7 times as likely to be hospitalized for work-related injuries as White non-Hispanic workers
- Nearly 25% of drivers still don't wear seat belts
- In 2014, suicide was the second leading cause of death among teens and young adults
- In 2014, men died by suicide 3.6 times more often than women
- The homicide rate among Black non-Hispanic males is 30 times higher than that for White non-Hispanic males
- Nearly one in three women and one in five men in Massachusetts reported experiencing rape, physical violence and/or stalking by an intimate partner during their lifetimes

Overview

Injuries are the leading cause of death for people aged one to 44 and are the third leading cause of death for all ages combined. Injuries, both unintentional and intentional (self-inflicted or violent) result in more deaths of children and youth than all other causes combined. Unintentional injuries can be fatal or non-fatal and result from a variety of causes including motor vehicle crashes, drowning, fires, poisonings, suffocation and falls. Occupational injuries occur during the course of paid employment and can result from unintentional or intentional actions. Self-inflicted injury can include completed suicides as well as non-fatal attempts or other non-suicidal self-inflicted injury. Violence, too, can be fatal or nonfatal: it can also be interpersonal or collective. Interpersonal violence is often categorized by the intended victim (youth violence, child maltreatment, domestic/intimate partner violence), the form of the violence (sexual violence, gun violence) or the context in which it occurs (community violence, gang violence). Collective violence can occur on a large scale due to conflicts between groups or countries (such as war) but can also include other less explicit forms of violence (such as repression and neglect). Unequal access to power and resources (such as wealth), along with social inequality, can lead to collective violence.

The patterns of unintentional injury, suicide and self-inflicted injury, and violence vary from one another and are all influenced by social determinants of health as well as demographics such as race, gender identity, sexual orientation, age, and disability status.

Unintentional Injury

Unintentional injuries are the leading cause of death among Massachusetts residents ages one to 44 and the third leading cause of death among all ages. In 2014, more than 670,000 non-fatal unintentional injuries were treated at an acute care hospital. Each year, unintentional injury deaths in Massachusetts generate lifetime costs of \$3 billion, and non-fatal injuries generate a cost of \$9.5 billion including \$3.5 billion in medical care alone.

Unintentional injuries occur across the entire lifespan and affect every race and ethnicity, geographic area, and gender. But certain populations are at greater risk for different injury causes. For example, between 2010 and 2014, the leading cause of unintentional injury death among young children (aged 1-4 and 10-14) was drowning; for adults over the age of 65, the leading cause was falls. With few exceptions, males have higher rates of unintentional injury deaths and non-fatal injuries than females. Racial and ethnic disparities exist, for example, in motor vehicle injuries among young drivers, unintentional injuries to children under age six, and for concussive symptoms related to sports activity in middle and high schools.

Childhood Injuries

Children are at increased risk for certain injury causes such as falls, sports-related injuries, and drownings as their motor skills, brain, and executive functioning capabilities are still developing. While death is the most tragic injury outcome, deaths account for a very small percentage of the overall burden of injury among children. In 2014, there were more than 140,000 non-fatal unintentional injuries to children under 18 years of age treated in a Massachusetts acute care hospital or emergency department.

Trends/Disparities

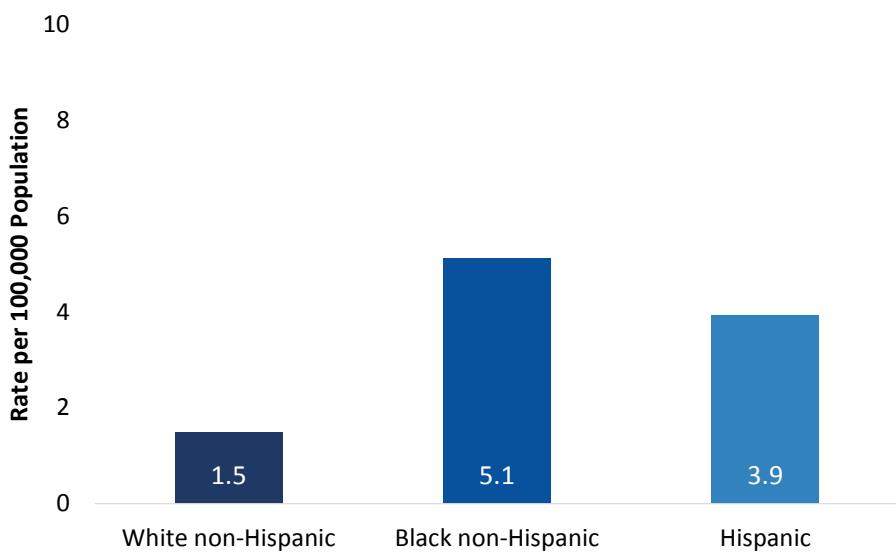
Massachusetts has had the lowest rate of unintentional child injury deaths in the US for nearly a decade²⁰³, and the rate of unintentional injury deaths of Massachusetts children under 18 also has been declining. Despite this achievement, unintentional injuries continue to be a leading cause of death among Massachusetts children ages one to 14.

The unintentional injury death rate among Massachusetts children under 18 years of age declined significantly between 2000 and 2015 (2000: 6.1 per 100,000 population; 2015: 2.0 per 100,000 population).²⁰⁴ The largest decline occurred between 2005 and 2012 with an average decrease of 11.9% per year.²⁰⁵

The leading causes of death among children vary by age group and race/ethnicity. Among Massachusetts children under 18 years of age, children ages one to four had the highest rate of unintentional injury deaths. Drowning was the leading cause of death (37%) for this age group. Infants under one year of age commonly drown in wading pools and bathtubs, while children ages one to four years most often drown in backyard swimming pools. As shown in **Figure 5.1**, Black non-Hispanic and Hispanic children under six years of age had higher rates of injury deaths than White non-Hispanic children.

Figure 5.1

Five-Year Average Annual Unintentional Injury Death Rate among Children Under 6, By Race/Ethnicity, Massachusetts, 2011-2015



SOURCE: WISQARS (WEB-BASED INJURY STATISTICS QUERY AND REPORTING SYSTEM), VITAL STATISTICS SYSTEM, NATIONAL CENTER FOR INJURY PREVENTION AND CONTROL, CENTERS FOR DISEASE CONTROL AND PREVENTION

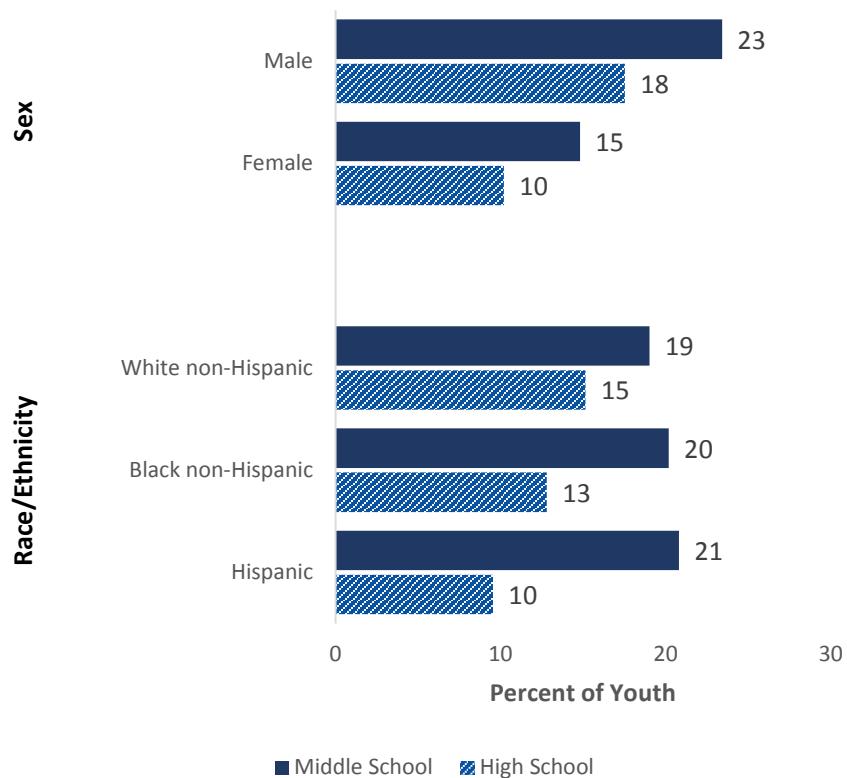
The leading causes of non-fatal injury among children also vary by age group, sex and, race/ethnicity. Among non-fatal unintentional injuries in 2014, falling was the leading cause of injury among children five or younger.²⁰⁶ Males in this age group account for a slightly higher percentage of unintentional injuries than females (males, 57% of injury-related emergency department visits, 55% of injury-related hospitalizations, and 57% of injury deaths).^{207,208,209}

For children ten to 17 years of age, the leading cause of non-fatal unintentional injury was being struck-by or against an object.^{210,211,212} Of these injuries, 56% were sports-related, of which 22% were associated with a concussion/traumatic brain injury (TBI).^{213,214,215}

The percentage of middle and high school students who continued to play after reporting symptoms of a concussion while engaged in sports was 50% in 2015.²¹⁶ As shown in **Figure 5.2**, disparities by sex and race/ethnicity exist among students who reported having symptoms of a sports-related concussion during the last 12 months.²¹⁷ In particular, reporting of such symptoms was higher among males.

Figure 5.2

Percentage of Middle School and High School Sports Players who Reported Having Symptoms* of a Sports-Related Concussion, by Sex and Race/Ethnicity, Massachusetts, 2015



NOTE: *SYMPTOMS INCLUDE BEING “KNOCKED OUT,” MEMORY PROBLEMS, DOUBLE OR BLURRY VISION, HEADACHES, “PRESSURE” IN THE HEAD, NAUSEA OR VOMITING. ^B STATISTICAL SIGNIFICANCE IS SET AT THE 95% CONFIDENCE LEVEL.

Older Adult Falls

Fall injuries are a serious and increasing health problem among Massachusetts adults aged 65 and older. Falls are the leading cause of unintentional injury death for men and women 65 and older in Massachusetts. In 2014, there were 528 deaths and 71,078 non-fatal injuries treated within Massachusetts acute care hospitals among adults 65 and older due to falls.

Older adults are at increased risk for a fall-related injury due to common characteristics of aging, such as decreased strength, poor balance, impaired vision, osteoporosis, dementia, multiple medications, and illnesses.^{218,219} Falls among

older adults can further impact physical function and mental well-being by producing feelings of social isolation, depression, and helplessness. In addition, prior falls and safety concerns may reduce the willingness of older adults to stay active in their community. Lifetime estimated costs of unintentional fall injuries (fatal and non-fatal) to Massachusetts residents 65 years or older in 2014 is estimated at \$1.9 billion.²²⁰

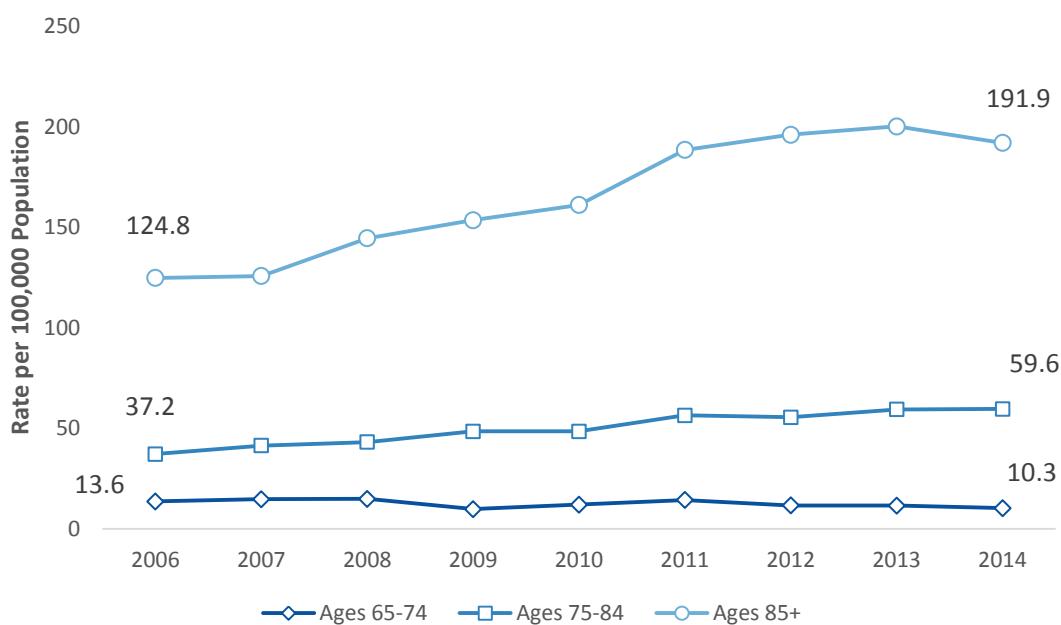
Trends/Disparities

From 2006 to 2014, the age-specific rate of fall-related deaths for Massachusetts adults 65 and older increased 41% (2006: 35.3 per 100,000 population; 2014: 49.7 per 100,000 population).

As shown in the **Figure 5.3**, fall-related death rates during this time period increased 60.2% among those 75-84 and 53.8% among adults 85 years or older. Persons ages 85 and older had the highest rates of fatal and non-fatal fall injuries. The fall death rate for this age group in 2014 was 18.6 times the rate for those aged 65-74. Of fall-related deaths among older adults in 2014, 56% included a TBI.

Figure 5.3

Age-Specific Rate of Fall-Related Deaths by Age Group, Ages 65 and Older, Massachusetts, 2006-2014



In 2014, more than 70,000 adults 65 years or older were treated at an acute care hospital for fall-related injuries.^{221,222,223} Approximately, seven out of ten (71%) fall-related hospitalizations among adults 65 years of age or older required additional care upon discharge through a skilled nursing facility or rehabilitation facility.²²⁴

Men have higher rates of fall-related deaths than women (2014: 62.7 per 100,000 population versus 41.5 per 100,000 population), but women have higher rates for non-fatal hospital stays and emergency department visits.^{225,226,227} White non-Hispanic residents had the highest rates of fall deaths (51 per 100,000 population), fall-related hospital stays, and emergency department visits.^{228,229,230} Asian and Pacific Islander residents had the second highest rate of fall deaths (44.4 per 100,000 population) but the lowest rates of fall-related hospital stays and emergency department visits.^{231,232,233}

Older adults were more likely to report falls and fall-related injuries in the past 12 months if they also reported poor mental health and depression, diabetes, disability, coronary artery disease, chronic obstructive pulmonary disease (COPD), heart attack, or stroke.

Motor-Vehicle Injuries

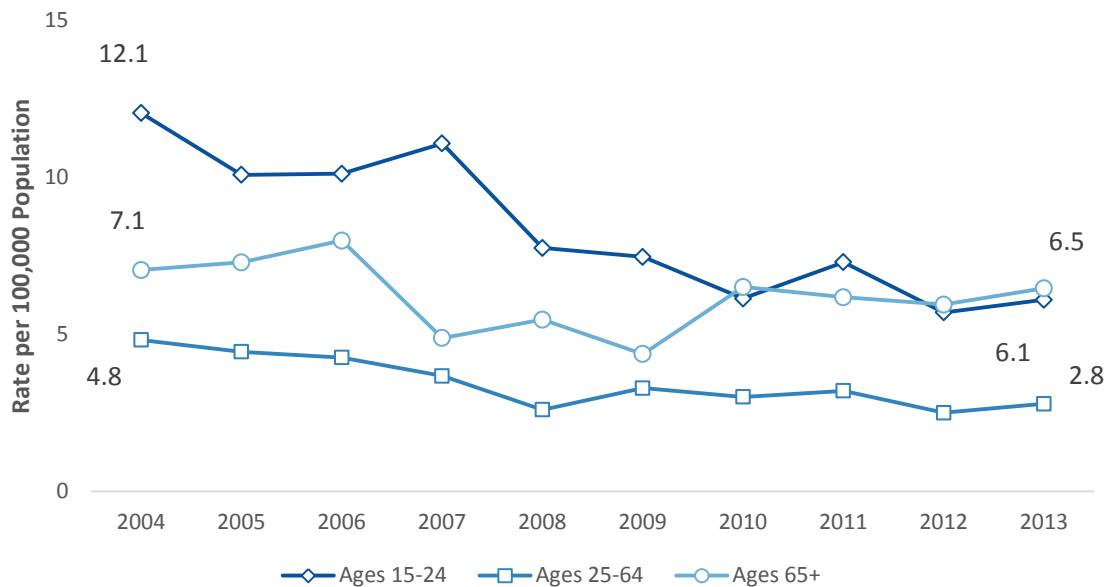
Motor vehicle traffic-related injuries include injuries to vehicle occupants, motorcyclists, pedestrians, and bicyclists struck by a motor vehicle. Some populations are at higher risk of motor vehicle injuries.²³⁴ For example, between 2010 and 2014, motor vehicle traffic injuries were the leading cause of death for Massachusetts residents 15 to 24 years of age. Pedestrians have a lower rate of death and non-fatal injury than motor vehicle occupants, but are vulnerable to more severe injuries. Motor vehicle traffic-related non-fatal injury rates are higher among Black non-Hispanic and Hispanic residents than White non-Hispanic residents and among males relative to females.

Trends/Disparities

Between 2004 and 2013, the age-adjusted rate of motor vehicle traffic-related occupant deaths declined by 38%. During that period, motor vehicle traffic-related occupant death rates decreased by 49% among persons 15-24 years of age and by 42% among adults 25-64 years of age (**Figure 5.4**). From 2004 to 2009, motor vehicle traffic-related occupant death rates were highest among young people 15-24 years of age. Over the same time period (2004 to 2013), hospitalizations for non-fatal unintentional motor vehicle traffic occupant injuries declined 42% for the total population and 65% among persons 15-24 years of age.^{235,236}

Figure 5.4

Traffic-Related Motor Vehicle Occupant Death Rates by Age Group, Massachusetts, 2004-2013

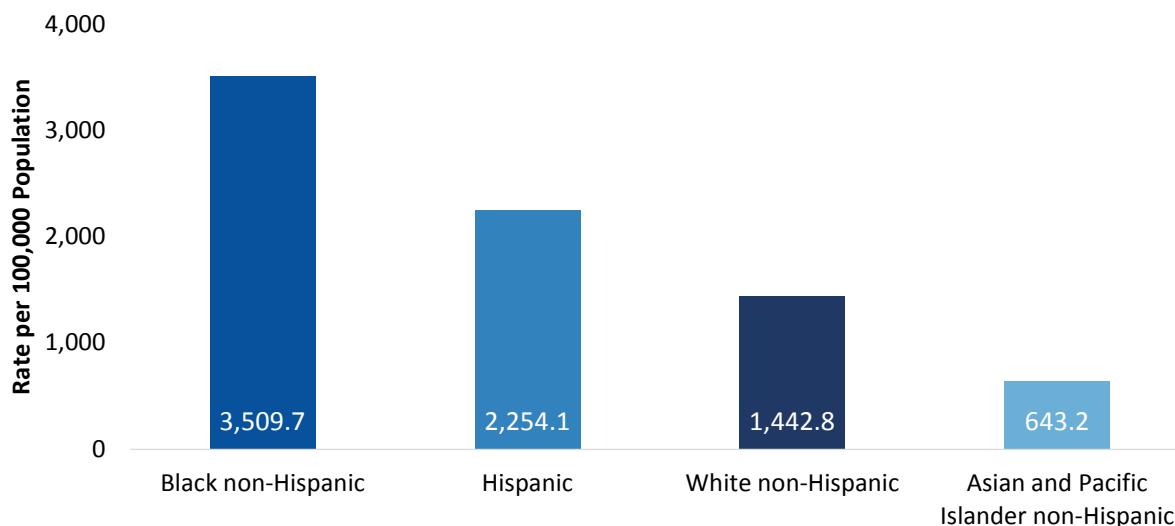


Young people (15-24 years of age) who live in urban areas are at increased risk of non-fatal motor vehicle traffic-related injuries. In 2015, nearly two thirds (64%) of non-fatal motor vehicle crash injuries to this age group occurred in urban areas and 35% occurred in suburban areas.^{237,238,239} As shown in **Figure 5.5**, in 2015 youth and young adults (ages 15-24) who were Black non-Hispanic had non-fatal motor vehicle crash injury rates that were 2.4 times greater than that of White

non-Hispanics (3,509.7 per 100,000 population versus 1,442.8 per 100,000 population, respectively) and 1.6 times greater than that for Hispanics in this age group (2,254.1 per 100,000 population). This rate for Hispanic young people was 1.6 times that for White non-Hispanics (2,254.1 per 100,000 population versus 1,442.8 per 100,000 population).²⁴⁰

Figure 5.5

Rate of Non-Fatal Motor Vehicle Injuries among Persons 15-24 Years of Age, by Race/Ethnicity, Massachusetts, Federal Fiscal Year 2015



SOURCE: CHIA, MA INPATIENT HOSPITAL DISCHARGE DATABASE, AND MA OUTPATIENT EMERGENCY DEPARTMENT DISCHARGE DATABASE

NOTE: *DATA ARE FOR FEDERAL FISCAL YEAR 2015 (OCTOBER 1, 2014 - SEPTEMBER 30, 2015).

Several factors shape risk of motor vehicle traffic-related injury, including night-time driving, driving inexperience, distractions such as texting or talking on the phone, and substance use. Several important examples are listed below:

- Observational surveys indicate that among Massachusetts drivers, cell phone use averaged 7% in 2016, but disparities exist by age.²⁴¹ Compared to all other age groups, drivers 16-19 years of age had the highest prevalence of combined cell phone use (9.3%), with 6% using handheld cell phones and 3.3% using their cell phone to text when driving.
- Seat belt use reduces the number *and* severity of motor vehicle injuries.²⁴² In 2016, observed seatbelt use in Massachusetts was 78%, among the lowest seatbelt use rates in the US.
- Approximately one-third of motor vehicle crash deaths in Massachusetts involve a driver who had been drinking. Although the total number of motor vehicle-occupant deaths in the state has decreased by 43% in the past decade, the percentage of motor vehicle deaths from an alcohol-impaired driver has remained fairly consistent over this time period (2001: 38%; 2010: 36%).

Occupational Injury

Occupational injuries are injuries that occur during the course of paid employment. They include acute traumatic injuries such as fractures, burns and amputations as well as musculoskeletal disorders due to overexertion and chronic wear and tear. Suicides and homicides that occur in the workplace are also included. Occupational injuries are common and costly, exacting a toll not only on the affected workers and their families but on employers and society at large as well. Nationally, occupational injuries have been estimated to cost \$186 billion annually.

The risk of fatal occupational injury increases with age, while younger workers are at higher risk of non-fatal injury. Low wage immigrant and minority workers are at higher risk of both fatal and non-fatal injury, largely because they are more likely to be employed in high risk jobs.²⁴³ Other factors also contribute to this disparity in risk including language and cultural barriers, discrimination or fear of discrimination and economic insecurity that can make workers hesitant to speak up about hazards, less health and safety training, and limited access to occupational health and safety resources.

Occupational injuries are preventable. Under state and federal laws, employers have a responsibility to provide all employees a place of employment that is free from recognized hazards that may cause death or serious physical harm and to comply with all relevant safety and health standards.^{244,245}

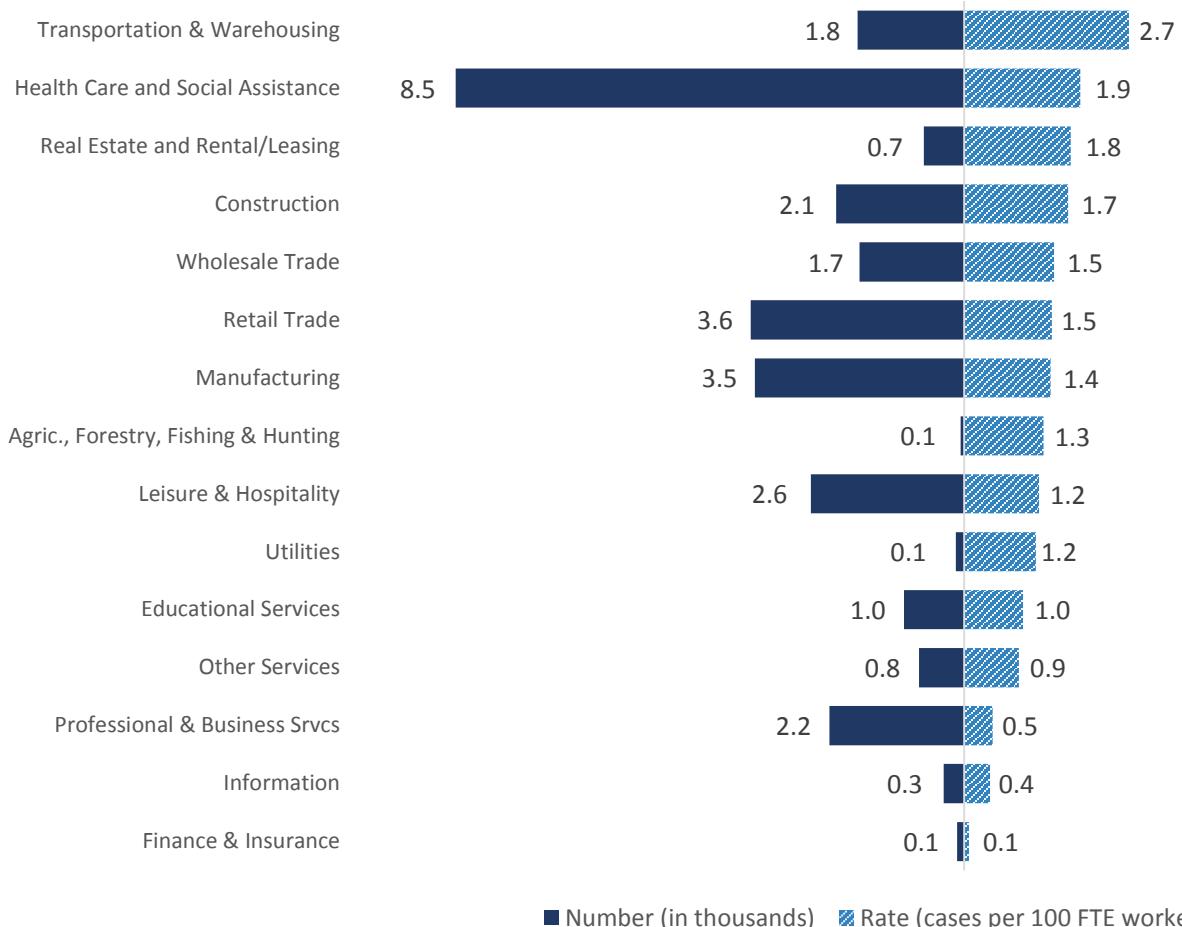
Trends/Disparities

According to employer reports, in 2015 one out of every 37 full-time workers in the private sector in Massachusetts, or approximately 65,300 workers, sustained a non-fatal injury at work that required more than first aid. Approximately 45% of these injuries were serious enough that the workers missed at least one day of work. While the rate of these more serious injuries in Massachusetts declined from 2006 to 2015, it remained consistently higher than the rate for the nation as a whole.²⁴⁶

In 2015, workers employed in transportation and warehousing were at highest risk for non-fatal occupational injury, with almost three out of every 100 full-time workers experiencing an injury resulting in one or more days of lost work. The health care and social assistance sector generated the highest number of workplace injuries in 2015, with approximately 8,500 employees experiencing injuries resulting in lost time. The injury rate for the health care and social assistance sector in Massachusetts (1.9 per 100 workers) was also high compared to injury rates for other industries in Massachusetts and exceeded the national rate for the sector (1.4 per 100 workers).²⁴⁷ Musculoskeletal injuries are one of the most common injuries experienced by health care workers, many of which occur in the course of lifting or moving patients. In 2010, an estimated 1,000 Massachusetts hospital workers suffered musculoskeletal injuries associated with patient handling.

Figure 5.6

**Number and Rate of Non-Fatal Occupational Injuries and Illnesses Resulting in Lost Workdays,
by Industry Sector, Massachusetts, 2015**



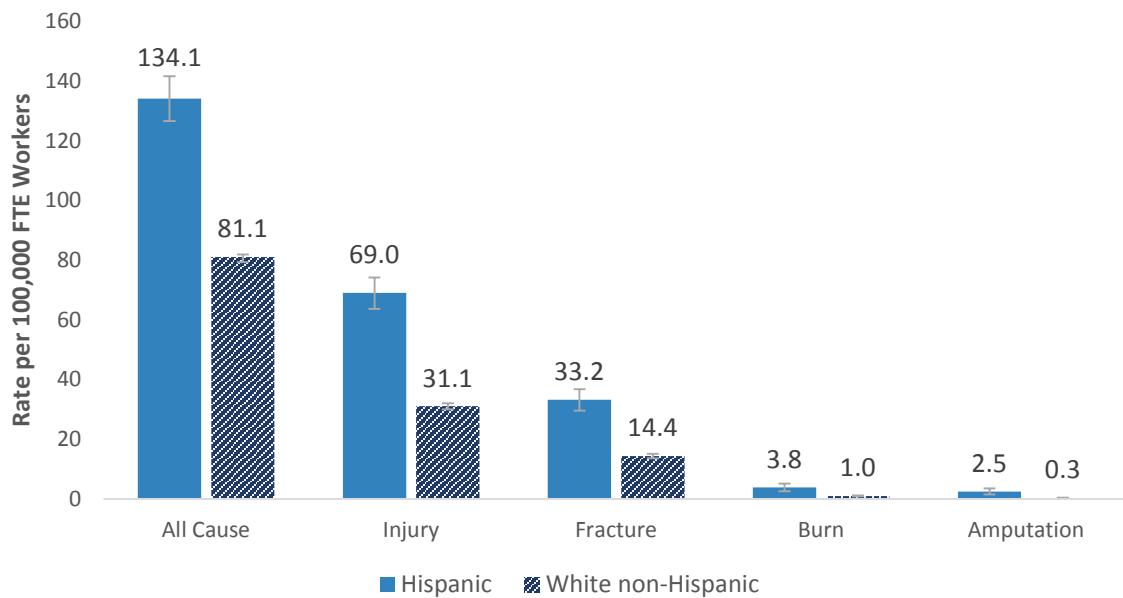
SOURCE: US DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS, SURVEY OF OCCUPATIONAL INJURIES AND ILLNESSES (SOII)

NOTES: THE MINING INDUSTRY REPORTED 20 CASES IN 2015. THESE CASES WERE EXCLUDED FROM THE FIGURE BECAUSE OF LOW NUMBER

The statewide rate is 1.6 non-fatal occupational injuries and illnesses resulting in lost workdays per 100 full time workers. From 2009 to 2013, Hispanic workers had significantly higher rates of hospitalization for work-related conditions, including many serious injuries such as amputations, burns, and fractures compared to their White, non-Hispanic counterparts.

Figure 5.7

Rate of Hospitalization for Select Work-Related Injuries, Hispanics and White, Non-Hispanics, Residents Ages 16-64, Massachusetts, 2009-2013



NUMERATOR SOURCE: CHIA HOSPITAL DISCHARGE DATASET CALENDAR YEAR 2009-2013; DENOMINATOR SOURCE: ESTIMATED FROM THE AMERICAN COMMUNITY SURVEY 5-YEAR FILE 2009-2013.

NOTE: 5-YEAR AVERAGE ANNUAL RATE IS EXPRESSED PER 100,000 FULL TIME EQUIVALENT WORKERS.

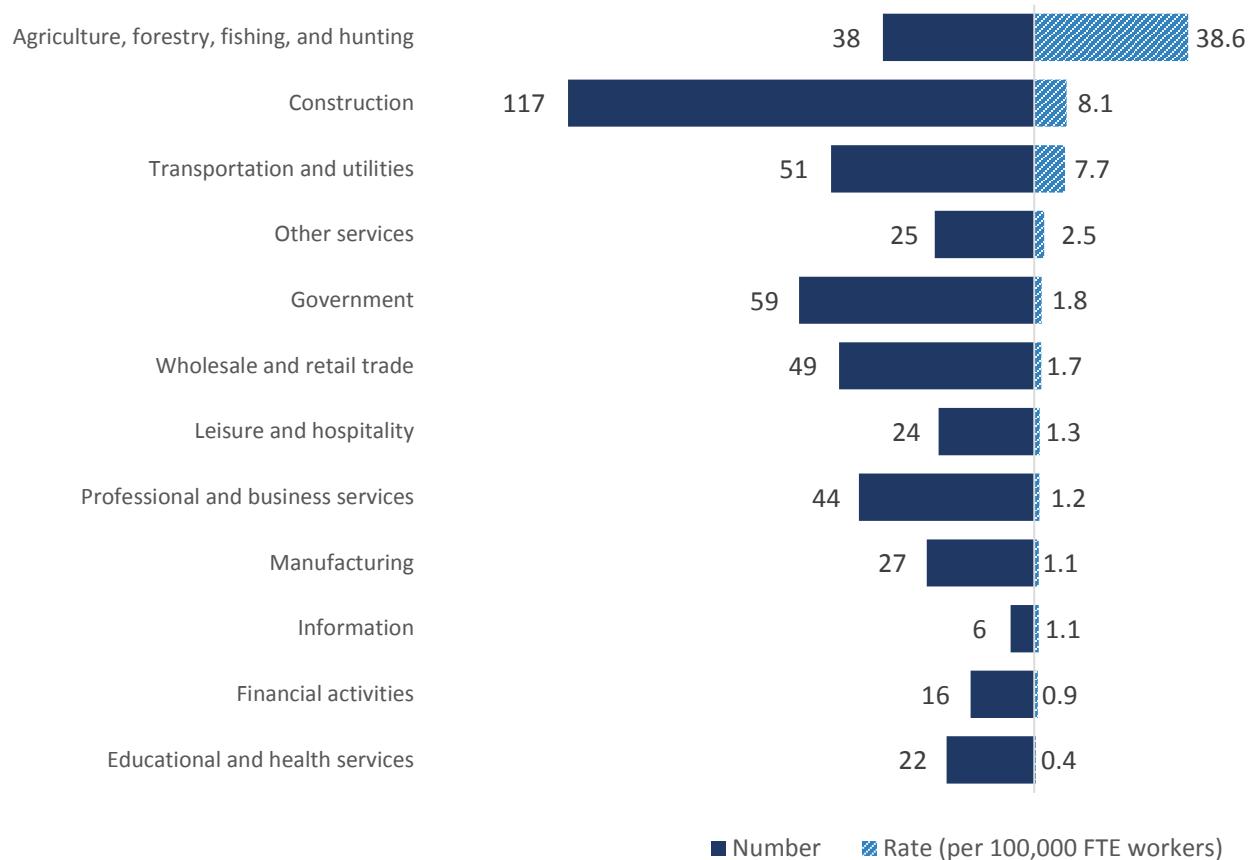
Young workers are also at elevated risk of occupational injury. From 2010 to 2014, teen workers aged 15-17 (1.8 per 100 full-time workers) and young adults 18 to 24 (2.6 per 100 full-time workers) experienced higher rates of emergency department visits for work-related injuries than workers 25 to 64 years of age (1.3 per 100 full-time workers). The rate for young adults was more than twice that for older workers.

From 2008 to 2015, 481 workers were fatally injured at work, amounting to an average of 60 deaths per year or approximately one death each week.²⁴⁸ Over this period, the average annual fatal occupational injury rate in Massachusetts was 2.0 deaths per 100,000 full-time workers. This rate remained relatively stable over this time period. Massachusetts' fatal occupational injury rate was half the US rate, which is partially attributable to differences in industries concentrated in Massachusetts relative to the nation as a whole. A smaller percentage of Massachusetts workers are employed in higher risk industries.^{249,250}

In Massachusetts, the agriculture, forestry, fishing, and hunting sector stands out as an exceptionally high-risk industry sector with 38.6 deaths per 100,000 full-time workers (Figure 5.6). The majority (71%) of the workers killed in this sector were employed in commercial fishing. The construction sector had the highest fatality count, with 117 deaths, and the second highest fatal occupational injury rate (8.1 deaths per 100,000 full-time workers).

Figure 5.8

Number and Rate of Fatal Occupational Injuries by Industry Sector, Massachusetts, 2008-2015



NOTES: NUMERATOR SOURCE: OCCUPATIONAL HEALTH SURVEILLANCE PROGRAM, MA FACE AND CFOI, DENOMINATOR SOURCE: BLS CURRENT POPULATION SURVEY WORKFORCE ESTIMATES

From 2008 to 2015, falls from heights such as from ladders and roofs were the most common fatal events with the majority occurring in the construction sector. Falls have consistently been the leading fatal event in Massachusetts, accounting for approximately one-quarter (24%) of all fatal occupational injuries.

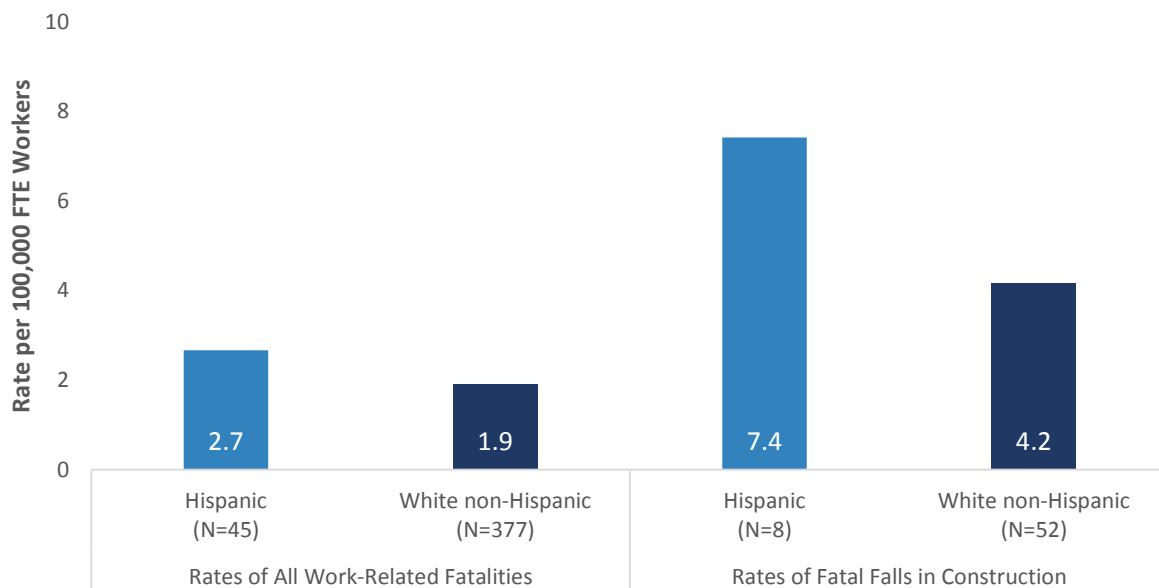
In recent years, the number of suicides at work has increased, consistent with the overall increase in suicides in Massachusetts. After falls, suicides (15%) have become the second leading fatal occupational injury, followed by motor vehicle crashes (12%). Suicides are discussed in a later section in this chapter.

Hispanic workers had an overall higher risk of being killed on the job in Massachusetts. In the construction industry, a high-risk sector for all workers, the rate of fatal falls among Hispanic construction workers (7.4 per 100,000 full-time workers) was 1.8 times that for White non-Hispanic workers (4.2 per 100,000 full-time workers). Not only are Hispanic workers more likely to be employed in high risk industries, they are also more likely to be working in jobs within industries such as construction in which hazards are less likely to be controlled.²⁵¹

Approximately one in five workers fatally injured at work in Massachusetts was born outside of the US, and the fatality rate among foreign-born workers was higher than the rate for US-born workers.^{252,253} The fatality rate for workers 65 years of age or older was more than three times higher than the rate for workers under 35 years of age.

Figure 5.9

Rates of Fatal Occupational Injuries, Hispanic and White non-Hispanic Workers, Massachusetts, 2008-2015



NOTE: NUMERATOR SOURCE: OCCUPATIONAL HEALTH SURVEILLANCE PROGRAM, MA FACE AND CFOI, 2008-2015

DENOMINATOR SOURCE: BLS CURRENT POPULATION SURVEY WORKFORCE ESTIMATES, 2008-2015.

NOTE: RATE SIGNIFICANTLY HIGHER THAN RATE FOR WHITE NON-HISPANIC

Suicide

Suicide is the 10th leading cause of death in the US.²⁵⁴ In 2014, suicide was the second leading cause of death in individuals 15-29 years of age nationally,²⁵⁵ and the second leading cause of death in individuals 15-24 years of age in the Commonwealth²⁵⁶. In the same year, the Commonwealth ranked the third lowest in suicide incidence among the 50 states and the District of Columbia. The age-adjusted suicide rate in Massachusetts was also below the average for the total US population in 2014 (MA: 9.0 per 100,000 population; US: 12.9 per 100,000 population).²⁵⁷

There are multiple factors that contribute to an individual's risk for suicidal ideation. These risk factors may include a history of mental illness, alcohol and/or drug abuse, and feeling alone.

There are several social determinants of health that contribute to suicidal ideation. Economic and housing instability can add tremendous stress, increasing the risk of depression, anxiety, substance abuse, and suicidal thoughts and behavior.²⁵⁸ The built environment can also shape risk of suicidal thoughts and behavior. Access to safe, shared spaces

“In order to reduce the number of suicides we must increase the knowledge and understanding of suicide warning signs, risk and protective factors through a public health perspective.”

Key Informant Interviewee

and common areas for people to interact, such as parks, community gardens, and community centers, is linked with decreased feelings of isolation and improved mental health and wellbeing.²⁵⁹ Exposure to violence in the home and community increases the risk of poor mental health, depression, and suicidality.²⁶⁰

Trends/Disparities

In 2014, Massachusetts recorded 608 suicides, which is two times higher than the number of motor vehicle traffic-related deaths and 4 times higher than homicide deaths. Suicide rates in Massachusetts have increased an average of 3.1% per year between 2004 and 2014, nearly twice the average annual increase across the US since 2004 (1.8% increase per year).²⁶¹ From 2004 to 2014, the total increase in the suicide rate was 32.4% (2004: 6.8 per 100,000 population; 2014: 9.0 per 100,000 population).

Groups at high risk of suicide in Massachusetts include middle-age White males, LGBTQ youth, and individuals with mental health issues. White non-Hispanic males accounted for more than 75% of suicides in 2015.²⁶² While more males die from suicide than females, females are more likely than males to have suicidal thoughts and to attempt suicide.²⁶³

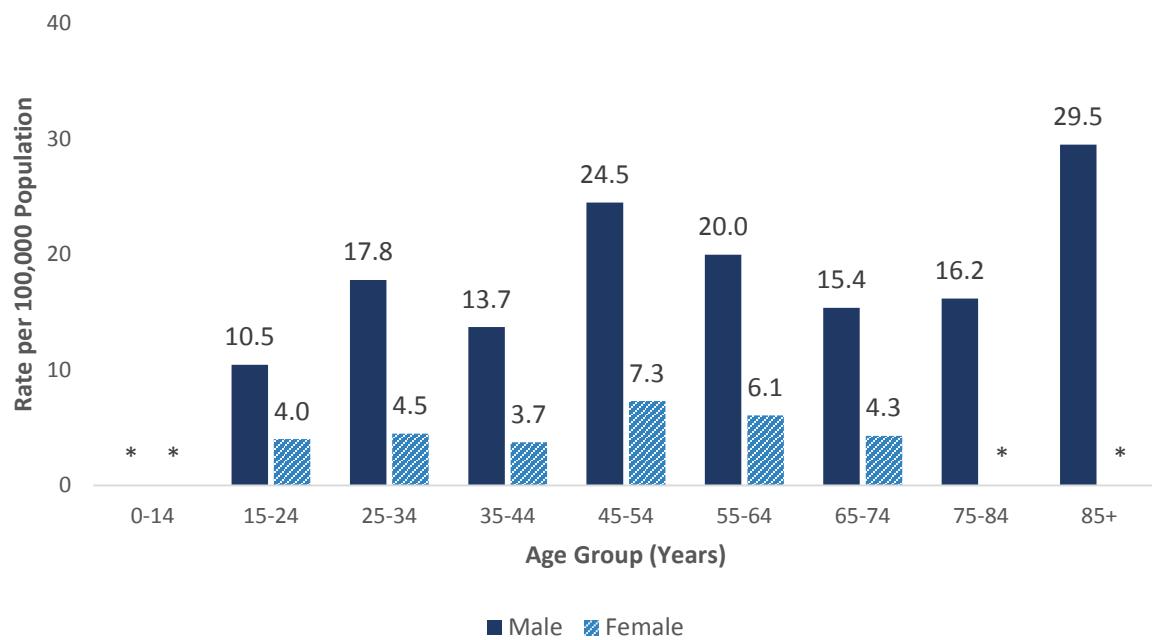
In 2014, the majority of suicides were among individuals 45-64 years of age (44%), reflecting a 4.1% average annual increase in the suicide rate for this age group from 2004 to 2014.

The majority of suicides in Massachusetts (77%) occur among men. In 2014, the suicide rate for men was 3.6 times higher than that for women (Males: 14.3 per 100,000 population; Females: 4.0 per 100,000 population). However, while there was an increase in the suicide rate for both sexes from 2004 to 2014, there was a sharper increase for women (48% increase) relative to males (29% increase). The highest male suicide rate was among individuals 85 years of age or older (29.5 per 100,000 population). Among women, the highest suicide rate was among individuals 45-54 years of age (7.3 per 100,000 population). While the suicide rate remains higher for men than women, the suicide attempt rate was 1.7 times higher among women than men (women: 120 per 100,000 population; men: 70 per 100,000 population).

For 2010 to 2014, the average annual age-adjusted suicide rate was highest among White non-Hispanic males (15.3 per 100,000 population) and White non-Hispanic females (4.6 per 100,000 population) compared to Black non-Hispanic, Hispanic, and Asian/Pacific Islander males and females (**Figure 5.11**).

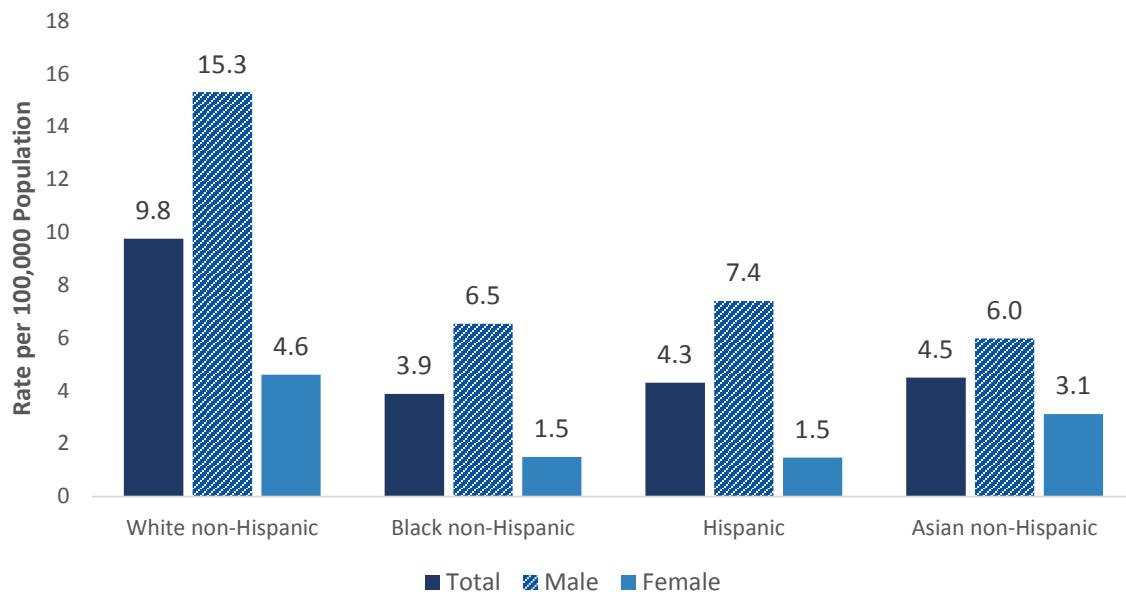
The circumstances associated with suicide deaths in 2014 varied by age group. A current mental health issue (60%), history of treatment for mental illness (49%), and current treatment for mental illness (44%) were most prevalent among those between 45 and 64 compared to the other age groups. The prevalence of alcohol and/or substance abuse problems (33%), history of suicide attempts (22%), and intimate partner problems (20%) was highest among persons aged 25-44 compared to those in other age groups.

Figure 5.10
Suicide Rates by Sex and Age Group, Massachusetts, 2014 (N=608)



NOTE: * DENOTES INSUFFICIENT SAMPLE SIZE TO CALCULATE RATE

Figure 5.11
Average Annual Suicide Rates, by Sex and Race/Ethnicity, Massachusetts, 2010-2014 (N=3,006)



Violence

Violence is a serious public health issue in Massachusetts and in the US. On average, every week in 2014 in Massachusetts, three people died by homicide, more than 37 individuals spent time in the hospital, and more than 440 individuals visited an emergency department because of an injury from an assault.

Preventing violence is an essential aspect to achieving health equity. Due to historical and present-day social and economic inequalities, communities with lower socioeconomic status, communities of color, LGBTQ communities, people with disabilities, and other vulnerable populations such as young women, children, and the elderly, are at increased risk for experiencing violence across the lifespan.

Violence can be prevented through a public health approach even though this issue is often seen as a criminal justice matter. For example, violence can be avoided after modifying factors that lower the risk for someone to commit a violent act. Also, both short and long term effects of violence can be prevented or reduced through the care of the survivors.

Homicide and Assault

Homicide is the third leading cause of death for Massachusetts residents 15-24 years of age and the sixth leading cause of death for those 25-44 years of age. In 2014, there were 147 homicides in Massachusetts. In 2013, there were 2,106 non-fatal assault-related hospital stays and 24,511 non-fatal assault-related emergency department visits.

Homicides and assault-related injuries resulting in a non-fatal injury are an important public health problem for which evidence-based prevention strategies exist.

Trends/Disparities

Homicides in Massachusetts decreased from 175 to 155 between 2004 and 2013 (from 2.8 to 2.3 per 100,000 population). Homicide victimization rates fell 48% among young people ages 15-24 during this time period. The total number of hospital stays for non-fatal assault-related injuries increased from 2,075 in 2004 to a high of 2,531 in 2010, then decreased to 2,106 in 2013.

Rates of homicide and non-fatal assault-related injuries differ by gender, age group, race/ethnicity, and geographic area. Homicide and non-fatal assault-related injuries disproportionately affect Black non-Hispanic males 15-24 years of age and older. Similar to homicide victimization rates, youth and young adults from 15-24 years of age had the highest hospital stay rates for assault-related injuries, but were also the only age group in which rates decreased significantly, a 32% decline over this period. Adults ages 25-64 had the second highest hospital stay rates for assault-related injuries. Hospital stay rates were lowest in children ages 0-14 and adults ages 65+ and remained fairly stable over this time period.²⁶⁴

Figure 5.12

Homicide Victimization among Massachusetts Residents by Age Group, Federal Fiscal Year, 2004-2013*

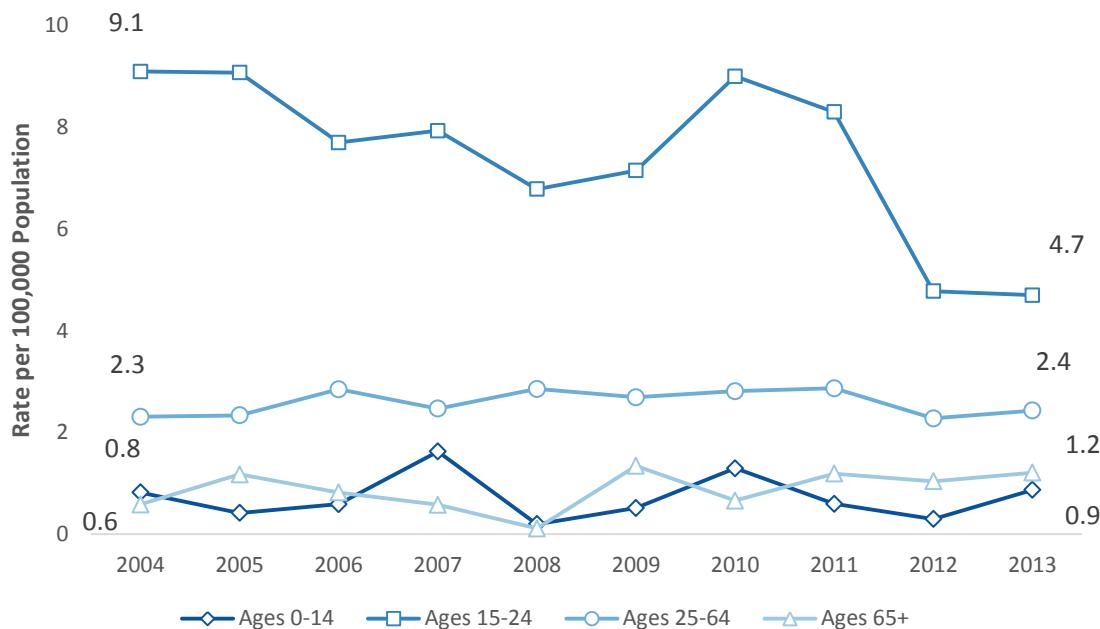
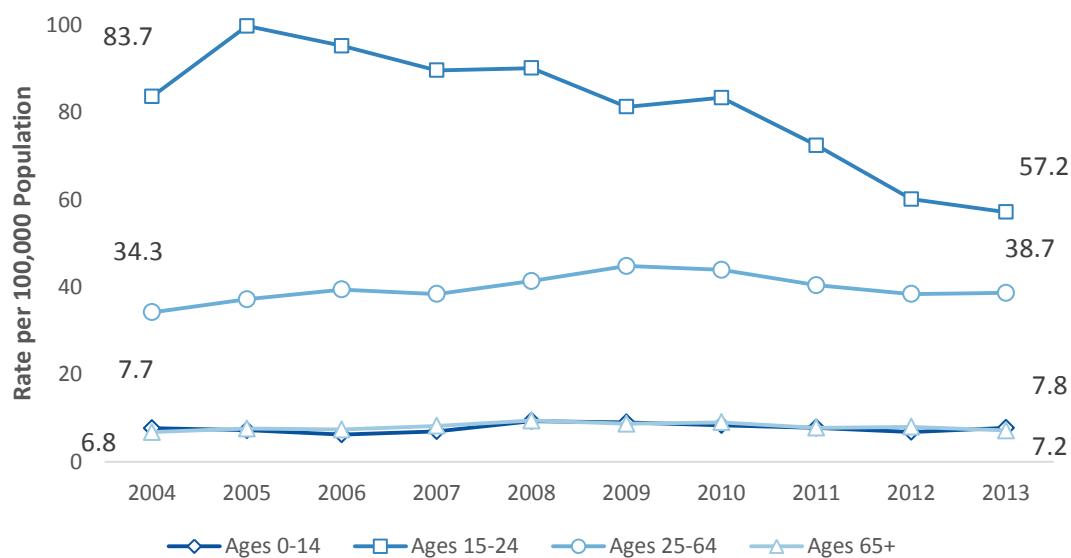


Figure 5.13

Hospital Stay Rates for Assault-Related Injuries by Age Group, Massachusetts, Federal Fiscal Year, 2004-2013*



*SOURCE FOR BOTH 5.12 AND 5.13: CHIA, MA INPATIENT HOSPITAL DISCHARGE,
OUTPATIENT OBSERVATION STAY DATABASES

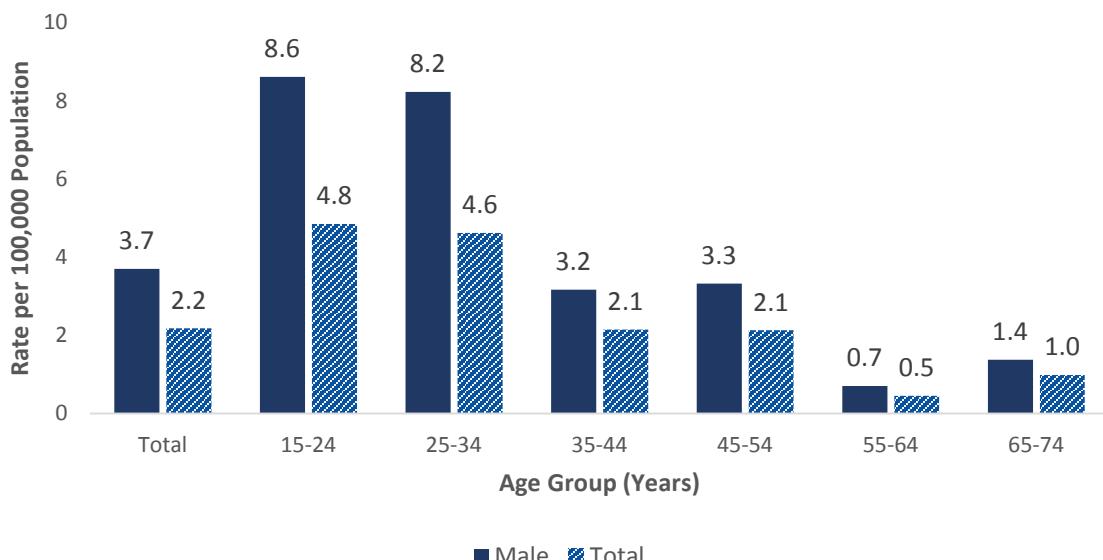
In 2014, homicide victimization rates among males were 5.3 times higher than among females (3.7 per 100,000 population versus 0.7 per 100,000 population). For the total population, the highest homicide victimization rate by age group was among persons 15-24 (4.8 per 100,000 population) and 25-34 year olds (4.6 per 100,000 population). The homicide victimization rate for both these age groups was twice the overall statewide rate of 2.2 per 100,000 population.

In 2013, rates of non-fatal assault-related hospital stays (50.4 per 100,000 population) for males were 3.8 times higher than among females (13.3 per 100,000 population). Male rates of non-fatal assault-related emergency department visits were 1.6 times higher than female rates (455.1 per 100,000 population versus 290.6 per 100,000 population). Non-fatal assault-related hospital stay rates were highest among Black non-Hispanic residents (103.4 per 100,000 population), followed by Hispanic residents (51.8 per 100,000 population) and White, non-Hispanics (19.9 per 100,000 population).

The highest male homicide victimization rates by age group were among 15-24 year olds (8.6 per 100,000 population) and 25-34 year olds (8.2 per 100,000 population). The rates for both of these age groups were over twice the male statewide rate of 3.7 per 100,000 population and 3.5 times higher than the overall statewide rate of 2.2 per 100,000 population.

Figure 5.14

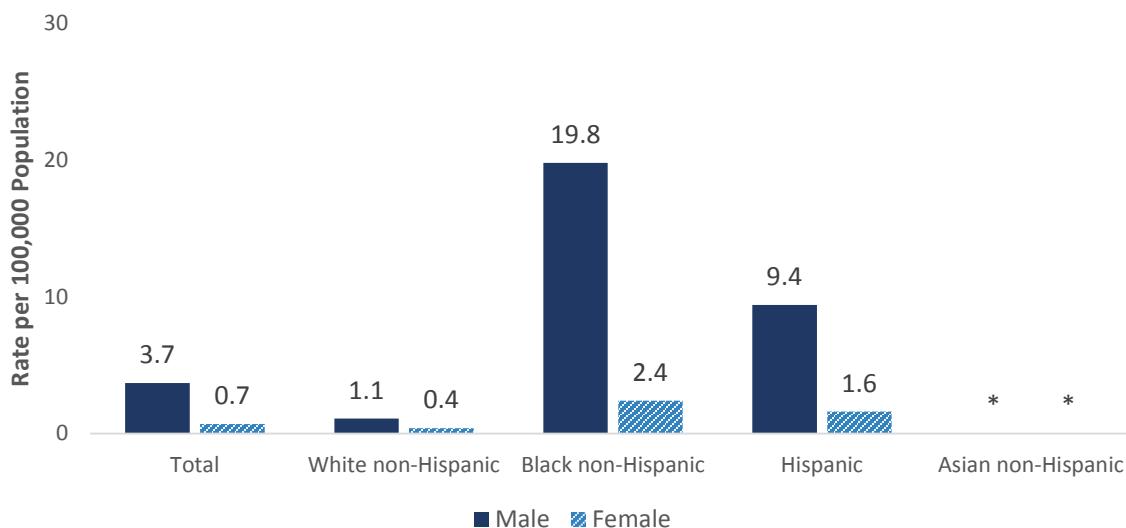
Homicide Victimization Rates, Males Compared to Massachusetts Totals, 2014



NOTE: RATES WERE NOT CALCULATED FOR FEMALE VICTIMS BY AGE GROUP DUE TO SMALL NUMBERS.

Black non-Hispanic residents had the highest homicide victimization rate among males (19.8 per 100,000 population). White non-Hispanic residents had the lowest homicide victimization rate for both men and women (1.1 per 100,000 population and 0.4 per 100,000 population, respectively). The homicide victimization rate among Black non-Hispanic men was 18 times higher than the rate for White non-Hispanic males.

Figure 5.15
Homicide Victimization Rates, by Race/Ethnicity and Sex, Massachusetts, 2014



NOTE: *RATES WERE NOT CALCULATED FOR ASIAN NON-HISPANIC VICTIMS DUE TO SMALL NUMBERS.

Across the Commonwealth in 2014, firearms were the most commonly used weapon in homicides (59%). Sixty-two percent of male homicide and 42% of female homicides were due to firearms. Handguns were the most frequent type of firearm used (96%) among firearm deaths where type of firearm was known.

In 2014, 43% of homicides occurred in Suffolk County, which had the highest number of homicides as well as the highest rate (8.0 per 100,000 population). This rate was 3.6 times higher than the state rate of 2.2 per 100,000 population. The cities with the highest rate of homicide were Brockton (11.6 per 100,000 population), Springfield (9.1 per 100,000 population) and Boston (8.4 per 100,000 population).

In 2014, 82% of homicide victims (n=120) had at least one circumstance known that was relevant to their homicide. The most frequently noted circumstance for males was precipitation by another crime (25%, n=30) which includes crimes such as robbery, burglary and drug trade. The most frequently noted circumstance for females was intimate partner violence-related (38%, n=10).

Youth Violence

In 2014, homicide was the third leading cause of death in the Commonwealth for young people 10 to 24 years of age²⁶⁵. Young survivors of violence often suffer physical, mental, and/or emotional health problems that carry on into adulthood.

Adverse Childhood Experiences (ACES) are associated with a variety of behavioral risk factors and chronic illnesses in adulthood.²⁶⁶ Furthermore, youth who live in areas with high risk of violence are at elevated risk for trauma, which can have devastating effects on a child's physiology, emotions, ability to think, learn, and concentrate, impulse control, self-image, and relationships with others.²⁶⁷

"There are distinct communities where violence is happening. These communities need to be targeted for programs and interventions."

Key Informant Interviewee

A prominent theme among focus group participants²⁶⁸ was concern for the effects of childhood trauma. One participant stated, “We need to do more to recognize adverse childhood experiences as a health priority.” Another reflected the concerns of many by pointing out: “Childhood trauma is not as in your face as the opioid epidemic, but it’s still so harmful because the consequences are long-lasting and affect adult health.”

Trends/Disparities

From 2004 to 2013, homicide rates were highest among youth and young adults 15-24 years of age. In 2014, 48 Massachusetts residents 15-24 years old were victims of homicide, making homicide the third leading cause of death among this age group. Homicide rates have decreased by 48% among youth and young adults 15-24 years old. Homicide rates among Black non-Hispanic residents ages 15 to 24 also declined from 2006 to 2013 (2006: 116.8 per 100,000 population; 2013: 38.1 per 100,000 population).

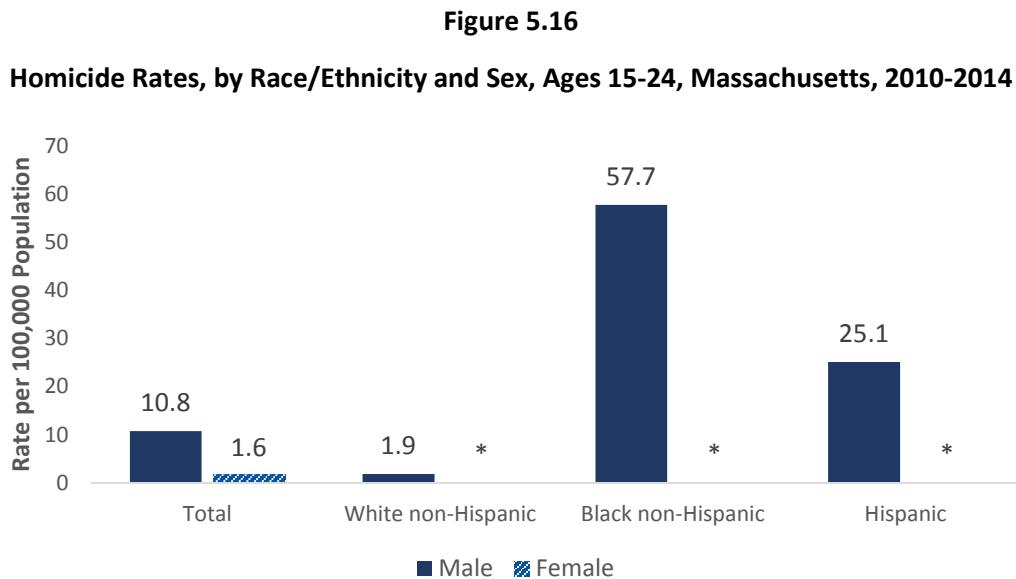
“We are treating the symptoms and results of trauma, but we are not treating the causes of trauma.”

Key Informant Interviewee

Despite these declines, homicide disparities by age and race/ethnicity persist. Youth and young adults ages 15-24 and Black non-Hispanic youth and young adults continue to experience the highest homicide and firearm-related deaths relative to other age and racial/ethnic groups.

Among youth and young adults ages 15-24, the homicide rate among Black non-Hispanic males (57.7 per 100,000 population) was 30 times higher than that for White non-Hispanic males (1.9 per 100,000 population). Among this same age group, the homicide rate among Hispanic males was almost 13 times higher than the homicide rate for White non-Hispanic males (25.1 per 100,000 population versus 1.9 per 100,000 population, respectively).

With the exception of incidents involving dating violence, males are far more likely than females to be killed in incidents of peer-to-peer youth violence. Across all racial/ethnic groups among the MA population 15 to 24 years of age, females were less likely to die in a homicide than their male counterparts.



NOTE: * RATES WERE NOT CALCULATED FOR FEMALES BY AGE GROUP DUE TO SMALL NUMBERS.

From Federal Fiscal Year 2004 to 2013, young adults, ages 15-24 were the only age group that experienced a significant decrease in rates of assault-related hospital stays. However, during this same time period, young adults ages 15-24 had the highest hospital stay rates for assault-related injuries of any age group. Among youth and young adults ages 15-24, Black non-Hispanic males were 31 times more likely to be treated for a non-fatal firearm related assault than White non-Hispanic males in Fiscal Year 2014 (224.0 per 100,000 population versus 7.3 per 100,000 population).

"We're seeing emerging issues or increasing challenges related to cyber-bullying."

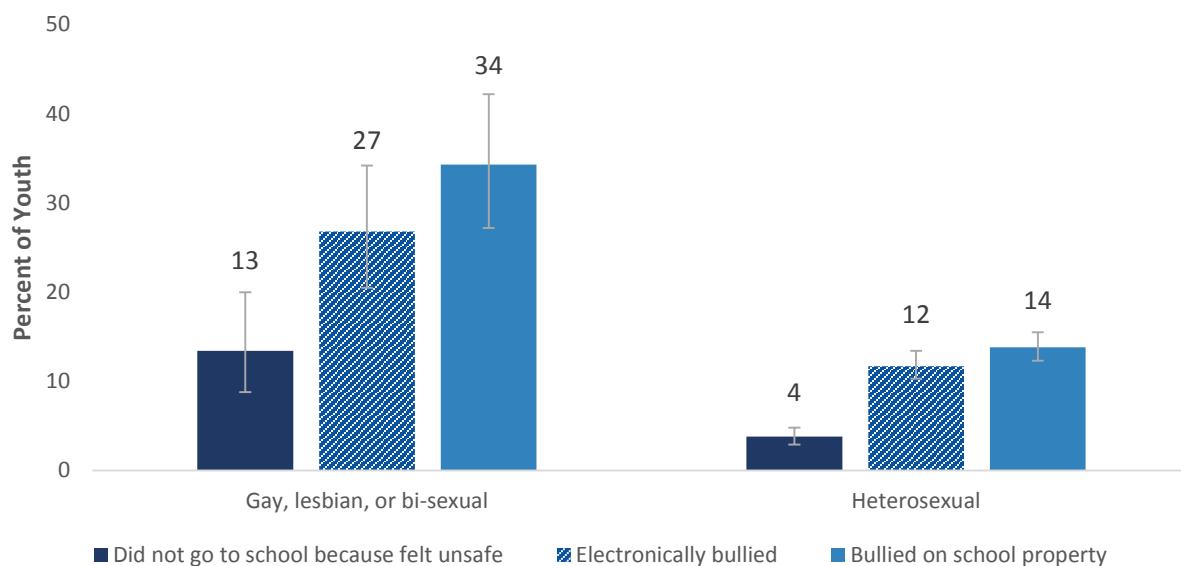
Key Informant Interviewee

In Fiscal Year 2014, Black non-Hispanic males ages 15 to 24 (1,799 per 100,000 population) were 2.6 times more likely to be treated for a non-fatal assault-related injury than White non-Hispanic males of the same age group (680 per 100,000 population). Hispanic males 15-24 (1,366 per 100,000 population) were twice as likely as White non-Hispanic males of the same age group (680 per 100,000 population) to be treated for non-fatal assault-related injury.

In 2015, gay, lesbian, and bisexual high school students were three times more likely than heterosexual or cis-gender students to miss at least one day of school because they felt unsafe at or on the way to/from school (13% versus 4%) and also more than 2 times more likely to have been bullied on school property in the past year (34% versus 14%).

Figure 5.17

Bullying Victimization in the Past 30 Days and the Effect of Fear for Personal Safety on School Attendance in the Past 30 Days among Massachusetts High School Youth by Sexual Orientation, 2015



Sexual Violence/Child Sexual Abuse

Sexual violence leads to many long-lasting physical and mental health effects. Sexual victimization has been associated with subsequent negative health outcomes such as acute and chronic gynecologic injuries and symptoms; sexually transmitted infections, including HIV; rape-induced pregnancy; cervical cancer; pre-term or lower birth-weight infants; and high-risk health behaviors, such as substance use and high-risk sex practices.²⁶⁹

Trends/Disparities

In Massachusetts, between 2011 and 2015, the prevalence of adults reporting sexual violence at some point in their lives showed no statistically significant changes, ranging from 10.7% to 12.8% overall and between 4.6% and 5.5% for men and between 15.7% and 20.1% for women.²⁷⁰

“People with disabilities are more vulnerable to sexual/intimate partner violence and other types of violence.”

Key Informant Interviewee

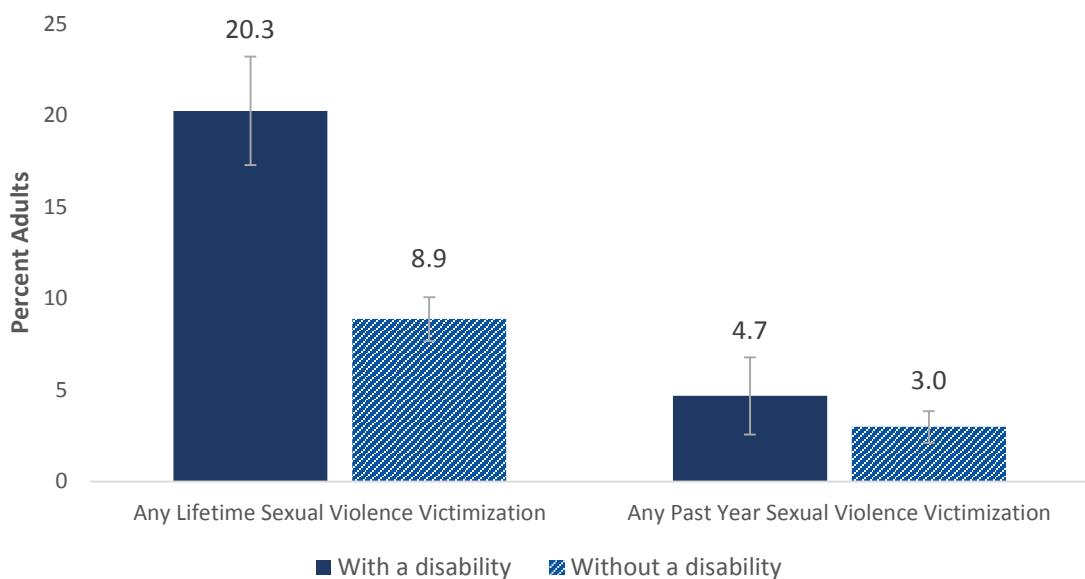
The number of suspected cases of child sexual abuse reported to the Massachusetts Department of Children and Families (DCF) has followed a similar pattern with no statistically significant change over the past five years of available data.^{271,272,273,274,275} The same pattern holds true for unwanted contact among Massachusetts high school students. The Youth Health Survey shows that between 2011-2015 the number of high school students reporting having experienced sexual contact against their will has remained fairly consistent. In 2011, 9% of high school students reported experiencing sexual violence, compared to 6% in 2013 and 7% in 2015.²⁷⁶

Massachusetts adults with disabilities reported a statistically significantly higher prevalence of lifetime sexual violence victimization (20%) than adults without a disability (9%).

Both males and females with disabilities are at a heightened risk for lifetime experiences of sexual violence and for experiencing such victimization within the past year. The prevalence of lifetime reported sexual violence victimization was 3.5 times higher among men with disabilities compared to those without disabilities (13.9% versus 3.7%). Similarly, the reported prevalence among women with disabilities was more than twice as high as that of women without disabilities (26.6% versus 12.4%).²⁷⁷

Figure 5.18

Lifetime and Past Year Sexual Violence Victimization Experiences among Massachusetts Adults, Ages 18 and Older, by Disability Status, 2012-2015



From July 1, 2013 through June 30, 2016, the Massachusetts Disabled Persons Protection Commission (DPPC) received 2,213 reports of sexual abuse, of which 749 fell within DPPC's jurisdiction and were investigated. Notably, statistics such as these do not represent the true scope of the problem, as research demonstrates that the majority of victims of sexual violence do not report their experiences to authorities.²⁷⁸

Youth who have disabilities are also at increased risk of sexual violence. In Massachusetts, youth with disabilities reported experiencing sexual violence at more than three times the rate of youth without disabilities (15% versus 4%, respectively), a difference that was statistically significant.²⁷⁹

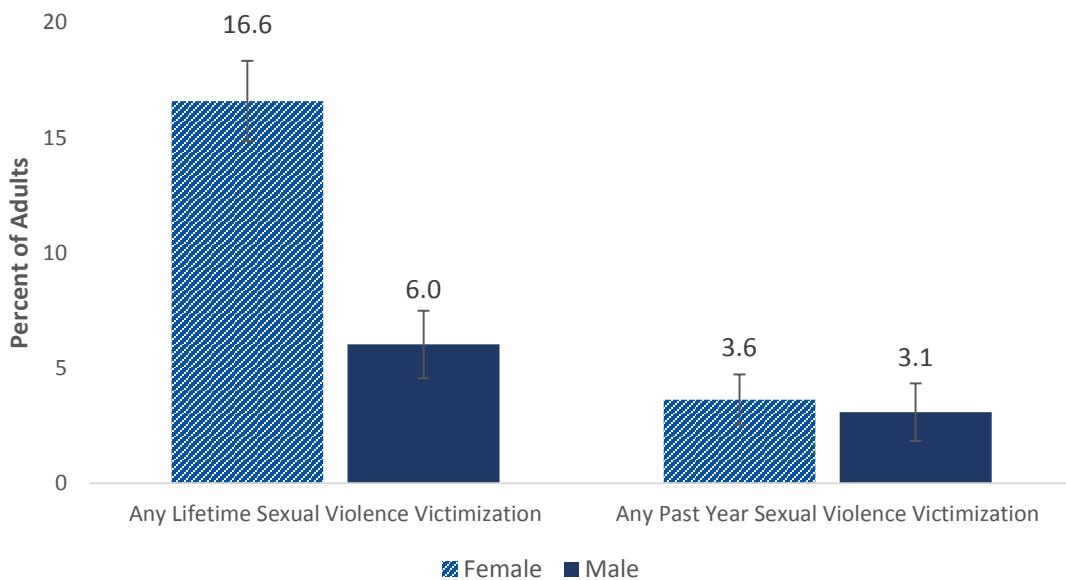
In Massachusetts, adult women and teenage girls face higher risk of experiencing sexual violence than adult and teenage men. The percentages of adult women experiencing some form of sexual violence were almost three times higher than the percentage of adult men (17% of females versus 6% of males). Massachusetts high school females reported experiencing any form of sexual violence at some point in their lives at almost three times the rate of high school males (11% versus 3%, respectively).

In Massachusetts, White non-Hispanic high school youth (6%) were statistically significantly less likely to report ever having experienced sexual violence when compared to Black non-Hispanic high school youth (10%), Hispanic high school youth (11%), and high school youth of other non-Hispanic races (8%).

For Massachusetts high school students who reported sexual violence during the 2011 to 2015 period, the most commonly reported perpetrator was a dating partner. For high school students overall, and for female high school students, this category of perpetrator was statistically significantly more commonly reported than any other category.

Figure 5.19

**Lifetime and Past Year Sexual Violence Victimization Experiences among Massachusetts Adults,
Ages 18 and Older, by Gender, 2012-2015**



A statistically significantly higher percentage of Massachusetts adults who identify as gay, lesbian, bisexual, or other sexual orientation reported experiencing sexual violence in their lifetimes, compared to adults who identified as heterosexual (29% versus 11%). The percentage of gay, lesbian, or bisexual high school youth who reported ever having experienced sexual violence was five times higher than that among youth who identified as heterosexual (30% versus 6%). The high rates of sexual violence against LGBTQ youth and adults illuminate the importance of making an effort to include LGBTQ experiences in discussions and resources relating to sexual violence.

Similarly, survivors in rural regions of the Commonwealth reported rapes to area rape crisis centers at a rate twice as high as the state rate (67 versus 33 per 100,000 population, respectively). The rural towns of Athol, Florida, Montague, Monroe, Plainfield, Warwick and Wendell had more than 3 times as many registered sex offenders as the state average; an additional 14 rural towns have twice as many registered sex offenders as the state average. One focus group participant stated, *"In rural areas, there is more isolation and less anonymity and as a result, sexual violence is often left untreated."*

Domestic and Dating Violence

Domestic violence (DV), also known as Intimate Partner Violence (IPV), can have a destructive effect, not only on victims but also on family members, bystanders, and perpetrators. Survivors of domestic violence experience a wide range of negative health outcomes beyond the injuries caused by the violence itself.

Domestic violence is costly not only to survivors, but also the health care system, employers, and society as a whole. Other direct costs to society include mental health treatment and increased volume for the criminal justice and the correctional systems.

Domestic violence disproportionately affects women, gay, lesbian, bisexual, and transgender individuals, and people with disabilities.

Women who experience domestic violence exhibit a wide range of negative health outcomes beyond the injuries caused by the violence itself. They are twice as likely to experience depression and almost twice as likely as their non-victimized peers to have an alcohol use disorder. They are 1.5 times as likely to contract sexually transmitted infections, including HIV, syphilis, chlamydia, and gonorrhea. They are also 16% more likely to have low-birth weight pregnancies.

Additional health outcomes that have been linked to domestic violence include, but are not limited to, chronic pain, migraines and/or headaches, immune system compromised by stress, stroke, TBI, cardiovascular and respiratory conditions, hypertension, heart disease, asthma, heart attack, cervical cancer, and physical and emotional scars.²⁸⁰ Women who experience domestic violence are more likely than their peers to be murdered.

Trends/Disparities

Nearly one in three women and one in five men in Massachusetts has experienced physical violence, rape, and/or stalking by an intimate partner during her/his lifetime.²⁸¹ The Youth Risk Behavior Survey indicates that in 2015 6.7% of Massachusetts high school students reported being a victim of physical dating violence in the past year.²⁸²

Between 2003 and 2012, Jane Doe Inc., the federally recognized Massachusetts coalition of domestic violence and sexual assault service providers, identified at least 266 homicides associated with domestic violence in Massachusetts. In addition, 72 perpetrators of domestic violence died by suicide, and six more were killed by police. During the 10-year period reviewed, domestic violence was the cause of 14% of all homicide deaths in the state.²⁸³ In Fiscal Year 2015, there were 28,158 domestic abuse or "209A" protective order filings in Massachusetts District Courts and the Boston

Municipal Court system. These 209A filings comprised 10.4% of all civil filings in these courts in Fiscal Year 2015.²⁸⁴ In Fiscal Year 2016, the percent of civil restraining orders in predominantly rural Berkshire and Franklin counties were 62% and 30% higher, respectively, than the Massachusetts state restraining order rate.²⁸⁵

One key informant interviewee explained, *"In rural areas of the state people are less likely to report domestic violence because they will likely know someone who's going to get involved in their situations."* One focus group participant reported a similar point of view, stating, *"There's a lack of domestic violence resources in Western Mass; the need is much higher than we can handle."*

Race/ethnicity is also related both to prevalence and outcomes of domestic violence. Nationally, a higher prevalence of American Indian or Alaskan Native (51.7%), multi-racial (51.3%), and Black non-Hispanic women (41.2%) report intimate partner violence compared to Hispanic (29.7%) and White non-Hispanic (30.5%) women.²⁸⁶ Black non-Hispanic women in Massachusetts are four times more likely to be murdered by a current or former intimate partner than other women.²⁸⁷ The risk of being a victim in a homicide perpetrated by an intimate partner is four times higher for Black women, three times higher for Hispanic women, and twice as high for foreign born women when compared to White, non-foreign born women in the Commonwealth.

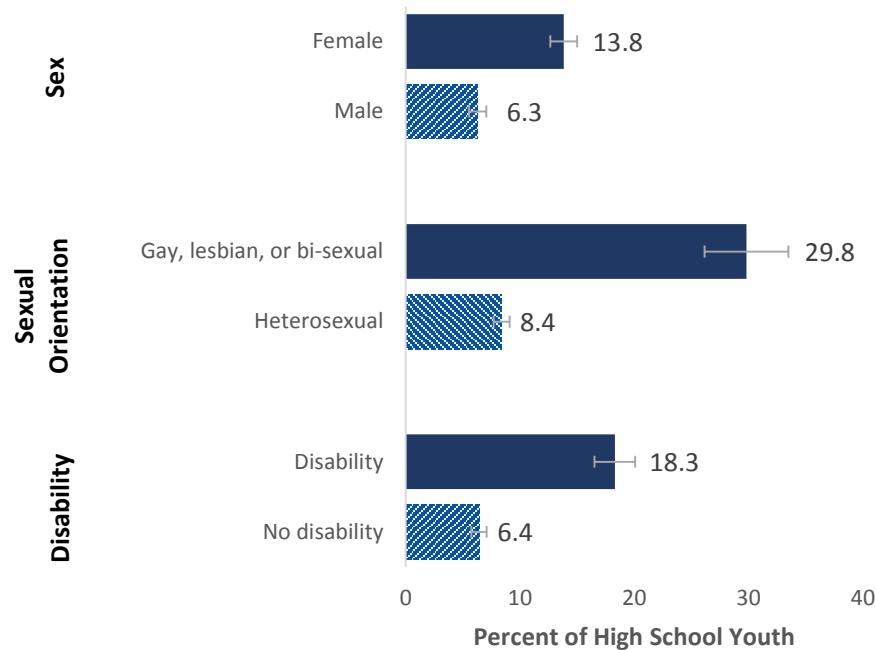
Nationally, Black women have the highest rate of domestic violence, at 4.7 per 100,000 vs 3.9 for white women and 2.8 for Hispanic women for the years 2002-2013.²⁸⁸ In Massachusetts between 1997-2007, Black women had four times the rate of domestic violence related homicide compared to non-Black women. Hispanic women were three times more likely to be killed by an intimate partner than their non-Hispanic counterparts, and immigrants were twice as likely to be killed by an intimate partner than non-immigrants.²⁸⁹

Massachusetts high school girls have been found to be more likely than high school boys to report experiencing dating violence in their lifetimes (14% of girls versus 6% of boys) and in the 12 months leading up to the survey (8% of girls versus 5% of boys).

High school students in the Commonwealth who identify as gay, lesbian, or bi-sexual are almost four times as likely as high school students who identify as heterosexual to report experiencing dating violence in their lifetimes (30% versus 8%). High school students who have a disability are about three times more likely than other high school students to report dating violence in their lifetimes (18% versus 6%).

Figure 5.20

Percentage of Massachusetts High School Youth who Reported Experiencing Physical and/or Sexual Dating Violence in their Lifetime, by Gender, Sexual Orientation, and Disability Status, 2009-2015



Selected Resources, Services, and Programs

Following are selected resources, services and programs that support the health topics discussed in this chapter.

Childhood Unintentional Injury

- The Massachusetts Home Visiting Initiative to support interventions at the individual, family, community, and state levels to reduce injury among children.
- Implementation of “Return to Play” sports concussion legislation by developing regulations, providing model policies, concussion history and medical clearance forms, and technical assistance to middle and high schools, and conducting numerous trainings.
- The Centers for Disease Control and Prevention (CDC) developed HEADS UP²⁹⁰ Concussion in Youth Sports Initiative, which is used in many school settings across the Commonwealth.

Older Adult Falls

- The Falls Prevention Coalition, a broad-based and active statewide coalition that is charged with recommending best ways to reduce older adult falls and associated health care costs to key state policy makers.
- The Massachusetts Prevention and Wellness Trust Fund (PWTF) that implements evidence-based interventions to reduce preventable health conditions, including older adult falls.
- The Elder Services of Merrimack Valley through their Healthy Living Center of Excellence utilized their competitively awarded Administration for Community Living (ACL) grants to expand and develop evidence-based falls-related programming in community settings.

Motor Vehicle Injuries

- The Traffic Safety Coalition of Massachusetts (TSCM) is a coalition of transportation safety advocates from across the state; MDPH’s Injury Prevention and Control Program (IPCP) works with TSCM to support prevention infrastructure.
- The Massachusetts Strategic Highway Safety Plan (SHSP), MDPH’s IPCP participates in the planning and implementation of the SHSP through disseminating relevant state data, research findings and evidence-based strategies; and developing a model Safe Driving Policy.
- The *Massachusetts Junior Operator’s Graduated Driver’s License* law that had significant changes made to it in 2007 imposes mandatory suspensions for violations related to night-time driving, operating under the influence, and operating to endanger.
- The Massachusetts Executive Office of Public Safety’s Highway Safety Division’s 2017 Impaired Driving Summit that brought together leaders, stakeholders, and experts to elevate the priority of impaired driving, identify needs to address impaired driving and create opportunities for participants to collaborate to address these needs.
- The MDPH Injury Prevention and Control Program is conducting a project to require the adoption of safe transportation policies among youth-oriented programs in an effort to reduce motor vehicle injuries and traumatic brain injury (TBI) among Massachusetts youth 15-24 years of age.

Occupational Injuries

- MDPH is working with hospitals, hospital worker organizations, and researchers to reduce risks associated with patient handling to protect both workers and patients; a MDPH-initiated Hospital Ergonomics Task Force developed a blue print for action and an ongoing stakeholder group is working to implement Task Force recommendations.
- MDPH is chairing the Massachusetts Youth Employment and Safety (YES) Team that coordinates efforts of multiple agencies to protect youth at work.
- MDPH develops multi-lingual materials that are broadly disseminated through worker centers and community organizations to educate low wage immigrant and minority workers about workplace safety.
- MDPH works with federal and other state partners to promote a federal campaign to prevent falls in construction and the safety stand-down for fall prevention, including a series of brochures on preventing falls in residential construction.

Suicide

- The MDPH's Suicide Prevention Program provides funds for the MassMen campaign and a statewide suicide prevention crisis hotline, and funding for 20 community partners to support "postvention" services to schools after a suicide.

Youth Violence

- MDPH's Child and Youth Violence Prevention Unit created three violence prevention grants programs that fund more than 25 community-based organizations to implement intervention programs to prevent violence by addressing its root causes.
- MDPH's Youth at Risk grants focus on the most underserved youth to address shared risk and protective factors that influence gang violence, sexual violence, violence against LGBTQ youth, teen dating violence, bullying, and suicide.

Homicide and Assault

- MDPH tracks gun shots and knife wounds through the Weapon Related Injury Surveillance System (WRISS).
- The Massachusetts Violent Death Reporting System tracks homicides and suicides and provides this information to prevention practitioners to help target their efforts.
- The Safe and Successful Youth Initiative works with "proven risk" youth who are often agency-involved to provide supports and services and reduce the risk of homicide or assault.
- See resources, services, and programs listed in the sections for "Youth Violence", "Sexual Violence/Child Sexual Abuse", and "Domestic and Dating Violence" that also support issues described in the "Homicide and Assault" section.

Sexual Violence/Child Sexual Abuse

- Youth Violence Prevention Services provide trainings on positive youth development, trauma-informed care, suicide prevention and risk identification; and trainings for community-based organizations to help staff of youth-serving organizations recognize and respond to adolescents' experiences of sexual violence.
- A total of 16 comprehensive rape crisis centers are funded by MDPH to deliver sexual assault survivor services, including 24/7 hotline response; 24/7 accompaniment to all hospital emergency departments; individual and group support sessions; legal advocacy and accompaniment to courts and police stations; outreach; and professional and community education.
- The Oversight Unit at the Massachusetts Disabled Persons Protection Commission (DPPC) coordinates with protective service agencies to meet the identified needs of the individual victims of sexual violence.
- Massachusetts Disabled Persons Protection Commission program builds and enhances relationships to improve access to trauma-informed services for sexual assault survivors who have intellectual and developmental disabilities.
- The Massachusetts Child Sexual Abuse Prevention Advisory Group supports youth-serving agencies across the state by conducting an assessment of what policies and procedures these agencies need in order to improve the prevention of child sexual abuse.

Domestic and Dating Violence

- MDPH supports residential and community-based programs across the Commonwealth to provide services to survivors of domestic violence and prioritizes services for populations at highest risk. High risk populations were determined to be rural populations, LGBT, immigrants, Black non-Hispanic women, and people with disabilities.
- MDPH certifies and funds 15 Intimate Partner Abuse Education Programs in Massachusetts to address abusive behavior by intimate partners. The majority of client are men who are referred to this service by the courts. However, referrals also come from other service agencies, service professionals, and self-referrals, and some women and transgender clients are served each year.

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A close-up photograph of a woman's face in profile, looking upwards and to the right. She has short brown hair and is wearing a light blue, tie-dye style top. A long, dangling earring with small beads hangs from her ear. The background is blurred, showing what appears to be a window frame and some greenery outside.

CHAPTER 6

Addiction



Addiction

This chapter provides information about addiction, which covers substance use disorder and problem gambling, in the Commonwealth of Massachusetts and related trends, disparities and resources. It includes the following topic areas:

- Prevalence of Addiction, Related Morbidity, and Mortality
- Opioid Epidemic in Massachusetts
- Governor's Working Group on Opioids Action Plan: Massachusetts Continuum of Care
- Addiction and Specific Populations
- Selected Resources, Programs, and Services

Chapter Data Highlights

- Addiction affects 27.1 million people in the US
- Opioid-related deaths have increased 450% over the last 16 years in Massachusetts
- Since 2010, over 10,000 naloxone rescues have been reported in Massachusetts
- Approximately 13,000 people in MA have been trained in SBIRT (Screening, Brief Intervention, & Referral to Treatment) to date
- Enrollment in Medication Assisted Treatment (MAT) following non-fatal opioid-related overdose reduces the risk of subsequent fatal overdose by 50%
- The risk of opioid-related overdose death for persons released from prisons and jails is 120 times higher than for the general population
- Fentanyl has a growing presence in the illicit drug market and is involved in the majority of opioid overdose deaths
- In Fiscal Year 2016, 52.6% of BSAS clients reported a history of mental health treatment

Overview

Addiction is a chronic relapsing disease affecting the brain. One in twelve people aged 12 and older are affected by addiction.²⁹¹ Recent research suggests that addiction is a chronic disease with many expressions, including: alcohol, cannabis, hallucinogens, inhalants, opioids, sedatives, hypnotics, and anxiolytics; tobacco; caffeine; and other behavioral expressions, such as gambling²⁹². The overall annual national cost of addiction is estimated to exceed \$740 billion dollars, including expenses related to health, crime, and lost productivity.²⁹³

The consequences of addiction extend far beyond economic costs. Addiction adversely affects individuals and their families, friends, and communities. Substance misuse and excessive behavior patterns enhance risk of developing adverse health and social outcomes such as HIV, hepatitis, unplanned pregnancy, family disintegration, domestic violence, criminal behavior, financial instability, housing instability, child abuse, non-fatal overdose, and fatal overdose.

The causes of addiction are multifaceted, including psychological, social, environmental, and biological factors.²⁹⁴ Accordingly, some individuals are at greater risk of developing addiction. Addiction can develop following exposure to and/or interaction with a substance or activity. When the relationship between a person and that drug or activity yields a desirable shift in subjective experience, addiction can develop. Increased exposure to a substance or activity increases the potential for an individual to develop addiction.

The health and social consequences of addiction are often related to the type of addiction. For example, liver cirrhosis may develop for an individual addicted to alcohol; debt is possible for individuals addicted to gambling; pulmonary carcinoma is a possible outcome for individuals who smoke; and sepsis and hepatitis are possibilities for individuals who use intravenous drugs. Overdose deaths are typically caused by consuming substances at high intensity and/or by consuming combinations of substances such as alcohol, sedatives, tranquilizers, and opioids to the point where critical areas in the brain that control breathing, heart rate, and body temperature stop functioning.

Prevalence of Addiction, Related Morbidity, and Mortality

According to the National Survey on Drug Use and Health (NSDUH) in 2015, an estimated 27.1 million people in the US aged 12 and older used illicit drugs in the past month. Of these, a majority (22.2 million) reported using marijuana and 3.8 million misused prescription opioids.²⁹⁵ During the same survey period, an estimated 20.8 million, approximately 1 in 10 people needed substance use treatment (i.e., treatment for problems related to the use of alcohol or illicit drugs). Of this population, 10.8 percent received treatment.²⁹⁶

According to the 2013-2014 NSDUH, 6.7% of Massachusetts residents 12 years of age or older met the criteria for dependence or abuse of alcohol and 3% met the criteria for dependence or abuse of illicit drugs.

Problem gambling is also a concern. Nationally, gambling disorder affects about 1% of the general population, and subclinical past year gambling-related problems affect 2-3% of the general population.²⁹⁷ In Massachusetts, according to the Social and Economic Impacts of Gambling in Massachusetts (SEIGMA) 2013-2014 survey, problem gambling affects 1.7% of the population.²⁹⁸

Substance misuse was considered a top health concern in focus groups and interview discussions. Participants mentioned a variety of substances including prescription drug use, alcohol, and opioids as being among the most concerning. The rise of Fentanyl was viewed as especially problematic.

Many people in Massachusetts who have a substance use disorder also have co-occurring mental health disorders. In Fiscal Year 2016, 52% of treatment admissions reported to MDPH Bureau of Substance Addiction Services (BSAS) had a history of mental health treatment. Approximately one in four persons ages 11 and older in the MassHealth population were identified as having a serious mental illness (SMI). The risk of fatal opioid-related overdose is six times higher for persons diagnosed with an SMI and three times higher for those diagnosed with depression.²⁹⁹

Interviewees and focus group participants also reported the need for improved care for individuals with dual diagnoses and comorbidities—especially for mental health and behavioral services. Participants described a high prevalence of co-occurring substance misuse and mental illness but reported barriers to care that addresses both issues simultaneously. As one participant said, *“We can fix the substance use but if they still have a mental health issue that they’re self-medicating for, it will inevitably come up again.”*

In 2014, among those under the age of 45, Massachusetts ranked highest among all states for rate of opioid-related emergency department visits and second highest for rate of opioid-related inpatient stays.³⁰⁰ The Centers for Disease Control and Prevention (CDC) reported that Massachusetts had the nation’s second highest rate of fentanyl seizures among all states in 2014.³⁰¹

From 2002 to 2015 there was a 2.2-fold national increase in the total number of deaths from all drug overdoses.³⁰² Each year in the US, more than 2,200 overdose deaths are due to alcohol and 5,415 deaths are attributed to cocaine/crack. Drug overdose deaths also occur as a result of the illicit manufacturing and distribution of synthetic opioids, such as fentanyl, and the illegal distribution of prescription opioids. Illicit fentanyl, for example, is often combined with heroin or counterfeit prescription drugs or sold as heroin, and may be contributing to recent increases in drug overdose deaths. In 2014, there were 17,465 overdoses from illicit drugs and 25,760 overdoses from prescription drugs in the US. For opioid-specific-related deaths, there was a 2.8-fold increase in the total number of opioid-related overdose deaths during this time period. In 2015, US overdose deaths totaled 52,404, including 33,091 (63.1%) that involved an opioid.³⁰³

Deaths due to driving under the influence (DUI) are also a public health concern. According to the National Highway Traffic Safety Administration (NHTSA), there is an alcohol-related highway fatality in the US every 48 minutes. In 2015, nearly 1.1 million drivers were arrested for DUI of alcohol or narcotics. The NHTSA estimates that DUIs cost the United States more than \$44 billion each year in prosecution, higher insurance rates, higher taxes, medical costs, and property damage. Of note, DUI statistics account for only alcohol-related driving impairment and fail to measure driving under the influence of other impairing substances. Drugs other than alcohol are involved in 16% of motor vehicle crashes³⁰⁴.

“Fentanyl is deadly and we’re seeing more and more of it on a regular basis.”

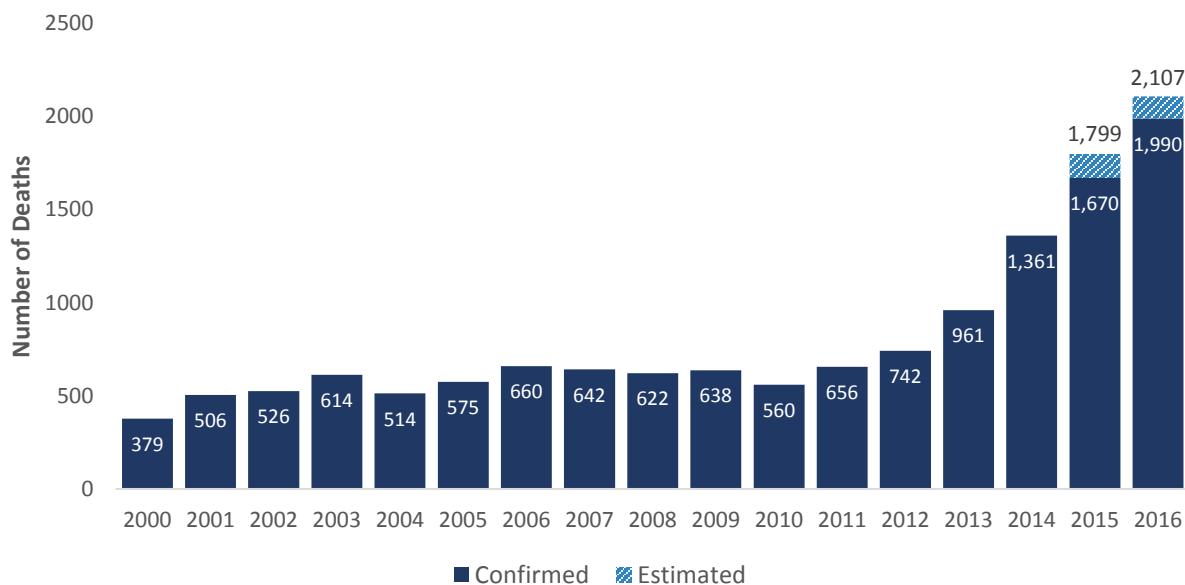
Key Informant Interviewee

Opioid Epidemic in Massachusetts

In Massachusetts, there has been a dramatic increase in opioid-related deaths. The number of opioid-related deaths in 2016 represents a 17% increase over 2015, and a 450% increase since 2000 (see Figure 6.1).³⁰⁵ Almost every community in Massachusetts is affected by the opioid epidemic. A key strategy to understanding the opioid epidemic is to improve the timely analysis and dissemination of data on opioid overdoses. Since April 2015, MDPH reports opioid data on a quarterly basis and uses predictive modeling techniques to estimate the number of opioid-related deaths on cases that have not been confirmed by the Office of the Chief Medical Examiner. Such timely information would help the state respond better to pressing policy and health concerns related to the opioid epidemic, guide policy development, and make programmatic decisions.

Figure 6.1

Number of Opioid-Related Overdose Deaths, Massachusetts, 2000-2016

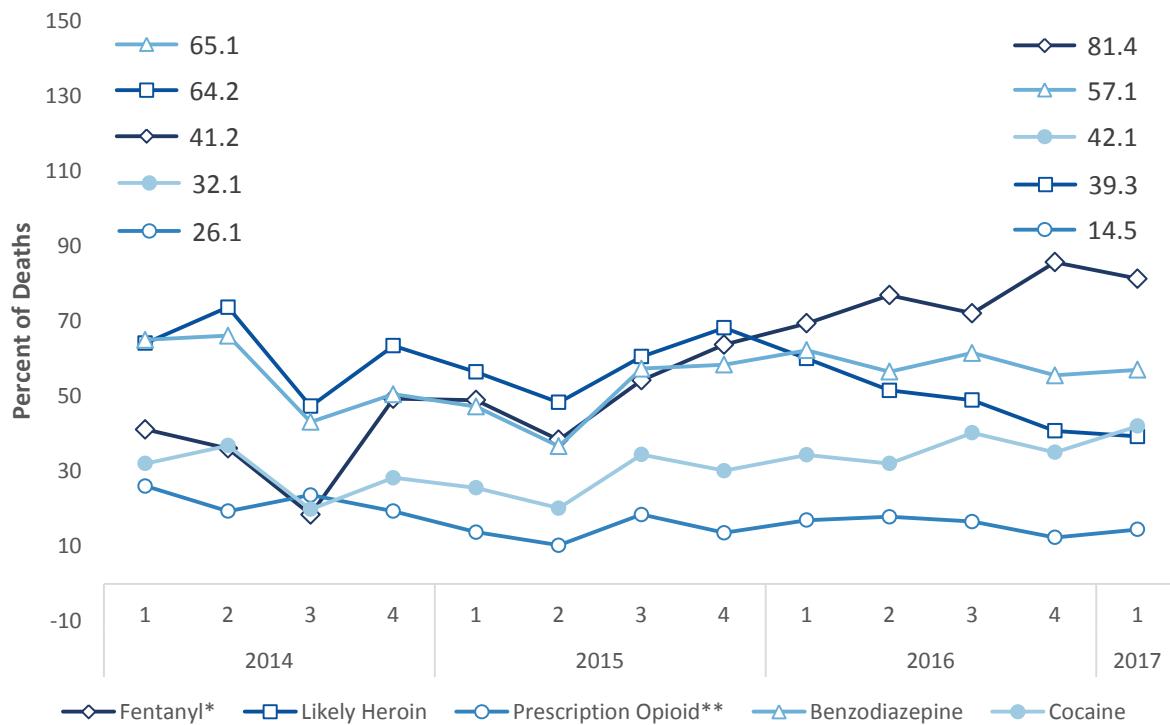


NOTE: OPIOIDS INCLUDE HEROIN, OPIOID-BASED PRESCRIPTION PAINKILLERS, AND OTHER UNSPECIFIED OPIOIDS

Increasingly, there's evidence suggesting fentanyl is fueling the current opioid epidemic. A Massachusetts- Centers for Disease Control and Prevention (CDC) collaborative epidemiologic investigation identified that the proportion of opioid overdose deaths in the state involving fentanyl, a synthetic, short-acting opioid with 50-100 times the potency of morphine, increased from 32% during 2013–2014 to 74% in the first half of 2016. Data from the MDPH quarterly opioid-related overdose death report shows the rate of fentanyl present in opioid-related deaths with a toxicology screen increased from a low of 19% in the third quarter of 2014 to 81% in the first quarter of 2017 (see Figure 6.2).³⁰⁶ Evidence for rapid progression of fentanyl overdose was common among both fatal and nonfatal overdoses. This rapid progression is a critical component in regards to overdose prevention and education.³⁰⁷

Figure 6.2

Percent of Opioid Deaths with Specific Drugs Present, Massachusetts, 2014-2017



NOTE: *THIS IS MOST LIKELY ILLICITLY PRODUCED AND SOLD, NOT PRESCRIPTION FENTANYL

NOTE: ** PRESCRIPTION OPIOIDS INCLUDE: HYDROCODONE, HYDROMORPHONE, OXYCODONE, OXYMORPHONE, AND TRAMADOL

In response to the opioid crisis in Massachusetts, the Baker-Polito Administration, the Massachusetts State Legislature, medical professionals, academic institutions, advocates, experts, and individuals collaborated to marshal a comprehensive long-term response to the opioid epidemic. Selected examples of actions taken include:

- Increased detox and treatment capacity
- Increased Naloxone distribution and education to reverse overdoses and prevent deaths
- Passage of the Good Samaritan Law to enhance and facilitate the use of Naloxone
- Launched first-in-the-nation core competencies for safe prescribing of opioids to medical schools, community health centers, nursing, physician assistant and dental schools
- Enhancing the Prescription Drug Monitoring Program (PDMP) to promote safe prescribing and dispensing of opioid prescriptions, including a first-in-the-nation law limiting first-time opioid prescriptions to seven days
- Passage of legislation, Chapter 55 of the Acts of 2015, that permits linking and analyzing data sets across multiple state agencies to better understand social determinants and risk factors related to the opioid epidemic, and to guide policy and program development

- An effort funded by a Prescription Drug Overdose Prevention grant to strengthen the Massachusetts PDMP increase its utilization rate by prescribers
- Creating three public awareness campaigns: State without Stigma, Stop Addiction, and the Good Samaritan Law. These campaigns intend to reduce stigma, increase awareness about addiction, and promote making the right call to provide help when needed
- Enhancing the Massachusetts Substance Abuse Helpline to provide free and anonymous information and referral for prevention and treatment for addiction to assist individuals and families in navigating treatment services
- Increasing access to and engagement in medication assisted treatment (MAT) to address the opioid epidemic, including expanding community and office-based services to all three federally approved medications (methadone, buprenorphine, and extended release injectable naltrexone)
- Implementing new models for providing timely, comprehensive assessment, and referral to treatment, including Opioid Urgent Care Centers
- Adopting a standardized assessment tool for consistent and evidence-based assessment of individuals' treatment needs

Governor's Working Group on Opioids Action Plan: Massachusetts Continuum of Care

The MDPH's Bureau of Substance Addiction Services (BSAS) has a pivotal role in addressing the current opioid epidemic under the Action Plan developed by the Governor's Working Group on Opioids. As the federally-designated single state authority responsible for substance abuse **prevention, intervention, treatment, and recovery support** for the Commonwealth, MDPH also collaborates with other state agencies tasked with the responsibilities related to the Action Plan.

Prevention initiatives serve to educate the general public, particularly adolescents and young adults, on techniques to reduce the risk of developing a substance use disorder. These prevention strategies help individuals develop the knowledge, skills, and attitudes to make good choices, and avoid or stop harmful behaviors before the behavior becomes addictive.

Intervention initiatives also focus on early identification of substance use, treatment referral, and strategies to reduce fatal drug overdoses such as administration of naloxone to reverse opioid-related overdoses.

Treatment goals are similar to the treatment goals for other chronic illnesses: to eliminate or reduce the primary symptoms (substance use or compulsive behavior), improve general health and function, and increase the motivation and skills of patients and their families to manage threats of relapse. The addiction treatment system includes acute services, stabilization services, medication assisted treatment (MAT), outpatient services, residential services, and wrap-

"I think it's important to address those who are already using substances, but we need to go back even further—even before middle school to work on prevention."

Key Informant Interviewee

around and supportive services for special populations. Addiction can be treated effectively, with recurrence rates equivalent to those of other chronic illnesses such as diabetes, asthma, or hypertension.³⁰⁸

Recovery support services are essential to assisting individuals and families affected by substance use disorder attain and maintain recovery. They require a coordinated, community-wide range of support programs, resources and tools.

Figure 6.3
Massachusetts Addiction Care Continuum



NOTE: SBIRT = SCREENING BRIEF INTERVENTION AND REFERRAL TO TREATMENT; SUPPORTIVE CM = SUPPORTIVE CASE MANAGEMENT; MAT=MEDICATION ASSISTED TREATMENT; RSC=RECOVERY SUPPORT CENTERS; RHS= RECOVERY HIGH SCHOOLS; MOAR= MASSACHUSETTS ORGANIZATION FOR ADDICTION RECOVERY

Prevention

Massachusetts' initiatives to prevent SUD focus on educating citizens, particularly adolescents and young adults, with techniques to help reduce the risk of addiction. These data-informed, evidence-based addiction prevention strategies are critical for avoiding or delaying early substance use and stopping the progression from substance use to addiction. Additional initiatives to prevent SUD focused on prescribers. Massachusetts is the first state in the nation to incorporate substance misuse prevention and management education for all medical, dental, physician assistant, and advanced practice nursing students.³⁰⁹

According to the Substance Abuse and Mental Health Services Administration (SAMHSA), preventive interventions are most effective when they are matched to their target population's level of risk. These prevention efforts can be categorized as universal, selective, and indicated.³¹⁰ Universal prevention targets the general public or a whole population. Selective prevention targets individuals or a population sub-group with no substance abuse disorders, but

where the risk of developing them is high. Finally, indicated prevention efforts focus on individuals who are already exhibiting risk and substance use/misuse.

A key to the development of effective prevention strategies is to understand the onset of use. The prevalence of substance use increases rapidly with age during adolescence and peaks in the early twenties.³¹¹ Early substance misuse, including alcohol misuse, is associated with a greater likelihood of developing a substance use disorder later in life.^{312,313}

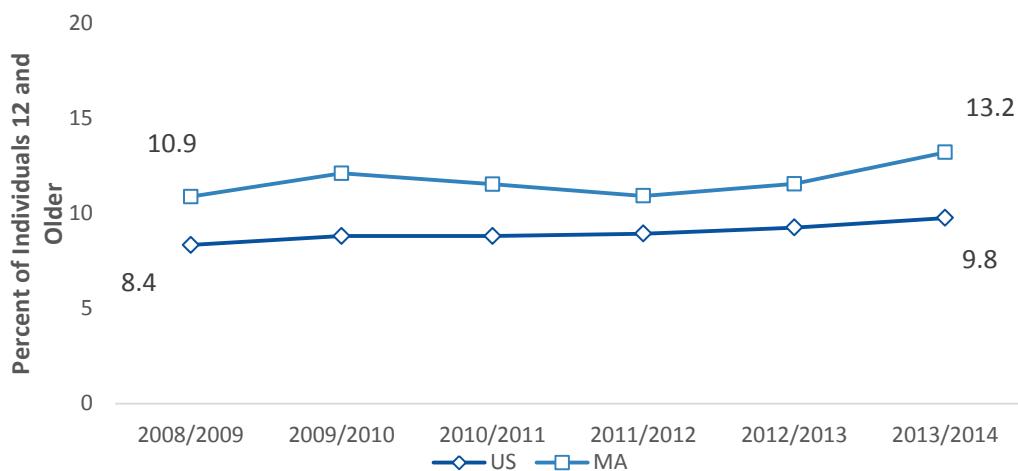
According to 2015 Massachusetts Youth Health Survey (YHS) high school students who started drinking alcohol before the age of 13 were significantly more likely to misuse prescription drugs than those who started drinking at the age of 13 or older. (Odds Ratio = 3.09, 95% Confidence Interval: 1.88-5.08).

Similar association of early onset of marijuana use with later prescription drug misuse was also found from the survey. High school students who initiated their marijuana use under the age of 13 were significantly more likely to report misuse of prescription drugs in the past month than those who started using marijuana after the age of 13 (Odds Ratio = 3.36, 95% Confidence Interval: 2.01- 5.61).

According to 2013-2014 NSDUH estimates, the prevalence of past month binge drinking, past month illicit drug use and past month marijuana use among Massachusetts residents age 12 and older exceeded the national averages (binge drinking: 24.2% vs. 22.9%; illicit drug use: 13.2% vs 9.8% and marijuana use: 11.8% vs 8%).

Figure 6.4

**Individuals Age 12 and Older Reporting Past Month Illicit Drug Use
(2008-2014 NSDUH, US vs Massachusetts)**



SOURCE: SAMHSA REPORTS ON 2008/2009 TO 2013/2014 TWO-YEAR COMBINED AVERAGE ESTIMATES; NSDUH DATA

Intervention

Intervention is an important component of a continuum of services to address substance use disorder (SUD) in a community. Intervention can also be referred to as Secondary or Tertiary Prevention, or Harm Reduction.

Secondary Prevention targets individuals who have low levels of alcohol and/or drug use and would benefit from prevention and safety messages. Tertiary Prevention targets individuals who exhibit a greater degree of SUD and experience problems associated with their alcohol or drug use and would benefit from prevention and harm reduction

messages as well as referrals to treatment. Individuals may experience a range of alcohol and drug use from no use to addiction, and can benefit from different levels of service depending on what they are ready to receive at any given time. A person-centered approach includes prevention, safety and harm reduction messages tailored to what the individual is ready to receive. BSAS incorporates intervention and harm reduction into a range of services provided either directly or through a partnership with the Bureau of Infectious Disease and Laboratory Sciences' Office of HIV and AIDS.

SBIRT Program

A key component of an intervention approach is SBIRT - Screening, Brief Intervention, and Referral to Treatment.

The screening process involves a short, validated questionnaire that identifies risk. While most people who are screened will have negative screening results, the screening process provides an opportunity to remind patients of drinking guidelines and allows health care providers to identify patients in recovery. Brief intervention provides individual feedback about actual substance use and safe limits, as well as patterns of use relative to the broader population. Routine, universal alcohol screening and screening for drug use should occur regularly for all individuals who present in health care settings, including primary, urgent, psychiatric, hospital, and emergency care.

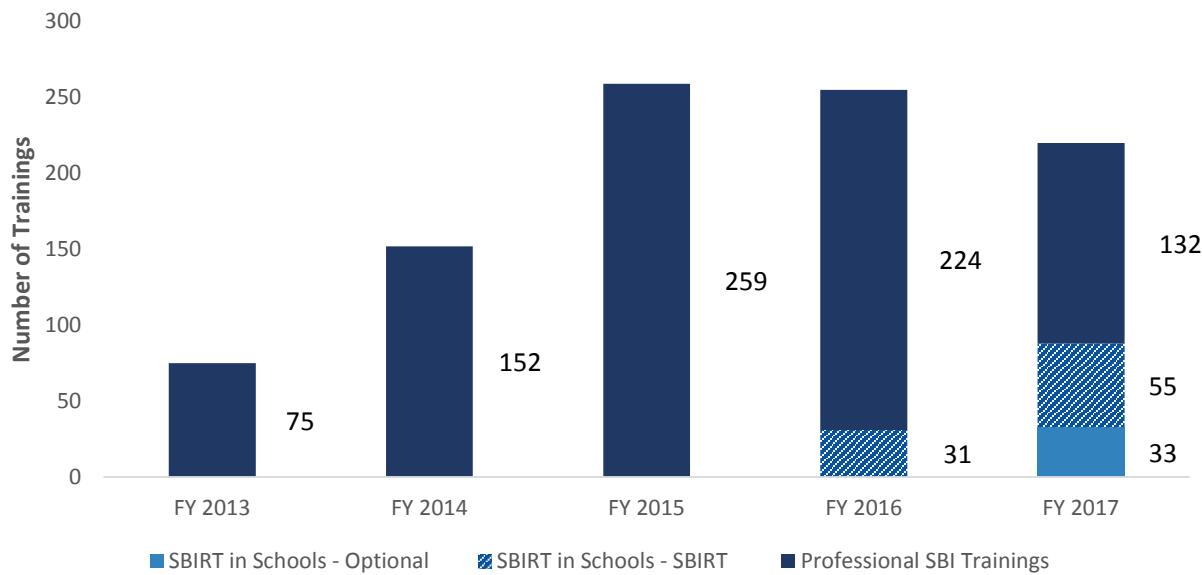
Screening for excessive alcohol use is an effective tool to address “binge drinking” defined as more than five drinks for men or more than four drinks for women, on a single occasion and generally within about 2 hours. “Heavy drinking” is defined as more than 15 drinks per week for men and more than eight drinks per week for women. While individuals that engage in binge drinking may not meet DSM-5 criteria for addiction, this risky behavior predisposes them for other adverse outcomes such as DUI, or DUI-related fatalities.³¹⁴

The success of interventions designed to reduce substance misuse, reduce harm, or treat an individual’s substance use disorder depends on the quality and provision of trainings for those delivering the interventions.

Beginning in Fiscal Year 2013, MDPH provided support for SBIRT trainings. To date, 842 SBIRT training sessions have been held at various settings, including: hospitals; community health centers; health clinics; behavioral health settings for mental health and SUDs; academic institutions; and others.

Of these trainings, 760 were skills trainings, 191 were for technical assistance, and 78 were for one-on-one coaching. As a result, 12,862 individuals are now trained to provide quality intervention services, including 1,229 doctors, 1,999 nurses, 522 nurse practitioners and physician assistants, and 2,140 behavioral health providers.

Figure 6.5
SBIRT Trainings, Massachusetts, Fiscal Years 2013-2017



Naloxone Access Program

Opioid-related overdose deaths often can be prevented by rescue breathing and administering naloxone, an opioid antagonist, in a timely manner. As a result, MDPH has prioritized increased community access to naloxone as a critical strategy to combat the opioid epidemic. Since 2011, the Overdose Education and Naloxone Distribution Program (OEND) has documented more than 10,000 opioid overdose reversals and rescues in Massachusetts.

“There are so many barriers to getting Naloxone, but the demand and need for it is so great.”

Key Informant Interviewee

The major components of the naloxone access strategy have been:

- **Community Bystander Program (OEND):** Under the MDPH OEND program, public health and community-based agencies deploy trained, non-medical workers and citizens to provide training to community members on how to prevent, recognize, and respond to an opioid-related overdose, including administering nasal naloxone. This program targets high-risk individuals and families in communities experiencing a large number of overdoses.
- **First Responder Naloxone:** MDPH provides First Responder Naloxone grants to 32 high-incident municipalities to support training, technical assistance and costs associated with police and fire departments carrying and administering naloxone. Since the grant program began in 2015, grantees have reported 4,738 confirmed naloxone rescues.
- **Pharmacy Access to Naloxone:** Since 2014, Massachusetts pharmacies have had the option to establish naloxone standing orders. This allows community members to request naloxone from a pharmacy without having to get a prescription. As of June 2017, 771 pharmacies have been stocking and dispensing naloxone under a standing order.
- **Naloxone Training:** Since OEND began in 2006, the program has trained approximately 60,000 individuals to recognize and respond to an opioid-related overdose, and has documented more than 10,000 overdose rescues.

Figure 6.6
Overdose Education and Naloxone Distribution Program Activity Over Time, 2008-2016

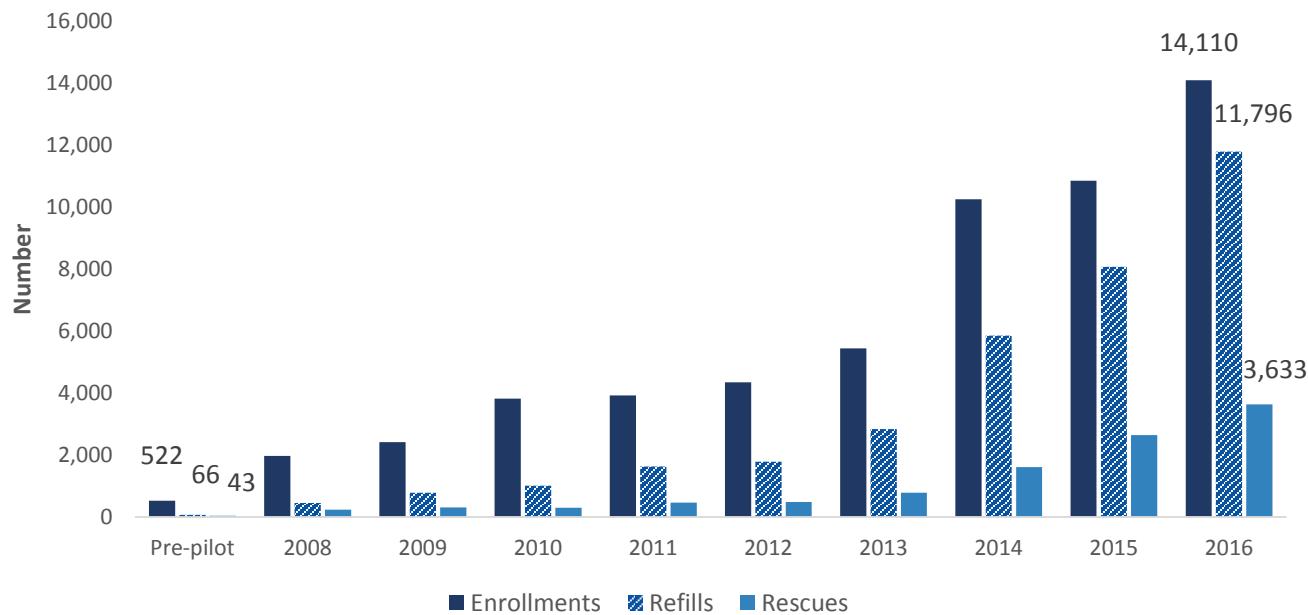


Figure 6.7
Overdose Education and Naloxone Distribution Program Reported Rescues, 2011-2016

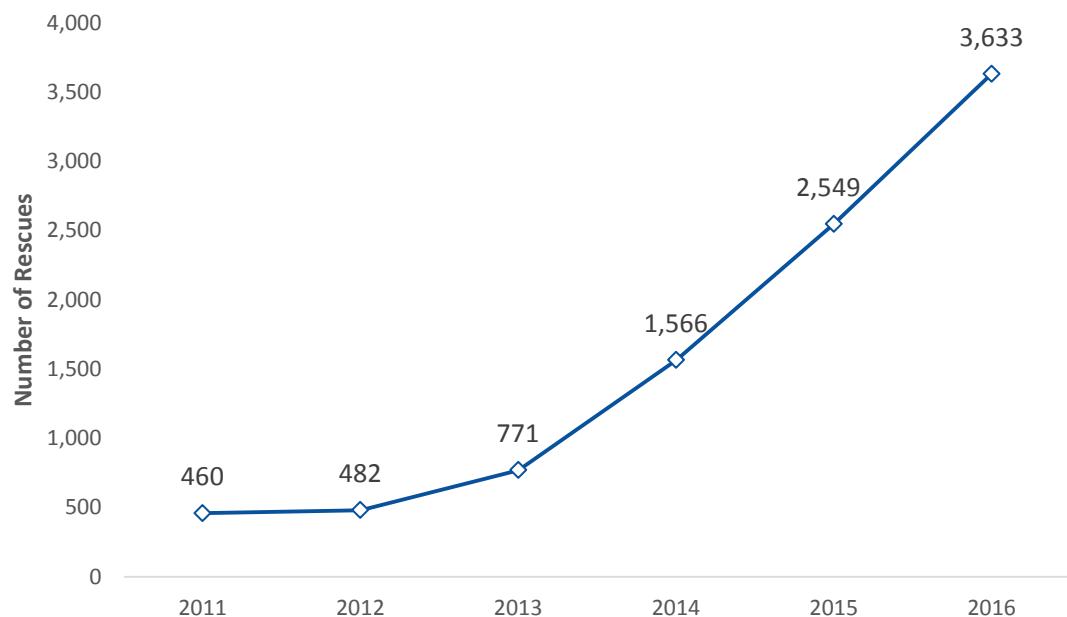
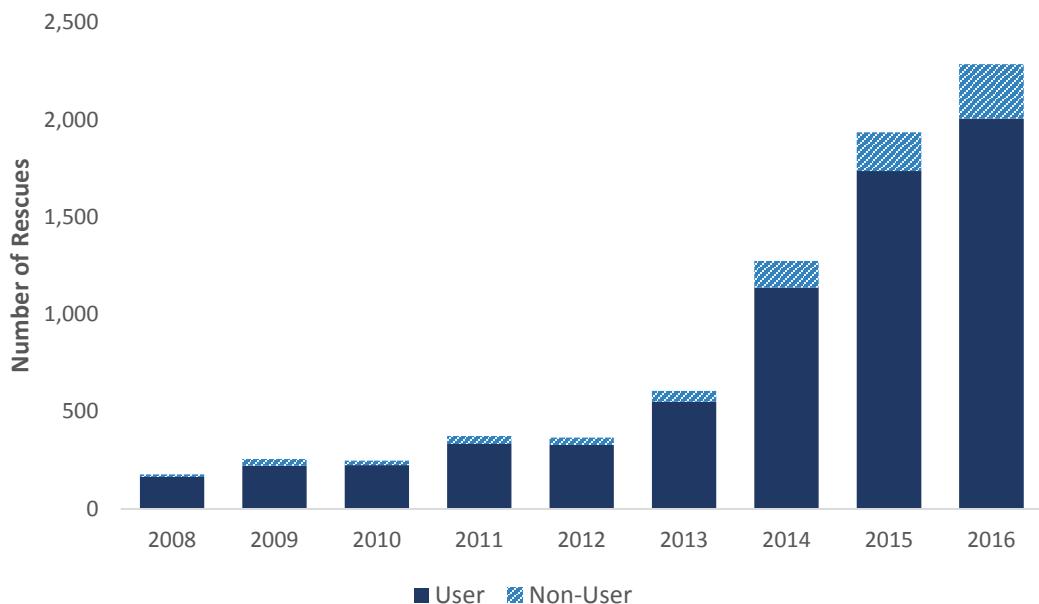


Figure 6.8

Number of Rescues by Overdose Education and Naloxone Distribution by Participant Type, 2008-2016



NOTE: A “USER” IS A PERSON WHO HAS LIVED EXPERIENCE USING DRUGS, A “NON-USER” IS AN ENROLLMENT TYPE FOR INDIVIDUALS WHO DO NOT HAVE THAT LIVED EXPERIENCE.

A prominent theme among focus groups was the challenge of meeting the demand of naloxone because of regulatory barriers at the state level. As one participant shared, *“We have a good group of trainers who can now go out into the community and educate, but they can’t distribute Narcan. The problem is that no one is going to the pharmacy to buy Narcan because of the stigma and price, so we need to change these systems that limit distribution.”*

Treatment

Addiction is a chronic disease that requires ongoing treatment and services. As individuals experience recurrences, they require a recovery-oriented system of care to sustain their progress towards recovery. MDPH has established comprehensive recovery-oriented services and a system of care for individuals and families aimed at engaging the client and supporting them in their ongoing recovery. The Commonwealth is working to ensure that everyone who seeks treatment is appropriately assessed, triaged and provided with facilitated referral to services in a timely manner, which is essential for improved outcomes.

Treatment-specific services include acute detoxification (detox), clinical stabilization, short-term transitional and long-term residential, and a range of community-based services, including outpatient and medication assisted treatment (MAT). All substance use disorder treatment programs offer a set of evidence-based clinical components. An individual's diagnosis and severity indicate the type of treatment needed, regardless of the substance for which the individual seeks treatment.³¹⁵

Massachusetts is in the process of adopting a standardized assessment tool across the continuum of care for consistent and evidence-based assessment of an individual's treatment needs. Innovative models such as the Opioid Urgent Care

Centers provide timely, comprehensive assessment and referral to treatment across the state. Additionally, the Massachusetts Substance Abuse Helpline is being enhanced to provide clinical and facilitated referral support to assist individuals and families navigating treatment services.

Research indicates that combining behavioral therapy and counseling with medication assisted treatment (MAT) are effective approaches to treating addiction.^{316,317} MAT (e.g. buprenorphine, naltrexone, and methadone) has been shown effective in reducing illicit drug use, fatal overdoses, and HIV transmission, as well as increasing retention in treatment.³¹⁸ In Massachusetts, enrollment in MAT following a non-fatal opioid-related overdose reduces the risk of subsequent fatal overdose by 50%.³¹⁹

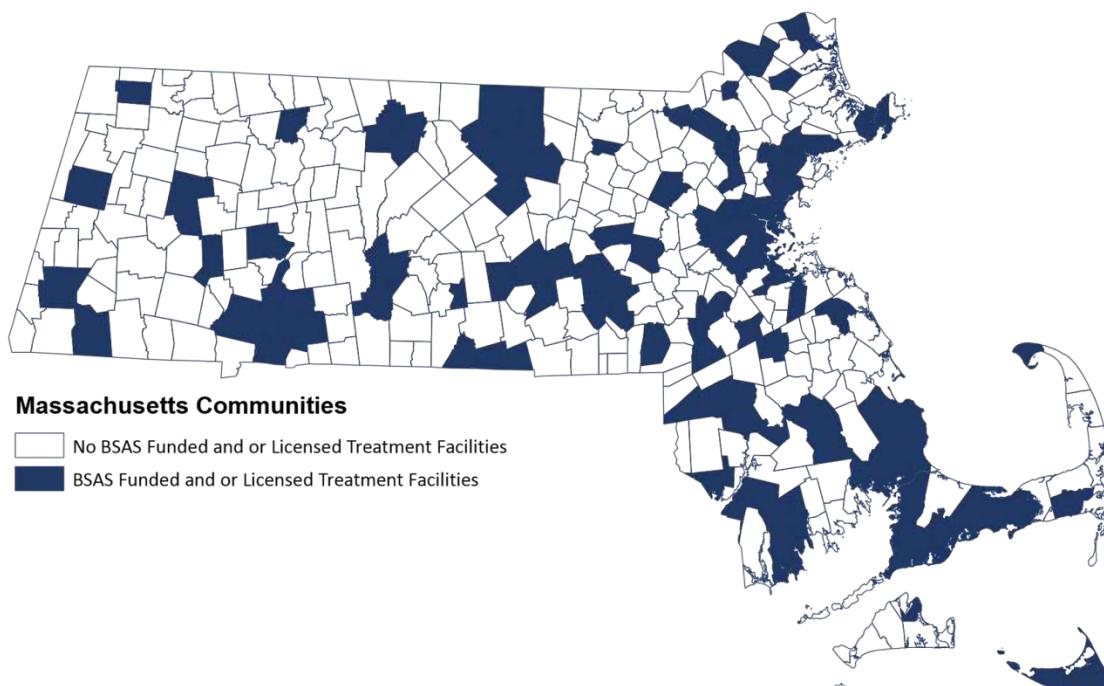
One-year post-discharge follow-up studies suggest that 40% to 60% of discharged patients have no indication of recurrence.³²⁰

Trends/Disparities

Geographic disparities exist in accessing appropriate substance use treatment services. Residents of more rural regions distant from treatment services face physical barriers, such as available and affordable public transportation, to accessing needed treatment. Disparities exist for access to MAT treatment across the state. Individuals from upper north shore, western Massachusetts, and the Cape/Islands seeking MAT are more likely to have to travel more than five miles to access care compared to those in more densely populated areas.³²¹

Figure 6.9

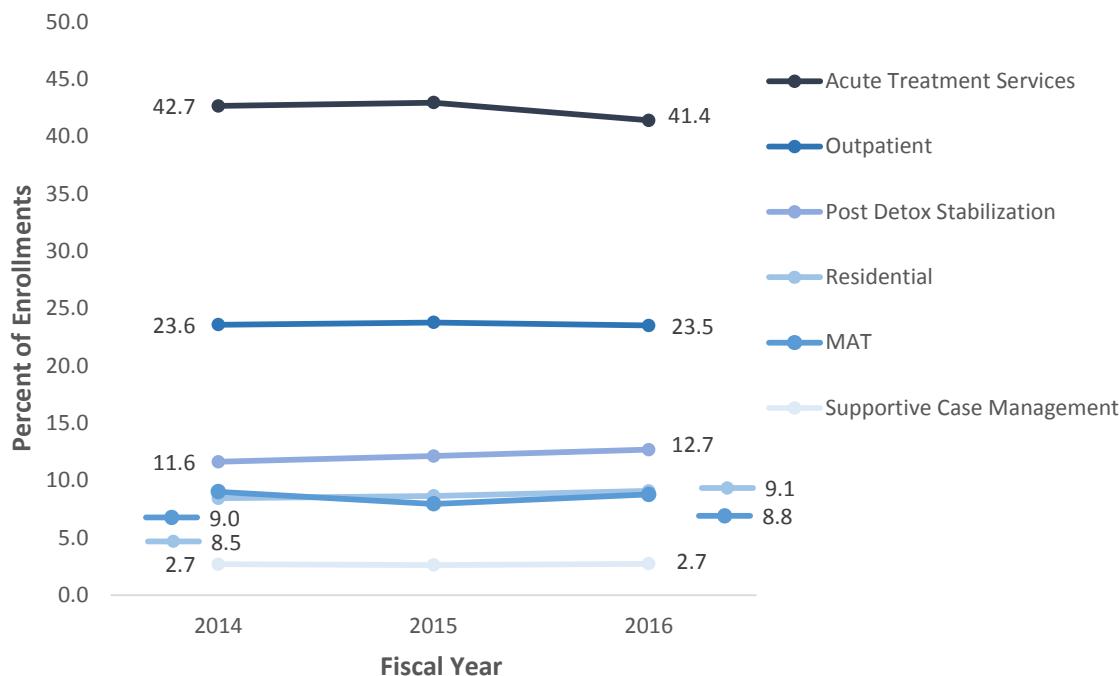
Communities with BSAS Funded and or Licensed Treatment Facilities



In Fiscal Year 2016, 53,007 individuals enrolled in BSAS treatment services accounting for 104,848 admissions. More than 40% of these admissions were for acute treatment services, followed by outpatient (23.5%), post detox stabilization (12.7%), residential (9.1%); and MAT (8.8%).

Figure 6.10

BSAS Enrollments by Service Category, Fiscal Years 2014-2016



Primary drug, prior substance use, and homelessness patterns vary across racial/ethnic groups. Black non-Hispanic and Hispanic individuals are less likely to complete treatment than White non-Hispanics.³²² Differences in economic resources and experience with social services may also place racial/ethnic minorities at a disadvantage in terms of meeting the demands of a structured treatment program.

There were differences in education levels among BSAS clients when compared with the Massachusetts general population. 89.8% of the Massachusetts population has a high school diploma and 40.5% has a bachelor's degree or higher. Among BSAS enrollments in Fiscal Year 2016, 75% had high school diplomas and 10% had bachelor's degrees.

The current licensed capacity of acute detoxification is 1,062 beds. Clinical stabilization includes 623 beds and transitional support services have 342 beds. Additionally, long-term residential treatment has 2,333 individual beds and 110 families are in family residential programs. Figure 6.9 shows the location of funded and/or licensed treatment providers across the Commonwealth.

Focus group participants stated that there is a need for more inpatient treatment beds for people with substance use disorders, inpatient long-term behavioral health treatment beds, outpatient, and on-demand ambulatory behavioral health services. Participants also called for increased reimbursement rates as well as state and local funding for services. As one interviewee stated, *"We have high rates of provider burn out and turnover because the compensation for these positions are very low."*

Recovery Support Services

Recovery support services (RSS) refer to the collection of community services available to provide emotional and practical support for attaining and sustaining recovery and continued remission.³²³ SAMHSA has delineated four major dimensions that support a life in recovery: health, home, purpose, and community.³²⁴

Even after one or two years of remission is achieved, it can take four to five years before the risk of relapse drops below 15%.³²⁵ Similar to other chronic conditions, a person with SUD often requires ongoing monitoring and management to maintain remission and to provide early re-intervention in case the person relapses.³²⁶

Recovery support is provided through treatment and community-based programs operated by behavioral health care providers, peer support, family members, friends, social networks, the faith community, and people with experience in recovery. Recovery support services help people enter into and navigate systems of care, remove barriers to recovery, stay engaged in the recovery process, and live full lives in communities of their choice.

Recovery coaches are an increasingly significant element of recovery support services. A recovery coach's responsibilities may include providing strategies to maintain abstinence, connecting people to housing and social services, and helping people develop personal skills necessary to maintain recovery.³²⁷

It is critical that housing issues be addressed when individuals are discharged from inpatient or outpatient mental health or addiction treatment settings. Clients leaving intensive treatment settings who do not have adequate housing to support their recovery have a significantly higher risk of relapse.³²⁸

Sober Homes, also known as alcohol-and drug-free housing, can offer a safe and positive environment for individuals new to recovery. These group-living homes ensure that individuals in recovery are not isolated and can share their success and support with others reaching for the same goal. Sober Homes are not treatment programs, but rather supportive environments where individuals finishing inpatient or residential treatment without a healthy home environment can live to support their recovery. The Massachusetts Alliance for Sober Housing (MASH) certifies sober housing and provides training and technical assistance. Certification is voluntary, and the Helpline, as well as any state-funded program, refers callers only to certified homes.

In the past year, BSAS has provided seven, five-day recovery coach academies, which have trained more than 545 individuals from 2015 to 2017.

There are now 12 recovery support trainers across the Commonwealth. BSAS has also conducted two-day Ethical Considerations trainings for recovery coaches. From Fiscal Year 2015 to Fiscal Year 2017, 263 Massachusetts residents have completed the course (47 in Fiscal Year 2015, 66 in Fiscal Year 2016, and 150 in Fiscal Year 2017).³²⁹

In Fiscal Year 2017, BSAS piloted a three-day Motivational Interviewing Skills training specifically designed for recovery coaches. Also in Fiscal Year 2017, BSAS piloted a three-day recovery coach supervision curriculum. Five trainings were held with a total of 151 attendees. These supervisors support recovery coaches seeking their 500 Certified Addiction Recovery Coach required hours for certification.

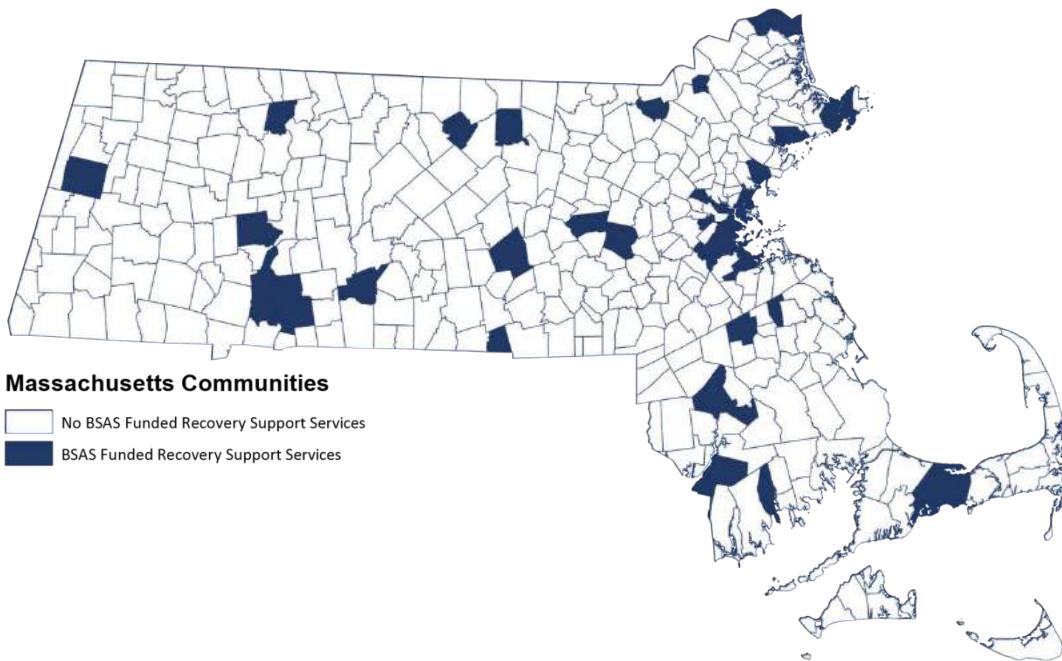
By the time of this assessment, there are 157 sober homes certified by the MASH in Massachusetts.³³⁰ MASH-certified sober homes must uphold several core principles that ensure the houses are well-operated, maintain the rights of residents, are recovery-oriented, and promote health.

"Recovery coaches are a huge asset in the addiction fight."

Key Informant Interviewee

The non-profit organization, Learn to Cope, provides weekly support meetings and maintains a private online message board and resource guide for family members of recovering substance abusers.³³¹ Since its inception in 2004, Learn to Cope has opened chapters in Brockton, Gloucester, Lowell, and Salem. New chapters are planned for Quincy and at Massachusetts General Hospital in Boston.³³²

Figure 6.11
BSAS Funded Recovery Support Services



Addiction and Specific Populations

Rates of substance use and misuse vary by demographics and geographic factors. Variations across population groups are shaped by several factors, including biological, genetic, psychological, familial, religious, cultural, and historical circumstances.

Massachusetts offers a variety of treatment approaches to address the needs of individuals with substance use disorders. However, there are important disparities in the outcomes and effectiveness of substance use treatment for different populations. Treatment needs can differ across populations, suggesting that treatment interventions should be individually tailored and incorporate culturally competent and linguistically appropriate practices relevant to specific populations and subpopulation groups.

Youth and Young Adults

The majority of individuals with substance use disorder begin using substances during adolescence.^{333,334,335} Youth (12 to 17 years old) and young adults (18 to 25 years old) with substance addiction tend to exhibit more reckless and unpredictable behavior due to hormonal changes that characterize this life stage.³³⁶ Additionally, components of the

brain that regulate impulsivity do not fully develop until 25 years of age. Youth and young adults have substance use patterns that differ from those of adults,³³⁷ and have different treatment needs than their adult counterparts.

Substance use among youth can lead to lifelong issues such as substance dependence, chronic health problems, and social and financial consequences.³³⁸ Problems at school, adverse physical and mental health outcomes, poor peer relationships, motor vehicle accidents, and increased financial and emotional family pressures are additional consequences of substance use among youth.³³⁹

According to the 2015 NSDUH, the percentage of individuals identified as needing substance use treatment was highest among young adults. Approximately 5.4 million young adults (15.5%) needed substance use treatment in the past year versus 15.0 million adults aged 26 or older (7.2%).

Youth and young adults are more likely than adults to need but not perceive the need for substance use treatment. According to 2015 NSDUH, of those that needed but did not receive treatment, 1.4% of adolescents perceived a need for substance use treatment, while that percentage was 2.7% for young adults and 5.5% for adults. Among people who needed substance use treatment, 93.7% of youth, 92.3% of young adults, versus 87.7% of adults did not receive treatment at a specialty facility in the past year.

Trends/Disparities

Despite the legal drinking age of 21, alcohol is the primary substance used by youth. According to NSDUH (2013-2014), there has been a decrease in past month alcohol use and binge drinking in the US among individuals 12 to 17 years of age. However, the prevalence of alcohol use in Massachusetts exceeded the national average in 2013-2014 (past month alcohol use: 13.3% in Massachusetts vs. 11.6% nationally; binge drinking: 7% vs. 6.2%). In 2015, 61% of Massachusetts high school students reported using alcohol in their lifetime: 34% reported past month use; 18% reported binge drinking in the past month.³⁴⁰

Alcohol is also the most prevalent substance used in the past month by Massachusetts residents 18 to 25 years of age. In 2013-2014, 70.2% of Massachusetts young adults reported using alcohol in the past month and 43.9% reported binge drinking in the past month, exceeding national averages for alcohol use among this population (past month alcohol use: 59.6%; past month binge drinking: 37.8%).

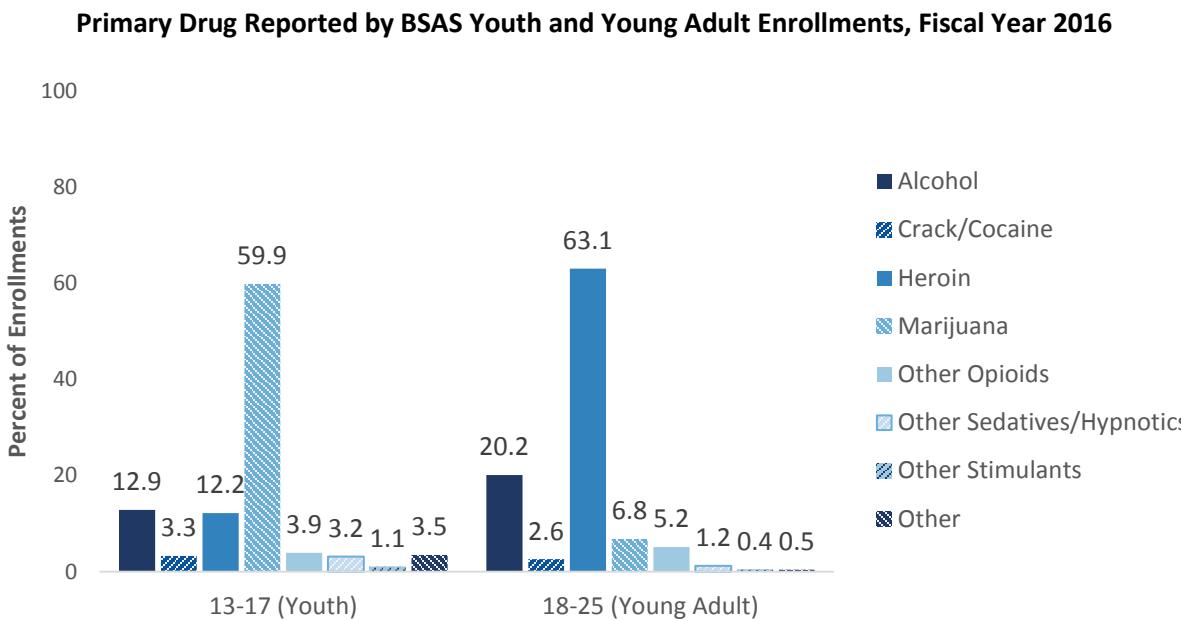
Nationally, illicit drug use among youth and young adults has remained stable since 2011-2012. In Massachusetts, the illicit drug use among 18 to 25 year olds increased from 27.2% in 2011-2012 to 31.1% in 2013-2014. Current marijuana use for individuals 18 to 25 years of age was higher in Massachusetts as compared to the national average (28.7% vs. 19.3%).³⁴¹

In Fiscal Year 2016, among BSAS treatment program enrollments, 59.9% of those 13 to 17 years of age reported marijuana as their primary drug, and 16.2% reported opioid as their primary drug of choice. Of enrollees that were 18 to 25 years of age, 68.3% reported opioids as their primary drug.

In Fiscal Year 2016, approximately 1,600 youth aged 13 to 17 were enrolled into BSAS funded and/or licensed treatment programs. Inpatient youth treatment programs (youth stabilization and youth residential programs) served the majority of these youth. Fiscal year 2016 was the year with the lowest percentage of youth enrollments into these programs in the last ten years. This decline is attributed to program capacity, lack of access, and shifting of youth treatment service focus from residential-based to community-based treatment. For example, the Adolescent Community Reinforcement Approach and Assertive Continuing Care (ACRA/ACC) provides community-based outpatient service to more than 14% of the adolescents among all BSAS substance treatment program enrollments.

There are important disparities in substance use patterns among youth and young adults. Nationally, prevalence of substance misuse and SUD among Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ) youth is twice that of their non-LGBTQ peers.³⁴² Middle and high school students with cognitive, emotional, and physical disabilities are more likely to drink alcohol, binge drink, or use illicit drugs, compared to students without disabilities.³⁴³

Figure 6.12



Although a majority (68.3%) of young adults served in BSAS treatment programs reported heroin or other opioids as their primary drugs of use, only 6.8% of them were admitted into MAT programs in Fiscal Year 2016. Less than 1% of youth served were enrolled in methadone or office-based opioid treatment programs, highlighting unmet treatment needs for opioid addiction for these age groups.

There are gender disparities in prevalence of substance misuse and substance use disorders among youth and young adults. During mid-adolescence, females are at greater risk than males for alcohol use.³⁴⁴ In 2015, the national prevalence of past year illicit drug use among females exceeded that of males 12-17 years of age (16.8% vs. 18.1%), whereas among persons 18 to 25 years of age this prevalence was higher for males than females (41.1% vs. 33.9%).

Pregnant and Postpartum Women

Pregnant women generally use alcohol and drugs less than other women of reproductive age.³⁴⁵ However, use of any substances and combination of multiple substances while pregnant can have adverse effects on the developing fetus.

Nationally, in 2015, among pregnant women 15 to 44 years of age, 9.3% reported alcohol use, 4.6% reported binge drinking, and 4.7% reported using illicit drugs in the past month. Approximately 13.6% reported smoking cigarettes, thus increasing risk of pre-term delivery, pregnancy complications, and, once in recovery, risk of relapse.³⁴⁶

In Massachusetts, 60% of pregnant women admitted into addiction treatment reported heroin as their primary substance. While another 10% reported alcohol as the primary substance, 43% of total reported using alcohol, indicating the prevalence of polysubstance use. Infants born to women with a substance use disorder are more likely to have low birth weight and, depending on the substance, to experience neonatal withdrawal syndrome. Alcohol use

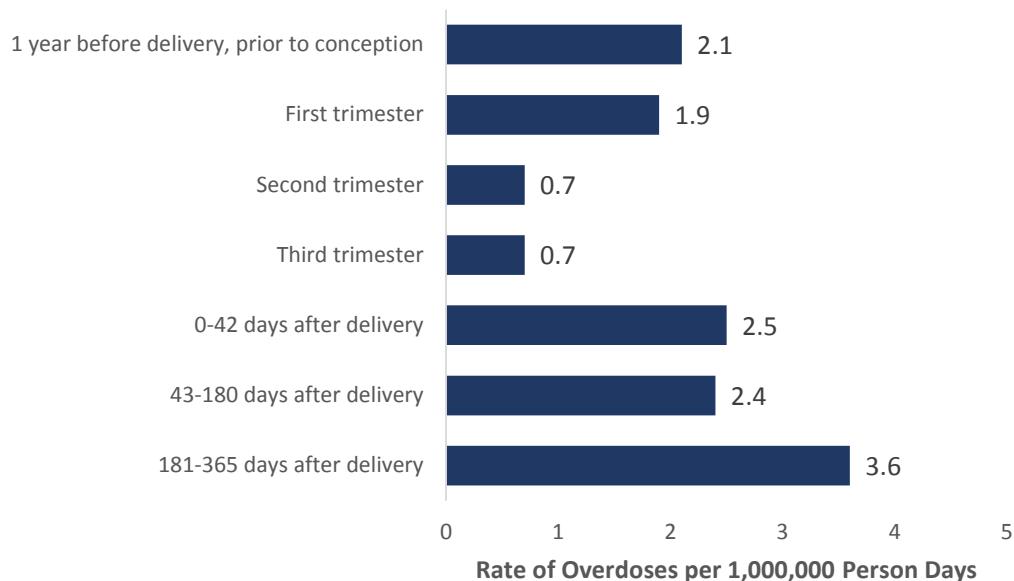
among pregnant women places the fetus at risk of fetal alcohol spectrum disorders. Prenatal alcohol exposure is the leading cause of preventable intellectual disabilities. Fetal alcohol spectrum disorders are estimated to affect 2% to 5% of the US population and to cost the country around \$4 billion every year.³⁴⁷

Rates of neonatal abstinence syndrome (NAS) and neonatal opioid withdrawal syndrome (NOWS) have increased dramatically in the last decade in both the US and Massachusetts. Nationally, there were over 21,000 cases of neonatal abstinence syndrome in 2012, a five-fold increase from the number in year 2000.³⁴⁸ In 2009, the rate of NAS in Massachusetts was three times the national rate.³⁴⁹ In Massachusetts, the rate of neonatal abstinence syndrome increased, from approximately 3 per 1,000 births in 2004 to 16 per 1,000 births in 2013. NAS can result from prescribed MAT use in pregnant women who are being treated for opioid use disorder. However, these treatments are considered best practice for pregnant women with opioid use disorder. Inconsistent or unregulated use of illicit opioids present a much greater risk to fetal development.

Pregnant and postpartum women with substance use disorders are at higher levels of risk for viral infections, adverse birth outcomes, other co-occurring diagnoses such as perinatal emotional complications, depression, or anxiety, and fatal opioid-related overdoses.³⁵⁰ The rates of opioid-related overdose decrease during pregnancy and are lowest during the second and third trimesters, but significantly increase in the postpartum period, with the highest rates 6 months to 1 year after delivery (see **Figure 6.13**). Mothers with evidence of opioid use disorder (OUD) have an opioid-related death rate more than 300 times higher than the rate among mothers without evidence of OUD.³⁵¹ Despite these stark statistics, pregnancy and the postpartum periods are pivotal windows of opportunity for a woman to engage in treatment and recovery. Historically, society and providers have cast a disproportionate amount of stigma and discrimination toward childbearing women with substance use disorders. High-quality maternal treatment and coordinated services can serve as primary prevention for healthy early child development. This is particularly true during the postpartum period, when family preservation, parenting supports, and coordinated community-based care serve as a woman's best defenses against mental health concerns or substance use relapse.

Figure 6.13

Rate of Opioid Overdose Events After Delivery for Mothers with Opioid Use Disorders, Massachusetts, 2011-2015



Intimate partner violence (IPV), childhood violence and abuse, and other adverse childhood experiences are risk factors for substance use disorders.^{352,353} Further, women seeking treatment for substance use report histories of violence and abuse more frequently than their male counterparts.^{354,355} Without the economic means to access safe, independent housing, many find it difficult to sustain recovery. Housing vacancy in Massachusetts is very low, meaning those seeking stable, safe, and affordable housing have an increasingly difficult time. This is particularly relevant for women of childbearing age with substance use disorders.³⁵⁶

Many pregnant or postpartum women in need of treatment are parenting children and avoid treatment settings where they would be unable to carry out their caretaking responsibilities. In Massachusetts, between 2002-2008, less than half (48.3%) of women 18 to 49 years of age with substance use disorders received treatment.³⁵⁷ Some research has suggested that treatment retention among women may be improved by treatment programs that allow women to remain in caretaking roles, which they feel obligated to fill.

Trends/Disparities

Past-year use patterns are different among pregnant women compared to non-pregnant women and their male counterparts, including use of heroin, crack/cocaine, and marijuana. In 2016, 669 pregnant women in Massachusetts entered substance use disorder treatment, representing 2.2% of the female treatment population. Among these women, 71.4% reported past year use of heroin, 44% reported crack/cocaine, and 36.6% reported marijuana at enrollment into substance use treatment.

In 2016, pregnant women were 5.7 times more likely to be enrolled in a methadone, naltrexone, or buprenorphine program than non-pregnant women (95% CI 4.6 to 7.0). A similar trend was observed among postpartum women, who were 2.9 times more likely to be enrolled in a methadone, naltrexone, or buprenorphine program than women who were not postpartum (95% CI 2.2 to 3.8). Among pregnant women not enrolled in a medication-assisted treatment program, 37.2% initiated medication-assisted treatment while in the program, compared to 15.4% of non-pregnant women.

There were no significant differences in pregnancy status at enrollment by race/ethnicity, but there was a racial/ethnic disparity in medication-assisted treatment status at enrollment at the time of admission to treatment. In 2016, pregnant, Black non-Hispanic women were nearly 75% less likely to report prior or current medication assisted treatment (MAT) than their pregnant, White, non-Hispanic counterparts.

In a SAMHSA funded initiative organized by MDPH (*Moms Do Care*) to increase access to improve engagement in MAT for pregnant post-partum women, the evaluation indicated positive changes across all individual outcome measures except for housing stability, which remained constant from baseline to follow-up. Of women who report being pregnant at admission into addiction treatment, 41.4% reported being homeless compared to 32.8% of non-pregnant women. Stable housing is a crucial component in the success of MAT.

Criminal Justice Involved Population

Each year, more than 11 million people move through America's 3,100 local jails. Of this population 64% suffer from mental illness, 68% have a substance abuse disorder, and 44% suffer from chronic health problems.³⁵⁸ Among the US prison population, an estimated 50% have a substance use disorder,³⁵⁹ though relatively few individuals receive substance use treatment while incarcerated. Abstinence from drug use in prison contributes to decreased tolerance for substances among incarcerated individuals with a substance use disorder. Upon release, those who resume previous substance use levels may not realize that their tolerance has diminished, raising the risk of drug overdose deaths after

release from incarceration. Indeed, one study found that from 1999 to 2009 14.8% of all deaths among formerly incarcerated individuals were related to opioids.³⁶⁰

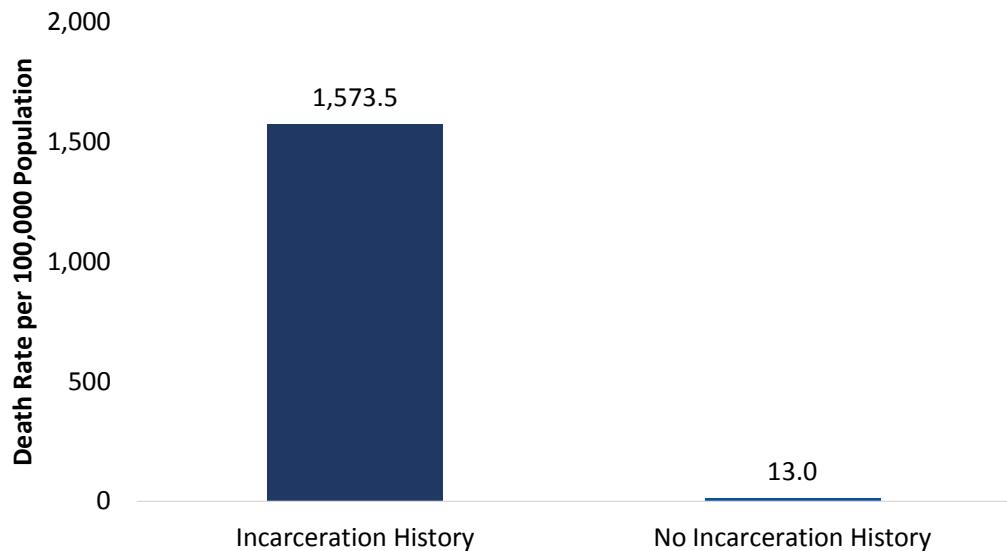
A recent Chapter 55 report from MDPH shows that the criminal justice involved population's risk of opioid-related overdose death following release from incarceration is 120 times higher than for the general public.³⁶¹ (see Figure 6.14) Additionally, in 2015, nearly 50% of all deaths among those released from incarceration were opioid-related. Initiating substance use treatment in prison and continuing treatment upon release is vital to both an individual's recovery and to public health and safety, and more importantly, to save lives. Combining prison- and community-based treatment for incarcerated individuals with addiction reduces the risk of both recidivism to drug-related activities and relapse to drug use.³⁶² Pre-release counseling and post-release follow-up may reduce risk of opioid overdose mortality.

Individuals who complete prison-based treatment and continue with treatment in the community have the best outcomes.³⁶³ Continuing substance use treatment helps with challenges post release, such as learning to handle situations that could lead to relapse, learning how to live drug-free in the community, and developing a drug-free peer support network. Treatment in prison or jail can begin a process of therapeutic change, resulting in reduced drug use and criminal behavior post-incarceration. Continuing drug treatment in the community is essential to sustaining these gains.

The most effective substance use treatment models for populations involved in the criminal justice system integrate criminal justice and drug treatment systems and services.³⁶⁴ Treatment and criminal justice personnel work together on treatment planning, including implementation of screening, placement, testing, monitoring, supervision, and systematic use of sanctions and rewards. Treatment for incarcerated individuals with a substance use disorder should include continuing care, monitoring, and supervision after incarceration and during parole. Methods to achieve better coordination between parole/probation officers and health providers are being studied to improve outcomes for criminal justice involved individuals.³⁶⁵

Figure 6.14

Opioid Death Rate for Individuals with Histories of Incarceration, Massachusetts, 2011-2015



The criminal justice system refers individuals convicted of an offense to addiction treatment through a variety of mechanisms. These include: diverting individuals convicted of a nonviolent offense to treatment; stipulating treatment as a condition of incarceration, probation, or pretrial release; and convening drug courts to handle drug offense cases.

Several social factors shape substance use treatment outcomes for individuals in the criminal justice system. For example, clients leaving intensive treatment settings who do not have adequate housing to support their recovery have a significantly higher risk of relapse.³⁶⁶

Young people in the criminal justice system often have wide-ranging health and welfare needs.³⁶⁷ Experiences while incarcerated, including traumas from physical, sexual, and mental abuse, and from isolation, can lead to drug use and further violence.³⁶⁸

Additionally, structural forces and experiences earlier in the life course may also affect substance use treatment outcomes among the criminal justice population. Structural racism contributes to over-policing of Black non-Hispanic communities and disproportionate punishment of racial/ethnic minorities throughout the justice system. Lead exposure in childhood contributes to developmental delays, behavioral issues, and crime. Unemployment can lead to drug use, involvement in the underground economy, theft, and various forms of violence. Conditions that lead to adverse childhood experiences, such as exposure to violence in the community, homelessness, or incarceration of a parent, can lead to behavioral issues in school and beyond, substance use disorders, as well as mental health disorders.³⁶⁹

Trends/Disparities

Although the past several decades have witnessed an increased interest in providing substance abuse treatment services to individuals in the criminal justice system,³⁷⁰ only a small percentage of individuals convicted of an offense have access to adequate services, especially in jails and community correctional facilities.^{371,372}

Not only is there a gap in the availability of these services for this population, but often there are few choices in the types of services provided. Combining prison and community-based treatment for incarcerated individuals with addiction, reduces the risk of recidivism for drug related criminal behavioral, and recurrence of substance use. Treatment is the most effective course for interrupting the addiction/criminal justice cycle for criminally involved individuals with addiction.³⁷³

In Fiscal Year 2016, 32% of admissions to BSAS treatment reported criminal justice involvement in their lifetime. Among this population, 41% were between the ages of 25 and 34, 72% were male, 75% identified as White non-Hispanic, 75% were on community supervision, and 54% reported a history of mental health treatment.

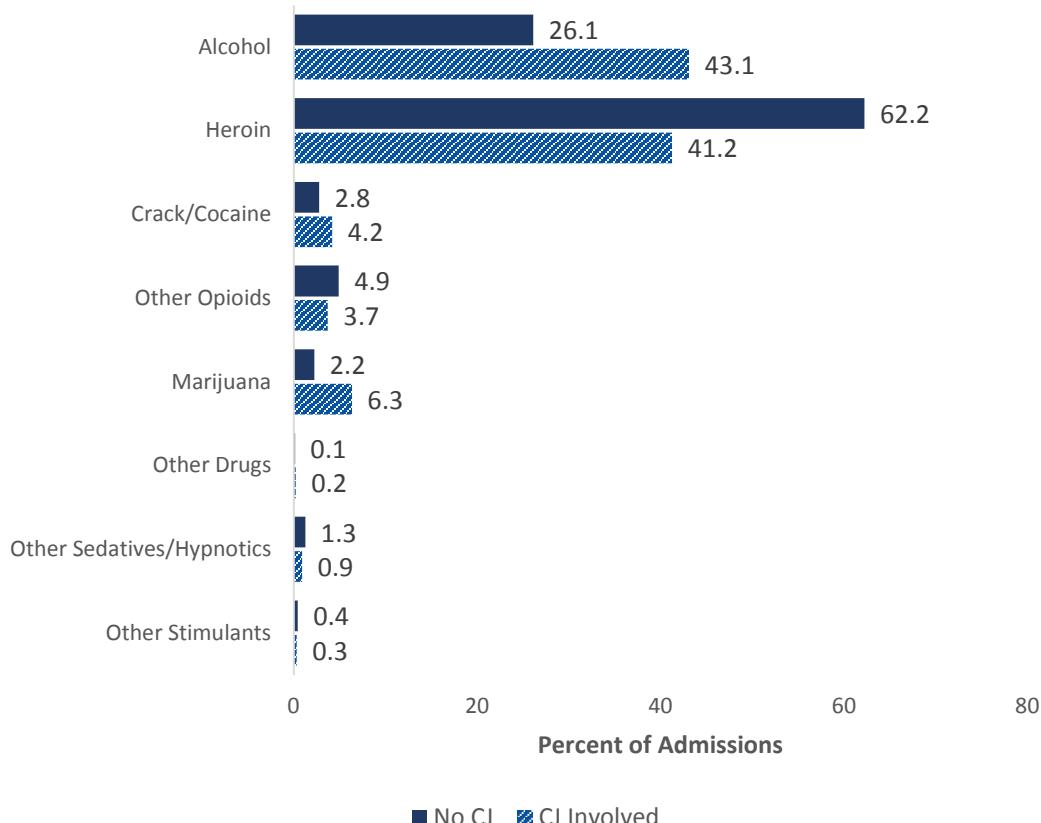
As shown in **Figure 6.15**, substance use and treatment utilization patterns among BSAS clients that report criminal justice involvement is different than those without a history of criminal justice involvement. Those with a history of criminal justice involvement are more likely to report alcohol as their primary drug (43.1% vs. 26.1%) and utilize residential and outpatient services (residential: 16.3% vs. 6.9%; outpatient: 39.3% vs. 14.7%).

Incarcerated individuals with substance use disorder who complete prison-based treatment and continued with treatment in the community show the best outcomes.³⁷⁴ MAT such as methadone, buprenorphine, and extended-release naltrexone have been shown to reduce heroin use³⁷⁵ and should be made available to individuals who could benefit from them. The National Institutes of Health also recommends methadone treatment be available to persons under legal supervision such as probationers, parolees, and the incarcerated.³⁷⁶ Additionally, behavioral treatment can increase adherence to medication regimens.

Given the proven efficacy of MAT for individuals with opioid use disorder, MDPH funded the Department of Corrections \$1 million to pilot a Medication Assisted Treatment Re-Entry Initiative (MATRI) for individuals being released to the community. This pilot includes screening incarcerated individuals scheduled to be released for eligibility to receive naltrexone treatment; providing substance use disorder treatment, medication-assisted treatment and pre-release education; providing Recovery Navigators for up to one year post-release. The program is offered at ten Department of Correction (DOC) facilities. By October 2016, 1,711 incarcerated individuals had been screened through the program. As of June 5, 2017, 258 offenders received a pre-release injection, of whom 62% received a post release injection and 16% engaged in an alternative treatment. BSAS and the Massachusetts Parole Board co-fund the House of Corrections (HOC) initiatives involving substance use disorder treatment. To date, 11 of the 13 Houses of Correction offer naltrexone to inmates, with 1,656 enrollments in Fiscal Year 2016. Additionally in Fiscal Year 2018, new funding allows for expanded pre- and post-release treatment and recovery services for incarcerated individuals in Houses of Correction.

Figure 6.15

Primary Drug Reported at Admission to BSAS Treatment, by Criminal Justice Status, Massachusetts, 2016



LGBTQ Population

Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ) populations often enter treatment with more severe substance misuse problems, have a greater likelihood of experiencing a substance use disorder in their lifetime, and initiate alcohol consumption earlier than heterosexual clients.³⁷⁷

Many factors contribute to the role of substance use and misuse among LGBTQ populations. Legal prohibitions against LGBTQ behavior and discrimination limit LGBTQ social outlets to bars, private homes, or clubs where alcohol and drugs often play a prominent role.³⁷⁸

A report from the National Institute on Alcohol Abuse and Alcoholism indicated that stigma, intolerance and open discrimination were the most substantial barriers to substance use prevention and treatment among the LGBTQ community. These barriers hinder exposure to healthy role models and limit access to LGBTQ-supportive resources and substance-free outlets. They also contribute to the alienation of LGBTQ individuals, increasing their vulnerability to substances of abuse.³⁷⁹

LGBTQ youth and young adults are disproportionately affected by risks arising from harassment, victimization, violence, homelessness, and family rejection. For example, 25% of Massachusetts lesbian and gay adolescents and 15% of bisexual adolescents report homelessness, compared with 3% of heterosexual youth.³⁸⁰ Homelessness also increases risk of harm and decreases access to resources.³⁸¹ LGBTQ youth who report family rejection are more likely to report suicide attempts, depression and substance use, compared with LGBTQ youth with no or low rejection.^{382,383}

For many LGBTQ youth, school is a place of fear and torment, resulting in high absenteeism and poor academic performance. In Massachusetts' schools, LGBTQ students are more than twice as likely as other students to report being bullied, threatened or injured with a weapon, or skipping school because they are afraid.³⁸⁴ Gay/Straight Alliances (GSAs) can help reduce risks in schools by serving as resources for LGBTQ students, and supporting the development of resiliency and leadership skills.³⁸⁵

Health and social consequences of rejection continue beyond adolescence. LGBTQ young adults who reported higher levels of family rejection during adolescence are 8.4 times more likely to report having attempted suicide, 5.9 times more likely to report high levels of depression, and 3.4 times more likely to use illegal drugs than those who experienced acceptance.³⁸⁶

Additionally, LGBTQ youth experience significantly higher levels of depression and suicidality than do their heterosexual peers, and the difference increases with severity of suicide ideation and attempts.³⁸⁷

Developing effective treatment programs that address the specific needs of LGBTQ populations is critical. Treatment providers should be knowledgeable about sexuality, sexual orientation, and unique aspects of LGBTQ developmental and social experiences. For example, factors such as transphobia or homophobia, violence, family issues, and social isolation may need to be addressed within the substance use disorder treatment environment for transgender people.

Given the experiences of LGBTQ youth and young adults, treatment programs and their staff must be able to demonstrate safety, cultural competence, care coordination, and ability to engage families. Program and staff ability and willingness to protect LGBTQ youth from harassment, discrimination and threats must be clear to all and reinforced through immediate response to incidents. Responses should be effective in protecting all involved and promoting their continued engagement in treatment. It is also important to consider the types of treatment that have been shown effective with the LGBTQ population.

Treatment programs with specialized groups for gay and bisexual clients have shown better outcomes for men compared to gay and bisexual men in non-specialized programs.³⁸⁸ Despite evidence indicating the importance of treatment tailored to LGBTQ populations, a significant minority of the nation's substance use disorder treatment agencies indicate that they offer treatment services tailored to LGBTQ populations, although only a small portion (7.4%) offered a service that they could identify as an LGBTQ-specialized service.³⁸⁹

Fully integrated cultural competence will include understanding LGBTQ culture as well as effects of race, ethnicity, country of origin and socioeconomic status on youth development, self-identification, coming out and supports. Cultural competence includes understanding how oppression arising from racism and sexism compound other traumas LGBTQ youth and young adults may experience.

Trends/Disparities

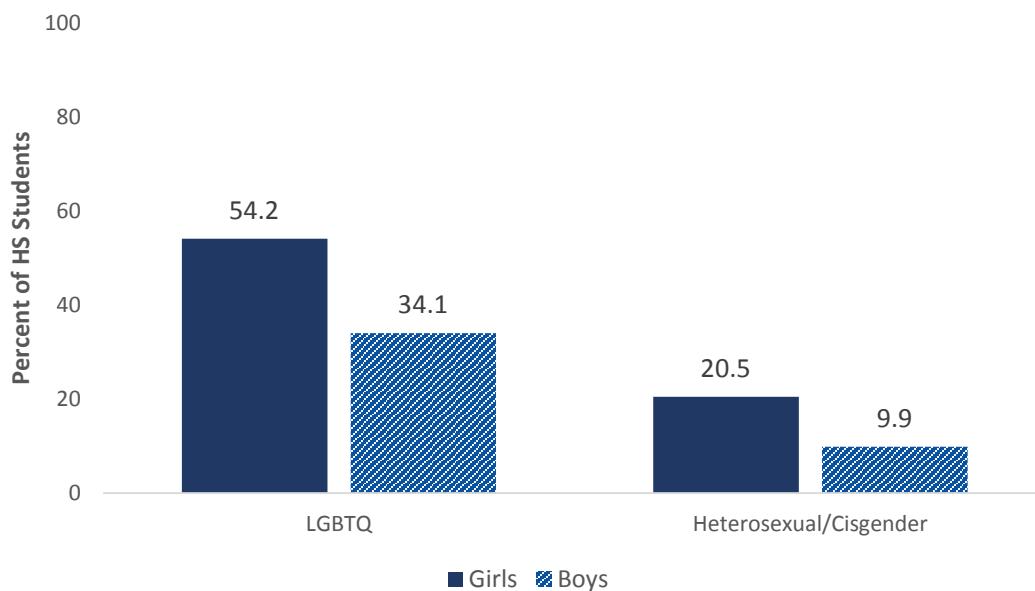
In Fiscal Year 2016, 3.1% of individuals enrolled in BSAS treatment identified as LGBTQ; 10.3% of those 13 to 17 years of age identified as LGBTQ, and 4.1% of those 18 to 25 years of age identified as LGBTQ.

According to a survey of LGBTQ youth of color in Boston in 2014, LGBTQ racial/ethnic minority youth experience disproportionate challenges to their physical and mental health.³⁹⁰ Approximately 40% of youth reported symptoms of depression and/or anxiety and nearly one in five attempted suicides within the past year. Half of the sample reported binge drinking and half reported marijuana use in the past month. More than one in ten youth reported any lifetime methamphetamine use. Child maltreatment, discrimination, and food insecurity were prevalent and are correlated with poor mental health and substance misuse.

The Massachusetts Youth Risk Behavior Survey (YRBS) indicates that LGBTQ youth are at significantly higher risk than their heterosexual counterparts for substance use and suicide. More than one-third of Massachusetts LGBTQ students report attempting suicide, compared to 4.6% of heterosexual youth.³⁹¹ Furthermore, 54.2% of LGBTQ girls in Massachusetts public high schools reported non-suicidal self-injury compared to 20.5% of straight/cisgender girls. **Figure 6.16** indicates that a difference was also visible in boys, where 34.1% of LGBTQ boys reported non-suicidal self-injury compared to only 9.9% of straight/cisgender boys. Cisgender is defined as denoting or relating to a person whose sense of personal identity and gender corresponds with their sex at birth.

Figure 6.16

Percent of Massachusetts High School Students who Hurt Them Self on Purpose, MYRBS 2015



NOTE: LGBTQ GIRLS (95% CI 45.7-62.7) STRAIGHT/CISGENDER GIRLS (95% CI 17.7-23.3). LGBTQ BOYS (95% CI 24.1-44.2)
STRAIGHT/CISGENDER BOYS (95% CI 7.8-12.1).

Military and Veteran Population

Military service members, veterans, and their families require culturally competent approaches to addiction treatment and services. They are a growing community exposed to traumatic events: losses, fears, and injuries associated with combat, repeated deployments and/or relocations, and military sexual violence may exert an emotional toll on military personnel, their families, and their communities.

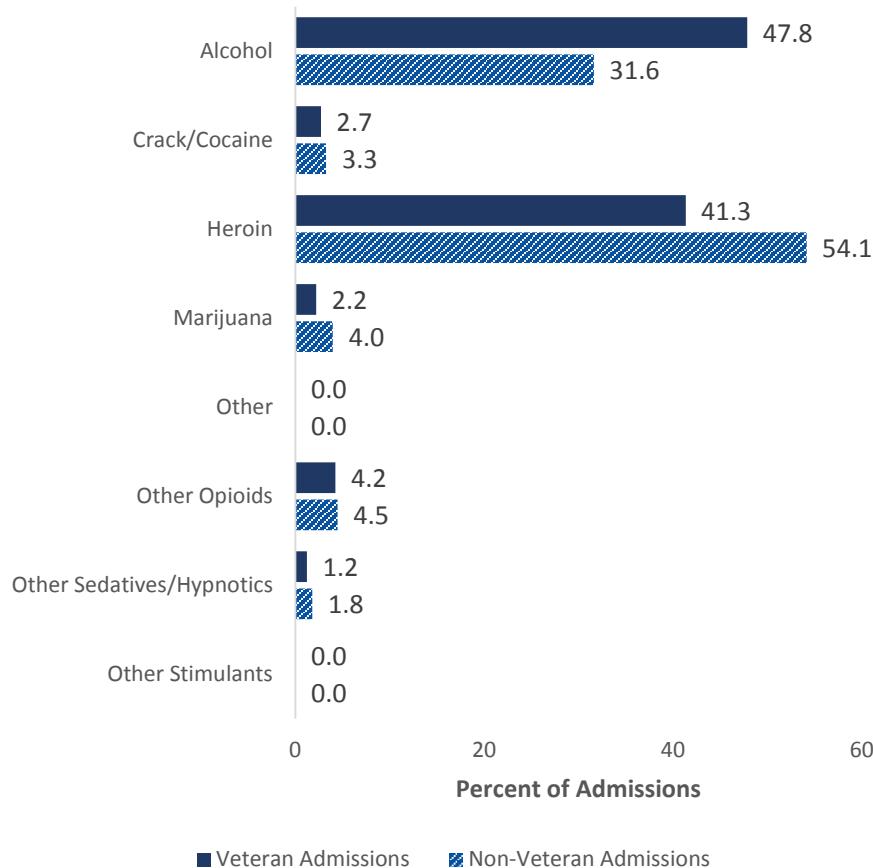
Different eras of service have different hallmarks. For example, the Vietnam War saw an increase in use of heroin and opiates while the post-9/11 military has seen a tripling of prescription drug abuse. Heavy alcohol use is also common among military populations: 20% of active duty personnel meet criteria for heavy alcohol use compared to 6.2% of the general population.³⁹²

Trends/Disparities

The number of BSAS clients who identified as veterans increased 12.1% from Fiscal Year 2011 (5,095 clients) to Fiscal Year 2016 (5,713 clients). In Fiscal Year 2016, 4% of the BSAS treatment population identified as veterans. Also in Fiscal Year 2016, alcohol was the primary drug reported among the BSAS veteran population (48%).

Figure 6.17

Primary Drug Reported among BSAS Admissions, by Veteran Status, Massachusetts, Fiscal Year 2016



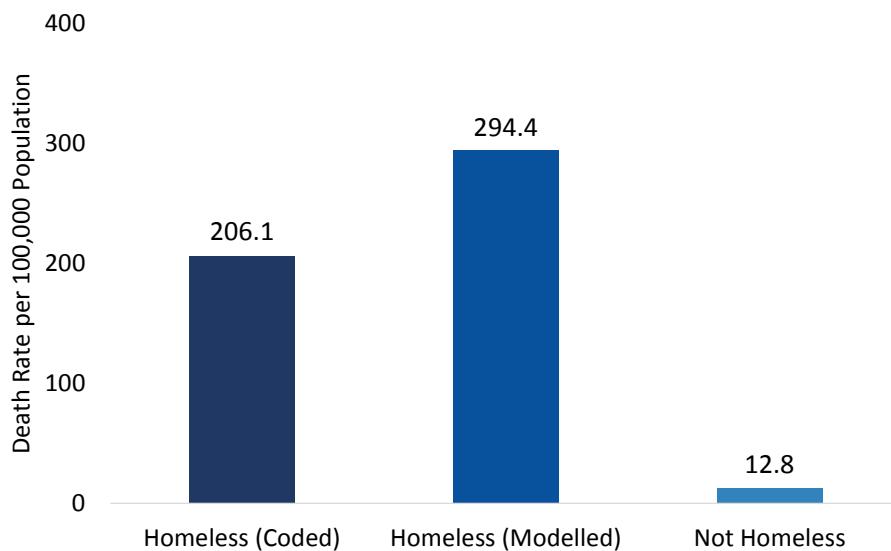
In Fiscal Year 2015, there were 13 trainings across Massachusetts for Veterans Affairs behavioral health workforce on military cultural competence. These trainings involved 603 participants. In Fiscal Year 2016 twelve military cultural competence trainings were implemented, which reached 552 individuals.

Homeless Population

Homelessness has been a persistent societal problem in Massachusetts and nationwide for decades.³⁹³ The MDPH Chapter 55 study estimated that approximately one in every 25 adults in Massachusetts has been homeless at some point between 2011 and 2015. People with mental and/or substance use disorders can be particularly vulnerable to becoming homeless or being precariously housed. According to Housing and Urban Development's (HUD) 2016 Annual Homelessness Assessment Report, of those who experience homelessness, approximately 202,297 people have a severe mental illness or a chronic substance use disorder.³⁹⁴ In Massachusetts, the risk of opioid-related overdose death for persons who reported experiencing homelessness is up to 30 times higher than it is for the rest of the population.³⁹⁵ Substantial progress toward recovery and self-sufficiency may require significant engagement efforts and repeated attempts at treatment and housing stabilization. In addition to substance use and mental health disorders, a range of complex, interrelated individual risk factors are related to homelessness, including trauma-related symptoms, cognitive impairment, medical conditions, lack of support from family, limited education and job skills, and incarceration.^{396,397}

Figure 6.18

Opioid Death Rate for Individuals Experiencing Homelessness, Massachusetts, 2011-2015



In 2016, nationally, one in five people experiencing homelessness had a serious mental illness, and a similar percentage had a chronic substance use disorder.³⁹⁸ In Massachusetts, it is estimated that approximately two in five homeless adults have been diagnosed with a serious mental illness.³⁹⁹ People who have or have had mood disorders, schizophrenia, antisocial personality disorder, or any substance use disorder are at least two times more likely to have been homeless than those without these diagnoses.⁴⁰⁰

The removal of institutional supports for lower income individuals contributes to fewer housing options for people diagnosed with a serious mental illness.⁴⁰¹ It is critical that housing issues be addressed in disposition planning when individuals are discharged from inpatient or outpatient mental health or addiction treatment settings. Clients leaving intensive treatment settings who do not have adequate housing to support their recovery have a significantly higher risk of relapse.⁴⁰²

Of people who are homeless and in addiction treatment, 68% of men and 76% to 100% of women report trauma-related events,^{403,404} similar to the prevalence of trauma reported by people who are homeless.

Approximately 80% of people who are homeless exhibit cognitive impairment, which can affect their social and adaptive functioning as well as their ability to learn new information and new skills.⁴⁰⁵ Additionally, people who are homeless have high rates of HIV/AIDS, hepatitis C, cardiovascular conditions, dental problems, asthma, diabetes, and other medical problems.^{406,407,408}

Trends/Disparities

In Fiscal Year 2016, 36% of BSAS admissions reported being homeless within the past year. Among this population, 72% were male, and 43% were between the ages of 25 and 34. Approximately 67% reported heroin as their primary drug at the time of admission, and 50% were admitted for acute treatment services. BSAS clients who reported homelessness were more likely to be admitted to acute treatment services, post detox services, and residential services as compared to non-homeless admissions.

Figure 6.19

BSAS Treatment Utilization, by Homeless Status, Massachusetts, Fiscal Year 2016

	Not Homeless	Homeless
Acute Treatment Services	37%	50%
Post detoxification	10%	22%
Residential	7%	15%
Other Services	46%	13%
Total	100%	100%

Co-occurring Mental Health

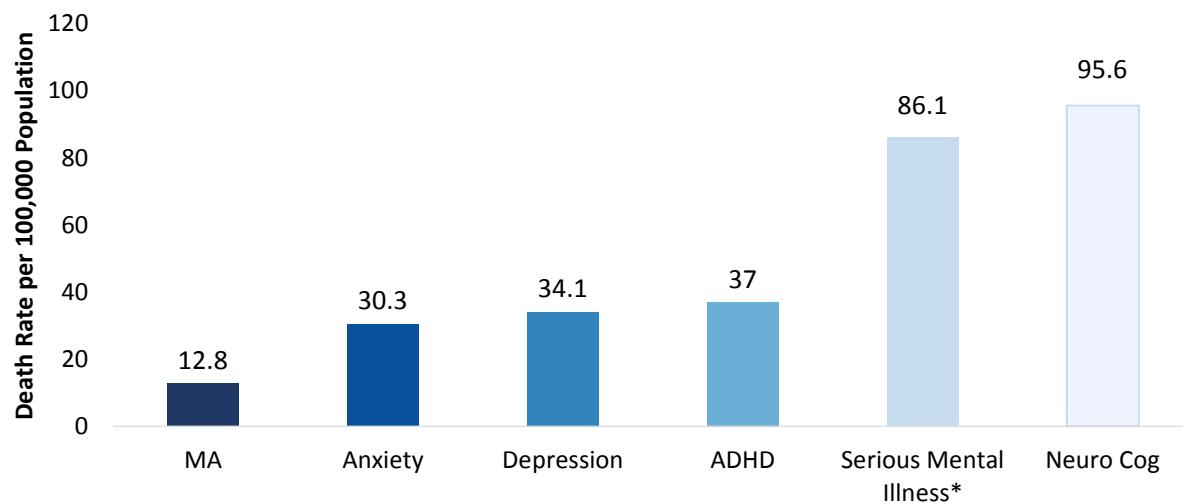
The coexistence of both a mental disorder and a substance use disorder (SUD) is known as co-occurring disorders. People with mental health disorders are more likely to experience a SUD. Often, people receive treatment for one disorder while the other disorder remains untreated. Undiagnosed, untreated, or undertreated co-occurring disorders can lead to a higher likelihood of experiencing negative outcomes, such as homelessness, incarceration, medical illnesses, suicide, or even early death.⁴⁰⁹ Mental health intersects with many areas of public health, including addiction, cancer, cardiovascular disease, and HIV/AIDS, therefore requiring common services and resource mobilization effort.

Integrated treatment is critical for treating people with co-occurring disorders, and can ultimately achieve better health outcomes and reduce costs. Increasing awareness and building capacity in service systems are important in helping identify and treat co-occurring disorders. Treatment planning should be client-centered, addressing clients' goals and using treatment strategies that are acceptable to them.

According to the Chapter 55 study, approximately one in four persons ages 11 and older in the MassHealth patient population were identified as having a serious mental illness. Of these individuals, roughly two in five have been homeless for some period of time between 2011 and 2015. The risk of fatal opioid-related overdose is six times for those with a serious mental illness (SMI) and three times higher for those diagnosed with depression compared to those without any mental health diagnosis.

Figure 6.20

Rates of Fatal Opioid Overdoses for Persons with Some Mental Health Diagnoses, Massachusetts, 2011-2015



NOTE: *AMONG MASSHEALTH MEMBERS ONLY

Trends/Disparities

According to the NSDUH, among the 19.6 million adults ages 18 or older in 2015 that had a past year SUD, 2.3 million (11.9%) also had serious mental illness in the past year.⁴¹⁰ Of those that have co-occurring SUD and mental health disorders, only 6.8% received care for co-occurring conditions.⁴¹¹

In Fiscal Year 2016, 52.6% of BSAS clients reported a history of mental health treatment, including either counseling, prior psychiatric hospitalizations, and or prescriptions for psychotropic medications.

Gambling Disorder and Problem Gambling

The latest edition of the standard Diagnostic and Statistical Manual of Mental Disorders (DSM-5) is the first iteration where gambling appears in the same section as substance use disorder. This reflects a new understanding that gambling disorder and substance use disorder fall under one disease: addiction. As with substance use disorders, gambling involvement can occur on a spectrum that ranges from non-gambling (level 0), to recreational gambling (level 1), people who gamble but do not meet diagnostic criteria (level 2), people who gamble and meet diagnostic criteria for gambling disorder (level 3).⁴¹²

Gambling disorder affects approximately 1% of the US population, and subclinical past year gambling-related problems affect 2% to 3% of the general population.⁴¹³ In Massachusetts, problem gambling affects 2% of the population, and at-risk gambling affects 8.4% of the population.⁴¹⁴ Individuals who report playing many different types of games (e.g., slot machines, lotteries, horse racing) are at greater risk for gambling-related problems than people who report playing fewer types of games.⁴¹⁵ Gambling disorder is characterized by individuals:

- Feeling a loss of control over their gambling, including previous unsuccessful attempts to quit or efforts to hide gambling behavior

- Continuing to gamble despite negative consequences such as interference with work or home obligations, legal problems, or fights and conflicts with other people
- Craving gambling or feeling a compulsion to gamble

People with gambling problems often have many of the same risk factors that predispose individuals to other expressions of addiction, other psychiatric problems such as depression, and an unstable home life.⁴¹⁶ Gambling disorder is often co-occurring with mental health conditions and/or substance use disorders. According to the 2001 National Comorbidity Survey replication, 96.3% of individuals reporting gambling disorder also met lifetime criteria for one or more other psychiatric disorders. Among the 96.3%, approximately one in five (22%) individuals reporting a gambling disorder also report a single additional disorder, one in ten (10%) report two additional disorders, and nearly two thirds (64%) report three or more additional lifetime disorders (e.g. impulse-control disorder, mood disorder, anxiety disorder, etc.).⁴¹⁷

Additionally, people with gambling-related problems are more likely to smoke, consume excessive amounts of caffeine, have more emergency department visits, and be obese.⁴¹⁸ Studies have also indicated the same health-related consequences for people that gamble recreationally. Recreational gamblers are more likely to be obese, smoke heavily, and use alcohol or prescription drugs.⁴¹⁹ Recreational gamblers that gamble two or more times a week are also more likely to report poor mental health.⁴²⁰

A few Massachusetts interviewees commented on a lack of services for residents struggling with gambling problems. As one participant shared, *"Gambling isn't taken seriously. Gambling is fun until it's not. It's misunderstood and that's why I think there is a lack of treatment. If it was more advertised...There's so much shame, stigma. We have to get it out onto more-billboards – but we don't have any money to do that."*

In Fiscal Year 2016, the Massachusetts problem gambling helpline received 1,061 calls, walk-ins, and emails regarding problem gambling. The website has received an additional 70,780 views.

The Massachusetts Council on Compulsive Gambling also has initiated several programs including: statewide trainings, regional trainings, and annual conferences; a Massachusetts Problem Gambling Specialist (MA-PGS) certification program; and technical assistance and resources for problem gambling professionals.⁴²¹

From 2015 to 2016, the Council conducted 217 provider trainings, which involved more than 4,600 participants. The council has issued 74 newly offered Massachusetts Problem Gambling Specialist (MA-PGS) certificates for gambling disorder treatment certification, and 29 MA-PGS have been renewed.

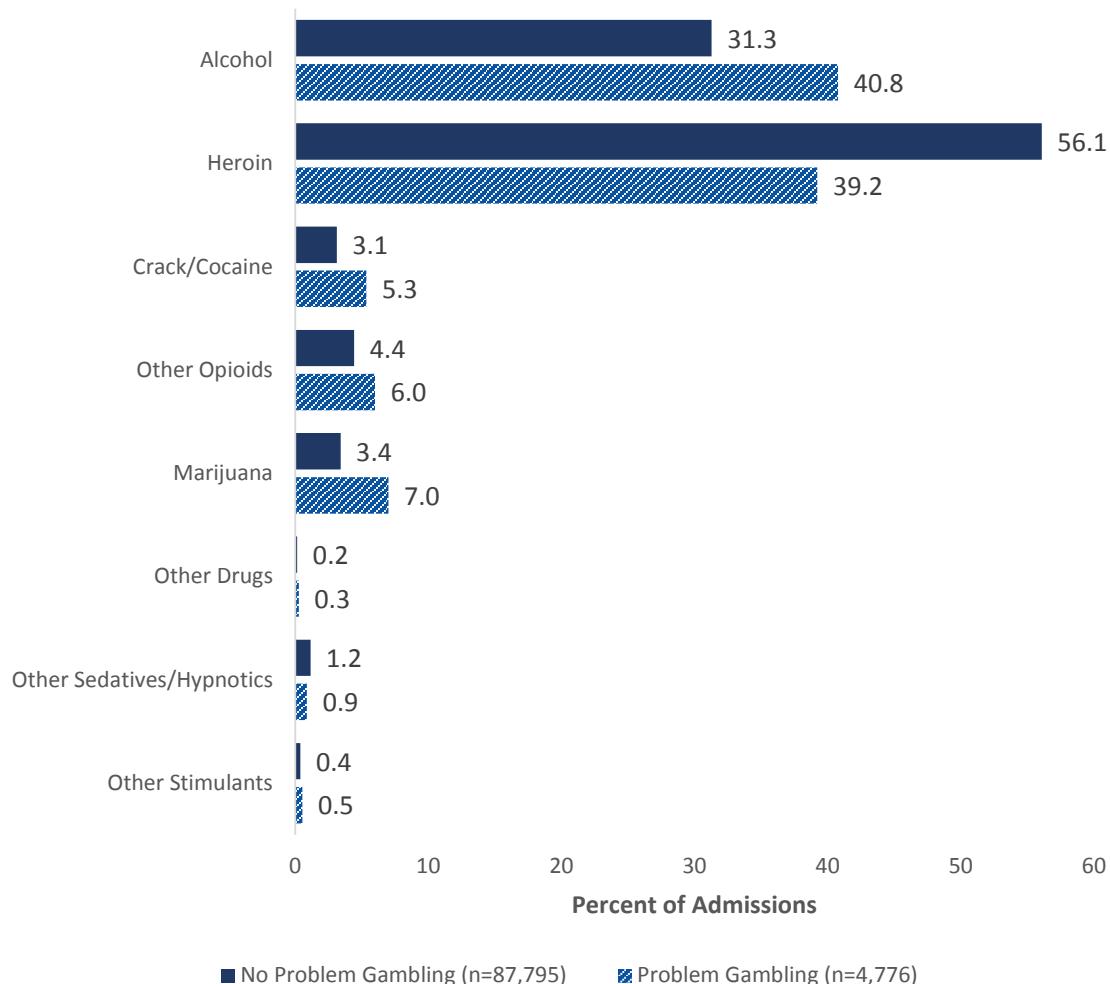
Trends/Disparities

According to the 2013-2014 Social and Economic Impacts of Gambling in Massachusetts (SEIGMA) survey, 1.7% of survey respondents reported problem gambling, 7.5% reported at-risk gambling, and 63.4% reported recreational gambling.

Among the BSAS treatment population in Fiscal Year 2016, 5.2% (or 4,776 individuals) reported problem gambling. The majority of admissions who reported problem gambling were White non-Hispanic (78%), and 82% were male. Nearly half of those who reported problem gambling were between 25 to 34 years of age (48%) and approximately one-third (36%) were homeless.

Substance use patterns among those that report problem gambling are different than those that report no problem gambling. In Fiscal Year 2016, BSAS admissions that reported problem gambling were more likely to report alcohol as their primary drug than those who did not report problem gambling. The opposite was observed for Heroin.

Figure 6.21
Primary Drug Reported by BSAS Admissions, by Problem Gambling Status, Fiscal Year 2016



Selected Resources, Programs, and Services

Following are selected resources, services and programs that support the topics discussed in this chapter.

Opioid Epidemic

- Chapter 55 of the Acts of 2015 permits the linkage and analysis of existing administrative datasets to better understand the opioid epidemic and guide the policy development and program design to address the epidemic
- The MA Prescription Drug Monitoring Program (PDMP) collects dispensing information on Massachusetts Schedule II through V controlled substances dispensed by prescription
- The Drug Control Program (DCP) analyzes PDMP data to determine prescribing and dispensing trends; provide patient prescription history information to prescribers and dispensers; provide educational information to health care providers and the public; and provide case information to regulatory and law enforcement agencies concerning drug distribution and diversion
- MDPH has launched three public awareness campaigns: State Without Stigma, Stop Addiction, the Good Samaritan Law to make the right call, reduce stigma, and raise awareness about addiction
- Partnering with medical schools, dental schools, advanced practice nursing programs and professional organizations, physician assistant programs, the Massachusetts Association of Physician Assistants, the Massachusetts League of Community Health Centers, and affiliated community health centers to implement a set of core competencies related to the prevention and management of prescription drug misuse for medical professionals
- The Massachusetts Interscholastic Athletic Association program that creates and distributes information to school personnel, parents, and youth about risks, signs, symptoms, and responses to opioid use for school-aged children, particularly athletes
- The Massachusetts Opioid Abuse Prevention Collaborative (MOAPC) initiative to support 116 cities and towns across the commonwealth to prevent the misuse of opioids and opioid overdoses through community-level policy, practice, and systems change

Continuum of Care

- The Massachusetts Health Promotion Clearinghouse website will soon provide substance use prevention and health promotion materials for Massachusetts residents, health care professionals, and social service providers that can be read on phones and any type of digital device
- Substance use prevention resources for parents, youth, older adults, and individuals and organizations who serve these populations
- Culturally and linguistically appropriate adaptations of resources and parenting guides to Spanish-speaking residents and Native American populations of Massachusetts
- Toolkits for health care providers and alcohol retailers on how to use their roles to prevent, address and/or refer people for alcohol and other drug problems

- The Massachusetts Substance Abuse Helpline provides free and anonymous information and referral for prevention and treatment of alcohol and other drug abuse problems and related concerns
- The Massachusetts Technical Assistance Partnership for Prevention (MassTAPP) supports programs across the Commonwealth in implementing substance abuse prevention
- The Substance Abuse Prevention Collaborative (SAPC) initiative supports 140 cities and towns in the state to prevent underage drinking and other drug use
- The Partnerships for Success (PFS) initiative supports 16 cities and towns to prevent prescription drug misuse among high school aged youth

Youth and Young Adult Population

- The Youth SEARCH program engages transitional age youth and young adults who are experiencing homelessness and housing instability
- Stabilization and residential programs
- Recovery high schools to provide educational environments suited to youth recovering from substance use disorders
- SAMHSA funded Youth Treatment - Implementation (SYT-I) grant program to extend Adolescent Community Reinforcement Approach (ACRA) to 16-25 year olds.
- Statewide ACRA learning collaborative

LGBTQ Population

- The Office of Youth and Young Adult Services (OYYAS) within the Bureau of Substance Addiction Services (BSAS) for initiating and implementing a plan to increase the capacity of OYYAS and its provider system to serve LGBTQ youth and young adults
- Partnership MaeBright LLC, a technical assistance and advocacy organization, to conduct a system-wide review of policies and practice guidance; explore strategies for collecting data on sexual orientation and gender identity; train staff in the provider system to ensure a more welcoming environment for LGBTQ youth and young adults; provide specialized training for youth/young adult residential providers, and provide training to new staff and on-going technical assistance
- Collaboration with Gay/Straight Alliances (GSAs) to help reduce risks in schools, serve as resources for LGBTQ students, and support the development of resiliency and leadership skills

Military and Veteran Population

- Projects Assistance in Transition from Homelessness (PATH), a SAMHSA grant program to provide services to veterans with serious mental illness, including those with co-occurring substance use disorders, who are experiencing homelessness

Homeless Population

- The Massachusetts Interagency Council on Housing and Homelessness program to develop and implement trainings for all case managers and housing stabilization staff

Co-occurring Mental Health Population

- The Quality Assurance and Licensing Unit within the Bureau of Substance Addiction Services is working with the Department of Mental Health on a pilot to enhance integrated treatment for people with co-occurring substance use and mental health disorders. Processes for assessing competencies, streamlining applications, and co-licensing are currently underway. In August 2017, the first co-licensing site visit and review commenced.
- Massachusetts offers training programs for providers on addressing co-occurring disorders.
- Regulations governing training and supervision require all BSAS licensees to have written plan for the professional growth and development of all personnel. As part of this plan, annual training programs including those on co-occurring disorders must be provided and evidence of attendance must be documented.

Problem Gambling Population

- Massachusetts Council on Compulsive Gambling statewide trainings, regional trainings, annual conferences
- Massachusetts Problem Gambling Specialist (MA-PGS) certifications

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CHAPTER 7

Health Systems and Health Care Access





Health Systems and Health Care Access

This chapter provides an overview of Health Systems and Health Care Access in the Commonwealth of Massachusetts and related trends and disparities. It provides information on health care access and delivery and the Department’s responsibility to regulate the health care system to ensure quality health care. The chapter includes the following topic areas:

- Health Care Access and Utilization
- Health Care Quality
- Local and Regional Public Health
- Oral Health
- Mental Health
- Health Care Workforce
- Public Health and Health Care Systems Preparedness
- Selected Resources, Services, and Programs

Overview

Massachusetts has long been recognized as a national leader in providing health care for its citizens. The focus includes continuously improving capacity and capabilities to allow Massachusetts public health and health care systems to prevent, protect against, quickly respond to, and recover from a variety of emergencies. People who cannot access health care are more likely to have poor overall health and chronic conditions. Accessing services such as preventive care, primary care, dental and mental health care, and emergency care without delay is necessary to a person's overall health.

The overall trends in health care in Massachusetts are among the most positive in the nation:

- Massachusetts has the fewest uninsured residents in the nation. Only four percent were uninsured due to legislation enacted in 2006 to provide improved access to health care coverage in the Commonwealth.⁴²²
- Only 7.5% of Massachusetts adults say they do not have a “usual place” of medical care compared to a national rate of 17.3%.⁴²³
- Additionally, Massachusetts ranks first in the number of primary care physicians per 100,000 residents.

Although metrics like health insurance and the availability of providers and facilities are important for assessing access to care, it is vital to consider barriers to health care that disproportionately affect vulnerable populations. These barriers, for some residents of the Commonwealth, may lead to unmet health care needs, delays in receiving care, financial burden, and preventable hospitalizations.

Assessing and improving the quality of health systems is important for improving population health. A key Commonwealth goal is a health system that provides quality care that is safe, effective, timely, equitable, and patient-centered. This means working to reduce and prevent adverse events and ensuring timely and accessible evidence-based care for all in the right place and at the right amount.

Another important element to the health system is the expansion of Accountable Care Organizations (ACOs). The ACO program is a major component in the state's five-year innovative 1115 Medicaid waiver that brings in significant new federal investment to restructure the current health care delivery system for MassHealth's 1.9 million members. The waiver provides \$1.8 billion in new federal investments, referred to as Delivery System Reform Incentive Payments (DSRIP), to support the transition of health care providers providing value-based care. The current fee-for-service system leads to gaps in care and inefficiencies and the ACOs selected demonstrate a strong commitment to improving care for the members they serve and will be held to high standards for quality and access of care.

Since December 2016, six ACOs have been participating in the MassHealth ACO Pilot program covering approximately 160,000 members and have already demonstrated early successes. For example, one ACO is connecting members with home and community-based services to avoid costly hospitalizations wherever possible, and to bring primary care services to members in their homes. MassHealth anticipates that the positive results demonstrated by the Pilot ACO program will continue with the full implementation and investments under the restructured ACO program.

MDPH ensures compliance by:

- Licensing health care facilities such as hospitals, nursing homes, clinics, rest homes, adult day health programs, and community health centers
- Licensing health care professionals such as physicians, nurses, community health workers, and pharmacists

- Monitoring and supporting health providers' efforts to meet national standards for Culturally and Linguistically Appropriate Services (CLAS)
- Systematically collecting a variety of data including adverse events, such as falls, deep pressure ulcers, and cardiac events to assess safety, and aid informed decision-making and quality improvement

In addition, MDPH also is responsible for public health coordinating, preparedness and emergency management. MDPH collaborates with stakeholders to ensure that all public health and health care partners, as well as local community members, have the knowledge, plans, and tools to prepare for, respond to, and recover from threats to public health such as:

- Acts of bioterrorism
- Outbreaks of infectious disease
- Other large-scale public health emergencies or mass casualty incidents

Culturally and Linguistically Appropriate Services (CLAS) Standards

The Massachusetts Department of Public Health (MDPH) Office of Health Equity (OHE) implemented its CLAS initiative in three phases. CLAS I (2005-2010) developed strategies and tools for adoption of CLAS Standards in Massachusetts. CLAS II (2010-2013) focused on implementation and piloting of CLAS efforts and tools both across the agency and throughout its network of contracted service providers. CLAS III (2013-2015) focused on the sustainability and ongoing assessment of CLAS efforts.

Ongoing CLAS Implementation

To identify gaps and priorities across all bureaus, MDPH completed CLAS internal assessments in 2008, 2011. Findings and recommendations were presented to department leadership, and follow-up meetings were held in 2014 with individual bureaus, which informed improvements to the assessment tool and process. As a result, a new internal assessment was developed and implemented in 2016, which includes individual workplans and one-on-one technical assistance follow-up for each program. Future internal assessments will be done annually.

Since 2007, MDPH has required that contracted vendors of direct services complete a [self-assessment](#) as part of their annual workplans. The self-assessment guides vendors to detail how they plan to work on a CLAS-specific goal during the following 1-year contract period. Contract managers are trained to provide ongoing monitoring and support of vendors' CLAS-implementation efforts as part of annual site visits and performance reviews.

Throughout CLAS I, II, and III, OHE convened an advisory board, with staff from all bureaus, who met regularly to ensure that the initiative met its objectives. Staff also worked in subcommittees to develop, pilot, promote and evaluate the CLAS-related trainings, materials, policies, and protocols MDPH developed. The committee also informed the initiative's strategic sustainability plan, which called for the seamless integration of CLAS into all MDPH work.

CLAS Training and Technical Assistance

OHE developed CLAS trainings and presentations for internal and external audiences—department staff, contracted vendors, community groups, sister agencies, fellow Offices of Minority Health in other states. In-person trainings for MDPH contract managers and vendors are offered several times a year, and webinars are offered upon request.

Interested individuals can contact CLAS@state.ma.us for information on CLAS trainings. Technical assistance requests are made by MDPH staff, vendors, and other stakeholders, via email or telephone and fulfilled by OHE in a timely manner.

CLAS Dissemination Tools

The Massachusetts Office of Health Equity developed [Making CLAS Happen: Six Areas for Action](#), a manual to help organizations operationalize the CLAS Standards. It is organized into six chapters covering the 15 CLAS Standards:

- Foster cultural competence
- Build community partnerships
- Collect and share diversity data
- Benchmark: plan and evaluate
- Reflect and respect diversity
- Ensure language access

Each chapter includes hands-on tools, resource lists, and case studies from public health and social service providers. The manual has been printed and disseminated and continues to be used across the state and the country. It was updated in 2013 to reflect the enhancement of the CLAS Standards, and can be downloaded by chapter from the MDPH CLAS website, which serves as an accessible repository for the dissemination of all MDPH-produced, CLAS-related materials.

Health Care Access and Utilization

Health Care Access

This section discusses the issues surrounding health care access. Access to health care is an important determinant of health. Health problems, including acute and chronic conditions, can be prevented or treated by health care professionals. Key components of health care access include health insurance coverage, provider availability, provider linguistic and cultural humility and sensitivity, and quality of care.⁴²⁴

Trends/Disparities

Although Massachusetts is a national leader in the number of health care facilities and health care providers, there are still some barriers that prevent individuals from accessing timely and adequate health care⁴²⁵:

- Lack of health insurance
- Lack of transportation
- Lack of language interpreters
- Lack of knowledge to navigate the health care system
- Lack of childcare
- Lack of culturally competent care
- High cost of care
- Distrust of health providers and the health care system

Barriers in access to health care can lead to delayed health care utilization, less preventive services, financial hardship, and rising health care costs, primarily through increased and preventable urgent care visits and hospitalizations.⁴²⁶ In Massachusetts, specific racial/ethnic populations, those that are low income, and residents of rural areas, disproportionately experience barriers in receiving timely care.⁴²⁷ Access to basic health care may vary by race, ethnicity, socioeconomic status, age, sex, gender identity, sexual orientation, ability and geographic location.

The trends in the availability of basic health care across the Commonwealth are positive, both in terms of the geographic distribution of facilities and services and the total numbers of facilities and services.

The table below illustrates the distribution of health care facilities by county. Though the numbers vary widely between counties, they are proportionate to the population size of their respective areas.

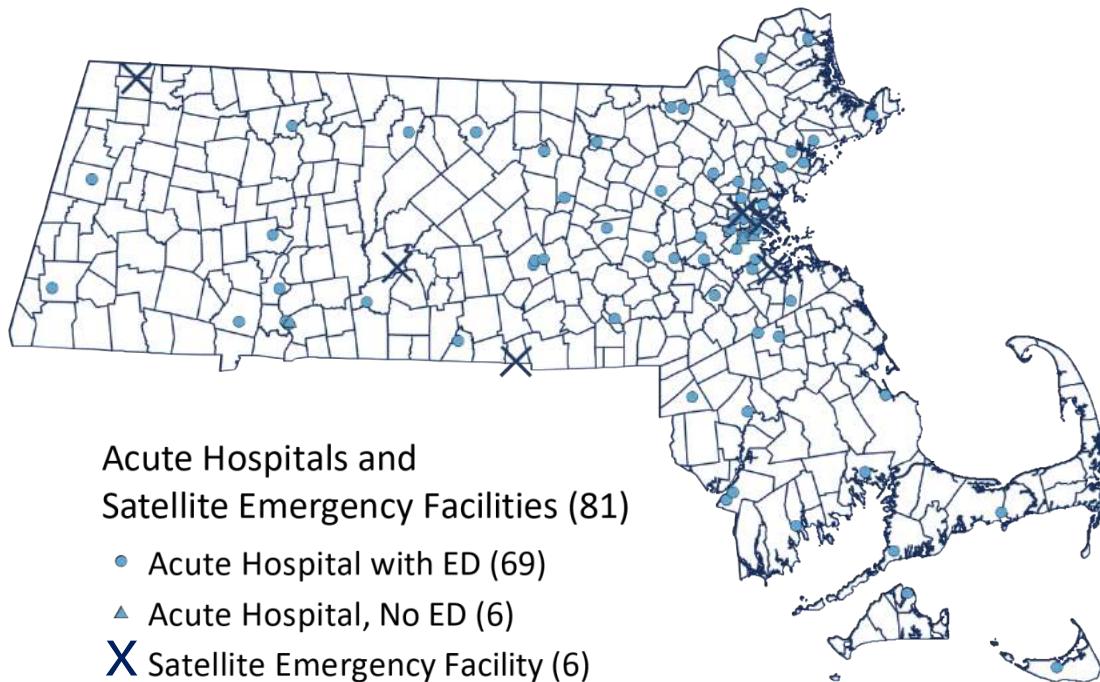
Figure 7.1

Number of Health Care Facilities, By County, Massachusetts, June 2017

County (Population)	Facility Type							
	Nursing Home	Rest Home	Adult Day Health	Acute Hospital	Non-acute Hospital	Clinic	Dialysis Centers	Total
Barnstable (214,276)	18	3	4	2	2	38	2	69
Berkshire (126,903)	15	0	3	2	0	23	3	46
Bristol (558,324)	39	5	19	5	5	60	7	140
Dukes (17,246)	1	0	0	1	0	3	1	6
Essex (779,018)	50	8	20	9	6	118	9	220
Franklin (70,382)	5	1	1	1	0	10	1	19
Hampden (468,467)	31	3	11	6	4	77	9	141
Hampshire (161,816)	6	3	2	1	0	15	1	28
Middlesex (1,589,774)	84	11	35	15	6	145	14	310
Nantucket (11,008)	1	0	0	1	0	2	1	5
Norfolk (697,181)	46	5	14	4	8	74	12	163
Plymouth (513,565)	32	5	12	4	3	58	5	119
Suffolk (784,230)	31	7	30	15	8	98	10	199
Worcester (819589)	55	17	16	9	5	106	9	217
Total (6,811,779)	414	68	167	75	47	827	84	1682

As shown in in the **Figure 7.2**, acute care hospitals with an emergency department and acute hospitals with no emergency department are concentrated in the Boston metropolitan area.

Figure 7.2
Massachusetts Acute Care Hospitals and Satellite Emergency Facilities



Massachusetts was home to the first community health center in the nation. Now in 314 locations and growing, Massachusetts community health centers provide high quality medical, dental, vision, pharmacy, behavioral health, addiction services and other community-based services to 998,000 residents regardless of their insurance status or ability to pay. Health centers work to eliminate the increased risk of serious illness, chronic disease, and mortality experienced among the state's many ethnic and racial groups by hiring multilingual and multicultural staff at every level of their organizations; deploying community health workers to help patients navigate the complex health system; and assisting residents in enrolling—and staying enrolled—in critical health care coverage.

In 2016, community health center data shows:

- 4.7 million visits a year
- Services accessed by individuals in 96% of Massachusetts cities and towns
- Almost 24% of the state's health center patients were women of child-bearing age (15-44)
- 23% were children under 18
- 11% of patients were older adults age 65 or older
- 89% of patients fell below 200% of the federal poverty level
- 44% were insured through MassHealth
- 31% had subsidized and unsubsidized commercial coverage

- 10% were Medicare beneficiaries
- Nearly 14% of patients remained uninsured
- 42% were non-English speaking

Community health centers address disparities identified in this and other chapters by providing locally-accessible, comprehensive, and patient-centered care. The result is that high-need patients in Massachusetts receive primary care and are less reliant on expensive emergency and hospital care. Community health centers are accessible in all areas of the state.

In 2009, the first ever data reporting platform for community health centers, DRVS™ (Data Reporting and Visualization System) was established. The platform measures and monitors health center performance on key clinical, operational, and financial metrics. DRVS is also providing support to several MDPH initiatives including the Massachusetts immunization information system (MIIS), the web-based immunization registry, Mass in Motion -- a community-based approach to promoting healthy eating and active living -- and the Bureau of Infectious Disease and Laboratory Sciences' Office of Integrated Surveillance and Informatics Services which collect data on 80 reportable diseases.

Community health centers are dedicated to integrating addiction care into the primary care they deliver and were the first health care providers in Massachusetts to endorse Governor Baker's core competencies for preventing and managing prescription drug misuse.

Currently, 86 percent of Massachusetts community health centers have achieved official patient-centered medical home (PCMH) recognition through an accredited organization, including the National Committee for Quality Assurance (NCQA) and the Joint Commission on Accreditation of Health Care Organizations. The Massachusetts Health Policy Commission, in collaboration with the NCQA, developed the PCMH PRIME Certification program which certifies Massachusetts-based federally qualified health centers for their integration of behavioral health either through formal agreements, co-location, or provider integration and emphasizes the importance of integrating behavioral health into patients' primary care. As of July 2017, 28 percent of federally-funded health centers have achieved PRIME status, with an additional 20% on the path to certification.

Medical Use of Marijuana Program

In 2012, MDPH established the Medical Use of Marijuana Program to implement the registration of non-profit organizations that cultivate and dispense marijuana for medical use and the registration of physicians, patients, personal caregivers, and dispensary agents. Massachusetts legalized marijuana for recreational use in 2016.

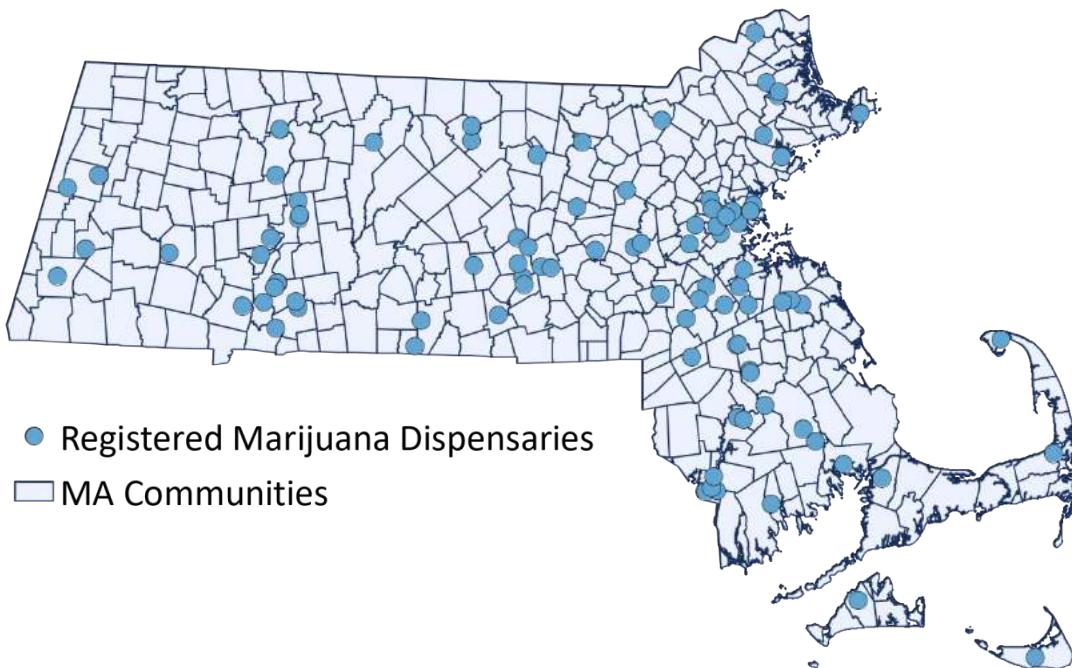
MDPH oversees regulatory enforcement of registered marijuana dispensaries (RMD), patient support services delivery, and processing of RMD applications. **Figure 7.3** illustrates the locations of RMDs across the state.

Additionally, it is also MDPH's responsibility to regulate the evaluation and labelling of marijuana for medical use. To accomplish this, MDPH uses an analytical testing protocol based upon standards published annually by the United States Pharmacopoeia (USP) Convention.

In July 2017, a new law was enacted which established the Cannabis Control Commission. As part of the new law, the Medical Use of Marijuana Program will be moved from MDPH to the newly created Commission by December 2018. The Commissioner's Office, Office of General Counsel and the Bureau of Health Care Safety and Quality's Medical Use of Marijuana Program staff are committed to helping ensure this transition is seamless.

Figure 7.3

Massachusetts Registered Marijuana Dispensaries with a Certificate of Registration, March 2017



Hospitalizations

Hospitalizations provide a lens into the health of residents across the Commonwealth. Many hospitalizations for acute illnesses and chronic conditions can be prevented through preventive health care in outpatient settings.⁴²⁸ Decreasing preventable hospitalizations can reduce health care costs.⁴²⁹

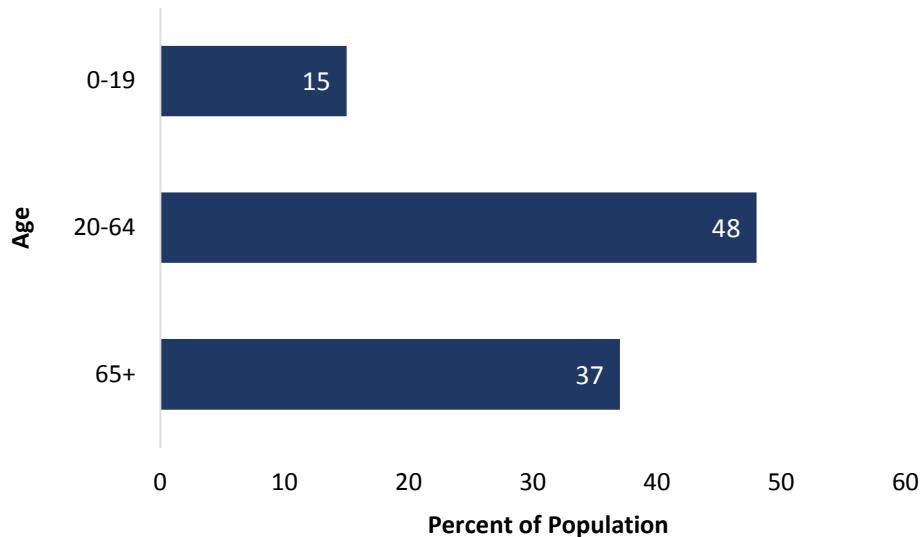
Inpatient Discharges by EOHHS Region

In Fiscal Year 2015, more than one-third (37.1%) of inpatient discharges across the Commonwealth occurred in Metro Boston. Northeastern (17.6%) and Western (12.1%) Massachusetts EOHHS regions together comprised nearly 30% of inpatient discharges across the state. From 2009 to 2015, inpatient discharges increased 65.2% in Metro Boston and 3% in the South Coast. Over this same time period, the Metro South (37.2%), Metro West (35.6%), and Cape and Islands (25.3%) experienced the greatest percent decrease in inpatient discharges.

Inpatient Discharges by Age

Nearly half (48%) of all inpatient discharges in 2012 were among persons 20 to 64 years of age and approximately one-third (37%) of inpatient discharges were among persons 65 years of age or older.

Figure 7.4
Inpatient Discharges by Age, Massachusetts, Fiscal Year 2012



SOURCE: CHIA, ACUTE CARE HOSPITALIZATION TRENDS IN MASSACHUSETTS

Observational Stay Discharges by Region

From Hospital Fiscal Years 2009 to 2013, observational stay discharges across Massachusetts increased by 25.7%. Over this period, the Cape and Islands (89.1%), Southcoast (54%), and Metro South (51.4%) regions experienced the greatest increase in observational stay discharges.

The Metro Boston (23.7%) and Northeastern Massachusetts (19.5%) regions each represented nearly one in five observational discharges across the Commonwealth in hospital fiscal year 2013.

Emergency Department Utilization

Emergency department utilization is an indicator of the health of a community and the identification of conditions that could be prevented by appropriate health care delivered in primary care settings.⁴³⁰⁻⁴³¹ Decreasing potentially preventable emergency department visits may reduce health care costs.⁴³²

Leading Causes of Emergency Department Discharges

Emergency department discharge includes emergency department visits that do not result in hospital admission. In 2012, conditions of the abdomen and pelvis and respiratory system and chest were among the leading causes of emergency department visits across Massachusetts, comprising 5% and 4.4% of total emergency department discharges respectively.

Emergency Department Visits by EOHHS Region

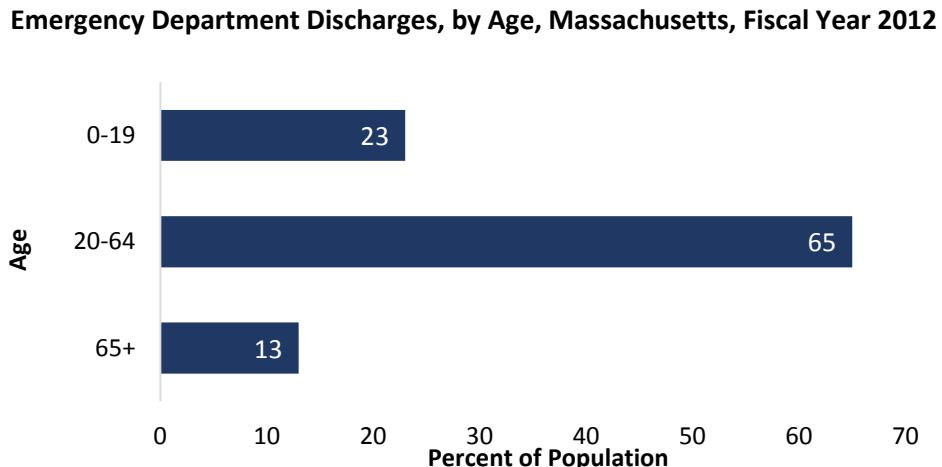
From Hospital Fiscal Years 2009 to 2015, emergency department discharges increased by 28.9%. Over this period, the Metro Boston region (60.8%) experienced the greatest increase in emergency department discharges. This increase was also high in Central Massachusetts (32.6%), Northeast Massachusetts (29.9%), the Cape and Islands (24.9%), and

Southcoast (24.4%). This increase in emergency department discharges reflects trends following health care reform in Massachusetts and the implementation of the Affordable Care Act.^{433,434}

Emergency Department Discharges by Age

In 2012, approximately two-thirds (65%) of emergency department discharges in Massachusetts were among persons 20 to 64 years of age. One in five (23%) emergency department discharges was among individuals from birth to 19 years of age.

Figure 7.5

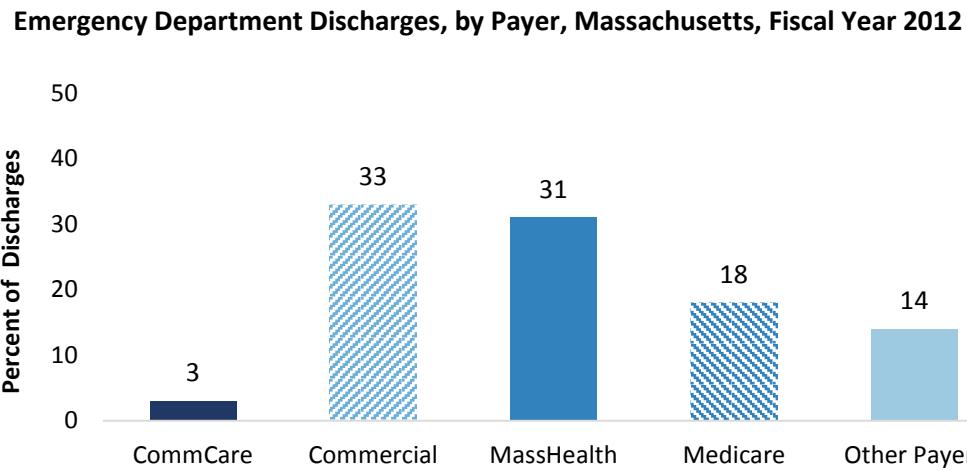


SOURCE: CHIA, ACUTE CARE HOSPITALIZATION TRENDS IN MASSACHUSETTS

Emergency Department Discharges by Payer Type

Patients with private health insurance (33%) and Medicaid (31%) each represented one-third of emergency department discharges in Massachusetts in 2012. Nearly one in five (18%) patients discharged from emergency departments across the Commonwealth had Medicare coverage in 2012.

Figure 7.6



SOURCE: CHIA, ACUTE CARE HOSPITALIZATION TRENDS IN MASSACHUSETTS

Health Care Quality

This section discusses trends and disparities relating to health care quality from the perspective of two key MDPH responsibilities specifically related to safety of care and timeliness of care and a few examples.

Safety: Trends/Disparities

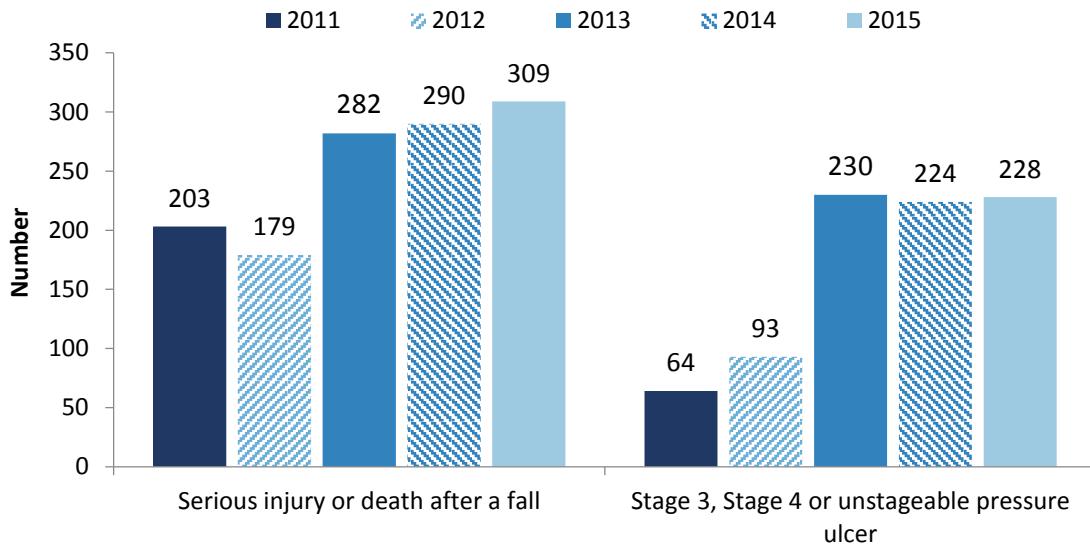
Falls and Pressure Ulcers in Health Care Settings

MDPH uses an adverse event identification and reporting framework developed by the National Quality Forum (NQF) to identify trends and disparities to confront health care safety issues. This framework translates a set of adverse events into measurable, evidence-based outcomes called Serious Reportable Events (SRE). Falls and pressure ulcers (bed sores) are two of the SREs that MDPH monitors and reports annually. MDPH also monitors and evaluates the quality of cardiac care delivered in Massachusetts by collecting patient-specific outcome data from all hospitals that perform certain cardiac procedures.

- From 2011 to 2015, the number of serious injuries or deaths after a fall increased 52.2%. (203 falls in 2011 vs. 309 falls in 2013)
- The number of pressure ulcers in acute care settings tripled from 2011 to 2015 (64 ulcers vs. 228 ulcers, respectively). During this period, the sharpest increase in falls and pressure ulcers in acute care settings occurred from 2012 to 2013.

Figure 7.7

Number of Falls with Serious Injury and Pressure Ulcers in Acute Care Hospitals, Massachusetts, 2011-2015



Much of these increases were the result of the adoption of new, more expansive NQF definitions in 2012⁴³⁵ and MDPH will continue to monitor. **Figure 7.7** shows the trends in Massachusetts in these safety categories in acute care hospitals identified through the NQF framework.

Cardiac Surgery and Coronary Intervention

Massachusetts hospitals that perform coronary artery bypass graft (CABG) and percutaneous coronary intervention (PCI) procedures are required to report patient-specific outcome data to MDPH on an annual basis. Risk-standardized, 30-day mortality is one of several indicators used to assess safety and quality of care.

In Fiscal Year 2014, Massachusetts had 7,546 hospital admissions in which at least one cardiac surgery was performed. Of these admissions, 3,063 (40.6%) involved bypass surgery. Of these admissions, 48 (1.6%) patients died within 30 days of surgery.

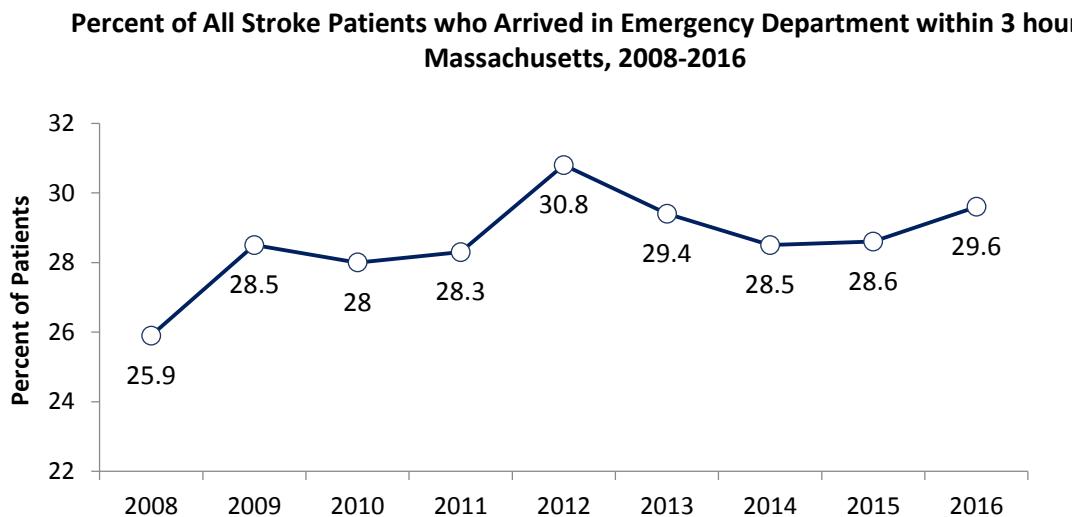
In Fiscal Year 2014, Massachusetts had 12,439 admissions in which at least one PCI (heart attack) procedure was performed. Of these admissions, 40 patients died within 30 days of surgery, which equates to 0.4%.⁴³⁶

No adverse trends or disparities have been identified in CABG measure of safety, but MDPH's data collection process will allow it to quickly identify adverse trends and disparities that may arise.

Timeliness: Trends/Disparities

The timeliness of receiving health care is critically important in sudden events, especially strokes. In **Figure 7.8**, the trend indicates increased improvement in receiving emergency care within three hours.

Figure 7.8



Local and Regional Public Health

A decentralized system of 351 local public health authorities (local boards of health and local health departments) plays an important role in the Massachusetts public health system. The Commonwealth has the highest number of local health departments in the country.

These local public health authorities work in partnership with MDPH and others to deliver a core set of services. Local public health authorities are charged with a broad set of responsibilities for enforcement of state sanitary, environmental, housing, and health codes, including:

- Protection of the food supply through inspections of restaurants and other food establishments
- Inspections and permitting of septic systems, landfills, and other solid waste facilities
- Health care and disease control, including timely reporting and response to communicable diseases, occupational health and safety violations, food poisoning, and rabies
- Inspections of pools, beaches, camps, motels, and mobile home parks
- Enforcement of state lead poisoning regulations and sanitary codes in housing
- Enforcing tobacco laws
- Developing, testing, and building awareness of emergency preparedness plans for a wide range of hazards

Trends/Disparities

Local public health services are primarily funded by local property tax revenues and fees. Inadequate funding for local public health is a key contributor to disparities in the delivery of core public health services across communities in the Commonwealth. Unlike many other states, Massachusetts does not provide base funding to local public health authorities for core public health services. Inadequate local public health funding is a key contributor to disparities in the availability of core public health services at the local level in Massachusetts.

Within the past decade, public health advocates have promoted voluntary accreditation as a means to advance state, local, and tribal health departments beyond a minimum set of services and standards. A principal component of accreditation through the national Public Health Accreditation Board (PHAB) is the demonstrated capacity to deliver the ten essential public health services. At this higher level of service delivery, there are also disparities among Massachusetts local public health authorities. Large communities are typically better equipped than small ones to provide at least some of the essential public health services. These disparities can be attributed to inadequate funding and limited staffing.

The MDPH approach to addressing inequities in core public health service delivery builds on the strengths of the local public health system. Some initiatives are particularly promising in addressing disparities in the provision of core services and the ten essential services. These initiatives include 1) technical assistance for public health accreditation, 2) supporting the formation of public health districts or other shared service arrangements, and 3) providing funding for municipalities to lead public health program and policy initiatives for tobacco control, wellness, addiction, and emergency preparedness. The trend over the past several years has been towards stronger relationships between MDPH and local public health authorities and more robust support for the important role of local health authorities in the Massachusetts public health system.

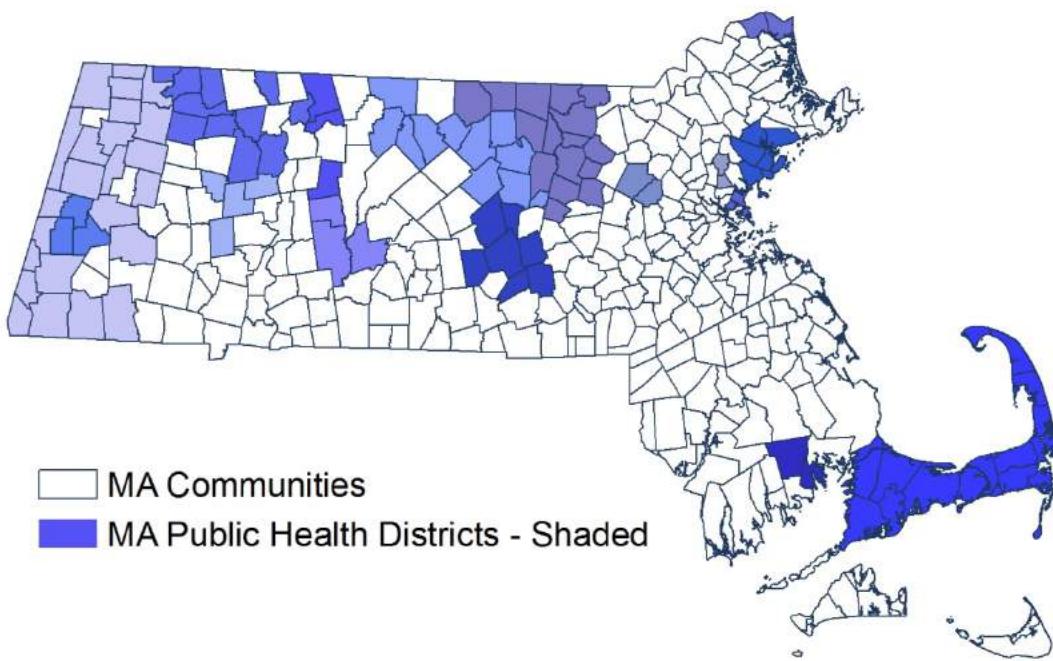
Nearly one-third of Massachusetts communities are part of a public health district or other cross-jurisdictional sharing agreement ([see Figure 7.9](#)). Serving about 20% of the population, these formal arrangements not only have demonstrated value in ensuring the delivery of core services but also enhance local capacity to provide some of the ten essential services. With their strong tradition of local autonomy, some Massachusetts cities and towns have been less receptive than others to public health collaboration across jurisdictional boundaries.⁴³⁷ The following efforts are among those in which Massachusetts has been working to advance cross-jurisdictional sharing:

- MDPH has been a participant in the Massachusetts Public Health Regionalization Project since its inception over a decade ago. Comprised of a diverse set of public health leaders, the project is dedicated to “strengthen[ing] the Massachusetts public health system by creating a sustainable, regional system for equitable delivery of local public health services across the Commonwealth”.

- In 2009, MDPH obtained funding from the US Centers for Disease Control and Prevention to support five new cross-jurisdictional sharing arrangements through the Public Health District Incentive Grant Program.
- The Special Commission on Local and Regional Public Health, convened in June 2017, is charged with assessing the effectiveness and efficiency of the local public health system and making recommendations for improvement.

Figure 7.9

Public Health Districts and Communities in Shared Services Arrangements, 2017



Oral Health

A healthy mouth is essential to overall health. Poor oral health can affect nutrition, learning, growth and development, self-esteem, quality of life, employability, and systemic health. When oral health is compromised, it can lead to increased risk for diseases such as cardiovascular disease or stroke. Oral disease has been linked to complications in pregnancy and childbirth and to respiratory, gastrointestinal, rheumatologic, and cardiovascular disease.⁴³⁸ Emerging evidence suggests a two-way relationship between diabetes and periodontitis, with diabetes increasing the risk for periodontitis, and periodontal inflammation negatively affecting glycemic control.⁴³⁹ Individuals with diabetes who receive periodontal intervention may lower their medical costs.⁴⁴⁰ Dental caries, or tooth decay, is the most common chronic disease among children and adolescents. Nationally, more than 51 million school hours are lost each year due to oral health issues.⁴⁴¹

There are notable racial/ethnic disparities in oral health care utilization for children, adults, and pregnant women. Insurance status is often a barrier to accessing oral health care, along with lack of adequate transportation to attend an appointment. Improving access to oral health services and preventive measures, such as community water fluoridation,

is important to preventing and treating oral diseases. Basic knowledge about oral health and its importance to overall health could lead to improved health outcomes across the life course.

Trends/Disparities

Dental Care Utilization

Experts locate the root causes of disparities in oral health outcomes in structural factors: the geographic dispersion of oral health care systems, uneven access to linguistically and culturally appropriate oral health care services, and differences in health care coverage according to income, to name just a few sources of inequity. There are clear racial/ethnic disparities in dental visit rates among all age groups in Massachusetts.

Children and Adolescents

Results from the Youth Risk Behavior Surveillance System in 2015⁴⁴² show that nearly 9 out of 10 middle and high school students in Massachusetts reported seeing a dentist in the past year. For Massachusetts high school students only 78% of Black non-Hispanic students and 82.1% of Hispanic students reported a dental visit, compared to 84.4% Asian non-Hispanics and 93.2% White non-Hispanic.

Adults

Among Massachusetts adults, Behavioral Risk Factor Surveillance System data⁴⁴³ suggests that the percentage reporting a dental visit in the past year decreased between 2010 and 2014, but still remains higher than the national average.

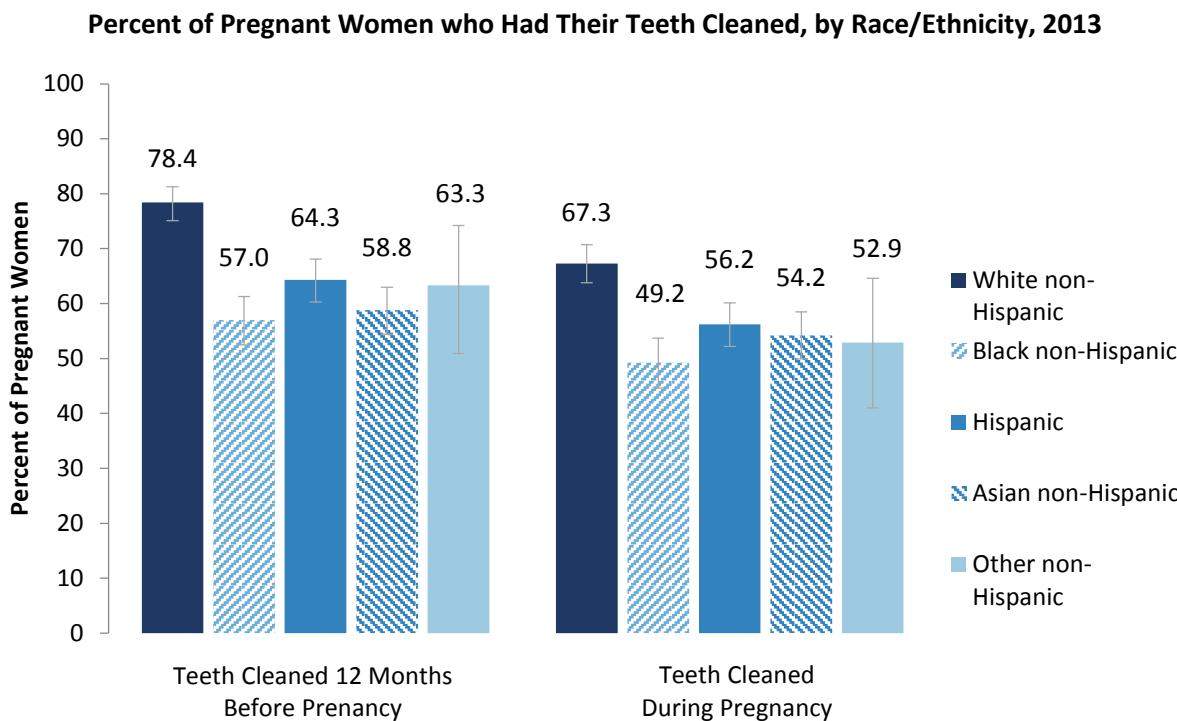
- In 2014, 74.7% of Massachusetts adults reported a dental visit in the past year. A greater proportion of White non-Hispanic (76.4%) and Asian non-Hispanic (74.9%) adults reported a dental visit in the past year compared with Black non-Hispanic (65.6%) and Hispanic (68.1%) adults.
- The percentage of adults who reported a dental visit in the past year increases with household income. Only 59.4% of adults making \$25,000 had a visit compared to 86% of adults making \$75,000 or more. Those with higher levels of education are also more likely to have had a dental visit in the past year (<high school: 59.7%; high school 67.7%; some college: 74.6%; college or more: 84.3%).

Pregnant Women

In Massachusetts between 2013 and 2014, the Pregnancy Risk Assessment and Monitoring System⁴⁴⁴ suggests that 71.7% of women had their teeth cleaned in the year before pregnancy and only 62.2% of women had their teeth cleaned during pregnancy. As shown in **Figure 7.10**, there are several disparities in dental visits among women:

- Among pregnant women, between 2013 and 2014 a greater percentage of White non-Hispanic women reported a dental visit in the past year (78.4%) and during pregnancy (67.3%) compared to other racial/ethnic groups. Black non-Hispanic women had the lowest prevalence of dental visits in the past year (57%) and during pregnancy (49.2%).
- Between 2013 and 2014, a lower percentage of those who were living at or below 100% of the federal poverty level reported having their teeth cleaned before (57%) or during (50%) pregnancy compared to those above 100% of the federal poverty level (78% and 67%, respectively).

Figure 7.10



Older Adults

Regardless of age, individuals with special health care needs often do not receive needed oral health care due to a lack of dental providers with expertise to treat them. Massachusetts is unique in that it has six specialized dental clinics operated by Tufts Dental Facilities to serve individuals with intellectual and/or developmental disabilities. In Fiscal Year 2016, Tufts Dental Facilities served 7,068 patients during more than 24,000 visits.

- In 2014, 15.6% of Massachusetts adults had six or more teeth missing.
- In 2009, 60% of residents in long-term care facilities had some natural teeth. Of these, 59% had untreated decay and 7% had urgent dental needs.⁴⁴⁵

Insurance Status

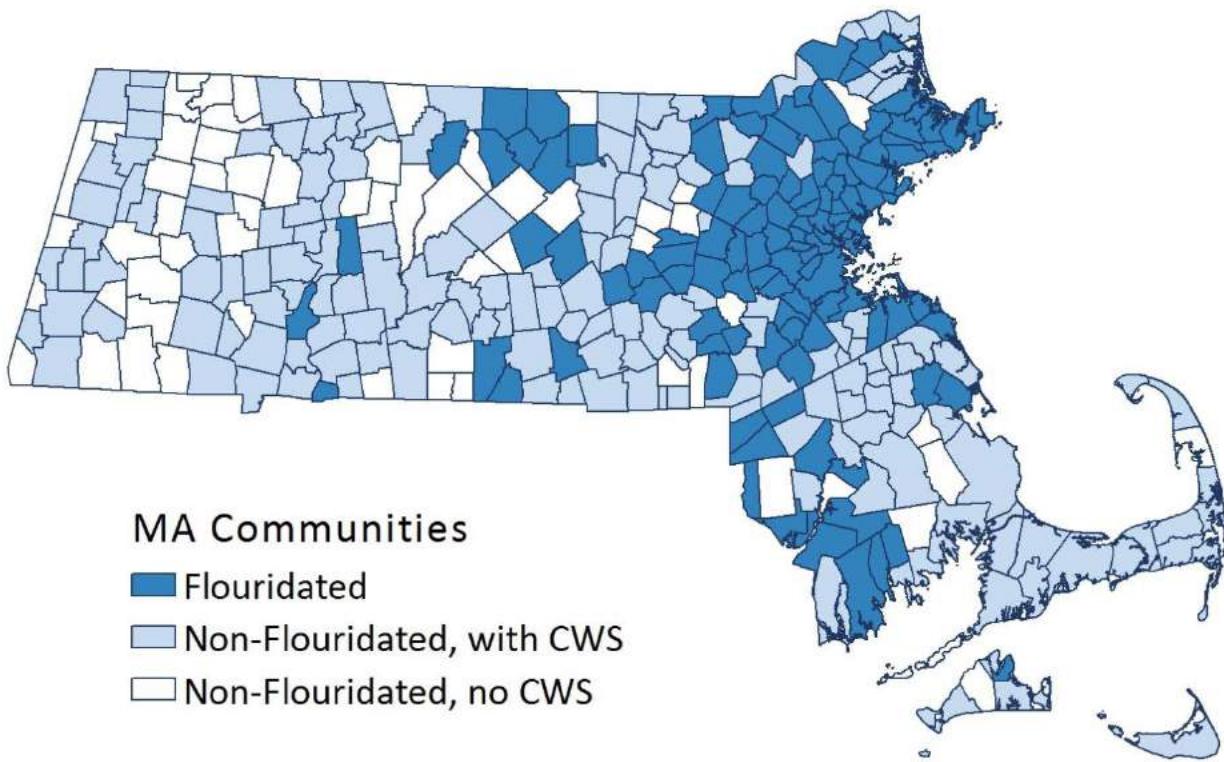
Health insurance is an important determinant of access to dental oral health care. According to the Centers for Medicare and Medicaid Services (CMS), in Fiscal Year 2015 there were 668,111 individuals under the age of 21 enrolled in MassHealth for at least 90 continuous days and of those only 55.1% received any dental oral health care.¹⁶ The proportion of dental providers who accept MassHealth insurance remains low. Approximately 45% of dentists reported treating patients with MassHealth insurance. Only 28% of those dentists reported that patients on MassHealth insurance made up more than half of their patient population.

Water Fluoridation

Community water fluoridation has been shown to prevent up to 25% of tooth decay in children and adults.⁴⁴⁶ Fluoride is a naturally occurring element in many water supplies in trace amounts. In public water supply systems the fluoride level is adjusted to an optimal level to improve oral health in children. Fluoride is safe, odorless, colorless, and tasteless. More than 3.9 million people in Massachusetts receive the health and economic benefits of fluoridation. As of February 2017

more cities and towns in the eastern and central regions of Massachusetts are fluoridated, with few or no cities and towns in western Massachusetts and the cape cod region being fluoridated.

Figure 7.11
Fluoridated Towns and Cities, Massachusetts, 2017



Mental Health

Approximately one out of seven White non-Hispanics, one out of eight Black non-Hispanics, and one out of six Latinos living in Massachusetts reported experiencing a mental health disorder in the last year. Looking at specifics of mental health, Latinos have higher rates of depression and poor self-reported mental health compared to White non-Hispanic, patterns that are not seen in the overall US population.⁴⁴⁷ As Massachusetts struggles to address the opioid crisis, one of MDPH's goals is to improve coordination between substance use disorder and mental health issues. Additional mental health information can be found in Chapters 5, 6, and 8.

Trends/Disparities

Utilization

Among those with mental illness, Latinos were less likely to receive any mental health care in the last year in Massachusetts, with disparities similar to the rest of the US.⁴⁴⁸

Older Adults

As the number of elderly rises, nearly one in five will suffer from, one or more mental health and/or substance use conditions. One clear trend is the growing risk of avoidable arrest and incarceration. In Massachusetts, approximately 25% of state correctional inmates and up to 50% of county jail and house of correction detainees and inmates receive mental health services. At MCI Framingham, a correctional facility for female offenders, up to 70% of the women awaiting trial or serving sentences receive mental health services.⁴⁴⁹

Disparities also exist in access to mental health services. Emergency Service Programs (ESPs) are community-based, recovery-oriented services which offer behavioral health crisis assessment, intervention, and stabilization services. Currently, only children and adults who receive MassHealth benefits receive coverage for ESP services.

Health Care Workforce

This section describes the health care workforce in Massachusetts in regards to:

- Physicians
- Nurses
- Pharmacists
- Emergency Medical Technicians
- Community Health Workers
- Mental Health Professionals
- Dental workers

Overall, licensure totals indicate a large availability of health-related professionals in the Commonwealth. These health professionals contribute to increasing access to health care in Massachusetts by creating an infrastructure of regulated, skilled workers. While the overall health care workforce trends are generally positive, disparities have been found and are described below.

Trends/Disparities

In summary, Massachusetts health professions licensure totals over the past five years increased 24.7% from Fiscal Year 2011 (193,775 licensees) to Fiscal Year 2015 (241,579 licensees). The number of licensees increased for most health-related professions, with the exception of nursing home administrators and emergency medical services (certified EMTs). **Figure 7.12** is an example of the continuing positive trend in attracting health care professionals across all spectrums of the workforce.

Figure 7.12

Trends in the Growth of Total Number of MDPH Licensees, Fiscal Years 2011-2015

	FY2011	FY2012	FY2013	FY2014	FY2015	Δ 11-15	Δ %
Board of Certification of Community Health Workers *	0	0	0	0	0	0	N/A
Board of Registration in Dentistry	18,191	18,230	18,349	18,827	24,113	5,922	33%
Board of Registration of Genetic Counselors	146	165	170	190	196	50	34%
Board of Registration in Naturopathy **	0	0	0	0	0	0	N/A
Board of Registration of Nursing Home Administrators	995	970	1,016	986	996	1	0%
Board of Registration in Nursing	141,934	143,756	142,555	143,638	157,225	15,291	11%
Board of Registration of Perfusionists	103	104	114	110	121	18	17%
Board of Registration in Pharmacy	25,902	27,158	28,673	29,721	29,935	4,033	16%
Board of Registration of Physician Assistants	2,199	2,437	2,479	2,808	2,906	707	32%
Board of Respiratory Care	2,000	1,926	2,990	2,838	3,064	1,064	53%
Office of Emergency Medical Services (Certified EMTs)	23,905	23,547	24,077	23,588	23,023	-882	-4%
Total	193,775	218,293	220,423	222,706	241,579	47,804	25%

NOTE: *THE BOARD OF CERTIFICATION OF COMMUNITY HEALTH WORKERS WAS ESTABLISHED BY CHAPTER 322 OF THE ACTS OF 2010, WITH AN EFFECTIVE DATE OF JANUARY 1, 2012 AS A RESULT OF STATE HEALTH CARE REFORM AND IS INTENDED TO HELP INTEGRATE COMMUNITY HEALTH WORKERS INTO THE HEALTH CARE AND PUBLIC HEALTH SYSTEMS IN ORDER TO PROMOTE HEALTH EQUITY, COST CONTAINMENT, AND MANAGEMENT AND PREVENTION OF CHRONIC DISEASE. THE BOARD WILL ESTABLISH STANDARDS FOR THE EDUCATION AND TRAINING OF COMMUNITY HEALTH WORKERS AND COMMUNITY HEALTH WORKER TRAINERS, STANDARDS FOR THE EDUCATION AND TRAINING PROGRAM CURRICULA FOR COMMUNITY HEALTH WORKERS, AND REQUIREMENTS FOR COMMUNITY HEALTH WORKER CERTIFICATION AND RENEWAL OF CERTIFICATION. THE BOARD HAS DRAFTED REGULATIONS, CONDUCTED PUBLIC HEARINGS, AND ARE IN THE FINAL REVIEW STAGES FOR SUBMISSION FOR PROMULGATION.

NOTE: **THE BOARD OF REGISTRATION IN NATUROPATHY WAS ESTABLISHED BY MASS GENERAL CHAPTER 112, SECTIONS 266 THROUGH 274 WITH AN EFFECTIVE DATE OF SEPTEMBER 1, 2017. THE BOARD OF REGISTRATION IN NATUROPATHY IS CHARGED WITH EVALUATING THE QUALIFICATIONS OF APPLICANTS FOR LICENSURE AND GRANTING LICENSES TO THOSE WHO QUALIFY AND ESTABLISHING RULES AND REGULATIONS TO ENSURE THE INTEGRITY AND COMPETENCE OF LICENSEES.

NOTE: Δ=CHANGE

Figure 7.13

**Trends in the Growth of Total Number of Division of Professional Licensure Licensees,
Fiscal Years (FY) 2011-2015**

	FY2011	FY2012	FY2013	FY2014	FY2015	Δ FY 11-15 #	Δ %
Board of Allied Health Professions	20,845	21,415	22,022	22,650	23,746	2,901	14%
Board of Registration of Chiropractors	2,114	2,140	2,145	2,124	2,115	1	0%
Board of Registration of Dietitians and Nutritionists	2,277	2,330	2,422	2,441	2,462	185	8%
Board of Registration of Dispensing Opticians	1,597	1,602	1,590	1,585	1,537	-60	-4%
Board of Certification of Health Officers	108	108	106	105	103	-5	-5%
Board of Registration of Hearing Instrument Specialists	161	178	168	490	187	26	16%
Board of Registration of Massage Therapy	9,322	9,621	9,785	9,887	9,799	477	5%
Board of Registration in Optometry	1,541	1,546	1,554	1,542	1,559	18	1%
Board of Registration in Podiatry	551	551	550	541	541	-10	-2%
Board of Registration of Social Workers	21,603	22,827	22,461	23,791	23,702	2,099	10%
Board of Registration for Speech-Language Pathology and Audiology	6,116	6,046	6,571	6,558	7,041	925	15%
Board of Registration in Veterinary Medicine	2,863	2,953	2,968	2,994	2,869	6	0%
Total	69,098	71,317	72,342	74,708	75,661	6,563	9%

SOURCE: OFFICE OF CONSUMER AFFAIRS AND BUSINESS REGULATION; NOTE: Δ=CHANGE

Physicians

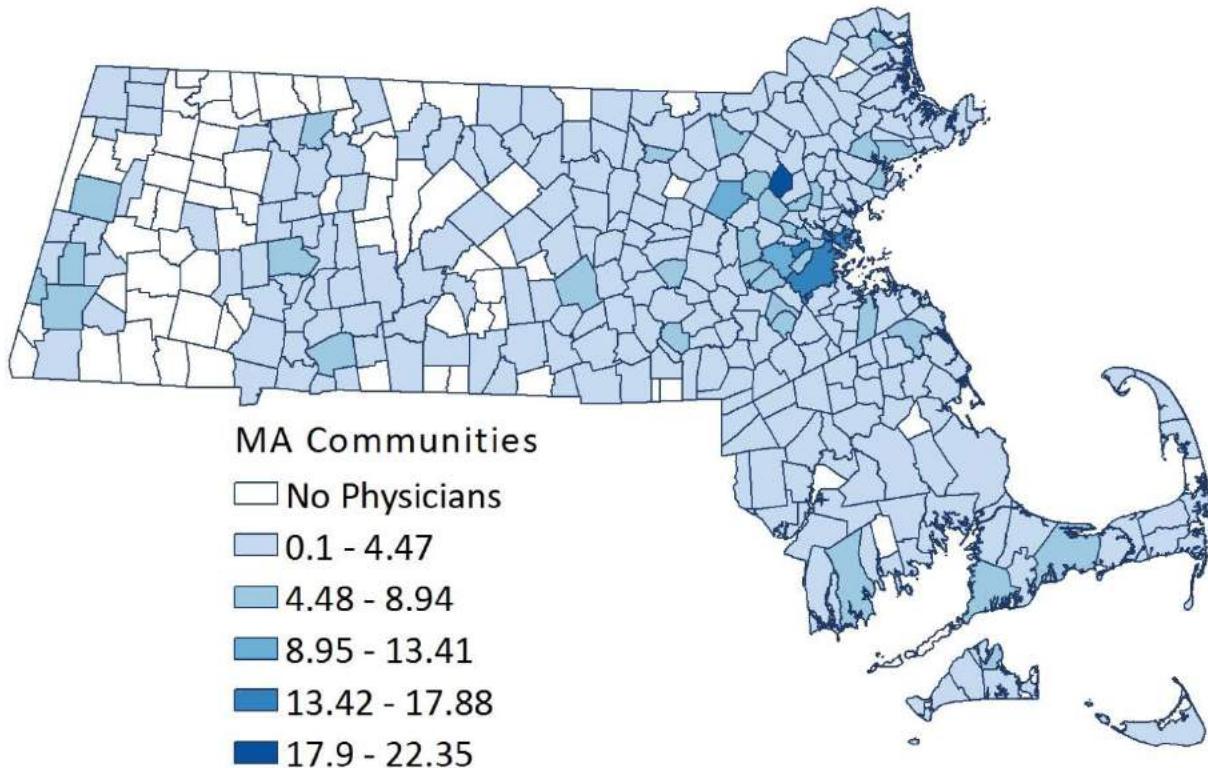
In another positive trend, the physician to population ratio in Massachusetts rose from 387 per 100,000 in 2007 to 413 per 100,000 in 2014, the highest physician to population ratio in the nation. In 2014, the number of licensed physicians in Massachusetts totaled 27,845. Although the proportion of male physicians (60%) exceeded that for female physicians (40%), the percentage of female physicians in Massachusetts is the highest ratio of any state in the nation.

However, the distribution of physicians across the state is unbalanced as shown in the **Figure 7.14**. The density of physicians is generally high in eastern portions of the state, particularly areas surrounding the Boston metropolitan area. The density of physicians is much lower in western portions of the state, with many municipalities having very few or even no practicing physicians.

A similar trend is seen with primary care providers. Although Massachusetts has the highest physician to population ratio in the country, differences in availability of providers in rural and urban areas may contribute to disparities in access to care, and poorer health outcomes.

Figure 7.14

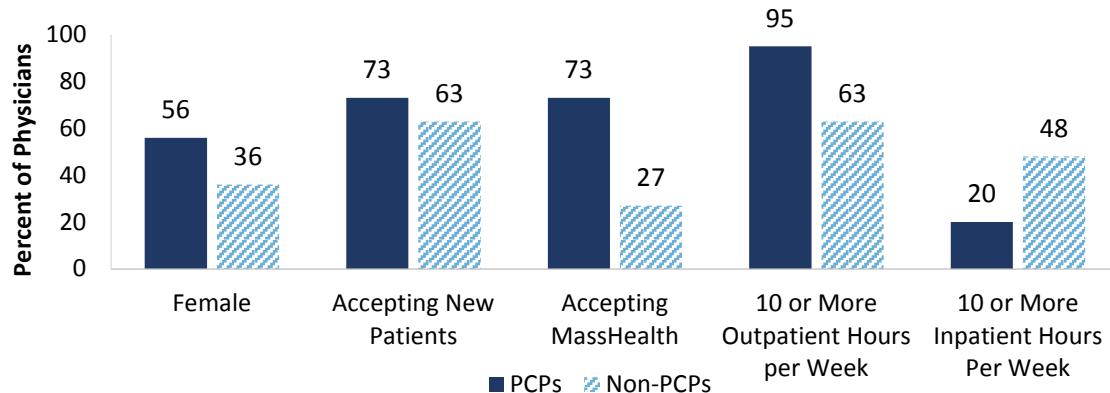
Ratio of Population to Physicians, Massachusetts, 2014



The trend in Massachusetts related to the number of primary care physicians is also positive. In 2014, 5,661 active Massachusetts physicians were categorized as primary care physician—20% of all physicians. Because primary care physicians are more likely to accept new patients and MassHealth insurance, these providers are critical for addressing disparities in the availability of health care.

Figure 7.15

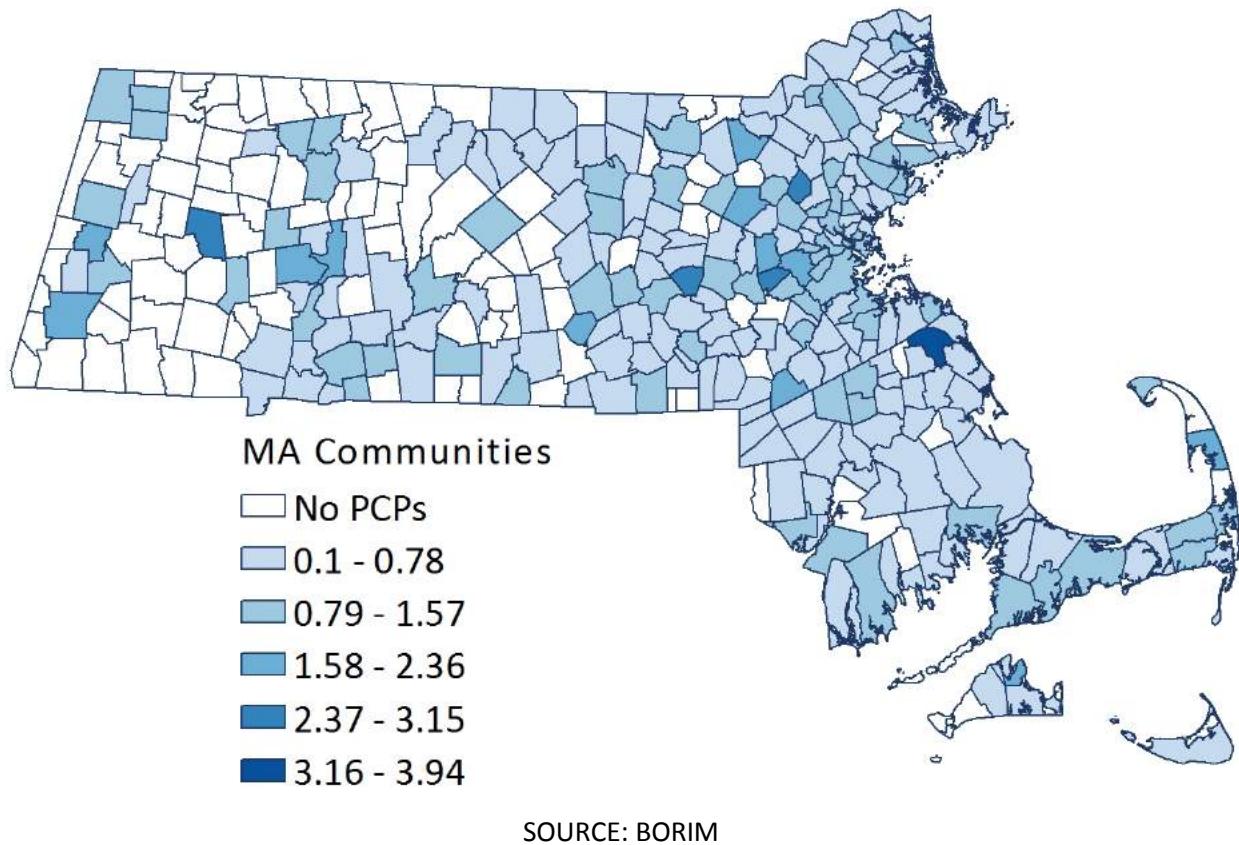
Demographic and Practice Characteristics of Physicians, Primary Care Physicians (PCP) vs. Non-Primary Care Physicians (Non-PCP), Massachusetts, 2014



SOURCE: BOARD OF REGISTRATION IN MEDICINE

The Health Resources and Services Administration (HRSA) uses a primary care physician to population ratio of 1:3,500 or greater as one criterion to define primary care health professional shortage areas (HPSAs). As shown in **Figure 7.16**, towns and cities with more favorable physician to population ratios were more prevalent in the Boston and Metro West regions, and cities and towns with no physicians were more prevalent in the western and central portions of the state.⁴⁵⁰ Massachusetts has four geographic areas that are designated as primary care health professional shortage areas (HPSAs). **Figure 7.16** illustrates geographic gaps in the distribution of primary care physicians.

Figure 7.16
Ratio of Primary Care Physicians to Population, Massachusetts, 2014



Nurses

In 2014, Massachusetts had 123,862 registered nurses, 1,861 RNs per 100,000.

In 2014, there were 11,325 active registered nurses authorized to engage in advanced practice nursing. Approximately 78% of advanced practice registered nurses are nurse practitioners; 11% are nurse anesthetists; 8% are clinical nurse specialists; and 5% are nurse midwives. This represents a larger ratio of advanced practice registered nurses relative to the population than other states.

However, the distribution of nurses across the state is unbalanced as shown in **Figure 7.17**. The Boston, Metro West, and Northeast regions of the state have a higher ratio of registered nurses to the population, while cities and towns with a lower registered nurse density are located in the western and central regions of Massachusetts.

As shown in **Figure 7.18**, while the large RN population in Massachusetts may be a positive development, the RNs population may not sufficiently meet the needs of the non-English speaking populations which it serves.

Figure 7.17
Ratio of Registered Nurses to Population, Massachusetts, 2014

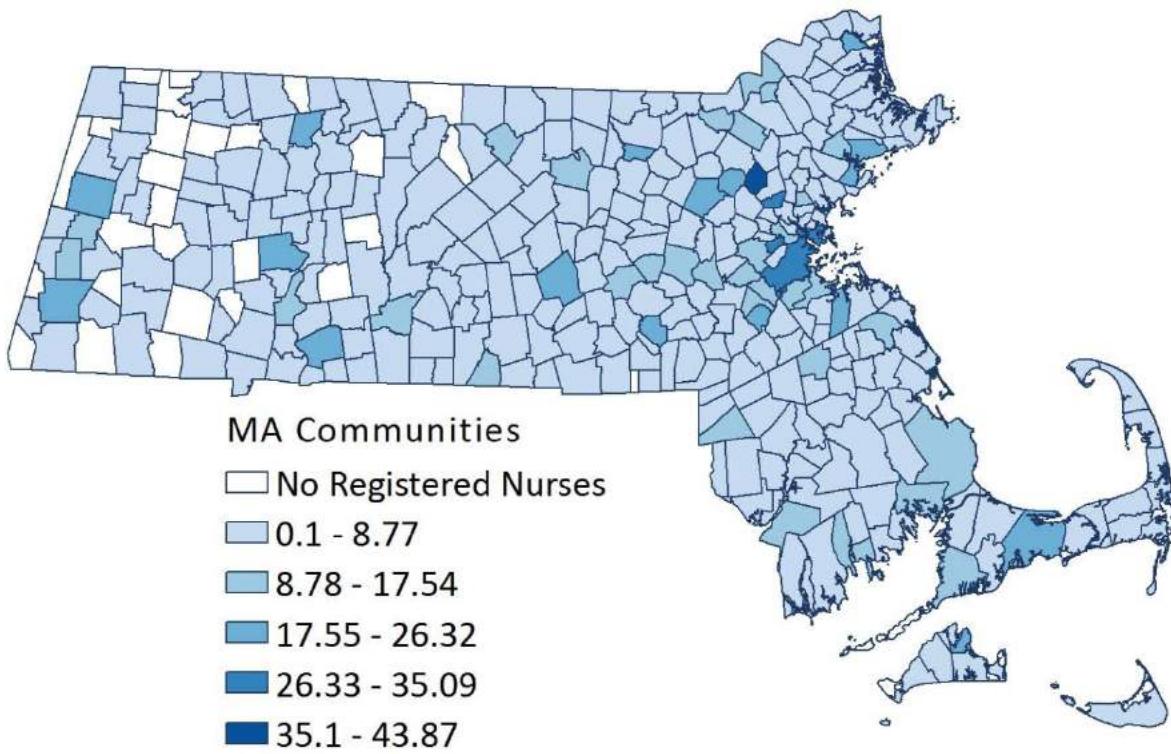
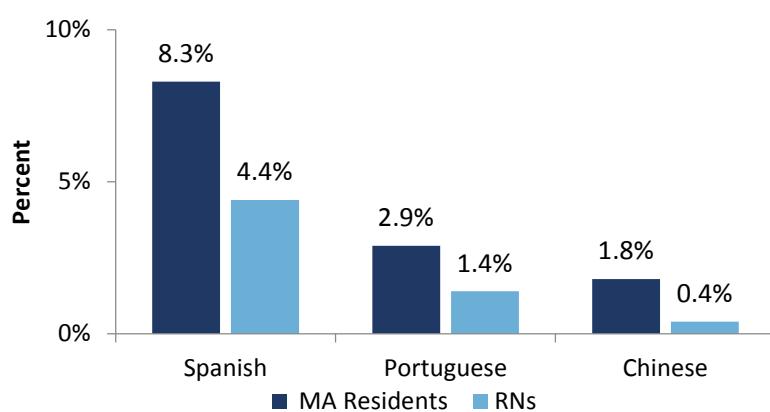


Figure 7.18
Comparison of Registered Nurse Language Fluency to Massachusetts Residents Primary Language, Massachusetts, 2010-2014



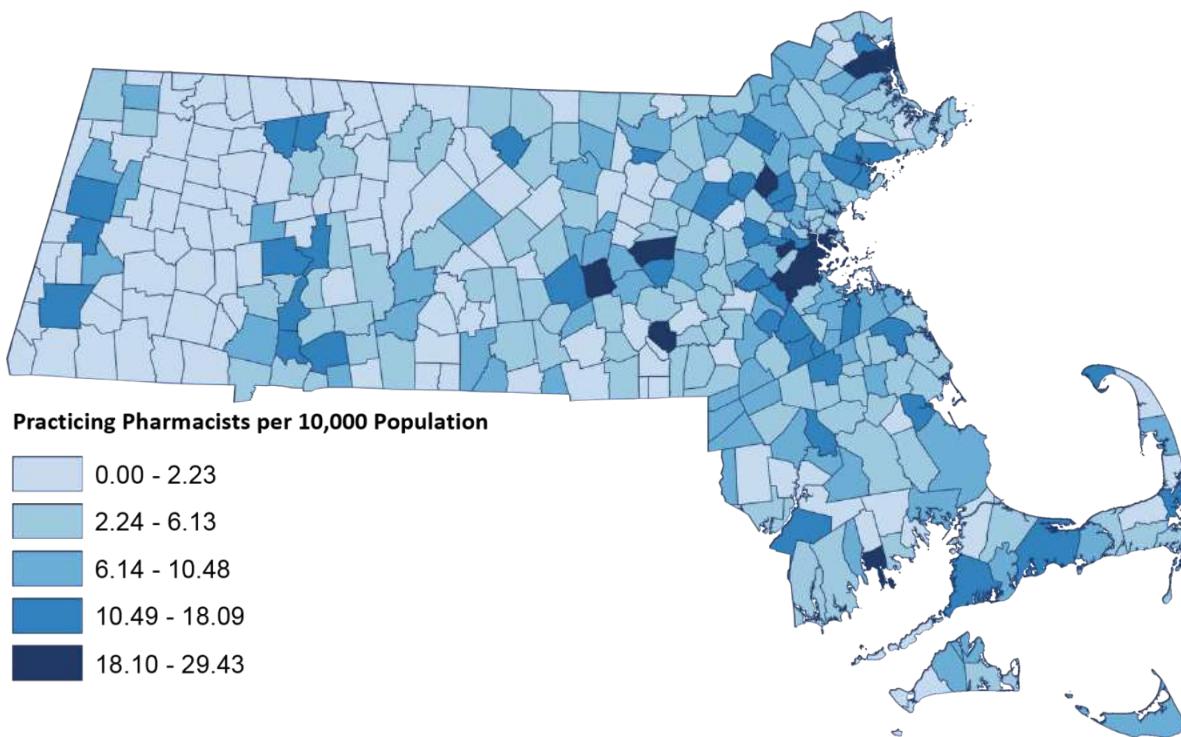
Pharmacists

The pharmacist workforce survey and the Massachusetts Health Professions Data Series indicate that in 2014, Massachusetts had 11,177 licensed pharmacists or 168 pharmacists per 100,000 in population.

As shown in the **Figure 7.19**, the distribution of pharmacists across the state is unbalanced. The density of pharmacists is higher in the eastern region of the state, particularly in the greater Boston area. The western and central regions of the state had a lower ratio of pharmacists to population.

Figure 7.19

Ratio of Pharmacists to Population, Massachusetts, 2014



Emergency Medical Technicians

Emergency Medical Technicians (EMT) provide out-of-hospital emergency medical care and transportation for critical and emergent patients who access the emergency medical services (EMS) system. EMTs have the basic knowledge and skills necessary to stabilize and safely transport patients ranging from non-emergency and routine medical transports to life threatening emergencies. Emergency Medical Technicians function as part of a comprehensive EMS response system, under medical oversight.

In 2013, Massachusetts adopted the National Registry of EMTs (NREMT) certification standards which improved the quality of EMT training, while also streamlining the certification and recertification process. In 2017, more than 23,300 certified EMTs, including those with Basic, Advanced EMT, and Paramedic level certification, delivered community level emergency medical services to residents across the Commonwealth. In 2017, Massachusetts had 343.4 EMTs per 100,000 population, a 2.3% decline from 2011.

An increase in training requirements and low compensation contribute to a high rate of turnover among EMTs relative to other health care professions.⁴⁵¹

Community Health Workers

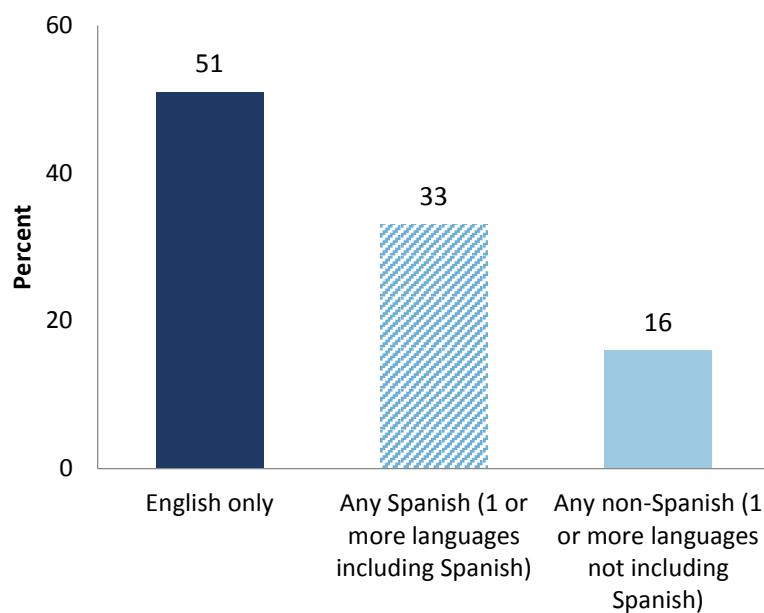
Community health workers (CHWs) are an essential public health workforce for reaching people in communities who experience the largest burden of health inequities. Community health workers (CHWs) are defined in Massachusetts as public health workers who apply their unique understanding of the experience, language, and/or culture of the populations they serve to carry out one or more of the following roles:⁴⁵²

- Providing culturally appropriate health education, information, and outreach in community-based settings, such as homes, schools, clinics, shelters, local businesses, and community centers
- Bridging or culturally mediating between individuals, communities, and health and human services, including actively building individual and community capacity
- Assisting people to access the services they need
- Providing direct services, such as informal counseling, social support, care coordination, and health screenings
- Advocating for individual and community needs

The shared life experiences of CHWs make them uniquely positioned to develop trusting relationships with populations most at risk for poor health outcomes. 58% of CHWs identify as non-White, with 29% identifying as Hispanic, and 19% as Black non-Hispanic. 81% of CHWs are female.⁴⁵³ CHWs also provide culturally sensitive care. Through the variety of languages spoken, CHWs increase access to care for traditionally language-isolated patients.(Figure 7.20)

Figure 7.20

Languages Spoken among English Speaking Community Health Workers, Massachusetts, 2016

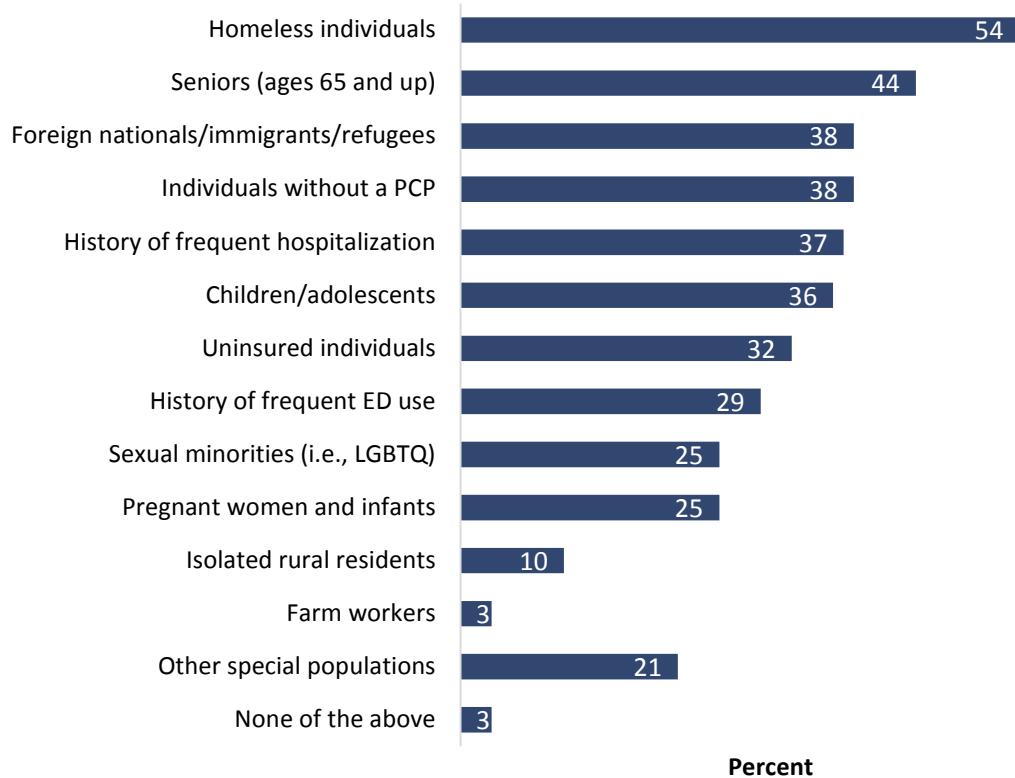


According to Figure 7.21 CHWs serve a variety of populations most at-risk for poor health outcomes due to their social and economic situations. Individuals experiencing housing instability comprise the most commonly served population. Also among the top five populations served are older adults, immigrants/refugees, and high utilizers of health care.

CHWs also help people to managing some of the most prevalent chronic conditions including diabetes, hypertension, substance misuse, and behavioral health.⁴⁵⁴

Figure 7.21

Top Populations Served by Massachusetts Community Health Workers in 2016⁴⁵⁵



NOTE: OTHER SPECIAL POPULATIONS INCLUDES NON-ENGLISH SPEAKING POPULATION/IMMIGRANTS, DOMESTIC VIOLENCE SURVIVORS, AND CANCER PATIENTS

By developing trusting peer relationships with patients, CHWs connect people to community services, provide culturally sensitive care coordination for chronic disease management, and referral to preventive services. CHWs on care teams both improve outcomes and reduce costs, notably in terms of urgent care use and hospitalizations.⁴⁵⁶ This is especially relevant given that the top populations they serve in Massachusetts are among the highest cost, most at-risk patient groups.

Mental Health Workforce

It is well established that there is a continuing national shortage of qualified behavioral health professionals.^{457,458} The Office of Consumer Affairs and Business Regulation, Board of Allied Mental Health and Human Services Professions oversee licensing of applied behavior analysts, mental health counselors, educational psychologists, marriage and family therapists as well as rehabilitation counselors. **Figure 7.22** depicts the number of licensees for Fiscal Year 2015.

Figure 7.22

Total Number of Allied Mental Health and Human Services Licensees, Massachusetts, Fiscal Year 2015

Profession	FY2015
Applied Behavior Analyst	46
Mental Health Counselor	5,974
Educational Psychologist	380
Marriage and Family Therapist	729
Rehabilitation Counselor	327
Fiscal Year Total	7,474

SOURCE: OFFICE OF CONSUMER AFFAIRS AND BUSINESS REGULATION, BOARD OF ALLIED MENTAL HEALTH AND HUMAN SERVICES PROFESSIONS

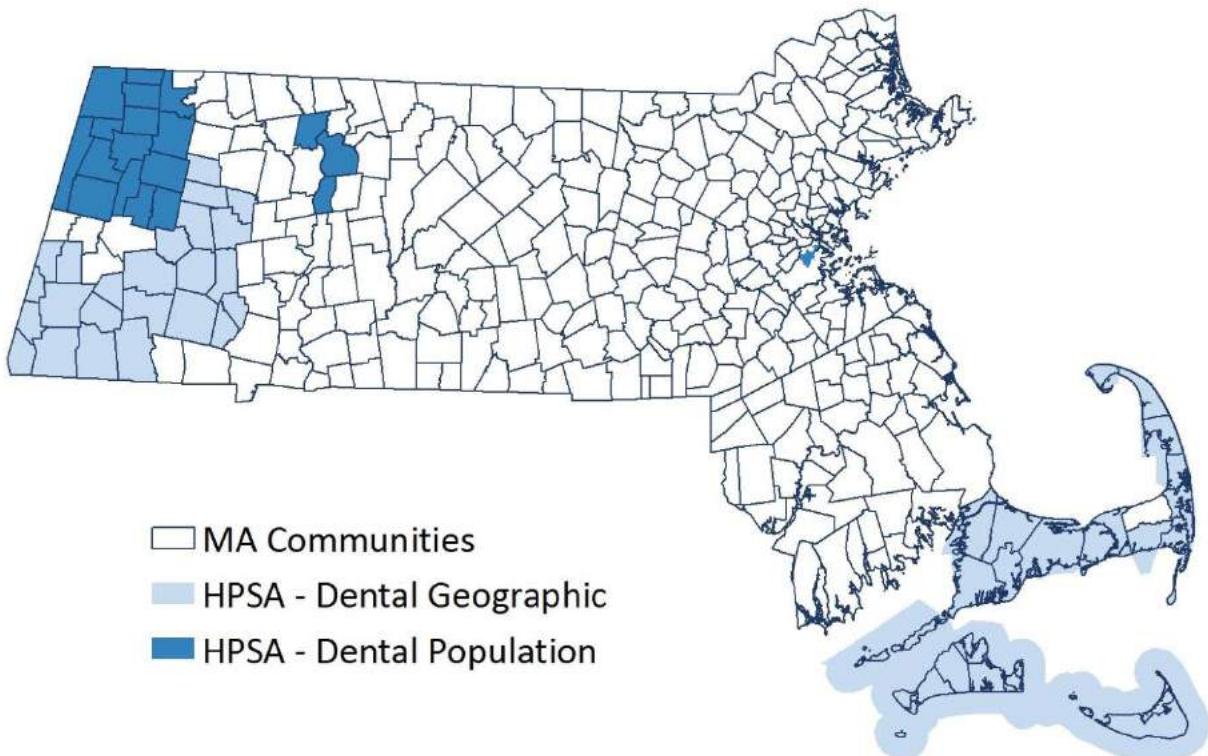
Dental Workforce

Massachusetts is facing shortages in the geographic distribution of its dental workforce. Dentists, dental hygienist, and public health dental hygienists make up the majority of this workforce which is well represented in the eastern part of the state. Many areas in western and central Massachusetts, however, have few or no dental providers.

Health Professional Shortage Areas (HPSAs) are designations made by the Health Resources and Services Administration (HRSA) that indicate health care provider shortages in primary care, dental health, and mental health. As shown in the **Figure 7.23**, Massachusetts currently has seven geographic dental health professionals shortage areas located in the following areas: Dukes County, Nantucket County, Lower Outer Cape, Mid-Cape, Upper Cape, the Hilltowns, and South Berkshire.

Finally, individuals with special health care needs often do not receive needed oral health care due to a lack of dental providers with expertise to treat them. Massachusetts is unique in that it has six specialized dental clinics operated by Tufts Dental Facilities. These facilities serve individuals with intellectual or developmental disabilities. In Fiscal Year 2016, Tufts Dental Facilities served 7,068 patients during more than 24,000 visits.

Figure 7.23
Dental Health Professional Shortage Areas (HPSA), 2017



SOURCE : HRSA, DATA WAREHOUSE, SHAPE FILE
NOTE: MAP CURRENT AS OF 8-23-2017

Public Health & Health Care Systems Preparedness

This section discusses public health and health care system preparedness and the network of stakeholders who ensure that public health plans are implemented during emergencies of all types. Local public health has long been involved in public health preparedness for their communities. However, in the wake of post 9/11 events, the 2009 H1N1 pandemic and other novel health threats, public health authorities have been compelled to focus on the need for increased preparedness.

MDPH works to expand the ability to prepare for, respond to, recover from and mitigate the impacts of disasters, infectious disease, terrorism and mass casualty emergencies by:

- Acting as the partnering agency for State Emergency Support Function 8 (public health and medical) during an activation at the state emergency operations center
- Sharing situational awareness with more than 45,700 active users of Listservs which including a wide range of health care
- Reaching more than 9,300 active users of the Health and Homeland Alert Network (HHAN), an alert and notification system to share information about urgent public health and public safety incidents with public information officers, federal, state, territorial, tribal and local public health practitioners, clinicians, and public health laboratories
- Serving as the grantee for the Centers for Disease Control & Prevention (CDC) and the Office of the Assistant Secretary for Preparedness and Response (ASPR) emergency preparedness funding enabling MDPH to financially support regional coordination
- Offering technical support for preparedness including planning, exercises, and trainings for local public health and health care systems partners
- Encouraging the use of Functional Assessments to assist local communities in their planning efforts to integrate considerations for individuals with disabilities and others with access and functional needs into local emergency plans, programs, services and activities.

To ensure integrated planning and capacity-building across five core disciplines—acute care hospitals, community health centers and ambulatory care organizations, emergency medical services, local public health, and long term care—MDPH has created six regional Health and Medical Coordinating Coalitions (HMCCs). Each HMCC conducts cross-disciplinary capabilities-based planning to advance regional health and medical capacity across all phases of the disaster cycle, and the HMCC also ensures 24/7 availability to support information sharing and resource coordination in the event of an emergency within the HMCC Region.

MDPH recognizes that training and exercises are integral to federal, state, and local preparedness efforts. Trainings provide baseline knowledge in terms of duties, roles, and responsibilities as well as current topic-specific information for practitioners. Exercises -- whether discussion or operationally-based -- are designed to engage team members and get them working together to manage the response to a simulated incident and assess plans, policies, and procedures prior to an actual event.

Based on this imperative, MDPH has created a Multi Year Training and Exercise Plan (MYTEP) that serves as the roadmap for MDPH to move towards meeting its emergency preparedness priorities. MDPH has implemented a coordinated all-hazard strategy that combines enhanced planning, innovative training, and realistic exercises to strengthen Massachusetts' resiliency in preparing for, responding to and recovering from health security incidents and emergencies.

Selected Resources, Services, and Programs

Following are selected resources, services, and programs that support the topics discussed in this chapter.

Workforce Development

- The Massachusetts Loan Repayment Program (MLRP) recruits health professionals working in areas with health profession shortages by providing loan repayment for professionals who agree to commit to practice in eligible health care organizations.
- The J-1 visa waiver program allows international medical graduates to practice in the United States under an educational exchange program for up to seven years in areas that serve the medically underserved populations.
- The MDPH Prescription Monitoring Program collects information on Schedule II through V controlled substances dispensed through a prescription.
- The Local Public Health Institute (Boston University School of Public Health) creates, implements, and sustains workforce development training for local public health and other local health system partners.
- The Collaborative Drug Therapy management (CDTM) is a multidisciplinary process for selecting appropriate drug therapies, educating and monitoring patients, and assessing outcomes of therapy.
- The MDPH supports the Community Health Worker (CHW) work force through technical assistance, certification and funding.
 - MDPH is one of the biggest funders of CHWs in Massachusetts, supporting the ability of CHWs to address chronic disease, environmental health, substance use, maternal health, violence and injury prevention, and HIV/AIDS.
 - The MDPH Office of Community Health Workers supports CHW program development, through technical assistance and best practice guidance on recruitment and hiring, supervision, training, and program evaluation, as well as policy guidance on workforce development and sustainable financing.
 - One of the first professional CHW boards in the nation, the Massachusetts Board of Certification of Community Health Workers provides voluntary certification for CHWs based upon a core set of competencies, and also approves core CHW training programs.
- Founded in 2000, the Massachusetts Association of Community Health Workers (MACHW) is a statewide professional organization which strengthens the professional identity of CHWs, fosters leadership among CHWs, and promotes the integration of CHWs into the health care, public health and human service workforce.
- Training is available through a variety of experienced organizations which specializes in core competency training and professional development opportunities for community health workers. Examples of established CHW training programs in MA include the Community Health Education Center (Lowell), Community Health Education Center (Boston), Center for Health Impact's Outreach Worker Training Institute (OWTI), Holyoke Community College, Western Massachusetts Public Health Training Center, and the Massachusetts Department of Public Health's Patient Navigator Hybrid Training.

Health Care Safety

MDPH monitors the safety of care provided in licensed health care facilities by investigating consumer complaints and conducting on-site surveys to ensure adherence to federal and state requirements.

Licensure regulations that specify the requirements for a hospital to become a designated Primary Stroke Services (PSS), include:

- Stroke protocols for patient assessment and care
- Continuous education of the public about warning signs and symptoms of stroke
- Emergency diagnostic and therapeutic services available 24/7/365 to patients presenting with symptoms of acute stroke
- An alternate point of entry plan for ambulances that requires the transport of patients presenting with symptoms of acute stroke to the nearest designated Primary Stroke Services hospital

Local and Regional Public Health

- The MDPH Office of Local and Regional Health provides funding and leadership to strengthen the capacity of local Boards of Health to meet their legal responsibilities to protect the health of their communities and supports external partners in strengthening local public health capacity and building a skilled local public health workforce by supporting:
 - The Local Public Health Institute at the Boston University School of Public Health) which creates, implement, and sustain workforce development training for local public health and other local health system partners
 - Legal technical assistance to local boards of health through the Massachusetts Association of Health Boards
- The Coalition for Local Public Health (CLPH), represents the five statewide public health organizations: Massachusetts Health Officers Association, Massachusetts Association of Public Health Nurses, Massachusetts Environmental Health Association, Massachusetts Public Health Association, and Massachusetts Association of Health Boards. The goal of the coalition to advocate for, promote, and strengthen the Massachusetts local public health system.

Medical Marijuana

- The MDPH Medical Use of Marijuana program provides processing and approval of applications for medical marijuana dispensaries.
- The MDPH Bureau of Environmental Health provides testing of medical marijuana products for safety.

Community Health Workers (CHW)

- The MDPH supports the CHW work force in a variety of ways – both through technical assistance, certification and funding.
 - MDPH is one of the biggest funders of CHWs in Massachusetts, supporting CHWs to address chronic disease, environmental health, substance use, maternal health, violence and injury prevention, and HIV/AIDS.
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Mental Health

- The primary responsibility of mental health facilities in Massachusetts is the Department of Mental Health.
- The primary responsibility of licensing mental health providers is the Office of Consumer Affairs and Business Regulation, Board of Allied Mental Health and Human Services Professions.
- Other organizations like National Alliance on Mental Illness (NAMI) partner in a variety of ways to improve mental health including:
 - Collaborating with the Municipal Police Training Committee (MPTC) and the Department of Mental Health (DMH) to develop and launch a new mental health curriculum for all municipal police recruits
 - Partnering with the Somerville and Cambridge Police Departments to develop a Regional Crisis Intervention Training and Technical Assistance Center
 - Developing of local collaborations between police departments, behavioral health providers, and other stakeholders
 - Establishing of a Statewide Advisory Group on Criminal Justice Diversion
 - Developing a Cross-System Information Sharing Project with the Cambridge Police Department, the Department of Mental Health (DMH) and Harvard Law School⁴⁵⁹

Oral Health

- The Perinatal and Infant Oral Health Quality Improvement grant program to expand the integration of quality oral health care into perinatal and infant primary care delivery systems statewide.
- The MDPH Oral Health Equity Project focuses on increasing childhood utilization of oral health services (up to age 14) in Worcester and Holyoke, two cities known for disparate oral health outcomes. The project is focused on engaging Black and Hispanic families through outreach and education.
- The MDPH Office of Oral Health operates school-based sealant programs where dental hygienists provide health screenings, oral health education, dental sealants and fluoride, and referrals for follow-up dental care screening, cleanings and recommended coating to adult teeth to prevent cavities while in public schools.

Public Health and Health Care System Preparedness

- MA Responds is an online registration system for public health, health care, and emergency response volunteers. Currently, 45 Medical Reserve Corps utilize this system to validate credentials, coordinate, and activate more than 8,000 volunteers.
- MDPH uses WebEOC, a web-based communications platform to support situational awareness during an emergency incident. The system allows for active communication of facility status and incident status among multiple organizations.
- MDPH provides funding to the DelValle Institute for emergency preparedness to provide interactive, all-hazards education focused on reducing the public health and safety impact of emergencies and disasters.
- Massachusetts Virtual Epidemiologic Network (MAVEN) is a web-based disease surveillance and case management system that allows MDPH and local health to capture and transfer appropriate public health,

laboratory, and clinical data efficiently and securely over the internet in real-time. This is particularly helpful during outbreaks of communicable diseases and foodborne illness.

- MDPH provides funding for the Local Public Health Institute to create, implement, and sustain workforce development activities for local public health and other public health system partners.
- Each year MDPH sponsors a statewide campaign for Emergency Preparedness Month to encourage Massachusetts residents, families and communities to make plans and prepare for public health and medical emergencies, threats and disasters.

References

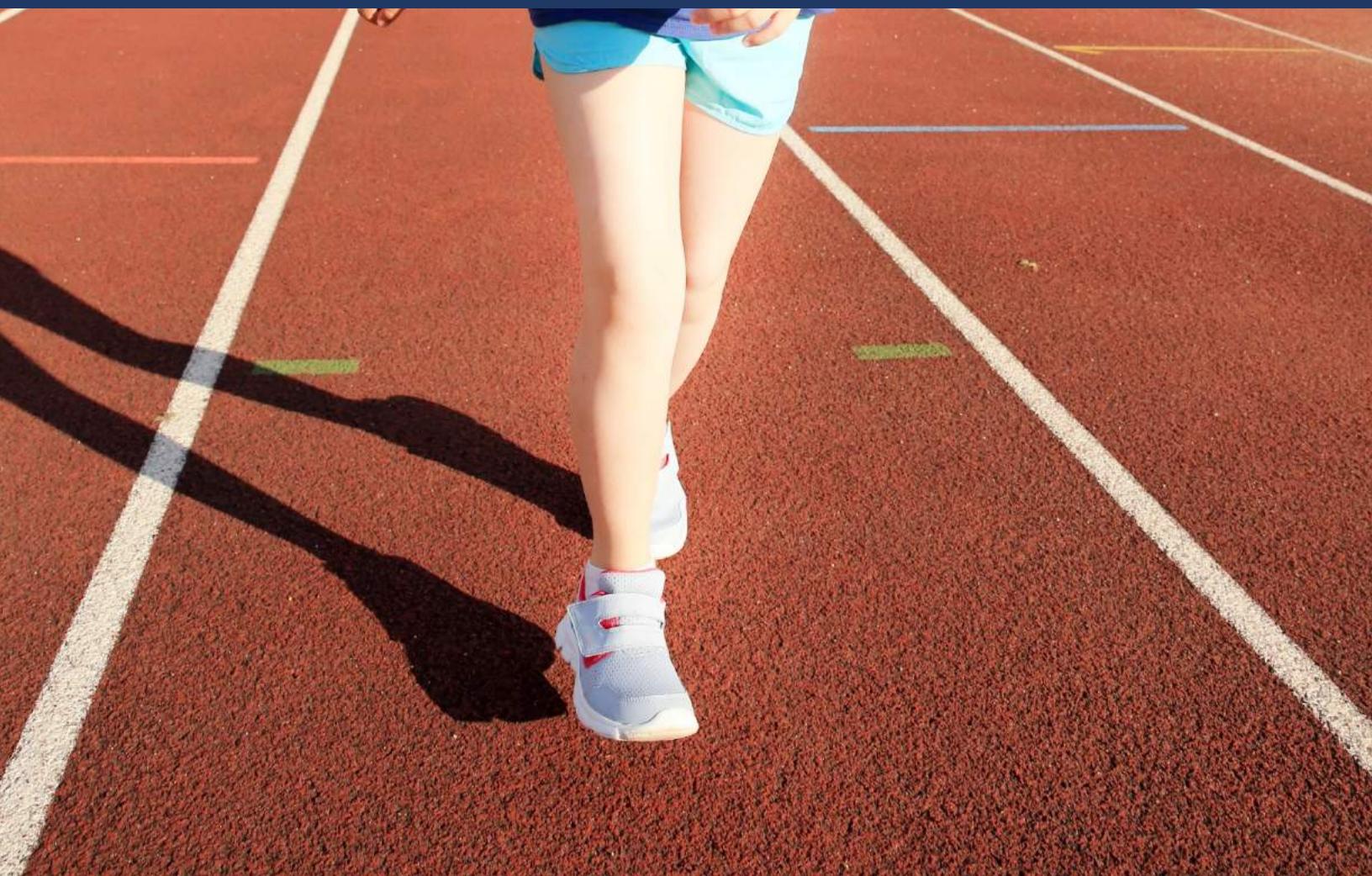
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CHAPTER 8

Wellness and Chronic Disease





Wellness and Chronic Disease

This chapter provides information on wellness and chronic disease in Massachusetts, related trends, disparities, and resources. It includes the following topics:

- Nutrition
- Physical Activity
- Tobacco Use and Exposure
- Smoking Cessation
- Obesity
- Cardiovascular Disease
- Diabetes
- Chronic Lower Respiratory Disease
- Cancer
- Selected Resources, Programs, and Services

Chapter Data Highlights

- Nearly 60% of Massachusetts adults are overweight or obese
- Cancer is the leading cause of death in Massachusetts
- Smoking is the leading cause of preventable death in Massachusetts
- Massachusetts spent \$30.9 billion on chronic disease in 2010 alone
- Only 1 in 5 Massachusetts adults consume the recommended daily amount of fruit and vegetables
- 3 out of 4 Massachusetts smokers (73.4%) have less than a high school degree, live in poverty, struggle with poor mental health, or are on public health insurance
- Those without a high school degree are 5 times more likely to have a myocardial infarction than those with a college degree or higher
- Black non-Hispanics had nearly 5 times the rate of diabetes-related emergency department visits compared to white, non-Hispanics
- Although Black non-Hispanic women are less likely to get breast cancer than their White non-Hispanic counterparts, they are the more likely to die from it
- Prostate cancer mortality among Black non-Hispanic men is nearly two times higher than their White counterparts
- 1 in 4 Massachusetts high school students have recently used an electronic nicotine delivery product (E-NDP), such as e-cigarettes, more than all other tobacco products combined

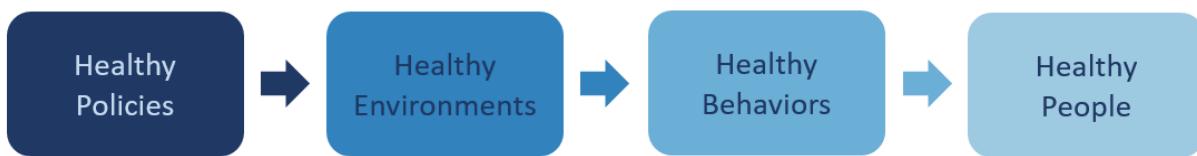
Overview

Prevention and treatment of chronic disease is a public health priority. Nutrition, physical activity, and tobacco use and exposure are three key risk factors that directly impact cancer, diabetes, chronic lower respiratory disease, and cardiovascular disease rates. These chronic conditions in turn contribute to 56% of all mortality in Massachusetts and over 53% of all health care expenditures (\$30.9 billion a year).⁴⁶⁰ This chapter provides an overview of the burden and distribution of chronic diseases and their risk factors across the Commonwealth.

Although the three leading risk factors are modifiable, the conditions in which people live, learn, work, and play do not offer equal access or opportunity to make this possible. For example, a history of policies rooted in structural racism have resulted in environments in which there are inequities in access to healthy foods, safe spaces for physical activity, walkable communities, quality education, housing, employment, and health care services.^{461,462,463,464} The health implications of this are evident in the fact that Black and Hispanic residents of Massachusetts are consistently and disproportionately impacted by the high prevalence of all chronic diseases, as well as the related deaths and high acute care service utilization. Healthy people cannot exist in unhealthy environments. Because of this, MDPH frames its chronic disease prevention and wellness efforts around addressing the social determinants of health and focusing on policies that ensure that all individuals have the ability to make healthy choices.

Figure 8.1

Upstream Health Impact



Nutrition

Poor diet is associated with 45.4% of cardiovascular and metabolic-related deaths nationwide⁴⁶⁵ and several preventable chronic diseases, including cardiovascular disease, type 2 diabetes, certain types of cancer, and obesity.^{466,467} Fruit and vegetable consumption is protective against several chronic conditions while consumption of sugar-sweetened beverages enhances chronic disease risk.^{468,469,470}

Because improved access to healthy food results in better quality of dietary intake and better health outcomes;⁴⁷¹ addressing food access is imperative for prevention of chronic disease.

“Food insecurity is a big issue in some communities; it’s not just about having access to food, but having access to nutritious foods that are accessible to low-income families.”

Focus Group Participant

Features of the physical and social environment affect access to healthy, affordable food.⁴⁷² Low-income communities, rural communities, and communities of color are more likely to live close to unhealthy fast food outlets and far from retail food outlets that offer a variety of healthy foods.⁴⁷³

Generally, a healthy diet costs more than an unhealthy diet.⁴⁷⁴ High costs of living can also prevent access to healthy food. For example, high costs of energy and housing, particularly relative to total household income, affect a household's ability to access healthy food, thus enhancing the risk of negative health outcomes for children.⁴⁷⁵ Because transportation is important for food access, inequalities in vehicle ownership, access to reliable public transportation, and community walkability exacerbate food insecurity.⁴⁷⁶ The majority of those living below the poverty line are people of color; this income inequality further compounds food insecurity.⁴⁷⁷

"Depending on where you're located, a lot of people don't have access or even the funds to get healthy food."

Key Informant Interviewee

Trends/Disparities

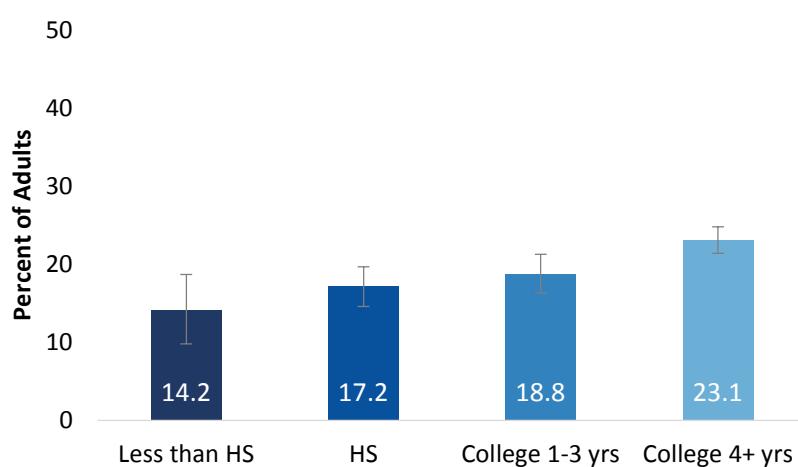
According to the BRFFS In 2015, only one in five (19.6%) Massachusetts adults consumed at least five daily servings of fruits and vegetables, a pattern that has not changed from 2011 to 2015. Fruit and vegetable consumption varies by educational attainment. Adults with a college education or higher (23.1%) are more likely to consume the recommended amount of fruits and vegetables than individuals with less than a college education (less than high school, 14.2%; high school education, 17.2%). Further, adults with a disability are less likely to consume the recommended amount of fruits and vegetables daily than those without a disability at 16.7% compared to 20.7% for the rest of the survey respondents.⁴⁷⁸

"Many of our clients rely on food pantries to make ends meet."

Focus Group Participant

Figure 8.2

Percent of Adults Reporting Consumption of at Least Five or More Fruits or Vegetables Daily, by Educational Attainment, Massachusetts, 2015

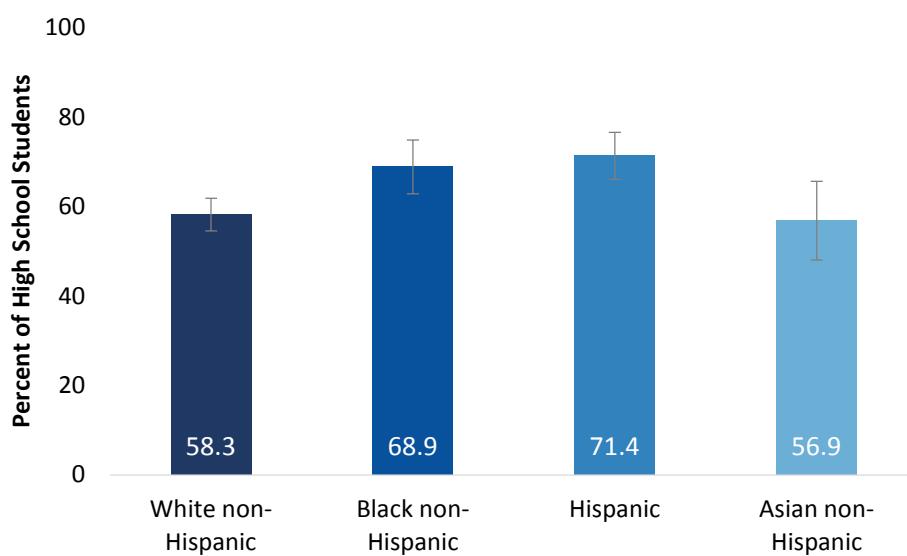


In 2015, 90% of Massachusetts high school students did not eat the recommended daily servings of fruits and vegetables. Sugar-sweetened beverage consumption among high school students has remained stable since 2013. But

racial/ethnic disparities in this category persist where Hispanic (71.4%) and Black non-Hispanic (68.9%) students are more likely to consume one or more sugar-sweetened beverages a day than White non-Hispanic students (58.3%).⁴⁷⁹

Figure 8.3

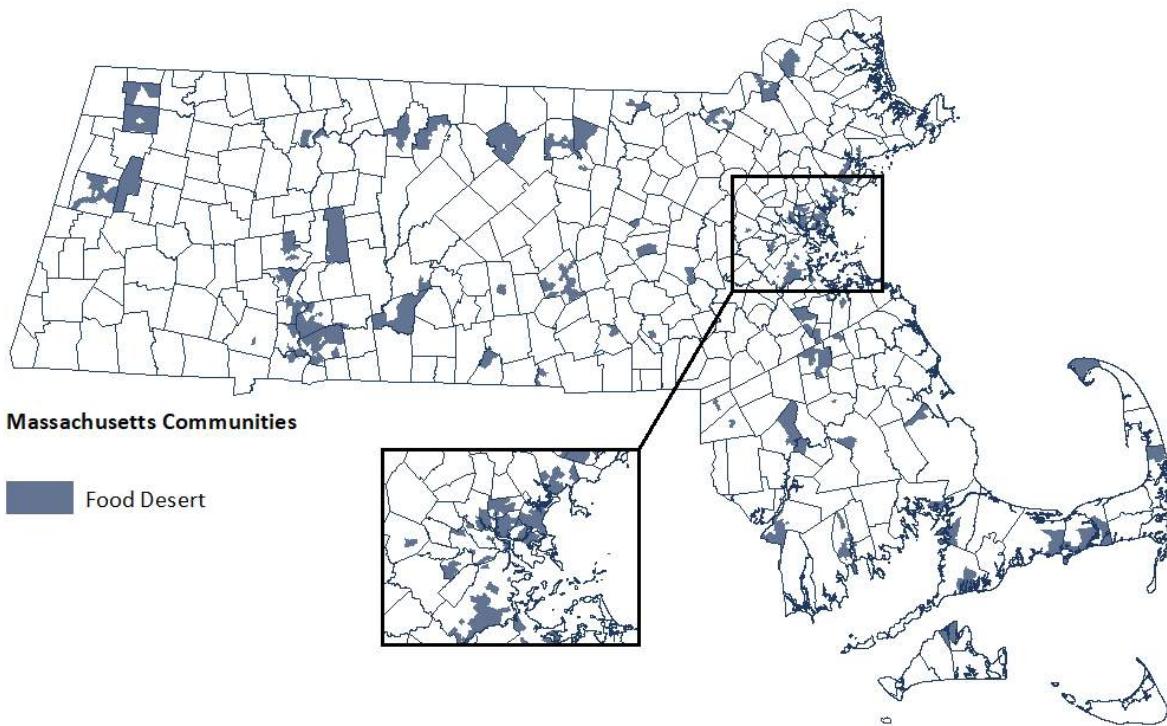
**Percent of High School Students Reporting Consumption of at Least One Sugar-Sweetened Beverage in Past Day,
Massachusetts, 2015**



"Food desert" locations are classified by the US Department of Agriculture (USDA) as low-income areas with limited access to healthy food outlets. These food deserts (see Figure 8.4) are concentrated in and around the Commonwealth's largest cities and towns, including Boston, Brockton, Lowell, Worcester, Springfield, New Bedford, and Fall River.⁴⁸⁰

Focus group and key informant interview participants expressed concerns about limited healthy food options in lower income communities across Massachusetts. Participants reported a dearth of grocery stores and a prevalence of convenience stores and fast food outlets in these communities. They viewed these limited options as directly linked to obesity and chronic disease among residents. As one focus group participant explained, "Every day I pass by six fast-food restaurants before I see a supermarket with fresh produce."

Figure 8.4
Food Desert Locations by Census Tract, Massachusetts, 2015



SOURCE: USDA FOOD ACCESS RESEARCH ATLAS. FOOD DESERTS INCLUDE LOW-INCOME AND LOW ACCESS CENSUS TRACTS MEASURED AT UP TO 1 MILE FOR URBAN AREAS AND 20 MILES FOR RURAL AREAS.

In Massachusetts, 11.7% of residents participated in the state's Supplemental Nutrition Assistance Program (SNAP) in 2013.⁴⁸¹ In 2014, SNAP served 85.4% of those eligible for benefits (household median income \$16,200-\$21,600). This indicates a negative gap between those who are eligible for benefits and those who are receiving them.^{482,483}

Overall food insecurity (i.e. problems with food access) has declined from 11.9% in 2011 to 9.7% in 2016. However, that rate is 24% higher than the recession of 2009 numbers.⁴⁸⁴ The emergency food system including food banks and food pantries has seen a general increase in usage since the recession of 2009, and is distributing increasing amounts of food.^{485,486,487,488,489}

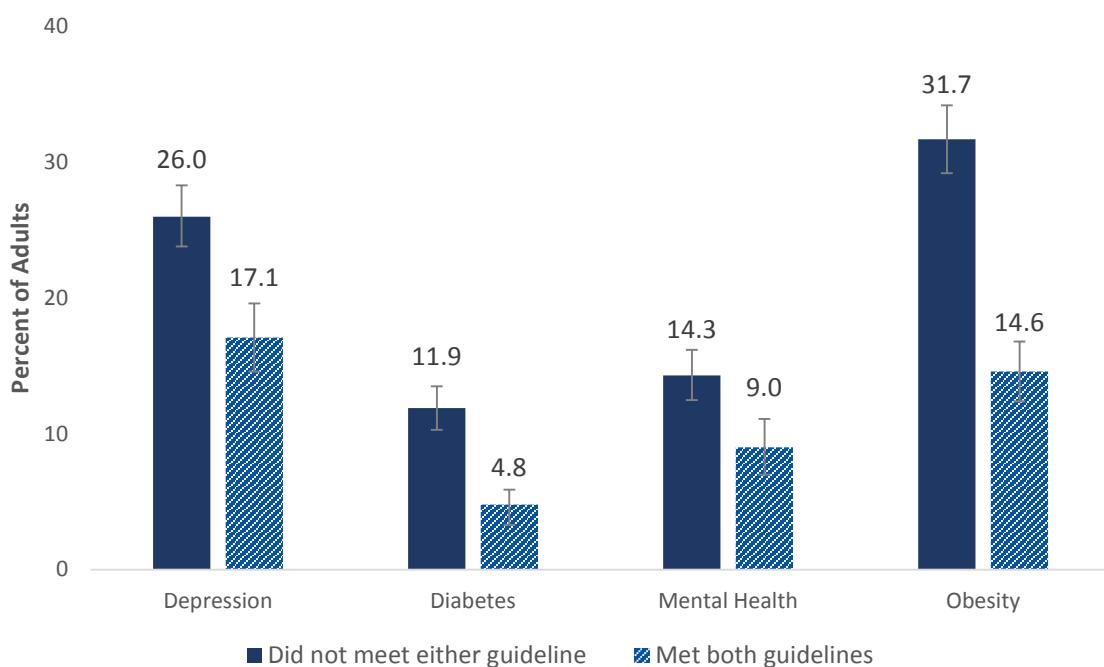
Physical Activity

Physical activity is a primary contributor to health and quality of life. Physical inactivity is a risk factor for cardiovascular disease, type 2 diabetes, cancer of the colon and breast, obesity, hypertension, bone and joint diseases, and depression.⁴⁹⁰ Physical inactivity along with tobacco use and poor diet are the leading causes of premature mortality. Physical inactivity alone accounts for upwards of 11% of all health care costs. Meanwhile, the rates of people not getting sufficient physical activity are increasing.⁴⁹¹

Massachusetts residents who meet all physical activity guidelines (both aerobic and muscle-strengthening) are less likely to have depression, diabetes, poor mental health, and are less likely to be obese as compared to those who do not meet either of these guidelines.

Figure 8.5

Percent of Adults Who Report Meeting Recommended Guidelines for Physical Activity (Aerobic and Muscle-Strengthening), by Depression, Diabetes, Mental Health, and Obesity, Massachusetts, 2015



These outcomes can be supported by opportunities available in the physical and social environment.^{492,493} For example: the quality of walking and biking infrastructure; the availability of and access to parks, playgrounds and recreation areas; how well infrastructure connects to destinations such as food outlets, employment centers, and health care facilities; and the location of housing in proximity to transit stops. These factors affect the opportunity and desirability to incorporate physical activity in daily activities.^{494,495,496}

Individuals who live in walkable neighborhoods are twice as likely to meet physical activity guidelines.⁴⁹⁷ The availability of sidewalks and protected bike lanes has been consistently and positively associated with physical activity.⁴⁹⁸ Access to and use of public transportation also increases regular physical activity.⁴⁹⁹ Furthermore, the design of recreational spaces and surrounding access to those spaces, such as the presence of trees, well-maintained buildings, water views,

and walkable and bikeable infrastructure access are important for making parks, playgrounds, and recreation areas accessible and desirable for use.⁵⁰⁰

Additionally, neighborhood safety and risk of injury (e.g., vehicle traffic) rank high on parents' concerns whether to allow their children to walk or bike to school.⁵⁰¹ Furthermore, increasing physical activity in Massachusetts is complicated by increasing levels of screen time among youth, a risk factor associated with sedentary behavior.

Neighborhood environments that are conducive to physical activity are often limited in low-income communities and communities of color across the state.⁵⁰² For example, youth who live in low-income areas or communities of color are 50% less likely to have recreational facilities near their homes.⁵⁰³ Therefore, it is necessary to approach physical activity as a policy, systems, and environmental change issue in order to begin to address socioeconomic and racial/ethnic inequalities in the built and social environment to promote active living.

Trends/Disparities

The percentage of Massachusetts adults who are physically inactive increased, from 23.5% in 2011 to 26.5% in 2015. **Figure 8.6** indicates that physical inactivity patterns varied according to age, educational attainment, and race/ethnicity during that time period. For example, older adults are more likely to be physically inactive than younger adults (65 years and older: 33.3% versus 25-34 years: 23.1%).

When compared to adults with college degrees or higher (15.2%), the prevalence of physical inactivity was three times as high among adults with less than a high school degree (47.8%), and twice as high among adults with a high school degree (33%). People making less than \$35,000 per year had approximately twice the prevalence of physical inactivity as those making more than \$50,000 a year (42.3% versus 16.9%). (**see Figure 8.6**)

Similarly, racial disparities are evident in people's ability to meet physical activity guidelines. Hispanic (43%) and Black non-Hispanic (34%) adults were significantly more likely to be physically inactive than White non-Hispanic adults (23.8%). Race and ethnicity, in particular, have consistently been a predictor of physical inactivity (even after controlling for confounding factors such as income).^{504,505} Neighborhood safety concerns, lack of recreational space, and fear of deportation among immigrants likely contribute to this disparity.⁵⁰⁶

In addition, among the Commonwealth's youth, inequities in being able to achieve physical activity guidelines are evident. **Figure 8.7** shows a greater percentage of White non-Hispanic high school students (50.8%) meet physical activity guidelines than their Black non-Hispanic (32.4%) and Hispanic (31.8%) peers.

Screen time is an important contributor to physical inactivity. Among middle school students, more reported playing three or more hours of video/computer games per day (42.4%) in 2015 than they did in 2013 (36%).

In 2015, Black non-Hispanic (30.1%) and Hispanic (24.4%) middle-school and high-school students were more likely to watch three or more hours of television on an average school day than White non-Hispanic students (15.5%), a risk factor associated with sedentary behavior.⁵⁰⁷

"There are very few affordable options to get kids out of the house and active during the summer months. Summer programming is very expensive, so lower-income children can't access these resources."

Focus Group Participant

Figure 8.6

Percent of Adults Who Report Not Engaging in Physical Activity in the Past 30 Days, Massachusetts, 2015

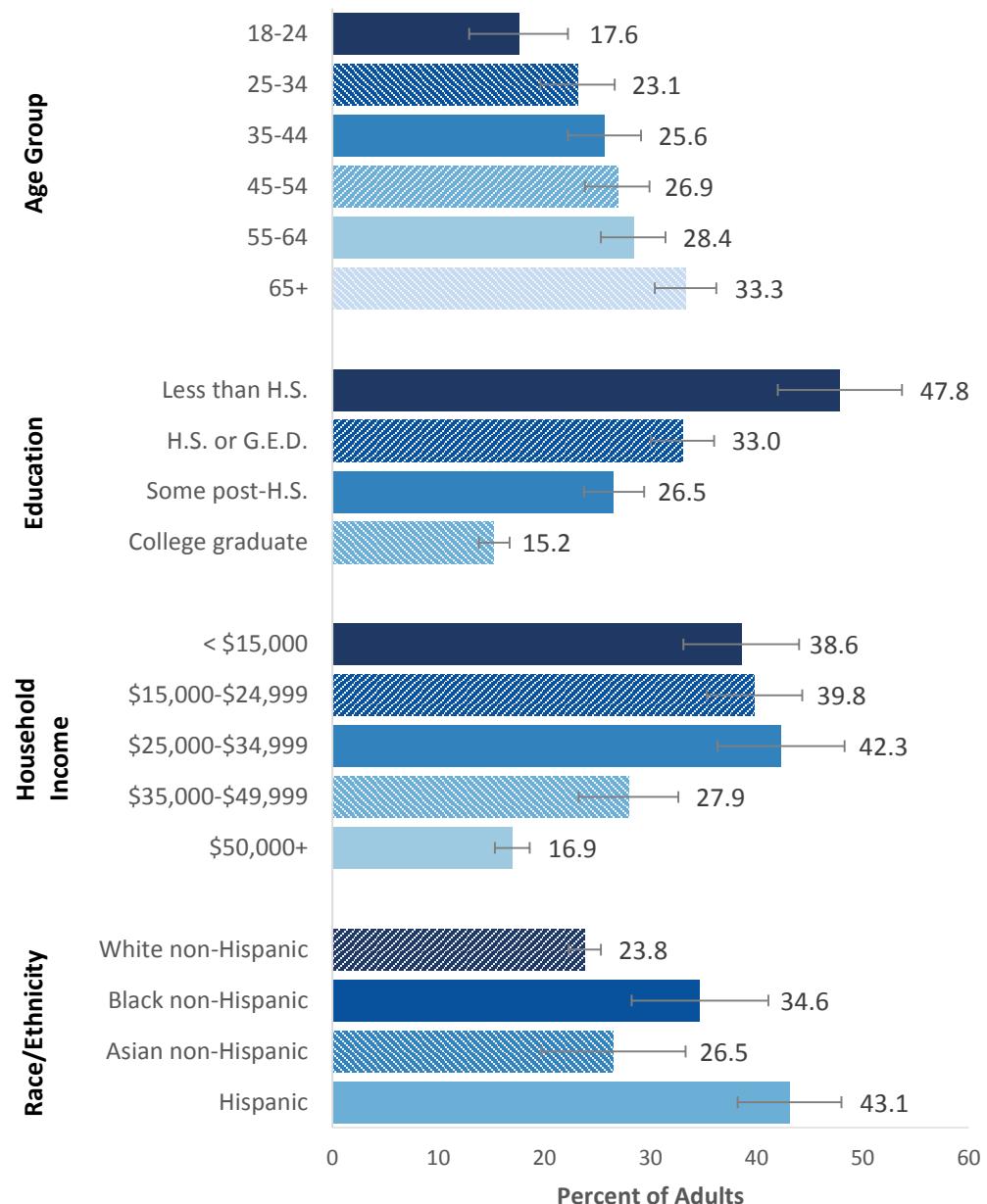
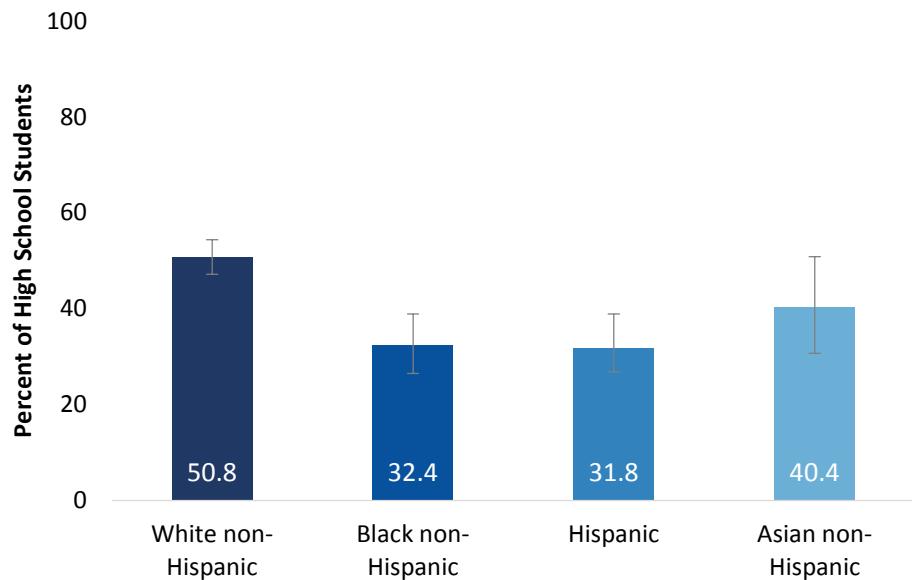


Figure 8.7

Percent of High School Students who Meet 60+ minutes of Physical Activity, 5+ days per week, by Race/Ethnicity, Massachusetts, 2015



Tobacco Use and Exposure

Smoking remains the leading cause of preventable death and disease in the United States, with nearly 500,000 Americans dying prematurely each year due to smoking.⁵⁰⁸ Smoking affects nearly every organ in the body and is associated with multiple preventable chronic diseases including coronary heart disease, stroke, type 2 diabetes, chronic obstructive pulmonary disease, asthma, and numerous types of cancer.⁵⁰⁹ Nicotine is addictive and has the potential to severely compromise the long-term health of the brain, particularly for individuals under the age of 26 for whom the brain is still developing.⁵¹⁰

In Massachusetts, the total medical cost incurred from smoking is more than \$4 billion annually. More than \$1.26 billion is incurred by Medicaid alone as a result of the high proportion of smokers covered by MassHealth insurance. This amount does not include health costs caused by exposure to secondhand smoke, smoking-caused fires, and use of other tobacco products such as smokeless tobacco, cigars, and pipe tobacco.^{511,512}

Significant gaps in the prevalence of smoking and quitting exist among different populations. Higher smoking rates, lower quit rates, and/or higher rates of tobacco-related health outcomes are reported more for the following groups of people than the Massachusetts overall population:⁴⁹

- Black non-Hispanics and Hispanics

"People [don't recognize] that smoking is one of the biggest health risks that they face...they're willing to work on their cholesterol level when smoking is five times more of a cardiovascular risk than their cholesterol."

Key Informant Interviewee

- Individuals that have MassHealth insurance
- Individuals with lower income
- Individuals with less than a high school education
- Persons with disabilities
- Individuals experiencing poor mental health
- Individuals who identify as LGBTQ

Adult Smoking

Smoking is the leading cause of death and disease in Massachusetts with more than 9,000 premature smoking related deaths each year.⁵¹³

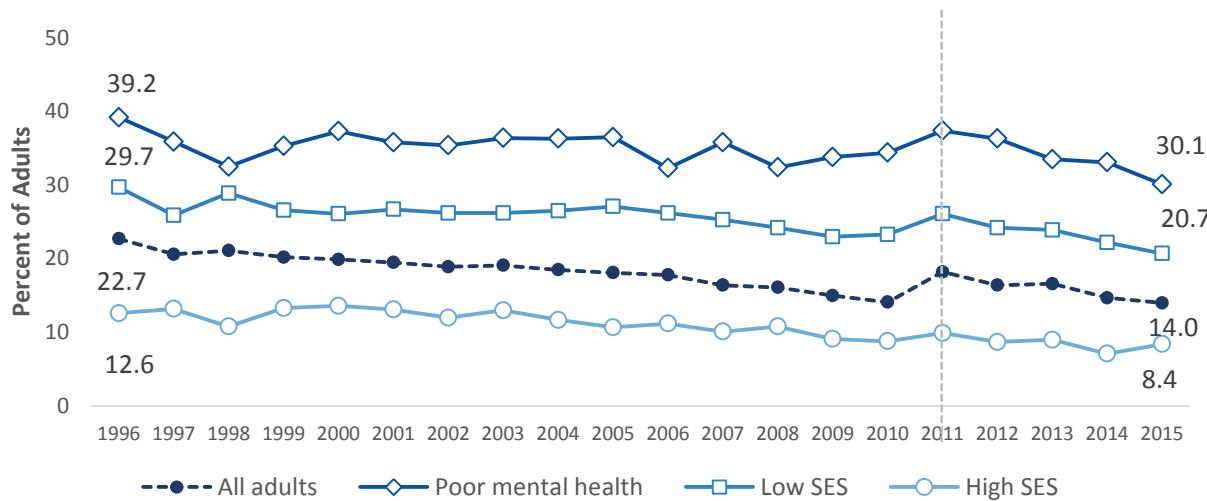
Trends/Disparities

Over the past 20 years, the prevalence of reported smoking among Massachusetts adults has declined from 22.7% in 1996 to 14% in 2015, a historic low. Today, an estimated 708,000 Massachusetts residents still smoke cigarettes.

While the smoking prevalence has declined since 1996, individuals with poor mental health and those of low socioeconomic status report consistently higher rates of smoking compared to the general population. This gap has not closed over time (see Figure 8.8). Consequently, three out of four smokers (73.4%) in Massachusetts today fall within one or more of the following socioeconomic or mental health categories: have poor mental health, are low socioeconomic status (less than a high school education or an income less than \$25k), and/or have MassHealth insurance.⁵¹⁴

Figure 8.8

Prevalence of Adult Smoking, by Socioeconomic and Mental Health Status, Massachusetts, 1996-2015



NOTES: POOR MENTAL HEALTH IS DEFINED AS 15+ DAYS OF POOR MENTAL HEALTH IN THE PAST MONTH; LOW SES IS DEFINED AS HOUSEHOLD INCOME OF LESS THAN \$25K OR HIGH SCHOOL EDUCATION OR LESS; AND HIGH SES IS DEFINED AS HOUSEHOLD INCOME OF \$75K OR MORE OR COLLEGE DEGREE; IN 2011 THERE WAS A CHANGE IN SURVEY METHODOLOGY / WEIGHTING WHICH RESULTED IN A BREAK IN TREND

While adults of low socioeconomic status and/or poor mental health experience the highest smoking rates, disparities in smoking are also seen in adults with a disability and in adults who identify as LGBTQ. In 2015, compared to the overall adult smoking prevalence of 14%, the smoking rate was 30.1% among adults with 15 or more poor mental health days in the past month, 24.2% among adults with MassHealth insurance, 23.6% among adults with less than \$25,000 in annual household income, 23.4% among adults with a disability, 20.9% among adults with a high school education or less, and 17.8% among adults who identify as LGBTQ.⁵¹⁵

Prevention/Other Tobacco Products

A total of 82% percent of adult smokers in Massachusetts smoked their first cigarette before age 19.⁵¹⁶ The earlier young people begin to smoke, the more likely they are to become addicted. In Massachusetts, more than 103,000 youth aged 0 to 17 years are projected to die from smoking.⁵¹⁷ Tobacco prevention efforts among youth therefore remain an important initiative in Massachusetts.

Trends/Disparities

Over the last 20 years, regular cigarette use among Massachusetts youth has declined by 78% to a historic low of 7.7% in 2015. However, tobacco products such as cigars, smokeless tobacco, and e-cigarettes have increased in popularity among youth because of their wide availability, attractive flavors, lower costs, and pervasive marketing.⁵¹⁸

In 2015, the rate of current cigar use was 10.4% and rate of Electronic Nicotine Delivery Products (E-NDP) use (i.e. e-cigarettes and e-hookah) was 23.7% among high school students (**Figure 8.9**). The prevalence of E-NDP use far exceeded use of all other tobacco products combined (23.7% vs. 15.9%). Furthermore, nearly 1 in 2 high school students (44.8%) reported ever trying E-NDPs compared to 27.8% of high school students who have ever tried smoking a cigarette.⁵¹⁹

“Vaping and e-cigarettes are all the rage right now, especially with young people, yet we don’t have any data showing how it’s affecting population health.”

Focus Group Participant

Smoking Cessation

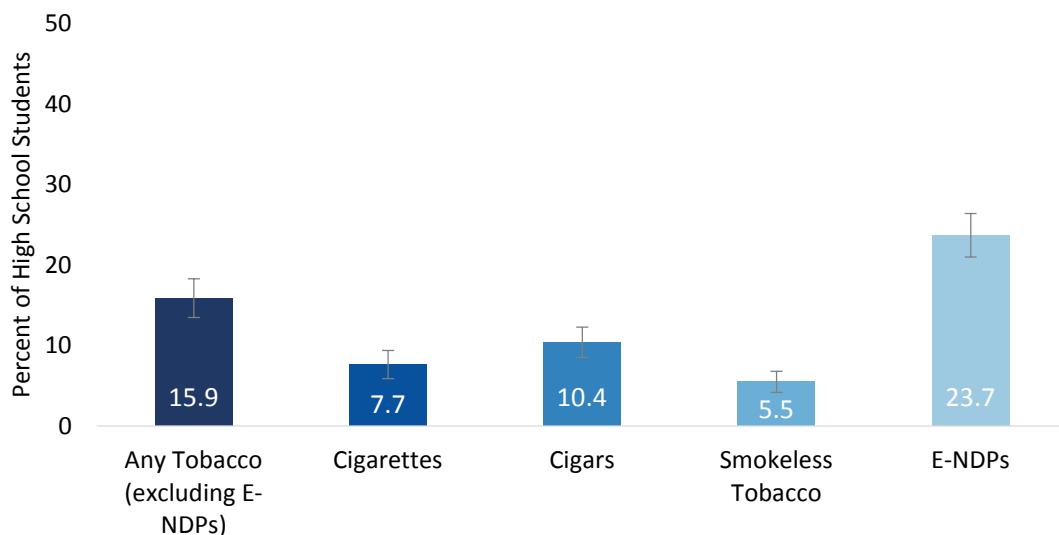
Stress due to social, emotional, and environmental factors is a barrier to cessation shared by many subpopulations that have more difficulty quitting.^{520,521} Oftentimes, these individuals have less support for quitting, lower motivation to quit, stronger addiction to tobacco, increased likelihood of not completing courses of pharmacotherapy or behavioral support sessions, and greater exposure to tobacco industry marketing that prevent them from successfully quitting.⁵²²

“I know I shouldn’t be smoking -- especially with a lung collapse. But I’m not ready now. There’s too much stress.”

Key Informant Interviewee

Figure 8.9

Percent of High School Students Reporting Current Use of Tobacco Products, by Product, Massachusetts, 2015



Trends/Disparities

In 2015, 61% of current smokers in Massachusetts tried to quit in the past year and the prevalence of successful quitting among adults who ever smoked was 65.8%.

Although the percentage of smokers who made a quit attempt were similar among different population groups, the prevalence of successful quitting varied by social and economic factors.

The prevalence of successful quitting experiences was lower among smokers with poor mental health (44.4%), adults with less than \$25,000 household income (52.3%), those with a high school education or less (57.5%), adults with a disability (58.2%), and adults who identified as LGBTQ (58.2%) (see Figure 8.10) The prevalence of successful quitting is also significantly lower among Black non-Hispanic (51.1%) and Hispanic (58.7%) adults compared to White non-Hispanic adults (67.9%).

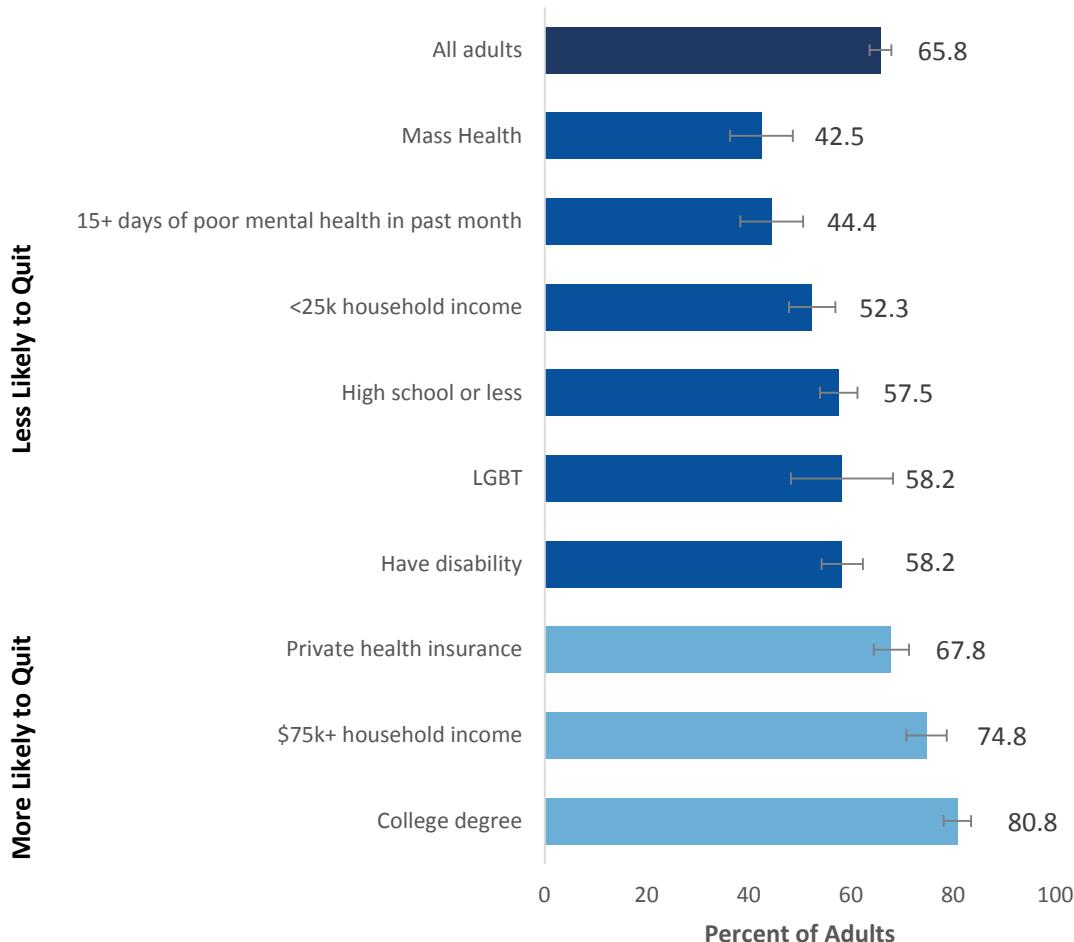
Secondhand Smoke

In Massachusetts, an estimated 1,000 or more adults and children die from exposure to secondhand smoke each year.⁵²³ In 2004, the Massachusetts Legislature enacted a statewide smoking ban in workplaces, restaurants, and bars. Since then, exposure to secondhand tobacco smoke has declined. However, nonsmokers continue to report exposure to secondhand smoke in their homes or in worksites that are non-compliant and in private vehicles.⁵²⁴

Currently, more than 896,000 adults and 148,000 children are potentially exposed to secondhand smoke because they live in a household and/or building that allows smoking indoors. Residents living in multi-unit housing without a smoke-free policy are nearly twice as likely to have a child with asthma compared to residents living in housing with a smoke-free policy (16.3% versus 8.8%).⁵²⁵

Figure 8.10

Percent of Adults Who Reported Successfully Quitting Smoking, by Subgroup, Massachusetts, 2015

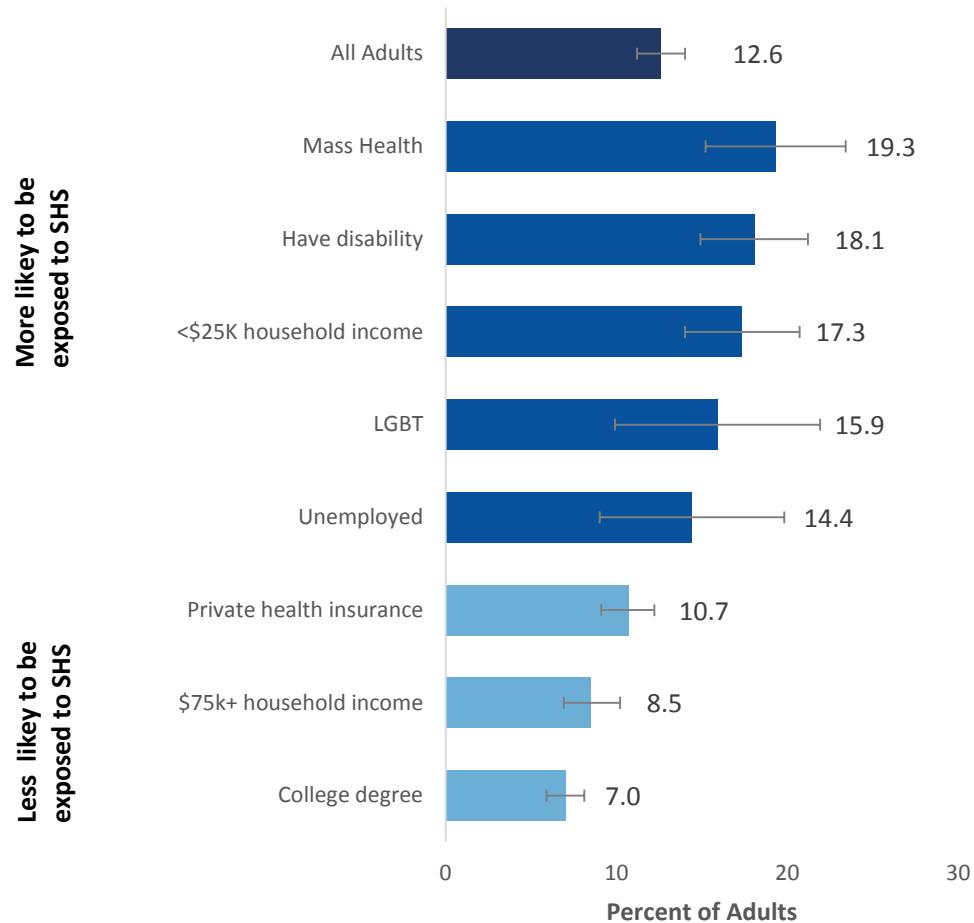


Trends/Disparities

Exposure to secondhand smoke among adult nonsmokers declined in Massachusetts from 32% in 2002 to 12.6% in 2015. However, an estimated 459,772 adult nonsmokers continue to be exposed to secondhand smoke at home, work, or other places for more than one hour per week.⁵²⁶

In 2015, exposure to secondhand smoke among nonsmokers was most prevalent among adults with MassHealth insurance (18.6%), adults who identify as LGBT (18.1%), and adults who were unemployed (14.4%).

Figure 8.11
Percent of Non-Smoking Adults who Reported Exposure to Second-Hand Smoke, by Subgroup, Massachusetts, 2015



Obesity

Obesity is both a chronic disease and a risk factor for other chronic conditions.⁵²⁷ Overweight or obese people are more likely to have type 2 diabetes, cardiovascular disease, gall bladder disease, and musculoskeletal disorders.⁵²⁸ In addition, overweight and obesity are associated with asthma, some forms of cancer, and many other health problems that interfere with daily living and reduce the quality of life.⁵²⁹ Engaging in physical activity and maintaining a healthy diet have been proven to lower the incidence of obesity, however structural barriers to accessing healthy foods and beverages and opportunities to be physically active (as described elsewhere in Chapter 8) disproportionately affect people of color in the Commonwealth.⁵³⁰ As a result, not all Massachusetts residents have the same opportunities to prevent obesity.

Adults

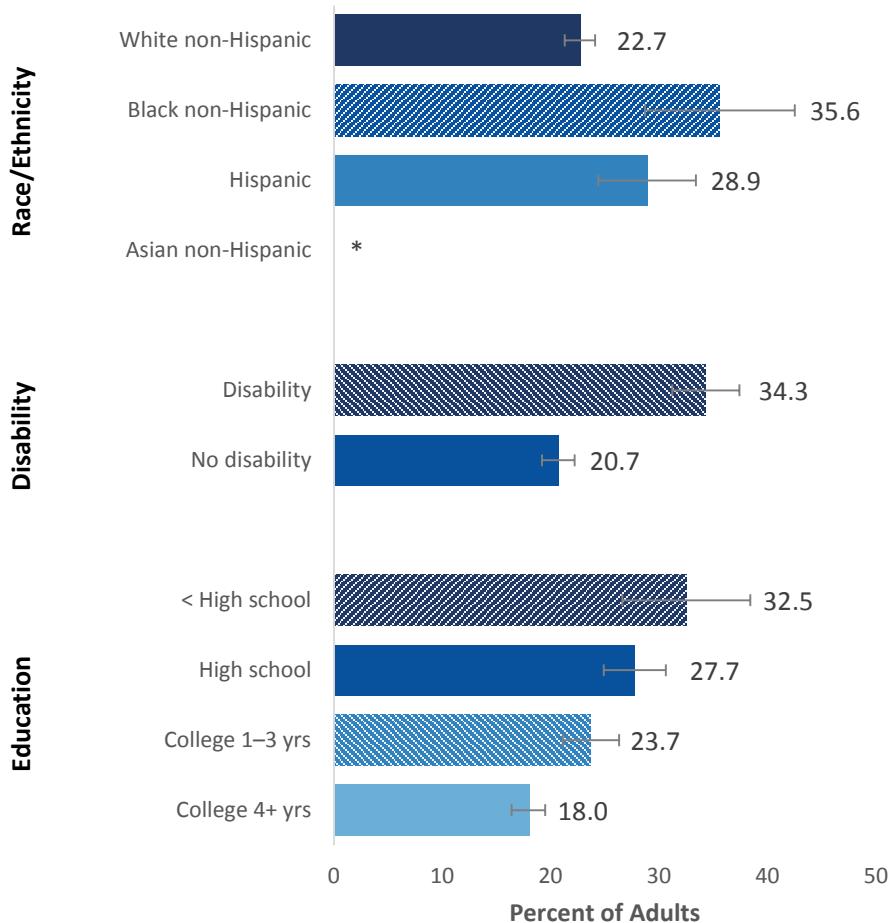
Overweight is defined as having a body mass index (BMI) of 25.0 to 29.9 kg/m². Obesity is defined as a BMI greater than or equal to 30.0kg/m². Both conditions are linked to poor nutrition and inadequate physical activity. There has been a shift in the leading cause of death over the past 50 years from acute conditions to chronic diseases. Given the tie between obesity and so many other chronic diseases, the need to address obesity is a public health imperative to control morbidity and mortality as well as ballooning health care costs in an aging population.

Trends/ Disparities

In 2015, nearly 60% of Massachusetts adults met the criteria for being overweight or obese and 24.3% were obese. **Figure 8.12** indicates that more than one-third of Black non-Hispanic adults (35.6%) were obese compared to Hispanic (28.9%), and White non-Hispanics (22.7%). Adults with disabilities (34.3%) were significantly more likely to be obese than adults with no disability (20.7%). Adults who have less than a high school education are almost twice as likely to be obese than adults with four or more years of college.

Figure 8.12

Percent of Adults Meeting Criteria for Obesity, Massachusetts, 2015



NOTE: *INSUFFICIENT DATA

Children

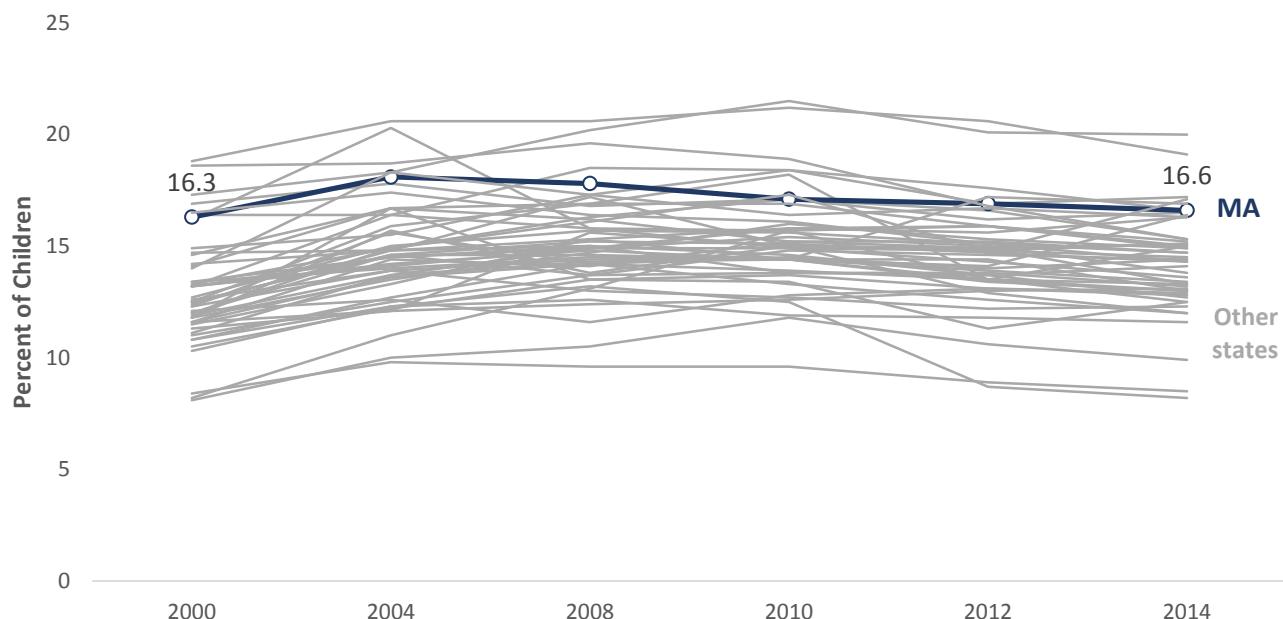
Child overweight is defined as a body mass index (BMI) at or above the 85th percentile for age. Child obesity is defined as BMI at or above the 95th percentile of expected for age.⁵³¹ As in adults, child obesity is linked to poor nutrition and inadequate physical activity; and inequities persist across socioeconomic status and race/ethnicity.⁵³²

Trends/Disparities

Massachusetts is ranked as the fifth worst US state on the prevalence of obesity among children enrolled in the Women, Infant and Children (WIC) program who are two to four years old.^{533,534}

Figure 8.13

Percent of WIC Children Aged 2-4 Years who have Obesity in the US by State, 2000-2014



SOURCE: SPECIAL SUPPLEMENTAL NUTRITION PROGRAM FOR WOMEN, INFANTS, AND CHILDREN BIENNIAL SURVEY FOR PARTICIPANTS AGES 2-4 WHO HAVE OBESITY

BMI screening reports conducted by school districts indicate that the prevalence of overweight and obesity decreased 2.1 percentage points from 2009 (34.3%) to 2015 (31.3%).⁵³⁵ However, this reduction in overweight and obesity was not shared evenly across all school districts. Between 2009 and 2014, school districts with median household incomes greater than \$37,000 experienced significant improvements. However, the prevalence of overweight and obesity for the poorest school districts (less than \$37,000 median household income) did not change and remained the highest across the state with approximately 40% of students being overweight or obese.⁵³⁶

Cardiovascular Disease

Nationally, cardiovascular disease is the leading cause of death for both men and women, representing 600,000 deaths annually.⁵³⁷ In Massachusetts, cardiovascular disease is the second leading cause of death after cancer. Cardiovascular disease is a broad term that encompasses a number of adverse health outcomes, including congestive heart failure, myocardial infarction, and stroke. Every year, a staggering 735,000 Americans have a heart attack, while every 40 seconds someone in the United States has a stroke.^{538,539}

Nutrition, physical activity, access to healthy foods and safe communities also shape cardiovascular risk.⁵⁴⁰ For example, poor nutrition due to food insecurity and lack of access to affordable produce contribute to cardiovascular risk.⁵⁴¹ Lack of access to safe neighborhoods, parks, and active transportation infrastructure contribute to physical inactivity that similarly enhances risk for cardiovascular disease.⁵⁴² Additionally, chronic stress from exposure to trauma and discrimination contribute to that risk.⁵⁴³

Hypertension

Hypertension is a critical risk factor for adverse cardiovascular and cerebrovascular outcomes including stroke, heart attacks, and congestive heart failure.⁵⁴⁴ In 2014, hypertension contributed to \$19 million in total hospitalization costs in Massachusetts.⁵⁴⁵ Hypertension disproportionately impacts people of color. These disparities are grounded in social and economic inequities such as access to health care and poverty.^{546,547}

Trends/Disparities

Although hypertension alone is not a major contributor to health care costs, it is widely prevalent. In 2015, 29.6% of Massachusetts adults said they had been diagnosed with hypertension, similar to previous years.

In 2015, a larger percentage of Black non-Hispanic adults were diagnosed with hypertension (39.4%) compared to White non-Hispanic adults (30.7%). Racial/ethnic disparities in hypertension are likely an important contributing factor to hospitalizations for congestive heart failure, myocardial infarction, and stroke.

Figure 8.14

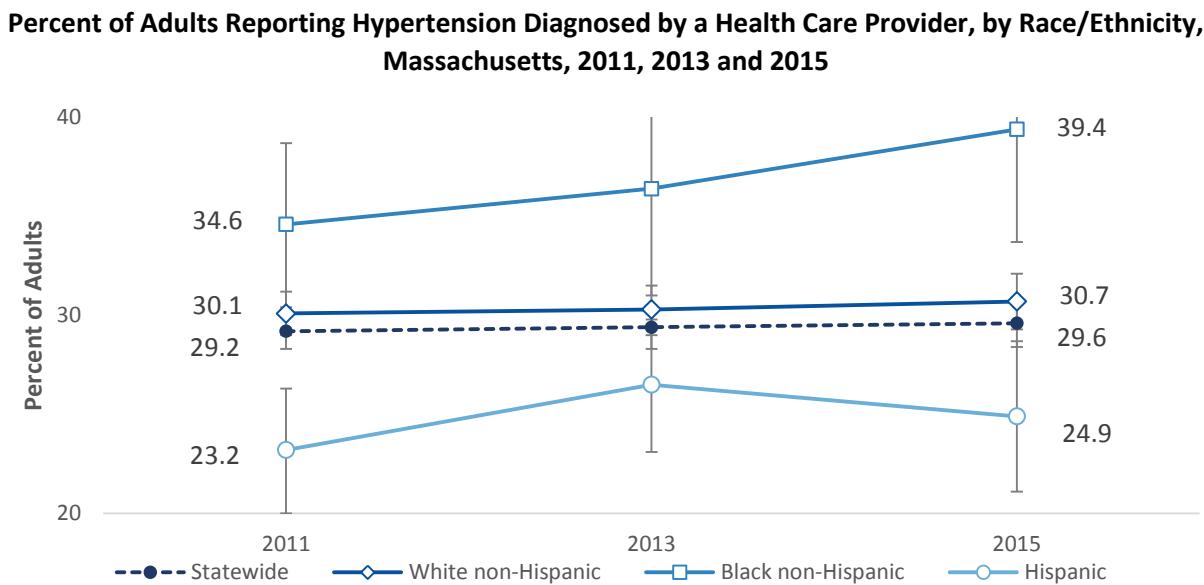
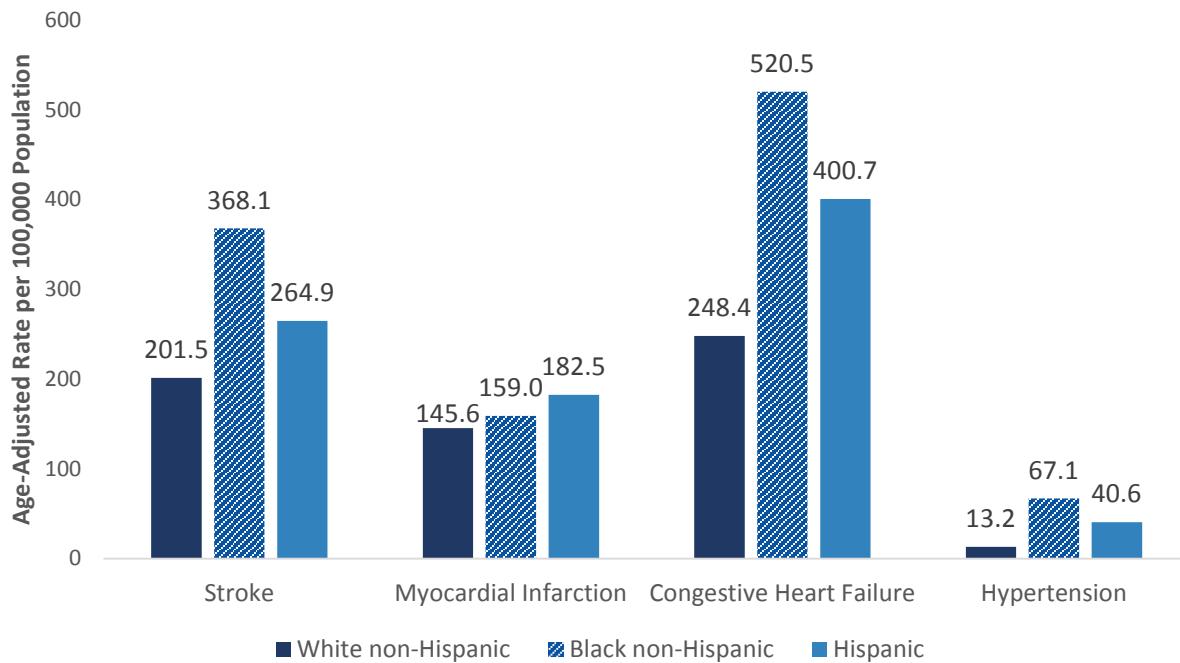


Figure 8.15
Racial Health Inequities in Age-Adjusted Rates of Hospitalization, 2014



SOURCE: CHIA, CASE MIX HOSPITALIZATION DATA

In 2014, Black non-Hispanic residents (67.1 per 100,000 population) experienced more than five times the rate of hospitalizations for hypertension compared to White non-Hispanic residents (13.2 per 100,000 population). Also in 2014, the rate of hypertension-related hospitalizations for Hispanic residents (40.6 per 100,000 population) was more than three times the rate than White non-Hispanic residents (13.2 per 100,000 population).

Heart Failure

Congestive heart failure can be debilitating and challenging for patients to manage. It is also a costly disease, amounting to \$540 million in total hospitalization costs in Massachusetts in 2014.⁵⁴⁸ If not managed properly, congestive heart failure is associated with high readmission rates, poor quality of life, and high health care utilization.^{549,550}

Trends/Disparities

In 2014, heart failure accounted for 273.9 hospitalizations per 100,000 population, a 1.7% decline from 2010.

In 2014, the rate of hospitalizations attributed to congestive heart failure for Black non-Hispanic residents (520.5 per 100,000 population) was more than twice as high than that for non-Hispanic White residents (248.4 per 100,000 population). Similarly, Hispanic residents (400.7 per 100,000 population) were hospitalized for congestive heart failure at a rate that was 1.6 times higher than that for non-Hispanic White residents (248.4 per 100,000 population).

Myocardial Infarction

Myocardial infarction contributed to \$566 million in total hospitalization costs in 2014 in Massachusetts.⁵⁵¹ Prevalence of myocardial infarction is connected to social determinants of health such as education and income.⁵⁵²

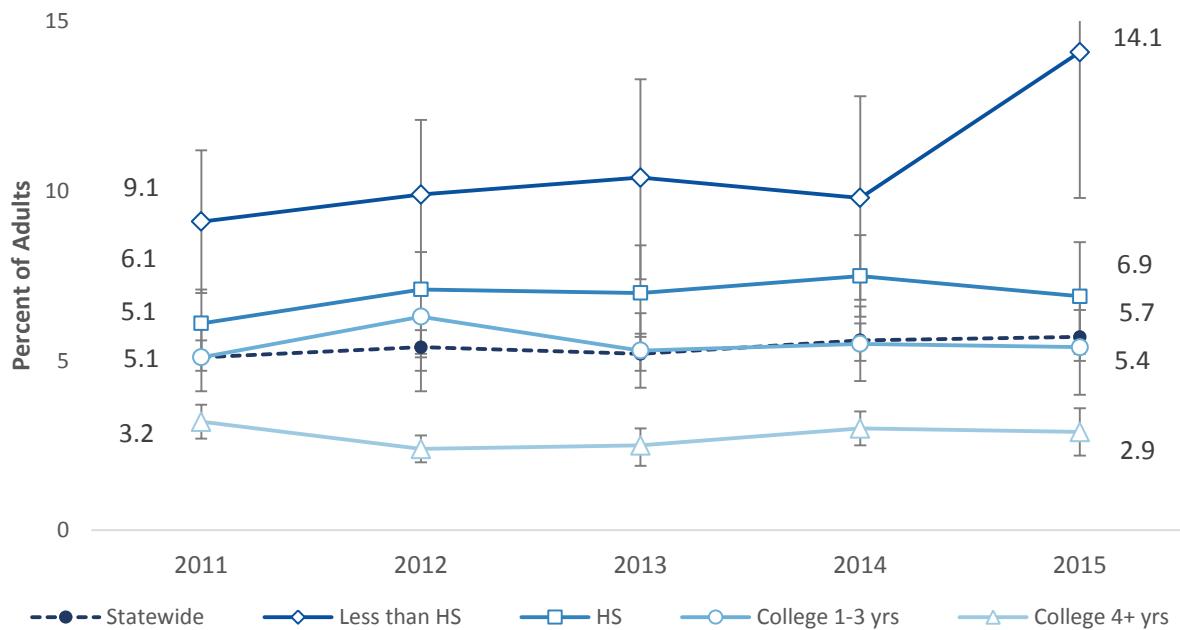
Trends/Disparities

In 2015, 5.7% of adults in Massachusetts were ever told they had a myocardial infarction.

There are important and persistent disparities in reported myocardial infarction by educational attainment. In 2015, Massachusetts adults without a high school degree (14.1%) were nearly five times more likely to report they had a heart attack than persons with four or more years of post-high school education (2.9%).

Figure 8.16

Percent of Adults Reporting Myocardial Infarction Diagnosis, by Educational Attainment, Massachusetts, 2011-2015



The rate of myocardial infarction-related hospitalizations declined 9.5% from 2010 (169.9 per 100,000 population) to 2014 (153.7 per 100,000 population).

In 2014, the myocardial infarction hospitalization rate for Hispanic residents in Massachusetts (182.5 per 100,000 population) and Black non-Hispanic residents (159.0 per 100,000 population) exceeded the state average (153.7 per 100,000 population) and the average for White non-Hispanic residents (145.6 per 100,000 population).

Stroke

Strokes were responsible for \$613 million in total hospitalization costs in Massachusetts in 2014.⁵⁵³ These hospitalization costs does not include other economic costs of stroke, such as lost productivity or outpatient health care expenditures, nor loss of life, reduced quality of life, and increased disability.

Trends/Disparities

In 2015, 3.3% of Massachusetts residents reported having been told by a provider that they had a stroke. In 2014, Massachusetts residents experienced 222.1 stroke-related hospitalizations per 100,000 population, a 3% decline from 2010 (228.9 per 100,000 population).

Racial/ethnic disparities continue to exist in stroke-related hospitalizations. In 2014, Black non-Hispanic residents (368.1 per 100,000 population) experienced stroke-related hospitalization at a rate that was nearly twice as high as that for White non-Hispanic residents (201.5 per 100,000 population). Similarly, Hispanic residents (264.9 per 100,000 population) had a stroke hospitalization rate that was 1.3 times that for White non-Hispanic residents (201.5 per 100,000 population).

Diabetes Mellitus

Diabetes mellitus is a condition where the body either does not make or cannot respond to the hormone insulin, resulting in high levels of sugar (glucose) in the blood. Diabetes mellitus is a term that includes type 1 and type 2 diabetes. It is a common chronic condition with profound impact on quality of life, currently impacting 29 million US adults, or approximately 9% of the population.⁵⁵⁴ Most concerning, however, is that 25% of persons with diabetes and 90% of persons with prediabetes do not know they have these conditions, which has serious implications for disease management and prevention.^{555,556}

Nationwide, the prevalence of diabetes is projected to increase dramatically. The prevalence of type 1 and type 2 diabetes is anticipated to increase 54% by 2030, affecting 54.9 million Americans.

In Massachusetts, the prevalence of diagnosed diabetes has more than doubled over a 22-year period. For example, in 1993, an estimated 3.9% of Massachusetts residents were told by a provider that they had diabetes. By 2015, an estimated 8.9% of Massachusetts residents were told they had diabetes.

Trends/Disparities

Socioeconomic disparities exist in diabetes prevalence. In Massachusetts, adults with an annual household income of less than \$25,000 (15.6%) have three times the prevalence of diabetes as compared to those with an annual household income more than \$75,000 (5%).

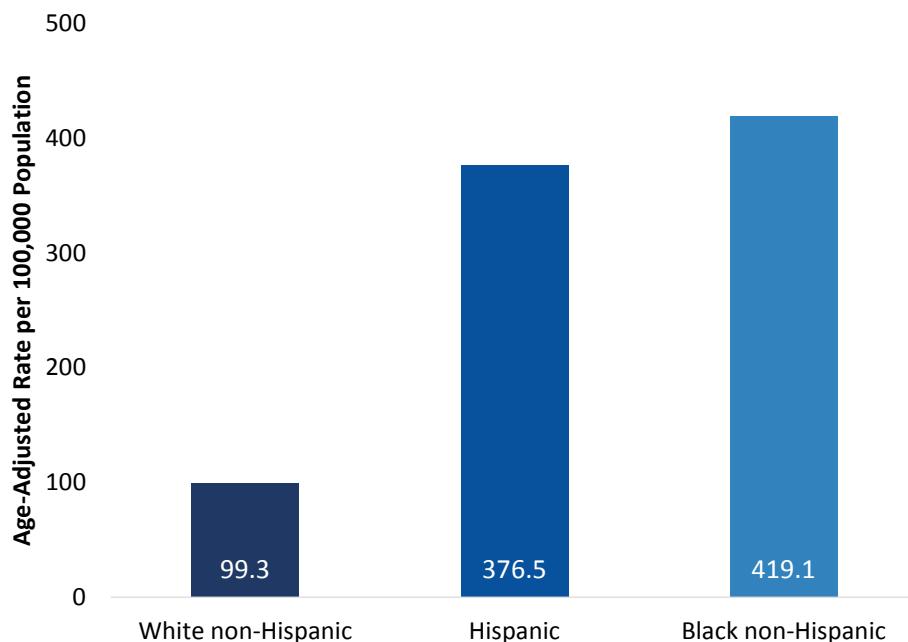
The prevalence of diabetes also decreases as educational attainment increases. A total of 14.5% of adults without a high school degree were diagnosed with diabetes compared to 5% of adults with four or more years of post-high school education.

Diabetes prevalence and mortality in Massachusetts also differs by race/ethnicity. In 2015, a greater proportion of Black non-Hispanic (12.3%) and Hispanic (11.7%) adults reported being diagnosed with diabetes compared to White non-Hispanic adults (8.7%). In 2014, Black non-Hispanic residents were more than 2.1 times more likely to die from diabetes than White non-Hispanic residents (29.5 versus 13.8 per 100,000 population).

In 2014, Black non-Hispanic residents had more than four times the rate for diabetes emergency department visits as White non-Hispanics (419.1 versus 99.3 per 100,000 population). Further, the diabetes emergency department visit rate among Hispanic residents was almost four times that for White non-Hispanics (376.5 versus 99.3 per 100,000 population).⁵⁵⁷

Figure 8.17

Age-Adjusted Diabetes Emergency Department Visit Rate, by Race/Ethnicity, Massachusetts, 2014



SOURCE: CHIA, CASE MIX HOSPITALIZATION DATA

Chronic Lower Respiratory Disease

Chronic lower respiratory diseases are diseases of the airways and other structures of the lung. Chronic lower respiratory diseases include asthma, chronic obstructive pulmonary disease (COPD), emphysema, and bronchitis.

In 2014, chronic lower respiratory disease was the third leading cause of death in the United States⁵⁵⁸ and the fourth leading cause of death in Massachusetts. Among adults aged 65 to 84, chronic lower respiratory disease is the third leading cause of death, after cancer and cardiovascular disease.

Risk factors for chronic lower respiratory disease include, but are not limited to, exposure to tobacco smoke, air pollution, occupational chemicals, and dust.⁵⁵⁹

The development and management of chronic lower respiratory disease is strongly linked with the social determinants of health, such as housing, tobacco exposure, and workplace exposures such as chemicals, smoke, dust, fumes or mold.⁵⁶⁰

Adult Asthma

Asthma is a chronic inflammation of the airways that affects people of all ages and is a significant public health problem both in Massachusetts and the United States. Asthma is exacerbated when airways become constricted with swelling and excessive mucous production, making it difficult to breathe.

Symptoms of asthma include wheezing, coughing, and chest tightness. Sometimes asthma symptoms become so severe that they result in an asthma attack that requires immediate medical treatment. Asthma attacks can be triggered by certain environmental factors such as air pollution, mold, pet dander or saliva, pests such as rodents and cockroaches, and dust mites in the environment. Asthma affects individuals differently, resulting in differing severity, presentation of symptoms and responsiveness to treatment. Asthma is among the top seven conditions that contribute to high costs and emergency room expenditures in the Commonwealth.⁵⁶¹

On average, asthma patients in Massachusetts incur \$58,600 in medical expenditures per person annually.⁵⁶² Although the percent of adults who have ever been told that they have asthma does not differ significantly by race/ethnicity, stark racial/ethnic disparities in emergency department visits and hospitalizations strongly suggest the role that the social determinants of health play in asthma outcomes.

Trends/Disparities

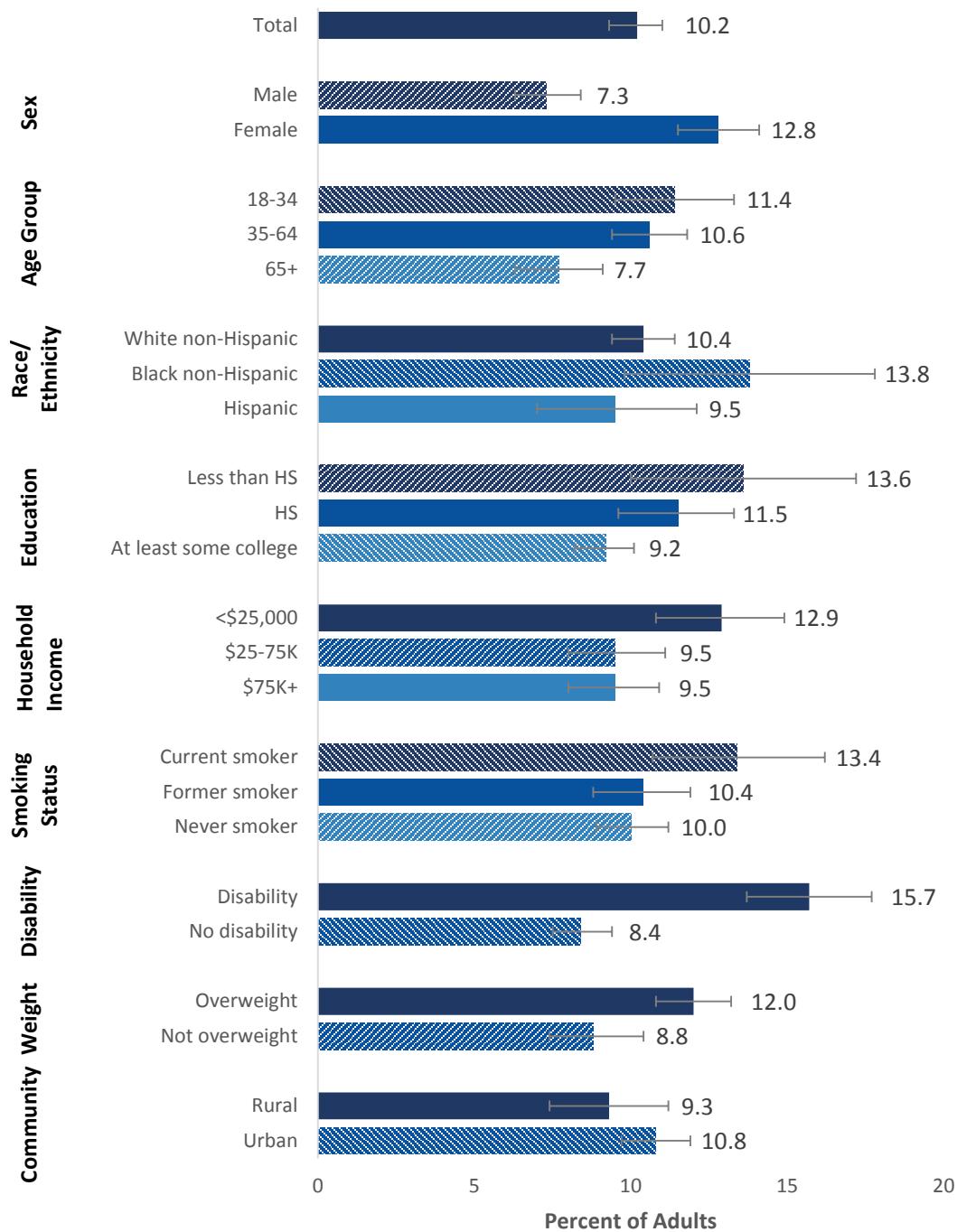
The percentage of adults reporting that they have ever been told by a health provider that they have asthma (lifetime asthma) as well as the percentage reporting that they still have asthma (current asthma) were consistently higher in Massachusetts than in the US as a whole from 2000 through 2013. In 2015, the overall prevalence was 10.2%.

Following national patterns, lifetime and current asthma prevalence in Massachusetts increased significantly from 2000 through 2010 (28.6% and 22.4% increase, respectively). While both lifetime and current asthma prevalence also appear to be increasing in more recent years, additional years of data are needed to estimate the magnitude of this increase.

Current asthma prevalence among Massachusetts adults differs based on demographic and socioeconomic factors and by geographic location. As seen in **Figure 8.18**, statistically significant disparities exist by gender, age, education, income, disability status, and weight.

Figure 8.18

Prevalence of Current Asthma among Adults, by Social and Economic Characteristics, Massachusetts, 2015



In 2012, the asthma hospitalization rate for Hispanic and Black non-Hispanic adults was 2.2 times higher than that for White non-Hispanic adults. That same year, emergency department visit rates for Black non-Hispanic and Hispanic adults were 3.4 and 3.1 times higher than the rate for White non-Hispanic adults respectively.

There are several features of the social and physical environment that enhance vulnerability for asthma. These include housing, health care access, stressors, workplace exposures, and outdoor air quality. Lack of access to safe and affordable housing can lead to environmental inequities that exacerbate asthma, including living in areas with high levels of air pollution or areas prone to flooding; poor physical and structural condition of housing, such as water leaks or dampness, holes in walls, and poor ventilation that increases risk of mold growth and pest infestations; and exposure to environmental tobacco smoke in multi-unit housing. Historical and structural inequalities that place greater sources of pollution in low-income and racial/ethnic minority communities contribute to asthma disparities.⁵⁶³

In the workplace, factors such as chemicals, smoke, dust, fumes or mold, may cause or exacerbate asthma.⁵⁶⁴ Work-related asthma is often under recognized and under diagnosed.⁵⁶⁵ In Massachusetts, 44.5% of adults with current asthma who have ever been employed reported that their asthma was caused or made worse by their work. Yet only 15.5% had discussed how work affected their asthma with their health care provider. Further, only 8.3% had been diagnosed with work-related asthma.⁵⁶⁶

Qualitatively, residents living in urban areas were described as especially vulnerable to adult asthma. As one participant shared: *"In Boston's Chinatown, for example, we see a lot of problems with the built environment. The residents live right beside the highway and there's lots of pollution in the area, including many smokers who work in the restaurants; lots of residents suffer from asthma because of it."*

Pediatric Asthma

The prevalence of pediatric asthma is high in Massachusetts.⁵⁶⁷ Two out of every three Massachusetts children with asthma have asthma that is not well controlled or is very poorly controlled.⁵⁶⁸ The rate of asthma hospitalizations among children aged 19 and younger is increasing, and children had the highest rate of asthma emergency department visits compared to other age groups. Disparities exist in poor asthma outcomes, with statistically significantly higher rates of emergency department visits and hospitalizations for asthma found among Black non-Hispanic and Hispanic children compared to White non-Hispanic children.⁵⁶⁹

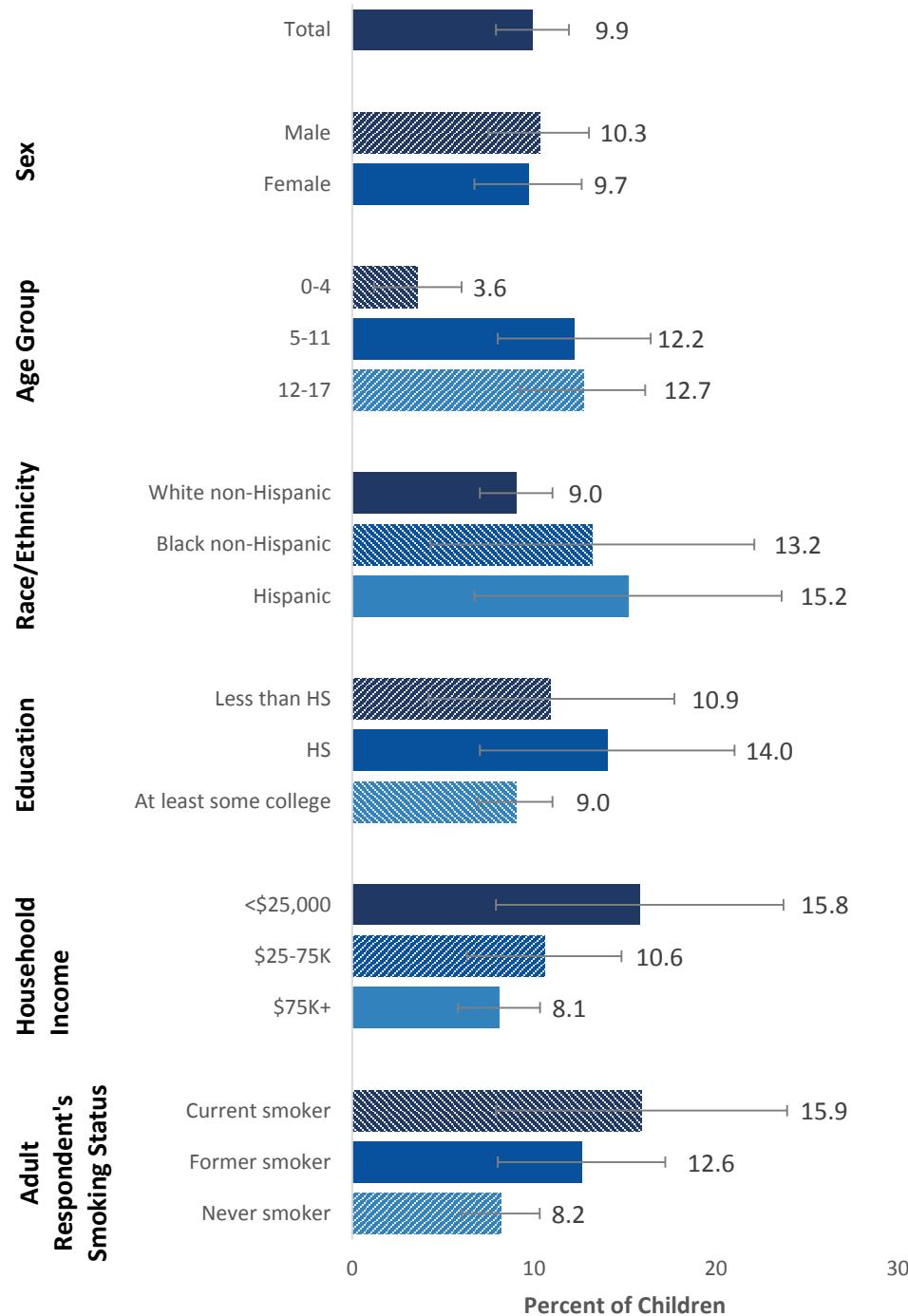
Trends/Disparities

From 2005 to 2010, current and lifetime asthma prevalence among Massachusetts children decreased by an average of 2.3% and 1.3% annually. Despite this progress, in 2006-2010, two out of every three Massachusetts children with asthma still had asthma that was not well controlled, or was poorly controlled.

The prevalence of asthma among children in Massachusetts varies based on social and economic characteristics as well as geography. The three-year (2013-2015) average annual prevalence of asthma among children in Massachusetts was 9.9%. High asthma prevalence among children is associated with being between the ages of 12 and 17 (12.7%) and having a household income of less than \$25,000 per year (15.8%).

Figure 8.19

Prevalence of Current Asthma among Massachusetts Children, by Demographic and Socioeconomic Factors, 2013-2015



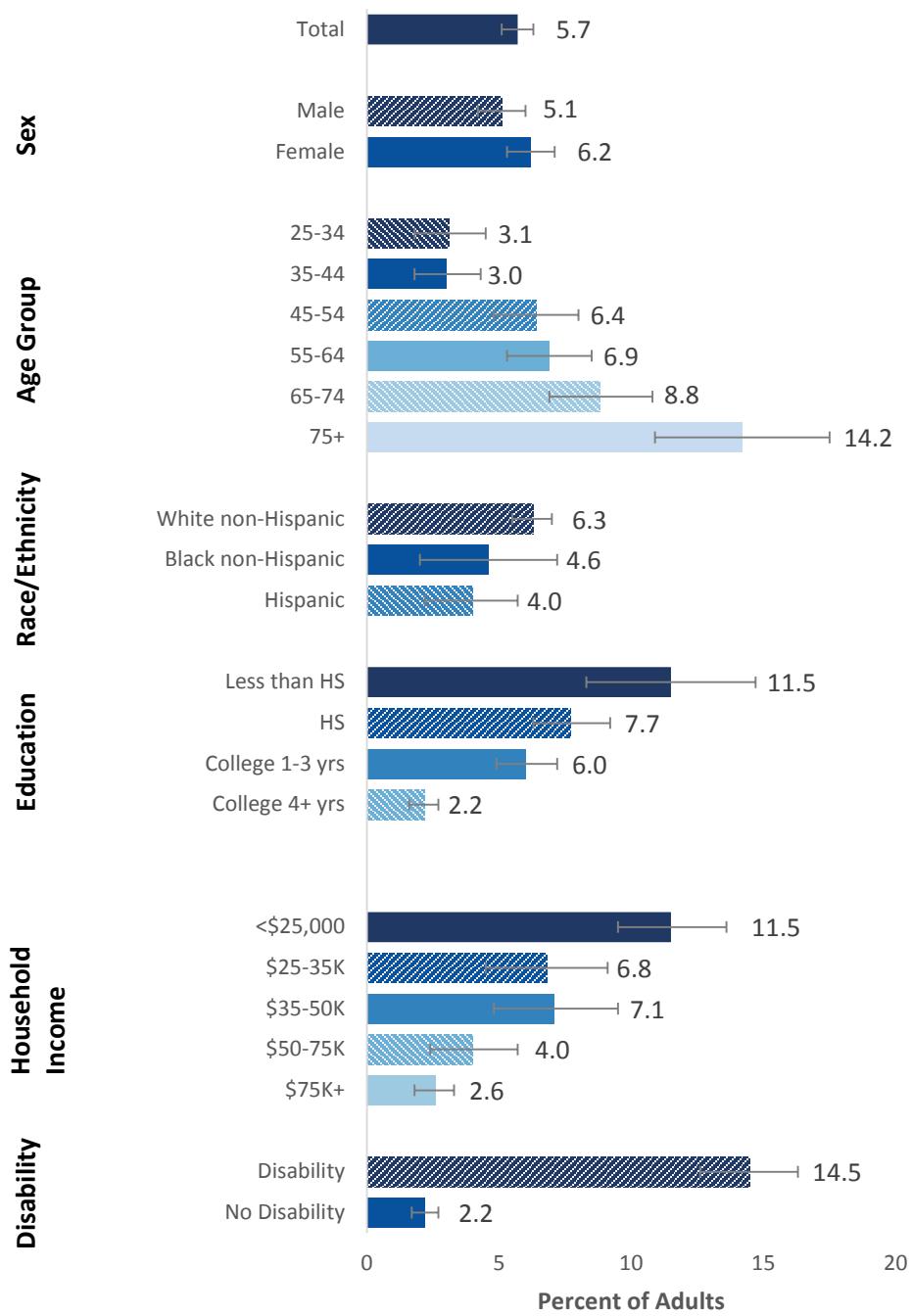
NOTE: MULTIPLE YEARS OF DATA WERE COMBINED FROM THE BRFSS FOR SUFFICIENT SAMPLE SIZE

In 2012, the asthma hospitalization rate for Black non-Hispanic children and Hispanic children was 3.6 and 2.6 times higher than the rate for White non-Hispanic children.

Social determinants of health affect inequities in asthma-related outcomes. For example, housing stock, residential segregation, tenancy laws, insurance coverage, and schools are factors associated with asthma inequities.

Figure 8.20

Prevalence of COPD among Massachusetts Adults, by Social and Economic Factors, Massachusetts, 2015



Chronic Obstructive Pulmonary Disease

Chronic Obstructive Pulmonary Disease (COPD) refers to a group of diseases that cause airflow blockage and breathing-related problems. COPD includes emphysema, chronic bronchitis, and in some cases asthma.

In the US, exposure to tobacco smoke is a key risk factor for COPD.⁵⁷⁰ Exposure to air pollutants in the home and workplace, genetic factors, and respiratory infections are also risk factors.⁵⁷¹

Trends/Disparities

In 2015, the prevalence of COPD among Massachusetts adults was 5.7% (see **Figure 8.20** on the previous page). Those with prevalence exceeding the state average include women (6.2%); adults older than 75 years of age (14.2%); white non-Hispanic adults (6.3%); adults with less than a high school (11.5%); persons with lower household incomes (e.g., household income less than \$25,000 (11.5%), and persons with a disability (14.5%). COPD is consistently among the top ten reasons for hospital admission in Massachusetts and the rate of potentially preventable hospitalizations due to COPD in Massachusetts exceeds the national average.

Cancer

The burden of cancer in the United States and Massachusetts remains high in terms of prevalence, health care utilization, health care costs, and mortality.⁵⁷² Since 2006, cancer surpassed heart disease as the leading cause of death in Massachusetts.

Although cancer incidence and mortality rates decreased in Massachusetts from 2010 to 2014, there were still more than 36,000 new cancer cases diagnosed annually during this period. The age-adjusted cancer incidence rate in Massachusetts was 471.1 per 100,000 population with men having a higher cancer incidence rate than women (505.7 versus 450.4 per 100,000 population). From 2010 to 2014, cancer incidence decreased 3.2% annually among men. Black non-Hispanic men and White non-Hispanic women had the highest incidence rate of all cancer types during this period.

Across the Commonwealth, breast cancer among women and prostate cancer among men is most common. Lung cancer, colon cancer, and melanoma are also among the leading types of cancer among both women and men. Together, these five cancers account for more than half of all cancer cases across the Commonwealth.

In addition, the overall cancer mortality rate decreased in Massachusetts from 2010 to 2014 (1.5% annually for women and 2% annually for men). Overall, cancer mortality for men was 1.4 times the overall cancer mortality rate for women (190.2 versus 135.9 per 100,000 population). Despite this decrease in mortality rate, an average of 12,734 people in Massachusetts die each year from cancer.

Several socioeconomic factors contribute to the prevalence of cancer and/or late stage cancer diagnoses. Obesity, tobacco use, and tobacco exposure are leading risk factors for many cancers including colorectal and breast cancer.⁵⁷³ Additionally, lack of access to healthy foods, limited physical activity, and lack of access to smoking cessation services are also risk factors.^{574,575} Gaps in health care coverage represent a barrier to covering the costs of diagnostic testing. For examples, individuals with high deductibles, low premiums, or high co-pays must pay for diagnostic tests to confirm a cancer diagnosis, contributing to delays in diagnosis.⁵⁷⁶

Lung Cancer

Lung cancer was the second leading cause of cancer among both men and women in Massachusetts between 2010 and 2014 and the leading cause of cancer deaths among both men and women. Lung cancer represents almost 14% of all cancers in men and women in Massachusetts, and more than one fourth (26.5%) of all cancer deaths in both men and women in Massachusetts were due to lung cancer.

Nearly one in 15 (6.4%) adults in the US will develop lung cancer at some point during their lifetime.⁵⁷⁷ Cigarette smoking is the most important risk factor for lung cancer. In the US, 90% of lung cancers are linked to cigarette smoking. The risk of developing lung cancer or dying from lung cancer is 15 to 30 times greater among people who smoke cigarettes than among people who do not. Other risk factors for lung cancer include second-hand smoke, exposure to asbestos, personal or family history of lung cancer, age, and air pollution.⁵⁷⁸

The overall lung cancer incidence in Massachusetts from 2010 -2014 was 70.8 per 100,000 among men and 60.7 per 100,000 among women. During the same period, the overall lung cancer mortality rate in Massachusetts was 60.3 per 100,000 and 36.9 per 100,000 among men and women, respectively.

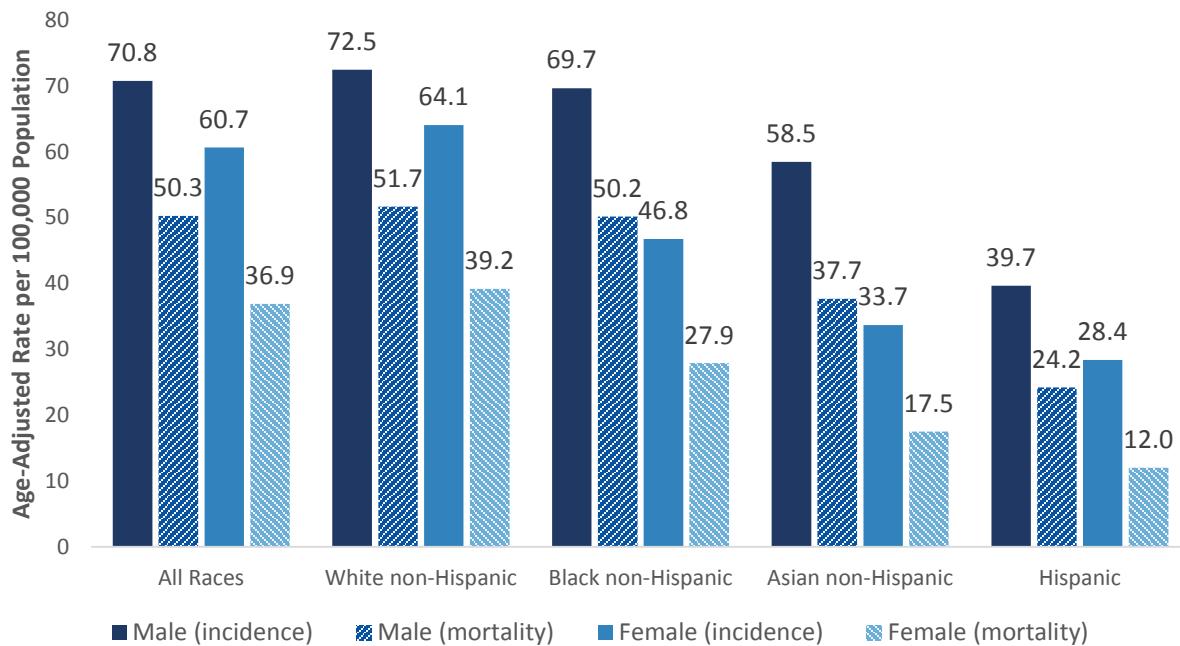
Trends/Disparities

Lung cancer incidence decreased significantly among women from 2010 to 2014 (1.4% per year) but not for men. During the same period, the lung cancer incidence rate was statistically significantly higher among White non-Hispanic women (64.1 per 100,000) when compared to the state average (60.7 per 100,000 population).

Between 2010-2014, mortality significantly decreased by 1.4% per year among men and 1% per year among women. Over this same period, the lung cancer mortality rate for White non-Hispanic men and women (51.7 and 39.2 per 100,000 population) exceeded the rate for all racial/ethnic groups combined.

Figure 8.21

Age-Adjusted Lung Cancer Incidence and Mortality Rate, by Race/Ethnicity and Sex, Massachusetts, 2010-2014



NOTE: MULTIPLE YEARS OF DATA WERE COMBINED FROM THE BRFSS FOR SUFFICIENT SAMPLE SIZE

Breast Cancer

Breast cancer was the most commonly diagnosed cancer among Massachusetts women from 2010 to 2014, representing almost a third (29.8%) of all cancers among women, and was the second leading cause of cancer deaths among Massachusetts women. About one in seven (13.2%) of all cancer deaths in women were due to breast cancer.

Risk factors for breast cancer include race, family history, age, and personal history of breast cancer. Other risk factors include having a period at an early age, having a child at an older age, never having children, radiation therapy to the breast or chest, obesity, and alcohol use.⁵⁷⁹

Between 2010 and 2014 the overall breast cancer incidence rate among Massachusetts women was 136.3 per 100,000 and the mortality rate was 18.2 per 100,000.

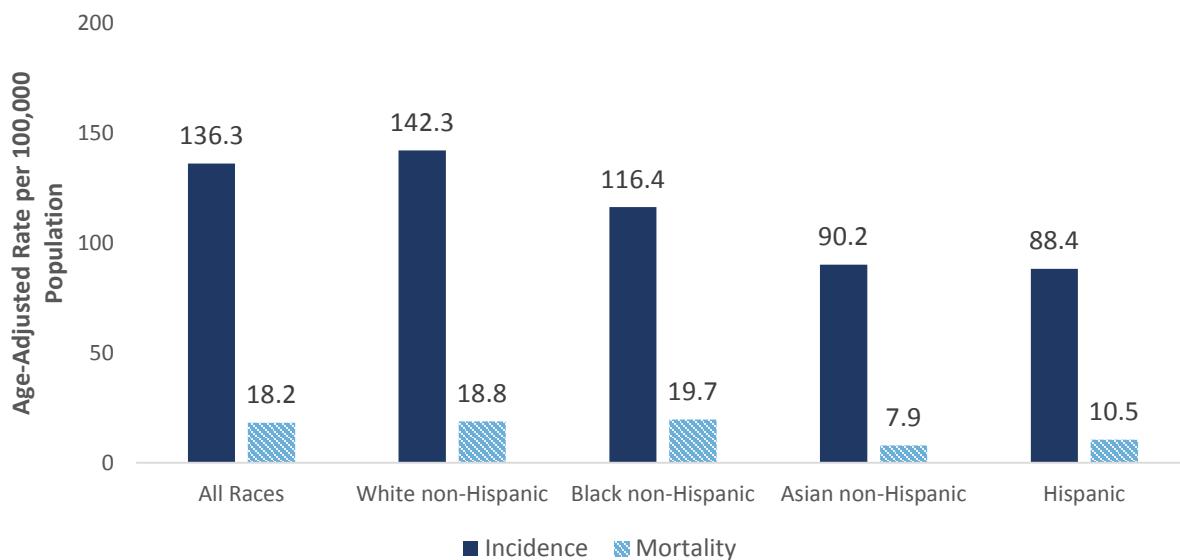
Trends/Disparities

There was no significant change in breast cancer incidence or mortality between 2010 and 2014. Breast cancer incidence was highest for White non-Hispanic women (142.3 per 100,000 population), followed by Black non-Hispanic women (116.4 per 100,000 population).

Breast cancer mortality rates exceeded the state average (18.2 per 100,000 population) for Black non-Hispanic women (19.7 per 100,000 population), followed by White non-Hispanic women (18.8 per 100,000 population). While Black non-Hispanic women had a lower breast cancer incidence rate, they had the highest mortality rate.

Figure 8.22

**Age-Adjusted Breast Cancer Incidence and Mortality Rate, by Race/Ethnicity and Sex,
Massachusetts, 2010-2014**



NOTE: MULTIPLE YEARS OF DATA WERE COMBINED FROM THE BRFSS FOR SUFFICIENT SAMPLE SIZE

Colorectal Cancer

Colorectal cancer was the third leading cause of cancer and was the third leading cause of cancer deaths among both women and men in Massachusetts between 2010 and 2014, representing 7.8% of cancer diagnoses among women and 8.3% of cancer diagnoses among men. Colorectal cancer also contributed to 8% and 8.5% of cancer deaths in Massachusetts men and women, respectively. Risk factors for colorectal cancer include age, race, personal or family history of colon or rectal cancer, personal history of other cancers, personal history of other gastrointestinal issues, certain types of diet, physical inactivity, overweight and obesity, smoking, heavy alcohol use, and inherited or genetic syndromes.⁵⁸⁰

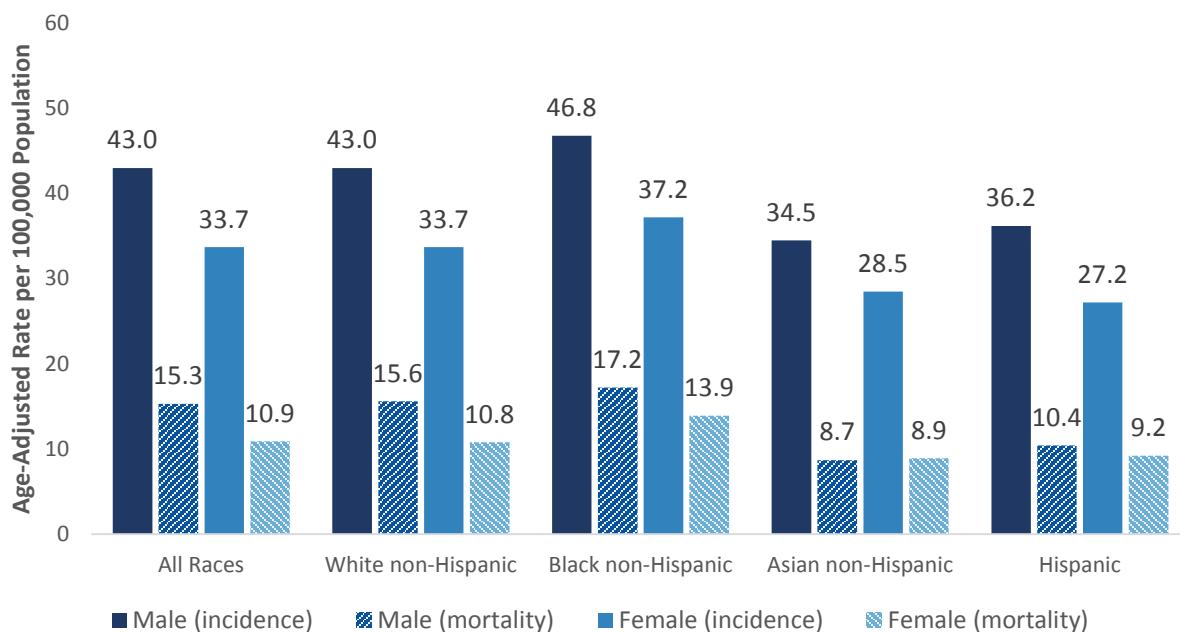
The overall colorectal cancer incidence in Massachusetts from 2010 -2014 was 43.0 per 100,000 among men and 33.7 per 100,000 among women. During the same period, the overall colorectal cancer mortality rate in Massachusetts was 15.3 per 100,000 and 10.9 per 100,000 among men and women, respectively.

Trends/Disparities

The incidence rate for cancer of the colon decreased 2.4% annually for women in Massachusetts from 2010 to 2014. Colorectal cancer incidence was highest for Black non-Hispanic men (46.8 per 100,000 population), followed by White non-Hispanic men (43.0 per 100,000 population), Black non-Hispanic women (37.2 per 100,000 population), and Hispanic men (36.2 per 100,000 population).

Figure 8.23

Age-Adjusted Colorectal Cancer Incidence and Mortality Rate, by Race/Ethnicity and Sex, Massachusetts, 2010-2014



NOTE: MULTIPLE YEARS OF DATA WERE COMBINED FROM THE BRFSS FOR SUFFICIENT SAMPLE SIZE

Colorectal cancer mortality was significantly higher among Black non-Hispanic women than any other racial group (13.9 per 100,000). Among men, however, mortality rates were higher among Black non-Hispanic men (17.2 per 100,000) than either Asian (8.7 per 100,000) or Hispanic men (10.4 per 100,000). Racial disparities in colorectal cancer mortality may reflect unequal access to timely, quality preventive care and cancer treatment.

Prostate Cancer

Most prostate cancers grow slowly. In most men, the cancer never causes serious health issues. But in some cases, prostate cancer can grow rapidly and spread outside the prostate and over time can cause death. Prostate cancer was the most commonly diagnosed type of cancer in Massachusetts men from 2010 to 2014 and was the second leading cause of cancer deaths among men during this period. Nearly one-quarter (24.2%) of cancer diagnoses among men and one in 10 (9.3%) of all cancer deaths among men were due to prostate cancer in 2010-2014.

Risk factors for prostate cancer include race, family history and age.⁵⁸¹ Approximately one in eight men (11.6%) in the US will be diagnosed with prostate cancer at some point during their lifetime.⁵⁸²

Between 2010 and 2014 the overall prostate cancer incidence rate among Massachusetts men was 114.4 per 100,000 and the mortality rate was 18.6 per 100,000.

Trends/ Disparities

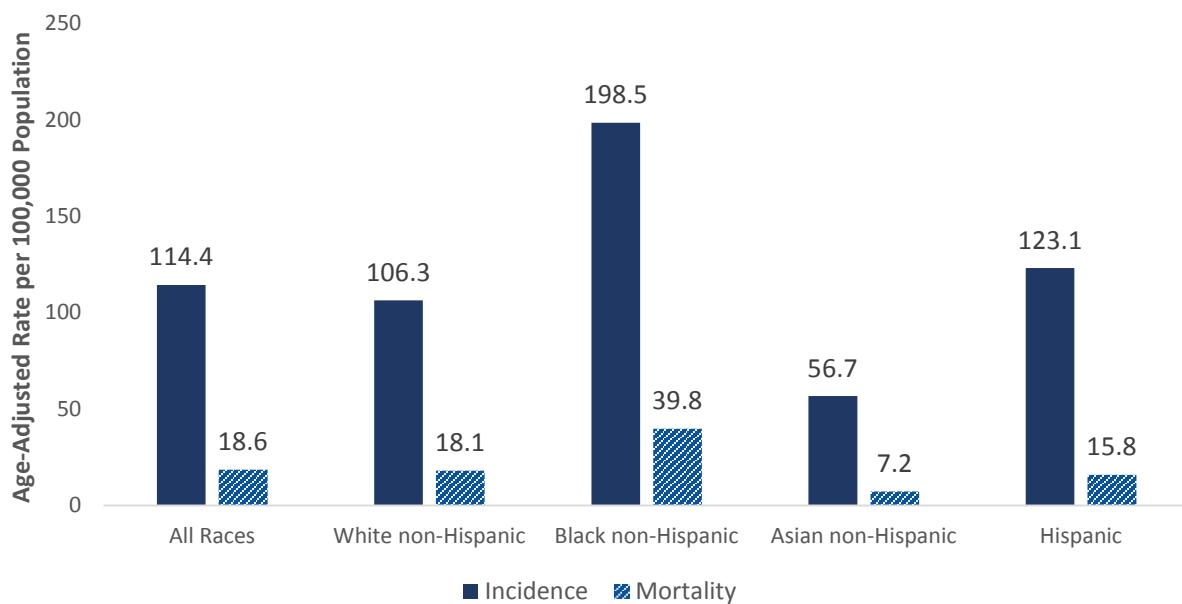
From 2010 to 2014, the incidence of prostate cancer decreased 11.1% annually. The incidence of prostate cancer for Black non-Hispanic men was 1.9 times that for White non-Hispanic men (198.5 versus 106.3 per 100,000 population).

Prostate cancer incidence for Hispanic men (123.1 per 100,000 population) exceeded the state average (114.4 per 100,000 population).

In 2010-2014, the prostate cancer mortality rate for Black non-Hispanic men was 2.1 times the state average (39.8 versus 18.6 per 100,000).

Figure 8.24

Age-Adjusted Prostate Cancer Incidence and Mortality Rate, by Race/Ethnicity, Massachusetts, 2010-2014



Melanoma

Skin cancer is the most common form of cancer in the United States. Skin cancers fall into three groups: melanoma, basal cell carcinoma, and squamous cell carcinoma. Almost all (97%) skin cancers are due to basal cell and squamous carcinomas. Melanoma is less common, accounting for only about 3% of skin cancers. However, melanoma is more dangerous than basal and squamous cell cancers as it is more likely to spread to other parts of the body if not caught early. Risk factors for melanoma include chronic sun exposure, indoor tanning, fair skin, family history, previous skin cancer, and age. Other risk factors are repeated sunburns, especially as a child, having a tendency to freckle or sunburn easily, and inability to tan.

Melanoma of the skin was the fifth leading cause of cancer among men and the sixth leading cause of cancer among women in Massachusetts between 2010 and 2014 and it accounted for 3.7% of cancer diagnoses among women and 4.9% of cancer diagnoses among men. It was also the 12th and 14th leading cause of cancer death in Massachusetts men and women, respectively. In Massachusetts, melanoma is responsible for 2.1% of all cancer deaths among men and 1.3% of all cancer deaths among women.

The overall incidence of melanoma in Massachusetts from 2010 -2014 was 25.5 per 100,000 among men and 17.3 per 100,000 among women. During the same period, the overall mortality rate for melanoma in Massachusetts was 4.1 per 100,000 and 1.9 per 100,000 among men and women, respectively.

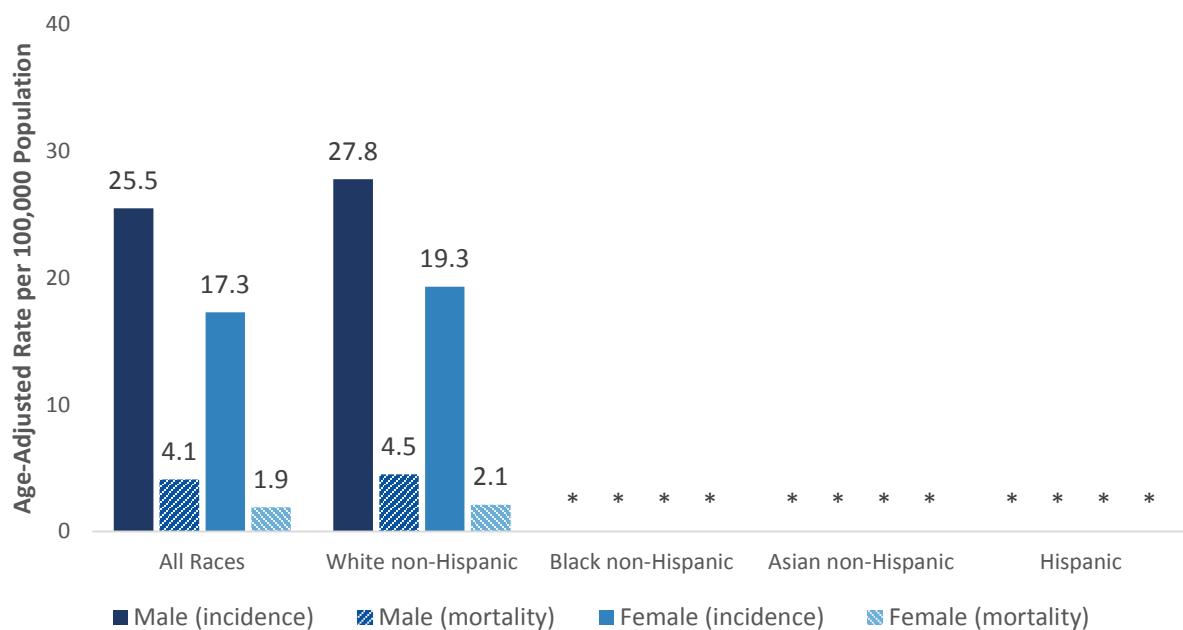
Trends/Disparities

The incidence of melanoma among White non-Hispanic men was 1.4 times that for White non-Hispanic women (27.8 versus 19.3 per 100,000). For women, the incidence of melanoma decreased 4.6% annually from 2010 to 2014.

White non-Hispanic men had a melanoma mortality rate that was approximately double that for White non-Hispanic women (4.5 versus 2.1 per 100,000). Melanoma cases were too few among racial/ethnic minorities to generate age-adjusted incidence and mortality rates.

Figure 8.25

Age-Adjusted Melanoma Incidence and Mortality Rate, by Race/Ethnicity and Sex, Massachusetts, 2010-2014



NOTE: *AN AGE-ADJUSTED INCIDENCE RATE WAS NOT CALCULATED WHEN THERE WERE FEWER THAN 20 CASES

Selected Resources, Programs, and Services

Following are selected resources, services, and programs that support the topics discussed in this chapter.

General

- The Massachusetts Partnership for Health Promotion and Chronic Disease Prevention is a coalition of statewide partners organized around seven priority objectives in Communities of Practice (CoPs). The CoPs develop strategies and activities to address common risk factors for chronic disease. Content-specific CoPs are featured below.
- The Prevention and Wellness Trust Fund (PWTF) was established by the state legislature and administered by the Massachusetts Department of Public Health for local partnerships to reduce rates of chronic disease.
- MDPH supports health system interventions and community-clinical linkages that focus on both the general population and priority populations experiencing increased risk for chronic disease through two CDC-funded initiatives, *State Public Health Actions to Prevent and Control Diabetes, Heart Disease, Obesity and Associated Risk Factors and Promote School Health* and *State and Local Public Health Actions to Prevent Obesity, Diabetes, Heart Disease and Stroke*.
- The Mass in Motion Municipal Wellness and Leadership Program works with 27 partners and 60 municipalities to promote equitable food access.

Nutrition

- There are strict regulatory standards for both the sale of foods and beverages that are part of the federal reimbursable school lunch meal in public schools as well as those foods sold at other times.
- The Healthy Incentives Program (HIP) works to subsidize SNAP purchases at farmer's markets, farm stands, mobile markets, and Community Supported Agriculture (CSA) farms.
- There are four regional food banks and a related emergency food system (SNAP-Ed).
- The Massachusetts Local Food Action Plan focuses on improving food access, food security, and health.
- Children's Health Watch's Hunger Vital Signs, is a simple-to-use tool to screen individuals and their households for food insecurity.
- By Executive Order, all foods purchased by state agencies who have dependent clients in the Commonwealth must meet a set of nutrition standards based on the Dietary Guidelines for Americans.
- The Massachusetts Food Trust Program, established in 2014, provides loans, grants, and technical assistance to support new and expanded healthy food retailers and local food enterprises in low and moderate income communities.

Physical Activity

- The Healthy Transportation Compact integrates health into transportation decision-making and assists with the development and implementation of MassDOT's *Complete Streets Funding Program*.
- The Massachusetts Partnership for Health Promotion and Chronic Disease Prevention's *Built Environment Community of Practice* helps implement Complete Streets Policies.

- The Massachusetts Healthy Community Design Toolkit provides municipalities with tools and best practices for local community design decisions that support more walkable and bikeable environments.

Tobacco Use and Exposure

- The Massachusetts Tobacco Cessation and Prevention (MTCP) program works to reduce the health and economic burden of tobacco use in the Commonwealth by helping current smokers to quit, preventing young people from starting to use tobacco, and protecting all Massachusetts residents from secondhand smoke.
- MTCP funds the Massachusetts Smokers' Helpline which provides free, confidential coaching to help tobacco users quit. Coaching is available 24/7 by calling (800)QUIT NOW, or online at www.KeepTryingMA.org.
- The QuitWorks program, a free, evidence-based referral service that helps clinicians refer patients to quit smoking programs and services.
- MassHealth provides comprehensive cessation coverage including mediation and counseling to all MassHealth members to ensure that tobacco use treatment is available, affordable, and easy to use.

Smoking Prevention

- MTCP provides comprehensive statewide technical assistance to local boards of health and community-based programs to increase capacity for tobacco policy and enforcement, community education, and youth engagement.
- MTCP works directly with 186 municipal boards of health help to inform local tobacco regulations that reduce youth exposure to tobacco industry targeting. These strategies include increasing the price of tobacco, limiting the availability of tobacco, and decreasing youth exposure to tobacco products.
- The 84, an MTCP statewide movement of high school students who work to educate peers and adults about the tobacco industry's marketing tactics, creates local and statewide change to reduce the influence of tobacco on communities, and promotes social norms against tobacco use.

Second Hand Smoke

- MTCP provides the Smoke-free Workplace Law Complaint line (800)992-1895 for residents to report violations of the Commonwealth's smoke-free workplace law.
- The Massachusetts Smoke-Free Housing Project's toll-free information line (877)830-8795 provides free information and technical assistance to landlords and condo associations that are interested in implementing a smoke-free rule and provides tenants with information about their rights to a smoke-free environment and referrals to organizations that may be able to help.
- MTCP technical assistance providers and local community partnership programs work closely with public housing authorities to develop and implement smoke-free policies.

Obesity

- State tax credit for small businesses who offer a wellness program to their employees.
- The Prevention and Wellness Trust Fund supports the adoption of workplace wellness programs.
- Mandatory BMI screenings take place annually in public school grades 1, 4, 7, and 10.

Cardiovascular Disease

- All nine community partnerships in the Prevention and Wellness Trust Fund (PWTF) included strategies to address hypertension in their population.
- The Massachusetts Paul Coverdell National Acute Stroke Program (Coverdell) strives to decrease the rate of premature death and disability from stroke in collaboration with emergency medical services, hospitals and post-acute care providers in the Commonwealth.
- The Face, Arm, Speech and Time (FAST) media campaign targets communities with higher incidence of stroke by providing information about the signs and symptoms of stroke and the need to seek medical care immediately by dialing 911.

Diabetes

- The State Diabetes Prevention Network to increase awareness of prediabetes and the evidence-based Diabetes Prevention Program among residents and health care providers.
- The Prevention and Wellness Trust Fund program focuses on improved identification, management and referral of patients with prediabetes and diabetes for the purposes of prevention and self-management.
- Collaboration with New England Quality Improvement Network and Quality Improvement Organizations (NE QIN-QIO) to sustain and expand diabetes self-management education.

Chronic Lower Respiratory Disease

- The Massachusetts Department of Housing and Community Development and US Office of Housing and Urban Development provides guidance to public housing authorities on adopting smoke-free policies.

Adult Asthma

- The Reducing Older Adult Asthma Disparities (ROAAD) study to improve asthma management and decrease health care utilization among older adults with poorly controlled asthma in Lowell, MA.

Pediatric Asthma

- The Prevention and Wellness Trust Fund (PWTF) forges local partnerships to address pediatric asthma in multiple settings.
- The Massachusetts Asthma Prevention and Control Program (MAPCP) implements standardized training, technical assistance and assessment protocols.
- The Promoting Policies for Asthma in Local Communities (PALC) project provides technical assistance and support protect the health of children with asthma.
- The Logan Airport Health Study Trust, a collaboration among MassPort (Massachusetts Port Authority), the Massachusetts League of Community Health Centers, and five community health centers in communities with increased probable rates of asthma (i.e. Chelsea, East Boston/Winthrop, Charlestown, the North End, and South Boston).

COPD

- The Reducing Older Adult Asthma Disparities (ROAAD) study to improve asthma and COPD management and decrease health care utilization among older adults with COPD in Lowell, MA.
- Tobacco treatment or cessation services to reduce the burden of and management of COPD .

All Cancers

- Several collaborative partnerships focused on eliminating cancer disparities and promoting health equity for the most common cancers.
- The Massachusetts Comprehensive Cancer Prevention and Control Network (MCCPCN), a statewide partnership that resulted in a State Cancer Plan focused on action to reduce cancer risk, find cancer earlier, improve and increase access to quality cancer care, and improve the health and well-being of cancer survivors.

Lung Cancer

- The Lung Cancer Workgroup to provide support to existing and emerging lung cancer screening programs across the state to ensure they follow screening guidelines for lung cancer by the US Preventative Services Task Force.

Breast Cancer

- The Breast Cancer Equity Coalition (comprised of city and state health department representatives, patient navigators, public health policy makers, researchers, oncology and primary-care clinicians, advocates, and patients) to work with health centers to implement evidence-based interventions among patient navigators and community health workers to assist patients in navigating potential barriers to care.

Colorectal Cancer

- A Massachusetts Division of Prevention and Wellness (DPW) program that works with the Massachusetts League of Community Health Centers (MLCHC) to improve the rate of colorectal cancer screening in federally qualified health centers (FQHCs).
- The Massachusetts Comprehensive Cancer Prevention and Control Network (MCCPCN) state cancer plan for 2017-2022 to help meet a national goal of 80% of people screened for colorectal cancer by 2018.
- The Massachusetts Partnership for Health Promotion and Chronic Disease Prevention's Clinical Preventive Services and Population Health Management Community of Practice has a goal of increasing colorectal cancer screening rates by 5% by 2017. In addition, they support provider use and recommendation of home-based stool testing through professional development opportunities and increased public awareness campaigns specific to fecal testing as a colorectal cancer screening option.

Prostate Cancer

- The Prostate Cancer Work Group developed information for men and provider's about prostate cancer screening guidelines and shared decision making. The workgroup also developed a Continuing Medical Education (CME) course on *Prostate Cancer and Primary Care* in collaboration with the Massachusetts Medical Society.

Melanoma

- Funding sunscreen dispensers in public and recreational areas and a sun safety and melanoma awareness program.
- Legislation was implemented in 2016 that bans anyone under the age 18 in Massachusetts from using or operating a tanning facility.
- Health departments across Massachusetts have increased the number of school age children who follow protective measures by conducting skin cancer education and outreach to schools, parents, and teachers.
- Major hospitals are promoting sun protective measures through intensive community outreach at beaches and wide dissemination of written educational materials.

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APPENDIX

- A.** Key Informant Interview Guide
- B.** Focus Group Discussion Guide
- C.** Commissions, Advisory Bodies, and Stakeholder Group Descriptions
- D.** Scan of Community Health Assessments and Community Health Needs Assessments 2012-2017
- E.** State Health Assessment Stakeholder Wheel and List of Organizational Stakeholders including Commissions, Advisories and Stakeholder Groups, Statewide Partnership Advisory Members, Organizational Key Informants and Focus Group Stakeholders
- F.** Data Limitations

APPENDIX A. Key Informant Interview Guide

MDPH State Health Assessment (SHA)
Discussion & Note Guide
[NAME OF INTERVIEWEE]

[NAMES OF INTERVIEWER, NOTETAKER, DATE]

Discussion Goal:

To identify the health needs/concerns and assets/programs/services that are most salient to key stakeholders who have statewide perspectives about specific public health issues facing residents of the Commonwealth of Massachusetts

Facilitator/Note-Taker Instructions:

- Modify/adapt questions as appropriate to the key informant's focus.
- For each question, facilitators should probe as indicated and appropriate. Please note that the questions are intended to serve as a guide, not a script.
- Keep within the allotted time.
- Take detailed notes on responses, focusing on key points, using the department template.

BACKGROUND SCRIPT

- Hello. My name is _____ from the Massachusetts Department of Public Health [OR from North Passage Associates/Health Resources in Action, a consulting organization assisting the Massachusetts Department of Public Health]. Thank you for participating in this discussion today. I really appreciate your time and feedback.
- As I mentioned previously, we are working with the Massachusetts Department of Public Health to develop a statewide health assessment. This effort will help the state health department gain national accreditation by assessing the health of our state's residents, then using this information to set priorities for health improvement and to develop ideas to address problems through collaboration with partners from communities and organizations across Massachusetts.
- As part of the assessment process, we are conducting interviews with Massachusetts leaders like yourself, to understand different perspectives. We are interested in hearing your feedback on issues specific to your field or the populations you serve, as well as your more macro perspective on the health of Massachusetts residents. We greatly appreciate your insight, openness, and honesty with us so we can paint as accurate a picture as possible for the assessment.
- Our interview will last approximately [45-60] minutes [EXPECTED RANGE FROM 30-60 MINUTES, DEPENDING ON INTERVIEWEE]. What we learn through interviews will help guide the state health assessment and planning process, and key themes will be incorporated into the health assessment report. No names or organizations will be connected to anything that any one person said in the discussion. Any quotes we put in the report will be presented anonymously. Additionally, nothing sensitive that can be connected to any organization or individual will be discussed in the report. However, at the end of the report, we will list _____ as an organization that contributed to the assessment.

- Do you mind if we record audio of our session today so we can make sure our notes are accurate? We will erase the recording once we complete our notes. This is optional, so if this makes anyone feel uncomfortable, we will just take handwritten/typed notes.
- The information you provide is a valuable part of this process and will help us better understand how to achieve the goals of this initiative most effectively. Your input will be critical as this process moves forward. Do you have any questions before we begin?

THEIR AGENCY/ORGANIZATION

- Can you tell me a bit about your organization/agency/business? [TAILOR PROBES DEPENDING ON AGENCY]
 - PROBE: What is your organization's/agency's/business' mission? What communities do you work in? Who are your main clients/audiences for or beneficiaries of your programs or activities?

IDENTIFYING TOP HEALTH ISSUES

- To begin, please tell me what you see as the most critical and pressing issues or concerns for the communities or populations with whom you work?
 - PROBE: Are education, violence and trauma, built environment, social environment, and housing top issues?
- What issues around health concern you the most as someone in the [HEALTH CARE/HOUSING/EDUCATION, ETC] field? [PROBE ON COMPELLING ISSUES]. Why?
 - if you had to pick 1 or 2 top health concerns, what would those be?
 - PROBE: Are chronic diseases or conditions, mental health, substance abuse, violence, access to healthy food, access to health care access top issues?
 - What do you think the [INTERVIEWEE'S FIELD] community sees as the most compelling issue(s) around health in Massachusetts?
 - Do you think there are any emerging threats to health of Massachusetts residents that might not yet be major issues, but have the potential to become more important? What are these? Why do you think these are important?
- What factors do you think contribute most to these specific health issues in Massachusetts? [PROBE ON: cost/affordability, quality, infrastructure/facilities, access, economic issues, inequities across population groups, etc.]
- How have these health issues affected the community/population you serve/Massachusetts residents overall?
 - PROBE: Which populations do you think are most vulnerable or at risk for these conditions/issues? In what way?
- From your experience, what are the biggest challenges to Massachusetts residents in addressing these conditions/issues?

- What do you see as the greatest challenges around improving health in Massachusetts? [PROBE IF NEEDED: lack of interest/political will/legislative support infrastructure/facilities, cost/lack of funding, competing interests among stakeholders, etc.]
- What are the consequences to Massachusetts in not addressing these issues? What is the impact on the community/population for whom you work or on your organization/agency?

ADDRESSING TOP HEALTH ISSUES

- Thinking about the top health issues you've mentioned, what are the Commonwealth's greatest strengths or assets around these issues?
- Thinking about the top health issues you've mentioned, what is currently being done to address those issues in the Commonwealth?
- What programs or services are available or organizations that are working on the top health issues facing the Commonwealth?
- What do you think leaders and decision-makers in the Commonwealth can do to help improve the health of Massachusetts residents?

VISION OF COMMUNITY AND PROGRAM/SERVICE ENVIRONMENT

- Thinking about the future, if you could do one thing to improve the health of Massachusetts residents, what would it be?
 - If you could change or implement a new program, service, or policy, what would it be?
 - What individuals/organizations are leading or should lead this effort?

CLOSING

Thank you so much for your time and sharing your opinions. We really value your feedback and help in making the state health assessment successful. Before we end the discussion, is there anything that you wanted to add that you did not get a chance to bring up earlier?

On behalf of the Massachusetts Department of Public Health and the State Health Assessment Coordinating Team, I want to thank you again for your time.

APPENDIX B. Focus Group Discussion Guide

MDPH State Health Assessment (SHA)
Discussion & Note Guide
[NAME OF FOCUS GROUP/ADVISORY GROUP HERE]

Discussion Goal:

To identify the health needs/concerns and assets/programs/services that are most salient to consumers who serve on advisory boards and the public health professionals that serve them in the Commonwealth of Massachusetts

Facilitator/Note-Taker Instructions:

- Modify/adapt questions as appropriate to the advisory group's focus.
- For each question, facilitators should probe as indicated and appropriate. Please note that the questions are intended to serve as a guide, not a script.
- Keep within the allotted time.
- Take detailed notes on responses, focusing on key points, using the department template.

BACKGROUND SCRIPT

- Hello. My name is _____ from the Massachusetts Department of Public Health [OR from North Passage Associates/Health Resources in Action, a consulting organization assisting the Massachusetts Department of Public Health]. Thank you for participating in this discussion today. We really appreciate your time and feedback.
- As was mentioned during the presentation, we are doing a statewide health assessment. This effort will help the state health department gain national accreditation by assessing the health of our state's residents, then using this information to set priorities for health improvement and to develop ideas to address problems through collaboration with partners from communities and organizations across Massachusetts.
- We are conducting discussion groups with folks like yourself from different geographic areas in the state to understand different perspectives about health issues affecting the communities you belong to or serve. We are interested in hearing your feedback on issues specific to your community or the people you serve as well as any insight you have about the main issues you think affect the health of Massachusetts residents overall.
- I want everyone to know there are no right or wrong answers during our discussion. We want to know your opinions, and those opinions might differ. This is fine. Please feel free to share your opinions, both positive and negative. We greatly appreciate your honesty and openness with us so we can paint as accurate a picture as possible for the assessment.
- Our discussion will last about 45 minutes. What we learn through these discussions will help guide the state health assessment and planning process, and key themes will be incorporated into the health assessment report. No names or organizations will be connected to anything that any one person said in the discussion. Any quotes we put in the report will be presented anonymously. Additionally, nothing sensitive that can be connected to any organization or individual will be

discussed in the report. However, at the end of the report, we will list _____ as an organization that contributed to the assessment.

- Do you mind if we record audio of our session today so we can make sure our notes are accurate? We will erase the recording once we complete our notes. This is optional, so if this makes anyone feel uncomfortable, we will just take handwritten notes.
- Do you have any questions before we begin? Before we begin, if you haven't already, please turn off your cell phones or put them on vibrate mode. Again, thank you for being here and sharing feedback with us. Let's get started.

INTRODUCTIONS

- Let's start by getting to know one another. Let's go around and introduce ourselves. Please tell me: **1) your first name; and 2) an activity you like to do in your spare time.**

[AFTER ALL PARTICIPANTS INTRODUCE THEMSELVES, FACILITATOR TO ANSWER INTRO QUESTIONS]

IDENTIFYING TOP HEALTH ISSUES

- What are some of the biggest problems or concerns in your community?
 - PROBE: Are education, violence and trauma, built environment, social environment, and housing top issues in your community?
 - I heard you say that the most pressing health concerns in your community are[List what you heard them say] of these, if you had to pick 1 or 2 top health concerns, what would those be?
 - PROBE: Are chronic diseases or conditions, mental health, substance abuse, violence, access to healthy food, access to health care access top issues for your community?
- How have these health issues affected your community?
 - PROBE: Are some people or populations more affected by these health issues than others? In what way?
- What are the consequences to the community in not addressing these issues? What is the impact on the community you represent?

ADDRESSING TOP HEALTH ISSUES

- Thinking about the top health issues you mentioned, what is currently being done to address those issues for the community?
- What programs or services are available or organizations are working on the top health issues facing your community?
 - What specific organizations play a lead role in making people healthy in your community?
 - PROBE: Would you describe an example of something being done in your community to tackle the top health issues facing your community?

STAYING HEALTHY

- What makes it harder to be healthy?
 - Are there significant barriers to being healthy or making healthy choices in your community? What are those barriers?
 - Do folks in your community experience barriers in accessing health care services? What are those barriers?
- What programs, services or policies are missing in your community that would support health or make it easier to be healthy? [THIS QUESTION MAY HAVE ALREADY BEEN ANSWERED]

VISION OF COMMUNITY AND PROGRAM/SERVICE ENVIRONMENT

- Thinking about the future, if you could do one thing to improve the health of people in your community, what would it be?
 - If you could change or implement a new program, service, or policy, what would it be?
 - What organizations are/who is already leading this effort?

CLOSING

Thank you so much for your time and sharing your opinions. We really value your feedback and help in making the state health assessment successful. Before we end the discussion, is there anything that you wanted to add that you did not get a chance to bring up earlier?

On behalf of the Massachusetts Department of Public Health and the State Health Assessment Coordinating Team, I want to thank you again for your time.

APPENDIX C. Commissions, Advisory Bodies, and Stakeholder Group Descriptions

13 Largest Cities Forum

The Office of Local and Regional Health (OLRH) formed the Massachusetts 13 Largest Cities Project (13 LCP) as part of its effort to define strategic relationships with public health departments in Massachusetts cities. On June 7, 2017, OLRH convened a public health forum with the public health leadership from the 13 largest Massachusetts cities. The selected Massachusetts cities (Boston, Cambridge, Somerville, Newton, Quincy, Lynn, Lawrence, Lowell, Springfield, Worcester, New Bedford, Fall River, and Brockton) met the criteria of the CDC 500 Cities Project (population greater than 75,000) with which the 13LCP is aligned.

The key objectives of the meeting were to 1) enhance collaboration, communication, and partnerships between MDPH and local public health leadership from the 13 largest cities in Massachusetts, 2) to identify and address the problems associated with delivering the 10 essential public health services in larger cities, 3) support accreditation readiness activities among larger cities, and 4) promote opportunities for future engagement among the 13 LCP public health leadership, academic institutions, and the health care community.

Coalition for Local Public Health

The Coalition for Local Public Health (CLPH) consists of five public health organizations dedicated to advocating for the resources needed to promote healthy communities in Massachusetts through strong Boards of Health and Health Departments. The organizations represent over 3,000 citizens and professionals interested in supporting the Commonwealth's local public health infrastructure.

The five member organizations are: Massachusetts Association of Health Boards, Massachusetts Association of Public Health Nurses; Massachusetts Environmental Health Association, Massachusetts Health Officers Association and Massachusetts Public Health Association.

Health and Disability Partnership

The Health and Disability Partnership is a coalition of disability advocacy organizations, state agencies and other stakeholders working to improve the health of people with disabilities statewide. The Partnership was created by the Health and Disability Program (HDP) at the Massachusetts Department of Public Health.

The Partnership, which meets quarterly, informs and strengthens HDP's priorities and initiatives, ensuring that HDP activities are carried out in the spirit of "nothing about us without us". The Partnership has been particularly helpful to HDP in gathering data and prioritizing issues for HDP's statewide health needs assessment of people with disabilities and their care providers, keeping HDP aware of important concerns in the disability community, collaborating to make the best use of people and resources, and including people with disabilities in emergency preparedness efforts. It has also been helpful in improving facility and communications access to health care providers, promoting the work of HDP within the disability community, helping to develop logic models and work plans for HDP activities, bringing accessible, culturally competent health promotion and disease management programs to people with disabilities, and planning for the sustainability of HDP and Partnership activities.

Health and Medical Coordinating Coalitions

Six regional Health and Medical Coordinating Coalitions (HMCCs) have been established to promote cross-disciplinary planning and support public health and medical response across the Commonwealth during emergencies and disasters.

Each HMCC is supported by a sponsoring organization with dedicated staffing whose objective is to ensure integrated planning and capacity-building across five core disciplines: acute care hospitals, community health centers, large ambulatory care organizations, emergency medical services, local public health, and long-term care. The HMCC works closely with other health and medical partners, and builds strong connections with emergency management and public safety/first responder organizations within the region, as well as other public and private organizations with a role under Emergency Support Function 8 (ESF8), public health and medical services.

Each HMCC conducts capabilities-based planning to advance regional health and medical capacity to prepare for, respond to, recover from, and mitigate the impact of large scale emergencies and disasters. Planning activities are consistent with the health care and public health preparedness capabilities as established by the Assistant Secretary of Preparedness and Response (ASPR) and the Centers for Disease Control and Prevention (CDC).

Local State Advisory Committee

The Local State Advisory Committee (LSAC) is a monthly meeting between local public health representatives of the Emergency Preparedness Coalitions and the Massachusetts Department of Public Health (MDPH).

The formation of the Local State Advisory Committee (LSAC) was initiated by the Coalition of Local Public Health (CLPH) in August 2006 to “build on the work already accomplished by the CLPH regarding public health” by serving as an Advisory Committee on public health emergency preparedness to the Massachusetts Commissioner of Public Health. The LSAC functions as a standing committee of the CLPH and is an advisory group only, with no formal authority. Public Health authority rests with the local health departments in the Coalitions.

The mission of the LSAC is to collaborate to advance Public Health preparedness in the Commonwealth of Massachusetts.

Membership of the LSAC consists of each of the Preparedness Coalitions, the two Tribal Nations and each of the five, statewide public health professional organizations which comprise the Coalition of Local Public Health. Each member organization will appoint one Representative (except the Central Region, which may have two Representatives) and an Alternate to the LSAC. The Commissioner of Public Health and his/her representative and the Director of the MDPH Emergency Preparedness Bureau and his/her representative shall have ex-officio membership at each meeting.

MA Coalition for Suicide Prevention

The Massachusetts Coalition for Suicide Prevention (MCSP) is a broad-based inclusive alliance of suicide prevention advocates. Members includes public and private agency representatives, non-profit organizations, policymakers, survivors of suicide loss, suicide attempt survivors, mental health clinicians and other health care providers, law enforcement, mental health and public health consumers, and concerned citizens committed to working together to reduce the incidence of self-harm and suicide in

Massachusetts. From its inception, the Coalition has been a public /private partnership, involving government agencies such as the Department of Public Health and Department of Mental Health working in partnership with community-based agencies and interested individuals.

The goals of the coalition are to support and develop effective suicide prevention initiatives by providing leadership and advocacy, promote collaborations among organizations, develop and recommend policy, and promote research and development.

MA Commission on LGBTQ Youth

The Massachusetts Commission on LGBTQ Youth is an independent agency of the Commonwealth with a mandate to investigate the use of resources from both the public and private sectors to enhance and improve the ability of state agencies to provide services that protect and support the health and safety of Lesbian, Gay, Bisexual, Transgender, Queer and Questioning (LGBTQ) youth in the schools and communities of Massachusetts. The Commission has a focus on suicide prevention and violence intervention policies regarding harassment and discrimination against LGBTQ youth, and also makes recommendations about policies and programs supporting LGBTQ youth to state government agencies.

Advisory Board to the Occupational Health Surveillance Program

The Occupational Health and Safety Advisory Board is a 13-member board consisting of the following persons or their designees: Secretary of Labor and Workforce Development, Personnel Administrator/Chief Human Resources Officer, Director of the Department of Labor Standards, Secretary of Administration and Finance, Director of the Office of Employee Relations, Commissioner of the Massachusetts Department of Public Health, Director of the Department of Industrial Accidents, four representatives from labor unions representing state employees, one representative from a community-based health and safety advocacy organization, and one member of the faculty of the Department of Work Environment at the University of Massachusetts- Lowell.

The mission of the Board is to evaluate and address any needed improvements in the protection of Commonwealth employees at the macro policy level. The Board uses methods such as evaluation of existing health and safety systems and injury and illness statistics to create recommendations on effective strategies to improve state worker health and safety -- including centralized worker protection policies or regulations, needed resource allocations, and/or agency health and safety system improvement measures. The Board also monitors the effectiveness of the state's health and safety programs.

Prescription Monitoring Program Stakeholders

The Prescription Monitoring Program (PMP) Stakeholders is composed of representatives of provider groups, professional medical and pharmacy organizations, and law enforcement who evaluate the Massachusetts PMP for its functionality and ease of use and make recommendations for enhancements to the system. The PMP collects dispensing information on Massachusetts Schedule II through V controlled substances dispensed pursuant to a prescription. Schedules II through V consist of those prescription drug products with recognized potential for abuse or dependence (e.g., narcotics, stimulants, and sedatives). Consequently, they are among those most sought for illicit and non-medical use. The PMP is primarily an educational tool that provides prescribers and dispenser access to their patient's prescription history. The PMP also provides access to law enforcement and regulatory officials provided their inquiries are related to open and ongoing investigations concerning drug distribution and diversion. Finally, the PMP analyzes the data to determine prescribing and dispensing trends.

Preventive Health and Health Services Block Grant Advisory

The PHHS Block Grant Advisory Committee is a 12-member committee with representation from local public health, public health advocacy organizations, and non-profit organizations. The committee provides oversight in planning program priorities, funding decisions, and maintenance of the funding accountability. The PHHS Block Grant was established in 1981 as a flexible way for states to address priority health concerns focused on Healthy People 2020 objectives. The grant has been a key mechanism for Massachusetts to achieve the three Public Health Core Functions: Assessment, Policy, and Assurance, and ensures the infrastructure is in place both at the state and community level to address the ten Essential Public Health Services. This funding is the foundation upon which other services and initiatives are built. Integrated with both state and other federal funding, it ensures that Massachusetts can continue to address the disparities which exist in health outcomes and maintain core public health functions. Some of the specific program goals include sexual assault prevention, implementation of community-level strategies to increase active living and healthy eating, local public health capacity building, healthy communities' capacity building, and infrastructure investment in public health.

Massachusetts Rural Council on Health

The Massachusetts Rural Council on Health is a group of 20 rural-based providers and community leaders representing a broad range of service types from across the state. Also participating in Council activities are staff from multiple state agencies and other statewide organizations interested in rural health. The Council serves not only in an advisory capacity to the State Office of Rural Health but also provides leadership for rural health across the state. They periodically host larger educational and networking events to bring together a greater network of rural health stakeholders in Massachusetts.

Wellness in Schools Coalition

The Wellness in Schools Coalition brings together stakeholders from across the state in an effort to mobilize communities to foster the whole child through school wellness initiatives. By taking an interdisciplinary approach to school wellness, the Coalition is able to support safe and healthy schools through the sharing of resources, collaboration of organizations, and promotion of public health. Topics range from nutrition and physical activity/education to mental health and substance abuse.

The Wellness in Schools Coalition is organized by Claire Santarelli, RD CDE LDN, of the Massachusetts Department of Public Health and Lisa Jackson, MS RD LDN, of the Massachusetts Department of Elementary and Secondary Education.

State Technical Advisory Group

The State Technical Advisory Group works with the Bureau of Environmental Health as part of the Environmental Public Health Tracking Cooperative Agreement with the US Centers for Disease Control and Prevention. The Advisory Group provides counsel to the Bureau on the development and implementation of the EPHT interactive public health data portal, including the environmental health data and educational messaging presented, the application's functionality and usability, and outreach and collaboration opportunities.

APPENDIX D. Scan of Community Health & Health Needs Assessments from Across Massachusetts, 2012 – 2017

Scan of Community Health & Health Needs Assessments from Across Massachusetts, 2012 – 2017

Author: Jonathan Morely, Massachusetts Department of Public Health, Performance Management and Quality Improvement Summer Intern and UMass Amherst School of Public Health Graduate Student

Abstract

Introduction: As part of the 2017 State Health Assessment, the Massachusetts Department of Public Health collected and analyzed Community Health and Health Needs Assessments from health systems, hospitals, organizations, and municipalities across the state. These documents identify priority health issues in communities through both qualitative and quantitative data collection. The purpose of this analysis was to ensure that the State Health Assessment includes the majority of the key health issues identified in these documents.

Methods: Documents completed in the past five years were collected through the Massachusetts Attorney General's Annual Community Benefits Reports search tool, and Google searches. Documents were quickly read and terms for health issues, barriers, disparities and priority populations were defined before analysis began. All 3,386 pages were coded using NVivo software. Coding was analyzed and terms were ranked according to the number of assessments in which they appear.

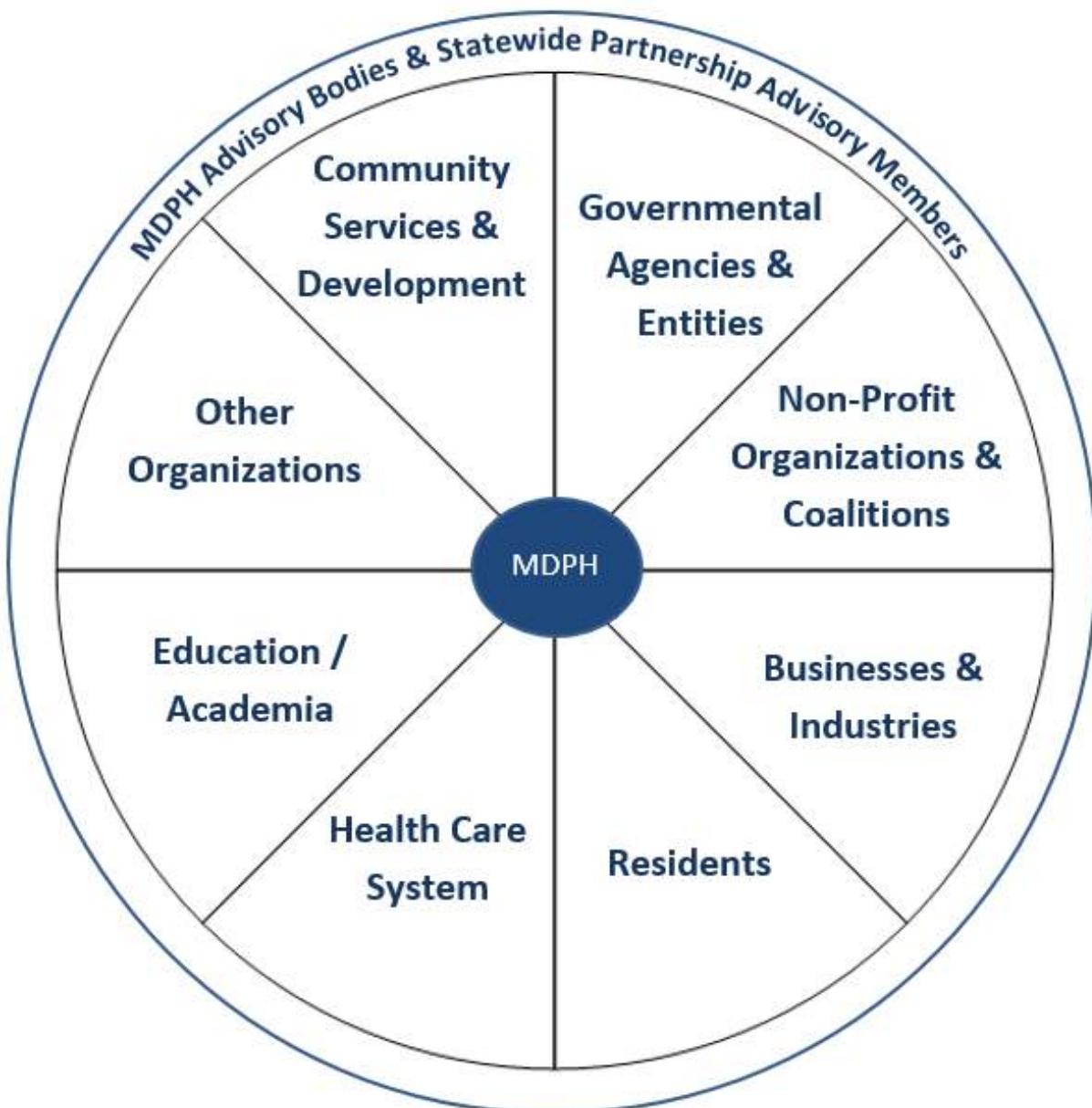
Results: The 42 analyzed documents cover 339 out of the 351 municipalities in Massachusetts. The represented municipalities account for roughly 99% of the state population. The top ten health priorities identified were: mental health; alcohol and substance use; chronic disease (including obesity, diabetes, heart disease, asthma, etc.); cancer; lack of physical activity; poor nutrition; tobacco use; reproductive health (including maternal, prenatal and infant health); sexual health (including sexually transmitted infections and teen pregnancy); and public safety (including crime, violence and motor vehicle crashes). The top ten barriers to health or health care were: cost of care or insurance; transportation; lack of affordable housing; health literacy issues; insurance coverage; lack of services or providers; general access to care; lack of cultural humility; language barriers; and access to healthy food. The top four disparities were based on geography, race, economic status, and age. The top four priority populations were the elderly, youth, poor, and immigrant communities.

Discussion: This analysis provides a broad overview of community health issues and barriers in Massachusetts municipalities. Therefore, the results should not be treated as a complete list of issues regarding health in the state. Despite limitations, repetition and improvement of this process is highly recommended to better inform future State Health Assessments. Further analysis on community strengths, resources, and strategies is also recommended during the State Health Improvement Planning process.

Suggested Citation: Massachusetts Department of Public Health, *Scan of Community Health & Health Needs Assessments from Across Massachusetts, 2012 – 2017*, July 2017.

The full Scan of Community Health and Health Needs Assessments from across Massachusetts is online: www.mass.gov/dph/2017StateHealthAssessment.

APPENDIX E. State Health Assessment Stakeholder Wheel and List of Organizational Stakeholders including Commissions, Advisories and Stakeholder Groups, Statewide Partnership Advisory Members, Organizational Key Informants and Focus Group Stakeholders



Sector	Key Stakeholders
Community Services & Development: Organizations Focused on Serving Communities	<ul style="list-style-type: none"> ● ABCD, Inc. ● Boston Planning & Development Agency (BPDA) ● Citizens' Housing and Planning Association ● Local Initiatives Support Coalition ● Project Bread ● WalkBoston
Governmental Agencies & Entities: State Government Offices and Departments	<ul style="list-style-type: none"> ● Health Policy Commission ● MA Department of Elementary and Secondary Education ● MA Department of Higher Education ● MA Department of Mental Health ● MA Department of Transportation ● MA Executive Office of Elder Affairs
Non-Profit Organizations & Coalitions: Non-Profits Working in Public Health	<ul style="list-style-type: none"> ● American Cancer Society ● American Heart Association ● DentaQuest ● Health Care for All ● Health Resources in Action (HRiA) ● MA Health Council ● MA Public Health Association ● National Institute for Children's Health Quality
Businesses & Industries: Associations Representing Industries and Special Interests	<ul style="list-style-type: none"> ● American Association of Retired Persons (AARP) ● Associated Industries of Massachusetts (aim) ● Association for Behavioral Health (ABH) ● MA Association of Health Plans (MAHP) ● MA Association of Public Health Nurses (MAPHN) ● MA Coalition for Suicide Prevention ● MA Dental Society (MDS) ● MA Food Council ● MA Law Reform Institute ● MA League of Community Health Centers ● MA Prevent Injuries Now! Network (PINN) ● National Association for the Advancement of Colored People (NAACP)

Sector	Key Stakeholders
Residents: Individuals, Consumers and Specific Populations	<ul style="list-style-type: none"> ● Asian Women for Health ● Current substance users ● General public ● Homeless Youth ● Individual: College professor, urban school ● MA Alliance of Portuguese Speakers (MAPS) ● Nipmuc Tribe ● People with disabilities ● Police ● Recovery community ● Veterans
Health Care System: Organizations and Individuals Involved with Health Care Delivery and Insurance	<ul style="list-style-type: none"> ● Atrius Health ● Blue Cross Blue Shield Foundation ● Boston Medical Center ● Cambridge Health Alliance ● Compass Medical ● Conference of Boston Teaching Hospitals ● First Responders ● Health and Disability Partnership ● Hilltown Community Health Center ● HIV care providers ● MA Chapter American Academy of Pediatrics ● MA Medical Society ● Maternal and Child Health Practitioners ● Mental Health Providers ● Partners HealthCare ● Primary care providers ● Substance use treatment providers

Sector	Key Stakeholders
Education/Academia: Educational Institutions and Organizations	<ul style="list-style-type: none"> • Boston University School of Public Health • Brandeis University • Harvard Catalyst • Harvard School of Public Health • Institute for New England Native American Studies at the University of Massachusetts, Boston • MA Association of School Committees • MA Association of School Superintendents • MA Department of Higher Education • Regis College • UMass Amherst School of Public Health and Health Sciences • Wellness In Schools Coalition
Other Organizations	<ul style="list-style-type: none"> • Council on Compulsive Gambling • GE Foundation • HomeBASE, a Red Sox Foundation and Massachusetts General Hospital Program • MA Rural Council on Health
MDPH Advisory Bodies: Existing Regularly Meeting Groups of Stakeholders	<ul style="list-style-type: none"> • 13 Largest Cities Forum • Coalition for Local Public Health • Health and Disability Partnership • Health and Medical Coordinating Coalitions - North Shore, South Shore, and Boston (HMCCs) • Local State Advisory Committee • MA Coalition for Suicide Prevention • MA Commission on LGBTQ Youth • MA Rural Council on Health (MARCH) • Advisory Board to the Occupational Health Surveillance Program • Prescription Monitoring Program Stakeholders • Preventive Health and Health Services Block Grant Advisory • State Technical Advisory Group • Wellness In Schools Coalition

Sector	Key Stakeholders
Statewide Partnership Advisory: External Advisory Board Charged with Informing Content, Disseminating Information and Identifying Gaps	<ul style="list-style-type: none"> ● ABCD, Inc. ● Alliance of MA YMCAs ● American Cancer Society ● American Heart Association ● American Lung Association ● Asian Women for Health ● Association for Behavioral Healthcare ● Atrius Health ● Boston University, School of Public Health ● Compass Medical ● Conference of Boston Teaching Hospitals' Community Benefit Advisory Committee ● Harvard Catalyst ● Health Care for All ● Health Policy Commission ● Institute for New England Native American Studies at the University of Massachusetts, Boston ● John Snow Inc. (JSI) ● Lead and Environmental Health Association ● Local Initiatives Support Coalition ● MassAHEC Network / UMass Medical School ● MA Alliance of Portuguese Speakers (MAPS) ● MA Association of Public Health Nurses ● MA Chapter American Academy of Pediatrics ● MA Coalition for Occupational Safety & Health ● MA Dental Society ● MA Health Council ● MA League of Community Health Centers ● MA Medical Society ● MA Public Health Association ● National Institute for Children's Health Quality ● New England AIDS Education and Training Center ● Partners for a Healthier Community ● Partners HealthCare – Community Health ● Regis College ● UMass Amherst, College of Nursing ● UMass Amherst, School of Public Health and Health Sciences ● WalkBoston ● Western MA Health Equity Network

Sector	Key Stakeholders
Focus Groups	<ul style="list-style-type: none"> • HomeBASE, a Red Sox Foundation and Massachusetts General Hospital Program • HIV care providers • Homeless Youth • MA Integrated Prevention and Care Committee • MA Rural Council on Health • MCH Title V Block Grant Advisory • Nipmuc Tribe • Substance abuse services coalition members (Southeast, Cape Cod & Western Regions)
Key Informants	<ul style="list-style-type: none"> • American Association of Retired Persons (AARP) • Asian Women for Health • Associated Industries of Massachusetts (aim) • Brandeis University • Cambridge Health Alliance • Citizens' Housing and Planning Association • DentaQuest • Massachusetts Department of Mental Health (DMH) • DPH Council on Compulsive Gambling • Executive Office of Elder Affairs • GE Foundation • Health Resources in Action (HRiA) • HomeBASE, a Red Sox Foundation and Massachusetts General Hospital Program • Individual/College Professor, Urban School • MA Association of Health Plans • MA Association of School Committees • MA Association of School Superintendents • MA Department of Elementary and Secondary Education • MA Department of Higher Education • MA Department of Transportation (MassDOT) • MA Food Association • MA Law Reform Institute • MA Public Health Association • MA Prevention Injury Network Now • NAACP • National Institute for Children's Health Quality • Partners for a Healthier Community • Project Bread • UMass Boston, Gerontology Institute • WalkBoston

APPENDIX F. Data Limitations

Limitations Crossing More Than One Chapter

Behavioral Risk Factor Surveillance System (BRFSS)

The BRFSS collects data on a variety of health risk factors, preventive behaviors, chronic conditions, and emerging public health issues. It is conducted continuously in all states as a collaboration between the federal Centers for Disease Control and Prevention (CDC) and state departments of health. The BRFSS is a telephone survey.

- The landline telephone portion of the survey has been conducted in Massachusetts since 1986; a cell phone component was not added until 2011. The CDC does not recommend using BRFSS data from 2011 and onward to show a trend or to compare with data collected prior to 2011.
- The BRFSS is limited to adults ages 18 and older residing in a private residence or college housing.
- Persons with the most severe limitations and with certain disabilities are not represented in this survey since individuals living in institutions are not included in the BRFSS. BRFSS methodology also precludes anyone from assisting respondents in completing the interview if the selected adult had difficulty in participating for any reason, such as an intellectual or developmental disability.
- The BRFSS is offered only in English, Spanish, or Portuguese.
- All data from BRFSS are self-report and cross-sectional.

Massachusetts Youth Risk Behavior Surveillance System (YRBSS) and Massachusetts Youth Health Survey (YHS)

YRBSS and YHS collect data on multiple topics relevant to adolescent health – diet, physical activity, alcohol, tobacco and drug use, behaviors related to unintentional injuries, violence, sexual behaviors related to unintentional pregnancy and STDs, and mental health.

- The YRBSS and YHS are pencil and paper surveys.
- They are administered to randomly selected schools and only in odd-numbered years.
- The YRBSS and YHS are limited to middle and high school students.
- YRBSS has been conducted in MA since 1993; YHS was first conducted in 2007.
- The YRBSS and YHS are administered only in public schools.
- Students who have severe limitations or disabilities, or who have frequent absences from school may be under-represented.
- All surveys are only administered in English.
- All data collected are self-report and cross-sectional.

Sexual Orientation and Gender Identity (SO/GI)

Massachusetts has been a national leader in monitoring the health of its residents along the lines of sexual orientation, adding a question about the sex of sexual partners (“sexual behavior”) to the Youth Risk Behavior Survey (YRBS) in 1993, and a question about sexual orientation identity in 1995. In 2000, a question about sexual behavior on the adult Behavioral Risk Factor Surveillance Survey (BRFSS) was added and a year later, a question to assess sexual orientation identity was added. In 2007, Massachusetts again demonstrated leadership and

included a transgender status question to identify transgender and cisgender respondents on the adult BRFSS, expanded in 2013 and adopted by the Centers for Disease Control for inclusion in the national BRFSS survey (optional lesbian, gay, bisexual and transgender module), the Youth Risk Behavior Surveillance System (YRBSS), and the Youth Health Survey (YHS). Health inequities by sexual orientation and gender identity (SO/GI) have been observed in all domains of health: safety, mental health, substance use, sexual health, and health care access. In 2017, the MDPH published a set of standards for SOGI data collection. These address the absence of a self-report question about assigned sex at birth on the BRFSS and YHS.

Where applicable, collecting sexual orientation, gender identity, and expression is increasingly becoming a standard in health care. MDPH has developed and will implement SO/GI data collection standards to ensure public health providers better understand patient needs, decrease invisibility, and improve the quality of care through communication, best practices, and interventions to reduce and eliminate health disparities. Massachusetts is actively working to improve health surveillance by modifying data collection tools and practices that are within the Department's domain.

- Instances of the word “sex” as a demographic category may be found in this report, which may in fact capture an individual’s gender identity and/or expression regardless of their biological or anatomical designation at birth.
- The terms gender and sex are often used interchangeably by many of the data collection systems the Department must utilize, although they reflect different constructs and, thus, should be assessed with different questions.
- The need for valid measures of gender and a national data standard for sex have been acknowledged by the Institutes of Medicine, the US Department of Health and Human Services, and the Centers for Disease Control and Prevention.

Chapter 1: Population Characteristics

- There are limited data sources for specific communities that make comprehensive analysis difficult, for example, the LGBTQ adult population, Immigrants, veterans, people with disabilities, and rural communities.
- Until MDPH can link their datasets, limitations will exist for generating a comprehensive analysis and evaluation of programs that can focus on many communities that includes descriptive statistics, the tracking of changes in health indicators and quality improvement.
- Mortality data sources do not currently include the race/ethnicity ancestries that meet standard MDPH expectations.

Chapter 2: Maternal, Infant, and Child Health

Breastfeeding

- There are limited real-time data on breastfeeding for mothers who are not WIC participants, particularly regarding duration and exclusivity; the National Immunization Survey (NIS) doesn’t ask about breastfeeding practices until the child is 18 to 36 months old, which can make accurate recall difficult.

Infant Mortality

- Data are limited on factors that contribute to the persistent racial/ethnic disparities in infant mortality.

- Surveillance systems lack standardized measures on racism and health inequities to discern their effects over the life course and across generations.

Perinatal Substance Exposure

- No universal screening or testing of pregnant women is available from obstetric practices or hospitals to allow for accurate assessment of the prevalence of perinatal substance use.
- Inconsistencies exist in reporting cases of neonatal abstinence syndrome (NAS) at the hospital level because hospitals do not have universal screening or testing procedures and have different definitions of NAS.

Sudden Unexpected Infant Death

- Population-based surveillance data are not available on sleep practices following the two- to six-month postpartum period.
- Existing data do not include community members' perspectives on infant safe sleep practices and post-discharge follow-up among preterm infants.

Nutrition

- Limited information is available about overweight and obesity prevalence among students in private schools.
- Data reported to MDPH are limited to the school district level; data at a more granular level (e.g., by school or neighborhood) are not routinely collected across the state.

Social/Emotional Health

- The inability to link Early Intervention (EI) program participation data to long-term school outcomes data restricts understanding of the benefits of EI on the social and emotional development of children.
- Data about parental mental health and well-being and adverse childhood experiences (ACES) are lacking in surveys of youth.

Immunizations

- Comparing coverage across specific population groups within Massachusetts is difficult because low response rates to the NIS limits reliability and precision.

Care within a Medical Home/ Support for Effective Care Transition

- Due to significant changes in the mode of data collection and sampling frame, 2016 data from the National Survey of Children's Health (NSCH) cannot be compared to prior years; 2016 data serve as a new baseline.
- Data are not yet available to examine state-specific 2016 NSCH indicators by select demographic characteristics (e.g., race/ethnicity, insurance status, etc.)

Prenatal Care

- The Adequacy of Prenatal Care Utilization Index is based on the timing of the first visit and the number of visits completed, not necessarily the quality of care received.
- Limited data are available on how women are treated during pregnancy care by race/ethnicity and how that may impact treatment outcomes.
- Prenatal providers are required to send prenatal care records to birth hospitals at 24 weeks gestation but often do not update those records which can lead to undercounting of visits.

- There have also been issues with individual hospitals reporting limited or incomplete data due to technical difficulties, including the transition between electronic medical record systems. Data from those hospitals are not included in this report.

Pregnancy Intention

- The Massachusetts Behavioral Risk Factor Surveillance System (BRFSS) survey asks respondents about pregnancy intention only in even-numbered years.
- Only 2012 through 2014 data from the Massachusetts Pregnancy Risk Assessment Monitoring System (PRAMS) have been included in this report because the relevant question was revised in 2012 and cannot be compared to previous years.
- The PRAMS survey is only offered to women who had live births. Therefore, pregnancy intention results do not estimate how many total pregnancies are unintended, but only among pregnancies that had a live birth.

Severe Maternal Morbidity

- Severe maternal morbidity surveillance uses administrative data created for billing purposes which sometimes lacks complete and accurate coding and can have limited information about disease severity.

Pregnancy-Associated Mortality

- Data are limited on deaths that occur during pregnancy or following an early pregnancy loss or termination because pregnancy status may not be known or documented.
- The maternal mortality review process is based on evidence from medical records, vital records and public records that do not always capture important qualitative information about the deceased person's social environment.

Chapter 3: Environmental Health

Public Health Fish Advisories

- The majority of Massachusetts waterbodies have not been tested for the presence or concentration of chemicals in fish.
- Limited information is available about local fish consumption rates (how many and which population groups are eating the fish from an advisory area), making it difficult to assess the magnitude of health impacts.

Ambient Air Quality

- The relationship between ambient concentrations of airborne contaminants and personal exposure is difficult to estimate and variable depending upon pollutant, activity patterns, and micro-environments.
 - Environmental measures do not necessarily equate to the amount of actual exposure or to the magnitude or severity of risk associated with potential exposures in a given area.
 - Variations across geography may not always be captured because data are only available from counties where monitors are located and these tend to be urban areas.
 - Air quality monitoring data may not coincide with health outcome data because of differences between the measurement and the exposure or the lag time between the exposure and symptoms.
- Ozone data are aggregated across the state and do not account for variations in levels of ozone between regions due to emissions sources, population density, meteorology, topography, and geography.

- Uncertainties exist in modeled air quality estimates and in projections of future air quality or climate effects.
- In evaluating the impact of ambient air quality on rates of disease like asthma, consideration of other determinants of respiratory health such as smoking, occupational exposures, and access to health care should be taken into account.

Recreational Water Quality

- The analytical methods for fecal indicator bacteria include a lag time of at least 24-hours between sample collection, analysis, and results.
- Recreational water quality samples are generally collected on a routine schedule irrespective of potential drivers of exceedances, such as rainfall.

Public Drinking Water Quality

- If a water system has a violation, it is not known if the entire water system was affected or only a part.
- Measures of the number of persons served by community water systems are estimates.
- It is difficult to quantify the exact number of people affected by a drinking water contaminant due to variation in consumption and susceptibility among the population.
- Data are not readily available for drinking water quality from private wells because testing is the responsibility of the private well owner.

Childhood Lead Exposure

- Childhood lead poisoning screening rates are calculated based on population estimates using US Census data, and may not accurately reflect changes in population since 2010.
- Screening rates reflect the percentage of children aged 9-47 months who are tested for blood lead annually according to state guidelines; rates do not reflect the percentage of children ever screened between the ages of 9 and 47 months.
- Childhood blood lead level screening rates do not provide insight into the barriers that contribute to low screening in certain communities or why some children may not be screened each year.
- Race/ethnicity data is based on birth certificate information and is only available for children born in Massachusetts.
- Blood lead level rates in small communities or those with few children screened have a large margin of error.

Heat Stress

- Heat stress data include all cases where heat stress is listed as the primary diagnosis or any other diagnosis in the hospital discharge databases, but does not include cases where heat stress is not listed as a diagnosis by the medical provider.
- Heat stress hospitalization data do not include individuals who are not hospitalized, including: deaths; those treated in outpatient settings; and some specialized hospital populations such as the Veterans Health Administration, Indian Health Service, and institutional populations.
- By focusing exclusively on the warmer months from May 1 to September 30, indicators of heat stress may miss changes in heat-related illnesses that occur in other parts of the year.
- Increased heat alone is not the only factor that can affect trends in “heat-related” hospitalizations. Vulnerability of a population due to factors like age and existing illness; geographic factors like climate, topography, and urbanicity; the extent to which people have adapted to higher temperatures; and the

steps people have taken to manage heat emergencies effectively can impact heat-related hospitalization rates.

Environmental Justice

- Health data measuring a population's potential vulnerability to environmental hazards are not available at the geographic level needed to effectively evaluate all potential indicators of vulnerability in environmental justice populations.

Adult Lead Exposure

- Case counts of elevated blood lead levels reported to the Occupational Lead Poisoning Registry are considered minimum estimates of the actual magnitude of the problem because not all occupationally exposed adults are tested.
- Information about sources of lead exposure for adults in Massachusetts is not routinely collected for all cases.
- Information about race/ethnicity as well as a worker's occupation and industry is incomplete and, therefore, summary statistics are not routinely generated.

Asbestos-Related Disease

- Asbestos abatement employers are required to provide medical monitoring for their employees, but there is no on-going public health surveillance program to collect medical records or exposure documents that might track exposure, protection, and disease over time for these workers.
- The Massachusetts Cancer Registry provides information about usual occupation and industry of some but not all mesothelioma cases. Better information is needed about the potential source of exposure to asbestos for those mesothelioma cases with no history of employment in known high-risk industries.
- Asbestos-related diseases have long latencies so current disease estimates may be due to exposures that were present in the past and may not provide information about current and emerging occupational hazards.

Chapter 4: Infectious Disease

Foodborne Diseases

- Data are from population-based surveillance and represent individuals with significant symptoms who sought care and had positive test results. Therefore, reports likely underestimate the burden of all infections.

Healthcare-Associated Infections

- Data on infections are from 2 different sources:
 - Population-based surveillance with limitation as above.
 - Hospitals through enrollment in the National Healthcare Safety Network (NHSN) and subject to staff reporting in accordance with national protocols.
- Data from antibiograms
 - Mix inpatient and outpatient specimen results.
 - Represent only infections for which susceptibility testing was requested.

Sexually Transmitted Disease, HIV, and Viral Hepatitis Infections

- The HIV/AIDS exposure mode indicates the most probable risk behavior associated with HIV infection. Assignment of exposure mode is done in accordance with Centers for Disease Control and Prevention (CDC) guidelines when multiple exposure modes are reported. MSM (Male-to-Male Sex) includes males who report sexual contact with other males and males who report sexual contact with both males and females. Please note the acronym MSM is also used to refer to “men who have sex with men”.
- Newly diagnosed HIV infections/cases include Massachusetts residents, persons diagnosed with HIV from 2012 to 2014, including those who were concurrently or subsequently diagnosed with AIDS. All HIV data are presented by the year of diagnosis, not the year of report.
- Descriptions by race and ethnicity should be interpreted with caution. These characteristics are frequently missing from laboratory reports. Specifically, for cases of chlamydia racial/ethnic frequencies have been for internal use only because a backlog of non-electronic case report forms has resulted in 62% of cases missing race/ethnicity information in 2016.
- Race/ethnicity references to white residents and black residents represent persons who are white non-Hispanic and black non-Hispanic, respectively. All references to Hispanic/Latino for race/ethnicity represent persons of Hispanic/Latino heritage regardless of race.
- STD case incidence calculations represent crude rates. STD incidence rate calculations use race/ethnicity values that redistribute unknown values according to proportions of cases with known values.

Tuberculosis

- Identification of latent TB infection depends on those infected getting tested and reported. Reports of latent TB underestimate the burden of all infections. BIDLS has excellent case ascertainment for TB disease as we rarely identify unexpected transmission. Completeness of case information is high because all TB disease cases are under BIDLS case management for a year or more.

Vectorborne Diseases

- Data are from population-based surveillance and represent individuals with significant symptoms who sought care and had positive test results. Therefore, reports likely underestimate the burden of all infections.

Immunization

- Immunization coverage data are from the Massachusetts Behavioral Risk Factor Surveillance System (BRFSS) survey and represent individuals self-reported responses to a telephone survey. Therefore, reports are subject to selection and recall biases.

Chapter 5: Injury and Violence Prevention

Childhood Unintentional Injury

- Data is lacking on state and local measures of socioeconomic status of children experiencing injuries.

- Surveillance data are lacking on individual-level registry information on sports-related concussions, including type of sport and injury details that would allow for more targeted injury prevention efforts.

Older Adult Falls

- Data are lacking about the location of injuries (e.g., home kitchen or yard) to assist advocates in tailoring prevention efforts.
- Data are fragmented on the incidence of falls in institutional settings such as assisted living or nursing facilities. Current data sources come from multiple agencies that provide health care at a range of institutional settings.
- Improved data are needed on the social and economic characteristics of persons who have fallen to better understand what groups experience a disproportionately high-risk for falls.

Motor Vehicle Accidents

- Hospital and emergency department discharge data typically does not include information on certain risk factors such as texting and drug use.
- Most datasets do not include information on the geographical location of injury, limiting the ability to identify high-risk traffic areas.

Non-Fatal Occupational Injuries

- Estimates of non-fatal occupational injuries from any one data source undercount the full extent of this issue; multiple data sources are needed to provide the most complete picture possible of the occupational health status of the population.
- Additional information is needed about the occupational injuries and health and safety experiences of workers employed through temporary staffing agencies and other non-traditional employer-employee relationships.
- Workers' compensation data are an important source of information on work-related injuries, but use of this administrative database is limited because data are not routinely coded for analysis.

Fatal Occupational Injuries

- Although Massachusetts has a robust fatal occupational injury surveillance system, better identification is needed about work-related motor vehicle usage.
- More research is needed on the health and safety of temporary workers, including whether these workers are receiving the appropriate safety and health protections and training by both the temporary agencies and the host employers.
- More information is needed about effective strategies for reaching low wage immigrant and minority workers with health and safety messages and training.

Suicide

- The number of suicide deaths is under reported. The most likely causes include stigma, misclassification of deaths as undetermined, and misclassification of overdose deaths.
- The Massachusetts Violent Death Reporting System is limited by the information collected from death certificates, medical examiner files, and police reports, resulting in a potential undercount in some demographic and circumstantial areas such as gender identity, sexual identity, and socio-economic status.

Youth Violence

- Limited data are collected over multiple time points about youth development and youth violence.
- Additional research is needed on the intersections of gender, trauma, and youth violence, including girls in gangs, sexual assault, increased incarceration, and bullying.
- Research is needed on the intersections of youth violence and bullying, emerging trends in violent extremism, child maltreatment or adverse childhood experiences (ACES), increases in opioid use among youth, poverty, school discipline for youth of color, including school expulsions, youth incarceration, and juvenile detention.
- Improved understanding is needed about the roles of policies and digital policing on youth violence.
- The Massachusetts youth surveys (Massachusetts Youth Risk Behavior Survey (MA YRBS) and Massachusetts Youth Health Survey (MA YHS)) do not obtain data from youth who are not in school for any reason, or from youth who are unable to independently complete a paper-and-pencil survey using a scantron sheet.
- The youth surveys (MA YRBS and MA YHS) are subject to the limitations of self-report data, which include impression management, self-deception, and memory limitations that arise from normal human cognitive processes.

Homicide and Assault

- The Massachusetts Violent Death Reporting System is comprised of data from death certificates, medical examiner files, and police reports; resulting in an undercount in some demographic and circumstantial information due to a lack of information in a victim's record.
- The Massachusetts Violent Death Reporting System does not capture information on socio-economic status and past exposure to violence that would be helpful in better understanding the role of social determinants of health in homicide deaths. Sexual Violence/Child Sexual Abuse
- More research is needed on understanding of the multilevel factors that contribute to the risk of sexual violence to help identify opportunities for prevention.
- Research has established links between women's sexual assault experiences and behavioral and reproductive health, but more longitudinal research is needed to document the timing of sexual violence victimization and these health outcomes.
- Since most studies on sexual assault focus on small convenience samples of women (such as patients), more research is needed with a broader representative sample of women.
- With the exception of data from a health survey of high school students, Massachusetts-based research does not include detailed data about child victims of sexual abuse or demographic information about the abuser, the race/ethnicity of the victims, and the age of the victims.
- The Massachusetts Behavioral Risk Factor System (MA BRFSS), a health survey of adults ages 18 and older in Massachusetts, does not capture data from adults living in institutional settings, homeless adults, adults without telephone service, or adults who are unable to answer survey questions independently because of a developmental or intellectual disability or a communication disability. Adults who do not speak English, Spanish, or Portuguese also are not represented in the MA BRFSS data.
- The Massachusetts youth surveys (Massachusetts Youth Risk Behavior Survey (MA YRBS) and Massachusetts Youth Health Survey (MA YHS)) do not obtain data from youth who are not in school for any reason, or from youth who are unable to independently complete a paper-and-pencil survey using a scantron sheet.
- Both the adult survey (MA BRFSS) and the youth surveys (MA YRBS and MA YHS) are subject to the limitations of self-report data, which include impression management, self-deception, and memory

limitations that arise from normal human cognitive and social-cognitive processes. In the case of stigmatized and traumatic experiences in particular, these processes can result in under-reporting.

Domestic and Dating Violence

- Massachusetts currently relies on a national survey conducted by the Centers for Disease Control and Prevention (CDC) for state-level estimates of intimate partner violence among adults, but this data lags several years behind the current calendar year.
- Limited data are collected on people with disabilities and their experience of domestic violence; little is known about the perpetrators of domestic violence against people with disabilities.
- Limited data are collected on perpetrators of domestic violence against people in other high-risk populations, including data on the gender and sexual orientation of perpetrators against victims who identify as LGBTQ. The Massachusetts youth surveys (Massachusetts Youth Risk Behavior Survey (MA YRBS) and Massachusetts Youth Health Survey (MA YHS)) do not obtain data from youth who are not in school for any reason, or from youth who are unable to independently complete a paper-and-pencil survey using a scantron sheet.
- The youth surveys (MA YRBS and MA YHS) are subject to the limitations of self-report data, which include impression management, self-deception, and memory limitations that arise from normal human cognitive and social-cognitive processes. In the case of stigmatized and traumatic experiences in particular, these processes can result in under-reporting.
- In the case of stigmatized and traumatic experiences in particular, these processes can result in under-reporting.

Chapter 6: Addiction

- Massachusetts currently does not have a comprehensive statewide youth health survey for establishing baseline prevalence estimates.
- Health surveys do not reach some populations who are at high-risk of substance use; for example, substance use assessments do not reach all schools and community organizations.
- Description of Bureau of Substance Addiction Services (BSAS) Data Set: Under MGL Ch.111 B and E authority, all treatment providers are required to submit data to BSAS to carry out the responsibilities listed under the law. The regulations promulgated to carry out these responsibilities require the providers to submit data in a timely manner. The required data fields include but are not limited to: client characteristics, enrollment, disenrollment information, services and outcomes. Currently, only treatment providers that receive funding from the Department submit the required data to BSAS. BSAS uses this data for billing/payment and service planning purposes. Almost all BSAS licensed/contracted providers enter the required data through the Virtual Gateway. Assessment data collected at admission and disenrollment are entered into Enterprise Invoice Management/Enterprise Service Management (EIM/ESM) system daily or in batches. Data entry occurs at provider sites and is transmitted to BSAS on a monthly basis. The current database includes data from Fiscal Year 2000-2017. BSAS can readily report data at the provider level, the enrollment level, and the client level.
- The BSAS data set poses several limitations. First, BSAS data does not represent all substance abuse treatment provided in the Commonwealth. BSAS only collects data from its contracted providers. Of the data that is submitted to BSAS, outpatient treatment data is incomplete and does not include all non-BSAS paid services. BSAS does not collect data from providers that prescribe Naloxone or from non-contracted Buprenorphine providers. At the time of this report, Methadone data was incomplete. Due to challenges associated with recent system changes related to data submission, some Methadone

providers have been unable to submit data. Data collected in regards to section 35 commitments are incomplete in the BSAS data set. As a result of these data limitations, it is possible that some of the analyses using BSAS treatment data may provide an incomplete picture of substance abuse treatment in the commonwealth.

- BSAS does not collect data from all sites that administer medication assisted treatment across the commonwealth. BSAS receives data for methadone and subset of buprenorphine providers that we fund. BSAS does not receive data for other FDA approved medications used to treat alcohol use disorders (i.e. Acamprosate and Disulfiram).

Intervention

- The state does not currently require information on the number of individuals who have been screened or have received brief intervention, or the number of practices or health care settings that routinely screen their patients.
- MDPH received one-time funding to include in the 2014 Behavioral Risk Factor Surveillance System survey questions about physician screening and discussions about substance use with patients, but this information is not routinely collected.

Narcan

- Available data are from MDPH-funded programs only, and do not include data from pharmacies or from all first responder departments that provide naloxone.
- Data collected from the Overdose Education and Naloxone Distribution (OEND) Bystander Program is reported by the bystander witness and has no information regarding the individual who experienced the overdose.

Treatment

- Treatment program utilization data does not include opioid treatment programs in office-based settings and level IV acute care facilities.
- Treatment program utilization data is not fully representative of access to treatment services due to lack of knowledge by the individual or improper triage or referral by the provider.
- Lack of follow up data on individuals who completed treatment prevents assessment of long term treatment outcomes.

Recovery Support

- Longitudinal data that follow individuals over time is not available to assess the longer-term impacts of recovery support centers and/or how recovery support services improve outcomes for clients.

Youth Population

- Massachusetts does not implement comprehensive statewide health surveys that reach out to all youth and or young adult populations.
- Treatment data are only collected from BSAS funded and/or licensed substance treatment programs.

Pregnant Women

- Pregnancy status data are collected once during an initial treatment admission, but gaps exists in periodic reporting of change in status for women who become pregnant and post-partum women while in treatment.

Criminal justice

- Criminal involvement among the treatment population is self-reported.
- There is a lack of data sharing regarding substance use among criminal justice population across state agencies.

LGBTQ

- Large data sets that may enhance understanding of the experiences and needs of LGBTQ youth and young adults are not currently available.
- Validated assessment tools have not been adequately tested with LGBTQ populations.
- Research studies on the LGBTQ community often cannot be compared because of inconsistent methodologies.
- Research on the effectiveness of various recovery pathways within LGBTQ communities is limited.

Military

- BSAS may underestimate the number of veterans they serve.

Homeless Population

- Many assessments tend to focus on individuals who stay in shelters or attend soup kitchens.
- Individuals who experience temporary housing instability are likely to be missed in many assessments.
- The definition used for classifying people as homeless substantially affects the estimate of the homeless population.

Mental Health

- Individuals with differential acuties between their co-occurring disorders might only access treatment for their most acute issue; if they have a more severe mental illness compared to their substance use disorder, they might only receive mental health services. These individuals would not be adequately represented in BSAS data. The pilot programs with the Department of Mental Health aim to cover this limitation in future assessments and ensure that individuals receive all needed services.

Gambling

- There are several limitations of available data regarding gambling. First, there is a general underreporting of gambling disorder in the Bureau of Substance Abuse Services (BSAS) system, as well as in national prevalence studies. Accordingly, national studies are limited in their ability to estimate the percent of the population who are currently in treatment for gambling-related issues. Second, SEIGMA has a low response rate (36.6%), and findings may not be generalizable. Third, the measures used in the SEIGMA to screen for gambling have not been validated using the DSM-5 criteria with adult samples, with implications for the extent to which gambling disorders are captured.

Chapter 7: Health Systems and Health Care Access

- Data limitations exist for health care workforce data sources that do not always include some health care providers who are also important when evaluating a community's capacity (i.e. EMT technicians, social workers, physician assistants).
- Data limitations exist for GPS mapping of vulnerable populations that would enable preparedness and emergency management responders to plan more efficient delivery of services around transportation

- and other unique needs during emergencies for these populations (i.e. people with a disability or chronic disease).
- Data sources exist for evaluating health care access, safety, timeliness, and other considerations but limited access to them as well as the need to build capacity to analyze them remains a challenge (i.e. All Payer Claims Database or Electronic Medical Records).

Chapter 8: Wellness and Chronic Disease

- Estimates of health behaviors and the prevalence of chronic disease across the Commonwealth are based on the Behavioral Risk Factor Surveillance System (BRFSS), but due to a new sample weighting methodology, trends after 2011 cannot be compared to previous years.
- The limited BRFSS sample size among adults prevents more sophisticated sub-group analyses.

Nutrition

- MDPH has no available indicators on consumption of sugar-sweetened beverages for adults, an important indicator of nutritional practices and chronic disease risk.
- Fruit and vegetable consumption among adults is assessed every two years in the BRFSS presenting challenges to analyzing trends in dietary practices.
- The US Department of Agriculture Food Desert program provides only a partial snapshot of access to and affordability of healthy foods across the Commonwealth.

Physical Activity

- Measures are lacking to evaluate the effectiveness of interventions and actions designed to create changes to the “built environment” and to reach all populations or geographies.
- The BRFSS does not adequately measure walking and biking behavior.
- The BRFSS is limited in its ability to examine overall physical activity behaviors at the local or sub-local level, where interventions need to be measured and evaluated.

Adult Smoking

- Massachusetts Tobacco Cessation and Prevention has limited information on tobacco use among high-risk groups including immigrants, veterans, and the homeless.

Prevention/Other Tobacco Products

- Published evidence is lacking on the long-term impact of many Massachusetts point-of-sale policies.
- Local youth survey data on the impact of local policies on youth behavior because many school districts are unwilling to publicly share survey results on substance use.

Second Hand Smoke

- Comprehensive data are lacking on the scope of smoke-free policies in multi-unit housing about residents living in low-income and Section 8 housing that are disproportionately exposed to secondhand smoke in the home.

Adult Overweight and Obesity

- The BRFSS provides no information about sugar-sweetened beverage consumption among adults.

- BRFSS questions that ask about the types of physical activity that are most likely to contribute to healthy weight as well as fruit and vegetable consumption are asked only every other year, making it difficult to analyze trends.

Child Overweight and Obesity

- Limited information is available about the prevalence of overweight and obesity among students in private schools.
- Data on body mass index, race/ethnicity, and gender are limited to data collected by school districts; Massachusetts does not collect data at a more granular geographic level.
- While data are available about children participating in the WIC program, there is no statewide mechanism for collecting BMI on children before school age.

Cardiovascular Disease

- The variety of datasets available on hypertension, heart failure, heart attacks, and stroke provide an important lens into disparities in the burden of cardiovascular disease across the Commonwealth.
- Although these data are expansive and are used to research and evaluate many risk factors, clinical data systems do not consistently capture some social and economic factors that shape health and health disparities. However, this is changing, with a particular focus on improving income, socio-economic status, and racial data.

Diabetes

- Diabetes risk factors and outcomes can be analyzed using a variety of data sources, providing detailed demographic and geographic stratifications.
- However, limited data are available about the prevalence of prediabetes (a critical risk factor for developing diabetes) due to a lack of knowledge about prediabetes and providers not always telling patients they have prediabetes.
- Clinical data systems do not consistently capture some social and economic factors that shape health and health disparities. However, this is changing, with a particular focus on improving income, socio-economic status, and racial data.

Asthma

- Delay in accessing the hospitalization discharge database and limited access to the All Payer Claims Database prevents analysis of more recent hospitalization data and/or examination of patterns by other social, economic, or geographic factors.
- Limited sample size of BRFSS Asthma Call Back Survey prevents additional subgroup analyses of children.

Chronic Obstructive Pulmonary Disease

- Further research is needed to understand the social patterning of COPD as well as effective intervention strategies to improve COPD management.

All Cancers

- Information is limited in the Cancer Registry about the socioeconomic status of individuals, including their household income levels, educational attainment, employment status, and health insurance status.
- The number of cancer cases at the local level is not large enough to examine cancer disparities locally by race/ethnicity, income, employment, and other social determinants of health.

Lung Cancer

- Although Massachusetts hospitals screen for lung cancer following the establishment of new screening guidelines, lung cancer screening data for individuals is not published.
- BRFSS is used to assess the proportion of people screened for various cancers, including breast, cervical, and colorectal cancer; however, lung cancer questions are not included.
- The Lung Cancer Workgroup uses data from the American College of Radiology to track the number of facilities that are conducting lung cancer screening, but this information does not include the proportion of adults who are screened for lung cancer.

Breast Cancer

- While cancer data are available at more granular geographic levels, the number of breast cancer cases at the local level is not large enough to examine cancer disparities locally by race/ethnicity, income, employment, and other social determinants of health.

Colorectal Cancer

- Colorectal cancer screening data for Asians and Native Americans is not collected.
- The MDPH uses the Health Resources and Programs Administration (HRSA) data to monitor and evaluate the effectiveness of colorectal cancer initiatives in community health centers under the League of Community Health Centers, but these data are not stratified by social and demographic characteristics such as age, race, income, education, and insurance status.

Prostate Cancer

- It is difficult to add questions to the BRFSS survey without increasing the length of the survey, adversely affecting the number of prostate cancer questions included in the survey.
- Because the BRFSS is a statewide survey, it is not possible to obtain shared decision-making data at the local level.

Melanoma

- The Cancer Registry only reports melanoma incidence and mortality data for Massachusetts overall and for White non-Hispanics. The registry does not include data for other racial/ethnic groups because the numbers are deemed insufficient to track.
- A central place is needed to document the implementation of various melanoma initiatives throughout the Commonwealth.