2019

Greater Lowell Community Health Needs Assessment

Lowell General Hospital

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GLHA

GREATER LOWELL HEALTH ALLIANCE

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295 Varnum Avenue, Lowell, MA 01854-2193
978-937-6000 • TTY:978-937-6889 • www.lowellgeneral.org

2019

Greater Lowell Community Health Needs Assessment

Conducted on behalf of:
Lowell General Hospital
Greater Lowell Health Alliance

Authors:
David Turcotte, ScD
Kelechi Adejumo, MSc
Casey León, MPH
Kim-Judy You, BSc

University of Massachusetts Lowell

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EXECUTIVE SUMMARY

Lowell General Hospital, the Greater Lowell Health Alliance, and the University of Massachusetts Lowell work together to conduct an assessment of community health needs for the communities of Greater Lowell every three years. This region includes the cities and towns of Billerica, Chelmsford, Dracut, Dunstable, Lowell, Tewksbury, Tyngsborough, and Westford. This assessment evaluates the overall health of the community members, overviews the strengths and weaknesses of the area's health services, identifies health barriers and social determinants of health, and provides recommendations to improve the health of its residents.

Information gathering for this health assessment included 20 listening sessions with over 200 participants, 19 key informant interviews, and 1,355 surveys completed by community members. Secondary resources were gathered to provide demographic, socioeconomic, and public health data.

The top priority health issues identified by the Community Health Needs Assessment Survey respondents were mental health issues, substance addiction, alcohol abuse/addiction, cancer, and nutrition. Other health issues included obesity, heart disease, diabetes, infectious diseases, and tick/insect illnesses. The top priority community safety issues are domestic violence, bullying, drug trafficking, sexual assault/rape, and unsafe/illegal gun ownership. Additional community safety issues include human trafficking, discrimination based on race, gang activity, discrimination based on immigration status, and discrimination based on class or income.

The most frequently reported health issues for Community Health Needs Assessment Survey respondents themselves are anxiety; depression; vision problems; bone, joint, and muscle illness; and high cholesterol. The most frequently reported issues for people participants know were cancer, alcohol abuse/addition, diabetes, high blood pressure, and depression. The most frequently reported health barriers for the respondents are a negative healthcare experience from their provider, inability to afford medication, inconvenient office hours, inability to afford mental health services, and inability to find a provider accepting new patients.

The top health problems revealed from the listening sessions and interviews are mental health issues, substance use/alcohol disorders, obesity, diabetes, infectious diseases, respiratory diseases (e.g. asthma and chronic obstructive pulmonary disease), cancer, and cardiovascular disease. Populations recognized in the community at greatest risk of health problems are people who identify as immigrants and refugees, the elderly population, people who earn low-wages, people who are homeless-experienced, teenagers and youth, and people who are part of the LGBTQ (lesbian, gay, bisexual, transgender, and queer) community.

The major strengths of the health system in the Greater Lowell area identified by listening sessions and interviews are the availability of the Lowell Community Health Center (LCHC) and Lowell General Hospital. Both health entities provide wide ranges of services and collaborate with other health professionals and agencies in the region to address the health concerns of the communities. Other strengths include the growing number of urgent care facilities that reduce emergency room utilization and the process of the Community Health Needs Assessment that allows community members to communicate with key stakeholders about health.

The major weaknesses identified from listening sessions and interviews include a need for culturally competent health care providers, shortages of certain types of health care providers, long wait times for appointments, and a lack of continuum of care. Lack of transportation and limited access to mental and behavioral health services were also stated. In particular, residents that speak a language other than English face greater difficulties in accessing transportation and optimal care. Community members also noted a lack of adequate proficient interpreters and translators.

The most prevalent barriers to obtain health services mentioned by listening sessions and interviews participants are transportation, health insurance, increase of medical related costs, and the stigma and discrimination related to those with substance

use disorders and mental health issues. The increase in minimum wage over time was found to be a challenge for families to qualify for subsidized health coverage. Income for some low-wage workers can put them just above the income eligibility limit, resulting in these individuals being unable to afford health insurance.

Public health indicators from secondary sources compared between Lowell, Greater Lowell communities, and state of Massachusetts include cardiovascular disease, obesity, diabetes, smoking, respiratory disease, mental health, substance use, cancer, and infectious disease. Many health indicators show a greater need for intervention in the city of Lowell compared to the Greater Lowell region. This result is not surprising due to the considerable socioeconomic impacts on health in Lowell's urban community.

This iteration of the community health needs assessment has specifically evaluated social determinants of health to better understand their impact on the health needs of the community. The social determinants of health addressed in this report include the built environment, social environment, housing, violence, education, and employment. These factors contribute to the health outcomes of the Greater Lowell region and are closely linked to the health disparities existing at both the community level and state level.

Housing affordability, access to food, and unemployment are some of the key measures that contribute the health outcomes of the area. More than 50% of the housing stock in Billerica, Chelmsford, Dracut, Lowell, and Tewksbury was built before 1979, which contributes to higher lead exposures. Excluding Dunstable, more than 40% of rental units cost more than 30% of the average household income in the area. Lowell has the highest gross rent as a percent of income and is the fourth most expensive city in the state of Massachusetts.

The population in Lowell is more than twice the population of any other town in the Greater Lowell region. Compared to other communities, Lowell has the greatest percentage of housing built before 1979, lowest median household income, and highest percentage of population who are Black, Asian, Hispanic, and born outside the U.S. Compared to neighboring communities of Greater Lowell CHNA, Lowell is the least affordable area for residents, with a Median Home Value to Median Household Income ratio of 4.5.

Listening session participants and interviewees suggested a variety of recommendations for improving health services in the Greater Lowell area. One suggestion was to increase outreach and health-related education programs. Members from the community expressed a desire to have more health resources available in multiple languages, education on navigating the health system, and development of community support teams. At the professional level, there were recommendations for more cultural competency training programs and greater focus on preventive strategies for diseases. The listening sessions and interviews also revealed that members in the community would like stronger, integrated care between medical and community health teams. There is also an increasing need for more shelters for people experiencing homelessness, mental health treatment facilities, substance use disorder crisis programs, and improved transportation system.

The collaborative approach by Lowell General Hospital, Greater Lowell Health Alliance, and the University of Massachusetts Lowell to develop this Community Health Needs Assessment will further inform the development process of a community health improvement plan (CHIP). The findings from this assessment will guide how community stakeholders will address the community's health priorities and formulate action plans to improve the health services and overall health of Greater Lowell region.

PROCESS AND METHODS

Introduction
Founded in 1891, Lowell General Hospital is a not-for-profit community hospital serving the Greater Lowell area and surrounding communities. With two primary campuses located in Lowell, Massachusetts, Lowell General Hospital offers the latest state-of-the-art technology and a full range of medical and surgical services for patients, from newborns to seniors.

As the second largest community hospital in the state, Lowell General Hospital's commitment to our community is an essential and integral part of our mission, vision and strategy. We seek to improve the health status of the community we serve, and to specifically address the health problems of at-risk and medically under-served populations. This mission is achieved by identifying existing and future health needs in the community and addressing them through health initiatives, including education, prevention and screening programs; many times in collaboration with key partners from across the Greater Lowell community. We aim to improve the capacity of our community efforts by providing Culturally and Linguistically Appropriate Services (CLAS) to all individuals in order to reduce disparities and achieve health equity.

Definition of Community
Lowell General Hospital's 2019 Needs Assessment focused on the hospital's service area, encompassing eight communities in Greater Lowell, including Billerica, Chelmsford, Dracut, Dunstable, Lowell, Tewksbury, Tyngsborough and Westford, which all comprise the Community Health Network Area 10 (CHNA 10). The Greater Lowell Health Alliance of CHNA 10 is made up of healthcare providers, business leaders, educators, and civic and community leaders, all with a common goal to help the Greater Lowell Community identify and address health and wellness priorities.

A Community Health Network Area (CHNA) is a coalition that is comprised of public, non-profit and private sectors working together to build healthier communities through community-based prevention planning and health promotion. Created in 1992 by the Massachusetts Department of Public Health, the CHNA initiative involves 351 cities and towns in 27 different networks throughout Massachusetts.

The Greater Lowell Health Alliance plays a vital role in developing the Community Health Needs Assessment with Lowell General Hospital in the Greater Lowell area. In 2017, the Greater Lowell Health Alliance of CHNA 10 released the first Greater Lowell Community Health Improvement Plan (CHIP). With a goal to create a long-term strategy to strengthen the area's health systems, our CHIP was used as road map for health improvement over a three-year period, guiding the investment of resources of organizations with a stake in improving health for the residents of Lowell and the surrounding communities. Our CHIP mission: to turn data into action and working initiatives to address our community's top health priorities.

Target Populations
IMMIGRANTS AND REFUGEES • ELDERLY • LOW-INCOME INDIVIDUALS AND FAMILIES • YOUTH MINORITY POPULATIONS • IINDIVIDUALS CLASSIFIED AS "AT RISK" • INDIVIDUALS WITH CHRONIC DISEASE • INDIVIDUALS AFFECTED BY BEHAVIORAL HEALTH AND/OR SUBSTANCE USE ISSUES

Previous Needs Assessment and Review of Initiatives
In 2016 Lowell General Hospital conducted its last Community Health Needs Assessment, which identified key health issues and informed the hospital's program planning. The process culminated in the development of a Community Health Improvement Plan (CHIP) to address health priorities in the area. In the 2016 Assessment, Lowell General Hospital identified the health priorities to be Access to Healthy Food, Asthma, Mental Health, Physical Activity, Substance Use Disorder and several areas which fall into the Social Determinants of Health arena.

To fulfill its commitment to the community and statutory requirements, Lowell General Hospital, in partnership with the Greater Lowell Health Alliance of the Community Health Network Area 10, contracted with the University of Massachusetts

Lowell Center for Community Research and Engagement to conduct the 2019 Community Health Needs Assessment. The University of Massachusetts Lowell team that worked collaboratively to complete this assessment included faculty, staff, students and community partners. The objectives of this study were to:

- Assess the overall health of area residents, including the social determinants of health
- Identify the strengths and weaknesses of the local health services system
- Determine the top health problems facing area residents, barriers to improved health and the populations at greatest risk
- Involve a broad spectrum of professionals and residents, including newer immigrant communities
- Provide recommendations to improve the health of area residents and address unmet health needs
- Inform an inclusive process to identify priority health needs and develop community health improvement plans to address these priority needs

This report summarizes the major findings from our community health needs assessment. Lowell General Hospital, in partnership with the Greater Lowell Health Alliance, intends to use the information within this report to inform a community process in collaboration with other stakeholders to identify priority health needs and develop action plans to improve the local health services system and overall community health, and address social determinants of health.

A steering committee was formed to facilitate the 2019 Community Health Needs Assessment that included the following individuals:

David Turcotte, ScD, Research Professor, UMass Lowell

Kelechi Adejumo, Research Assistant, UMass Lowell

Kim-Judy You, Research Assistant, UMass Lowell

Krysta Brugger, UMass Lowell Graduate Student Intern at Lowell General Hospital

Kerrie D'Entremont, Executive Director, Greater Lowell Health Alliance

Kate Elkins, Community Health Coordinator, City of Lowell Health Department

Amanda Clermont, Community Engagement Coordinator, Greater Lowell Health Alliance

Lisa Taylor-Montminy, Community Benefit Manager, Lowell General Hospital

An Advisory Committee was also formed to help guide the process. The Greater Lowell Health Alliance (GLHA) is comprised of a diverse group of healthcare providers, business leaders, educators, and civic and community leaders with a common goal to help the Greater Lowell community identify and address its health and wellness priorities. As a result, the GLHA Board of Directors served as our Advisory Committee (see list of names in Appendix F). As part of our inclusive assessment process we also involved diverse organizations and community members in listening sessions and interviews. The following organizations were engaged to host listening sessions between February to April:

- Cambodian Mutual Assistance Organization (CMAA)
- Lowell's Early Childhood Council
- Hunger & Homeless Commission
- Upper Merrimack Valley Public Health Coalition
- Youth Violence Prevention Coalition
- Non-Profit Alliance of Greater Lowell
- Greater Lowell Interfaith Leadership Alliance
- RISE Coalition (Refugee and Immigrant Support & Engagement)
- Elder Services of Merrimack Valley

- Center for Hope & Healing
- Lowell Community Health Center
- Lowell Housing Authority
- Lowell House
- Greater Lowell Health Alliance

COMMUNITY HEALTH NEEDS ASSESSMENT SURVEY

An inter-agency, cross-disciplinary survey team convened to draft the 2019 Greater Lowell Community Health Needs Assessment (GLCHNA) Survey, which included representatives from the Greater Lowell Health Alliance, University of Massachusetts Lowell, Lowell General Hospital, Lowell Health Department, Lowell Community Health Center, and community activists and health workers. The survey development process involved completing a document analysis of exemplar and aspirant assessments from other regions and soliciting feedback from community leaders and key informants about their priority research areas before finalizing the survey. The GLCHNA Survey included the following sections: demographics, community health resources, health needs, health issues, community safety, health access barriers and service utilization history.

Each section had between 13-26 related responses and respondents were asked to indicate if each response was a low, medium, or high priority. They are then asked to take the top three priority responses and assign them a rank of one, two, or three. Total Rank Count was calculated by summing the number of times an item was ranked as one, two or three. The responses with the highest rank count and percentage were found to be the top priorities of each section.

In addition to providing information about themselves, the respondents were asked the same questions for people that they know. This provided their insights into other members of the community.

The GLCHNA survey was distributed to maximize the likelihood of proportionally stratified sampling by town of residency, age, race, language ability, gender, and LGBTQ identity. Online versions of the survey were available in English and Spanish and paper versions in English, Spanish, Portuguese, Khmer, Arabic, and Swahili. Paper copies were disseminated at 25 community locations (e.g. libraries, medical offices, police stations) with distribution instructions to protect anonymity. Paper copies were also distributed at community events and listening sessions over a 3-month data collection period. The online version of the survey was hosted on Qualtrics survey software platform with a secure survey link directly distributed to over 100 online groups, email lists and electronic contacts in community and government leadership positions, as well as through social media. Cell phone users could also access the survey. A total of 1,355 completed surveys were analyzed.

Listening Sessions and Key Informant Interviews

A total of 20 listening sessions with over 200 total participants were conducted between February 4 and April 26, 2019 (see attendees who agreed to have their name published in Appendix C). The average duration of each listening session was 60 minutes. The listening session discussions included between 8 and 10 discussion questions. All groups were asked about the overall health of Greater Lowell, priority health problems, populations at greatest risk, strengths and weaknesses of health services in the region, barriers and obstacles to health, and suggestions for improvement. Groups at community listening sessions were also asked about specific health needs of their communities and how existing health services are responding to their needs.

A team of 11 individuals, including UMass Lowell faculty, graduate and undergraduate students, and individuals from the Cambodian Mutual Assistance Association took part in facilitating, note taking, and interpretation and translation services for the listening sessions. The listening sessions were conducted in English with the exception of the community groups of individuals who were Khmer-speaking, Spanish-speaking, and Portuguese-speaking. For these three groups, the sessions were conducted in Khmer, Spanish, and Portuguese respectively.Notes were taken and recordings were made for all listening sessions.

The composition and number of the listening sessions organized and the list of individuals invited were determined in collaboration with the 2019 Community Health Needs Assessment (CHNA) Steering Committee and Advisory Committee, and other community partners.

The 13 listening sessions organized by professional or organizational grouping included: nonprofit organizations, organizations providing services to older adults, public health directors, nurses and agents, early childhood education professionals, immigrant and refugee advocates and service providers, professionals working on hunger and homelessness, government and public housing officials, organizations with youth, professional working to eradicate sexual violence, providers of substance use disorder services, Circle Health leaders, non-Circle Health providers, physicians, Greater Lowell Health Alliance members, and Lowell General Hospital Community Benefit Advisory Committee members.

The other 7 listening sessions included members from the Cambodian, African, Portuguese-speaking and Spanish-speaking communities, as well as participants of Teen Block at the Lowell Community Health Center, Lowell Housing Authority residents and Lowell House clients receiving services for substance use disorders. Individuals were asked to participate as private individuals and not as official spokespersons for their communities.

A total of 19 key informant interviews were conducted with first responders by UMass Lowell students. The first responders included individuals from the police department, fire department, paramedics, and emergency medical services (EMS) professionals. These individuals were asked to take part as private individuals and not official spokespersons of their organizations. A member of the 2019 CHNA Steering Committee also conducted key informant interviews with a clinical leader from Lowell General Hospital and a Lowell Community Health Center's Board of Directors Member. The average duration of the interviews was 45 minutes. The questions were the same as the community listening sessions. Notes were also taken.

Listening session and key informant interview data was analyzed using NVivo software. Top health issues were ranked based on the cumulative number of sessions that mentioned specific health topics.

Analysis of Secondary Data Sources

The Population Health Information Tool (PHIT) from the Massachusetts Department of Health provided most of the community and state level health surveillance data. This data portal provided information from the Massachusetts Cancer Registry, Massachusetts Vital Records (2016), Behavioral Risk Factor Surveillance System (BFRSS) data between 2012 and 2014, Massachusetts Bureau of Substance Abuse Services (BSAS) and hospitalization data from the Massachusetts Center for Health Information and Analysis (CHIA).

Additional information was acquired from the following sources:

- Trinity EMS
- U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates
- FBI: Uniform Crime Report Program
- Massachusetts Environmental Public Heath Tracking Portal
- USDA Food Atlas
- Community Teamwork, Inc. 2017 Community Health Survey
- Youth Behavior Risk Survey (YRBS) and Communities that Care (CTC) Results

When possible, data was compared between the City of Lowell, Greater Lowell CHNA, and the state of Massachusetts. We analyzed and presented data on Lowell as it has the greatest population diversity and generally experiences more health issues and needs. Due to the small population of Dunstable, the municipality was not included some datasets. This will be indicated in the graphs and charts.

Data Limitations

We analyzed public health surveillance data to provide additional evidence of community health status, but in some cases the data was 3-6 or more years old and may not reflect current health needs. Epidemiological data was also not available for municipalities where the numbers of cases were unstable or not significant. In these cases, the Greater Lowell CHNA measure excludes that town. Responses from listening sessions, informant interviews and surveys were not a representative sample of all the residents of Greater Lowell, but a convenience sample of individuals connected to an organization or available and interested to participate. Nevertheless, the insight or perceptions of these participants are still valuable in assessing the community health needs of this region.

POPULATION

Lowell General Hospital's Greater Lowell service area had an estimated total population of 290,258. The population of the city of Lowell makes up 38% with an estimated 110,964 residents. Billerica is the second most populated area with 42,792 residents, followed by Chelmsford, Dracut, Tewksbury, Westford, and then Tyngsborough. The least populated area is the town of Dunstable with 3,337 residents. Compared to the previous assessment, there has been a slight increase in population overall, but the population size rankings remain the same.

Lowell has the largest percentage of residents born outside the US at 26.7%. The American Community Survey 5-Year Estimates of percentage of residents born outside the United States indicate that all areas except for Dracut, Tewksbury, and Dunstable are greater than 10%. Lowell has a more diverse population with 21% of residents identifying as Asian and 20.3% as Hispanic/Latino. Westford, Chelmsford, and Tyngsborough also have a substantial population of Asian individuals of 17.7%, 9.5%, and 8.1% of residents respectively. The greatest change since the results of the 2016 Greater Lowell assessment is the percentage of residents identifying as White. Whereas most of the communities had a slight decrease in this measure, Lowell's population of White individuals increased by more than 3% from 57.1% in 2014 to 60.8% in 2017.

Within the Greater Lowell CHNA, Lowell is the least affluent community with a median household income (MHI) of $48,581, which is markedly lower than Dunstable and Westford at $138,700 and $138,006. The city also has the highest poverty rate of 22.4% and unemployment rate at 8.4%. Between the 5-year estimates from 2014 and 2017 from the American Community Survey, Lowell was the only community that experienced a decrease in median household income of $583 (-1.2%). Conversely, Dunstable's MHI increased by $22,575 (+19.4%), Westford increased by $12,865 (+9.3%), and Chelmsford by $12,789 (+12.0%) (Greater Lowell CHNA, 2016). When compared with other gateway cities including Fall River, New Bedford, Haverhill, Lawrence, Springfield, Brockton, and Worcester, Lowell's rates of poverty and unemployment are within a similar range. The range of median household income of these gateway cities were between $37,118 (Springfield) and $65,929 (Haverhill). The average poverty rate, median household income, and unemployment rate of other gateway cities were 21.2%, $46,183 and 9% respectively (not shown).

Table 1 – Basic Demographic Data, Cities/towns in the Greater Lowell CHNA

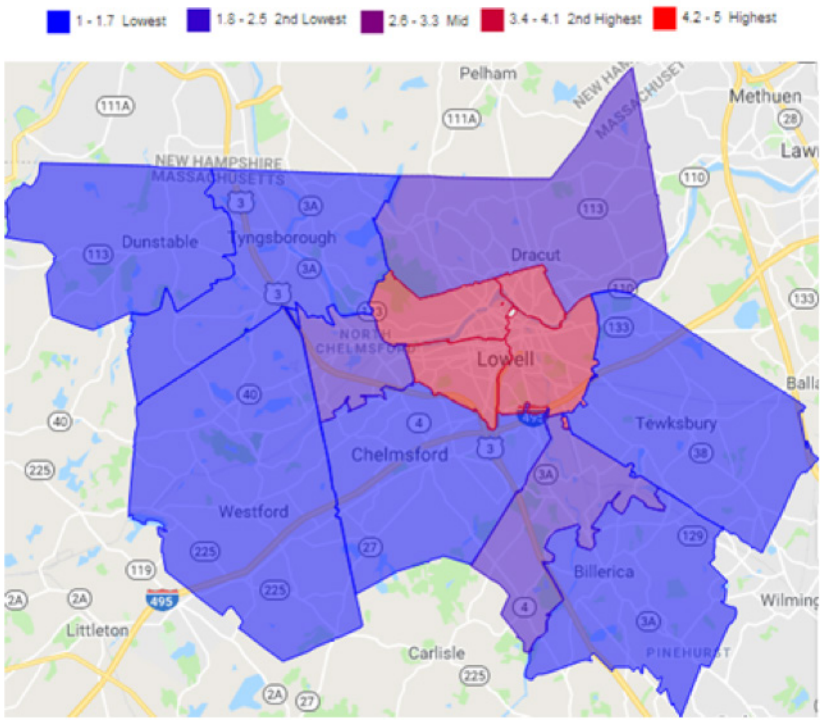
City/Town	Population	% White	% Black	% Asian	% Hispanic	% Born Outside the US	% Aged 0-17	% Aged 65+	Median Household Income	% Below Poverty Line	% Unemployment Rate*
Billerica	42,792	86.6	3.4	6.2	4.3	11.0	19.6	14.8	99,453	4.3	4.9
Chelmsford	35,067	87.2	0.8	9.5	3.7	11.2	20.4	18.0	106,432	3.6	4.2
Dracut	31,113	86.9	4.7	4.2	5.9	9.0	21.9	14.6	86,697	7.2	4.9
Dunstable	3,337	93.7	-	4.1	1.1	5.3	23.6	14.1	138,700	2.1	3.4
Lowell	110,964	60.8	7.3	21.0	20.3	26.7	22.7	10.5	48,581	22.4	8.4
Tewksbury	30,666	92.4	1.8	3.8	1.6	7.5	19.7	17.5	93,817	5.4	4.7
Tyngsborough	12,232	87.6	0.5	8.1	3.1	10.9	21.0	9.8	101,303	7.1	4.5
Westford	24,087	80.3	0.5	17.7	2.2	13.9	27.6	12.3	138,006	2.3	3.2
Total/Weighted Average	290,258	77.1	4.1	12.8	10.0	15.6	21.9	13.4	101,624	11.5	6.0
Massachusetts	6,789,319	78.9	7.4	6.3	11.2	16.2	20.4	15.5	74,167	11.1	6.0

Source: American Community Survey 2013-2017 5 year estimates

*The unemployment rate is the "number of unemployed as a percentage of the labor force (sum of employed and unemployed)." This should not be confused with "% unemployed" which refers to "people who are jobless, actively seeking work, and available to take a job" (BLS, 2015).

The Community Needs Index

Figure 2 – Greater Lowell CHNA Community Needs Index Map



Source: 2019 Dignity Health with Truven Health Analytics

The Community Need Index (CNI) score is based on community demographic and economic statistics that make up a community's overall socio-economic profile. The CNI is a calculated average of five barrier scores which include income, culture, education, insurance, and housing barriers. The overall score is interpreted as an indicator of a community's health needs. The CNI scores of the cities and towns of the report are as follows (listed from lowest need to greatest):

City/Town	Zip Code	2019 CNI Score	2016 CNI Score
Dunstable	01827	1.2	1.2
Chelmsford	01824	1.4	1.4
Tewksbury	01876	1.4	1.4

1. The "Community Needs Index" (CNI) was developed in 2004 by the nonprofit corporation, Dignity Health and the multinational company, Truven Health in order to clearly see the healthcare needs of a community. The purpose was to be able to help communities distribute resources in the most effective manner, recognizing that some areas have more health care needs than others and prioritizing accordingly. There is a CNI score for every populated zip code in the United States. There is a CNI score for every populated zip code in the United States. CNI scores range from 1.0 to 5.0, 1.0 being the lowest need, 5.0 being the highest. The barriers receive scores of 1-5, reflective of need in comparison to other zip codes across the country. The barriers are then averaged to get the CNA so that each barrier is equally represented. The accuracy of a CNI score increases as population increases. All scores are based on 2018 data.

Tyngsboro	01879	1.6	1.6
Billerica	01821	1.6	1.8
North Billerica	01862	1.8	--
Westford	01886	1.6	1.8
North Chelmsford	01863	2.0	--
Dracut	01826	2.0	2.2
Lowell	01851	3.8	4.0
Lowell	01852	3.8	3.8
Lowell	01854	4.0	4.2
Lowell	01850	4.0	4.2
Lowell Average	--	3.9	4.1

The average CNI score of Lowell's four zip codes shows a greater health need than other towns by at least 2.1 points. The other towns' CNI scores range from 1.2-2.0 while Lowell's scores range from 3.8-4.0. These scores reflect Lowell's population, which is greater in number than the other towns and comprised of more individuals who are in the lower to middle socio-economic position. As previously mentioned, there is also a greater diversity of races, cultures, and languages that potentially creates a barrier in accessing health services.

City	**Population**	**Weighted Average 2019 CNI Score**	**Weighted Average 2016 CNI Score**
Lowell	112,127	3.9	4.0
Lawrence	80,813	4.4	4.5
Haverhill	72,806	2.8	3.1
Fall River	106,051	3.7	3.9
New Bedford	106,968	4.0	4.0
Brockton	94,856	4.0	3.9
Worcester	181,136	3.8	3.8
Springfield	169,007	4.0	4.0

Lowell's CNI score is comparable with similarly-populated cities across the state with the exception of Haverhill as its CNI is noticeably lower with a score of 2.8. The cities in the table above were historical areas that were part of the industrial revolution with populations between 70,000 and 181,000. The average score of these seven mid-sized, urban cities is 3.8, indicating Lowell is not an exception.

Social Determinants of Health

Healthy People 2020 defines social determinants of health as "conditions in the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality of life outcomes and risks" (Social Determinants of Health, 2019). The County Health Rankings Model (2019) indicates that social and economic factors with physical environment contribute to health outcomes by 50%. In this assessment, we highlight relevant resources including built environment, social environment, housing, food access, violence, education, and employment. An assessment of the impact of social factors on health revealed how health-related behaviors were strongly shaped by socioeconomic and social factors (Braveman & Gottlieb, 2014). Factors that contribute to differences in achieving optimal health outcomes are referred to as health disparities (Disparities, 2019). Social constructs such as race and ethnicity have been linked to health disparities. Other characteristics include gender, age, socioeconomic position, geographic location, and sexual orientation (Baciu et al.,2017). By addressing these social determinants and inequities that exist in our region, we can improve health outcomes and lower health-related costs.

Built Environment

Built environment can refer to the physical aspects of communities we live and work in. During the 19th century, crowded and unsanitary living conditions contributed to disease and epidemics. Although there has been a shift in public health focus toward chronic disease, the link between environment and public health remains prevalent (Perdue et al., 2003). The design of the physical environment can be used to facilitate healthy behaviors by promoting physical activity or accessing proper nutrition. However, it can also contribute to health inequalities for vulnerable individuals due to population or infrastructure density, access of public spaces and facilities, and functional integration to promote community engagement (Gelormino et al., 2015).

Environmental Justice

Environmental justice states that "all people, regardless of income or race, have the right to fair treatment and equal involvement in environmental issues, and have the right to live in environmentally healthy neighborhoods (MEPHT, 2019). When this principle is achieved everyone has the "same degree of protection from environmental and health hazards" in addition to the decision-making process in order to have a healthy environment (EPA, 2019). This is different from environmental inequality or environmental injustice which is when "a specific social group is disproportionately affected by environmental hazards" (Brulle & Pellow, 2006).

Table 3 – Environmental Justice

Community	EJ Criteria	Percent of Block Groups in EJ	Percent of Population in EJ Block Groups
Billerica	Minority		3.3%
Chelmsford	Minority	4.5%	3.0%
Dracut	Income	5.6%	4.0%
Dunstable	--	--	--
Lowell	Minority Income English Isolation	87.5%	87.6%
Tewksbury	--	--	--
Tyngsborough	--	--	--
Westford	Minority	8.3%	10.2%
MA State	--	--	12.1%

Source: EOEEA (2010)

An environmental justice neighborhood is defined by the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) as a census block group that meets at least one of three criteria: median annual household income at or below 65% of statewide median income; 25% or more of the residents are a minority; or 25% or more of the residents are not fluent in the English language. Communities such as Lowell, where neighborhoods have more than one criteria and significantly higher percentages among key criteria are potentially more at risk for exposures from environmental and health hazards.

Open Space

Table 4 – Percent of Land Use – Open Space

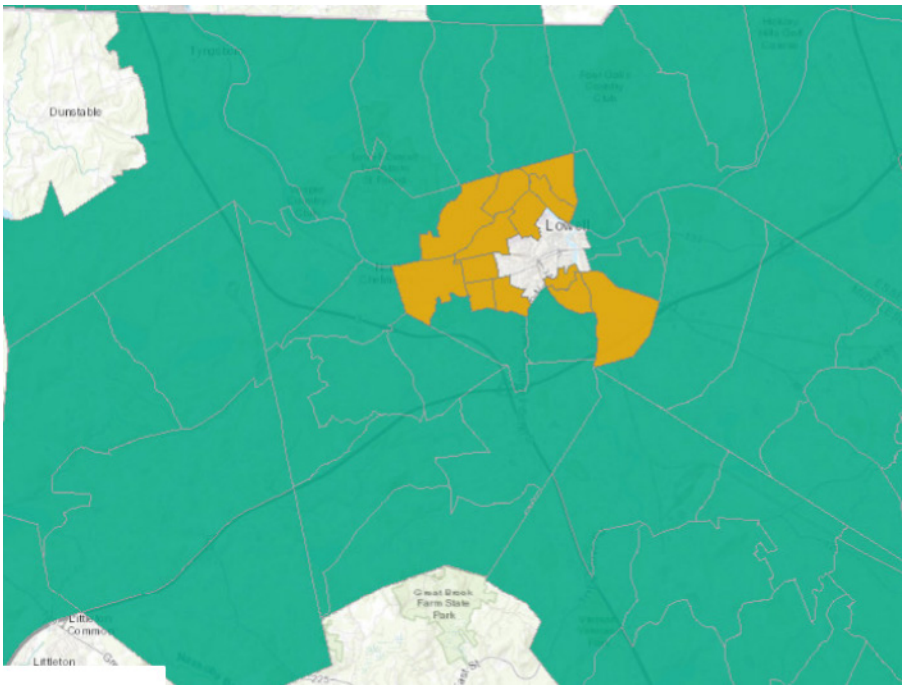
	Agriculture	Forest	Open Space	Recreation
Billerica	1.1	38.2	5.6	1.7
Chelmsford	1.7	37.1	5.9	1.5
Dracut	4.4	41.3	6.5	1.1
Dunstable	7.9	69.4	6.8	0.5
Lowell	0.2	14.9	5.1	3.4
Tewksbury	2.6	40.6	8.1	2.2
Tyngsborough	2.9	57.5	3.5	2.3
Westford	2.3	56.9	6.1	1.8

Source: MEPHT Community Profiles (2019)

Within the Greater Lowell area, there is an average of about 6% of land use dedicated as open space and less than 2% for recreation. Despite being a predominantly urban city, Lowell has the greatest amount recreation space with 3.4%. The Lowell-Dracut-Tyngsboro State Forest spreads over 1,000 acres of these three communities, including 6 miles of trails. More than half of the land in Dunstable, Tyngsborough, and Westford is forest. Dunstable has the greatest percentage of land for agriculture at nearly 8% followed by Dracut with more than 4%.

Food Environment

Figure 5 – Greater Lowell CHNA Food Atlas Map



Source: USDA Economic Research Service, ESRI (2017)

Results from the USDA's Food Atlas indicate a majority of the Greater Lowell Region as Low Access at ½ and 10 miles based on the 2015 Census tracts (Food Access Research Atlas, 2017). Census tracts are subdivisions of counties determined by the Bureau of Census to be able to collect and compare results of the U.S. Census that is completed every ten years. The areas colored green are tracts where at least 500 people or 33% of the population lives farther than ½ mile in urban areas or 10 miles in rural areas from the nearest supermarket. The orange areas also include this Low Access measure in addition to being Low Income. Low income tracts have a poverty rate of 20% or higher or those with a median income less than 80% of the state median family income. There are at least 13 census tracts in Lowell that are both Low Income and Low Access areas.

Childhood Lead Poisoning

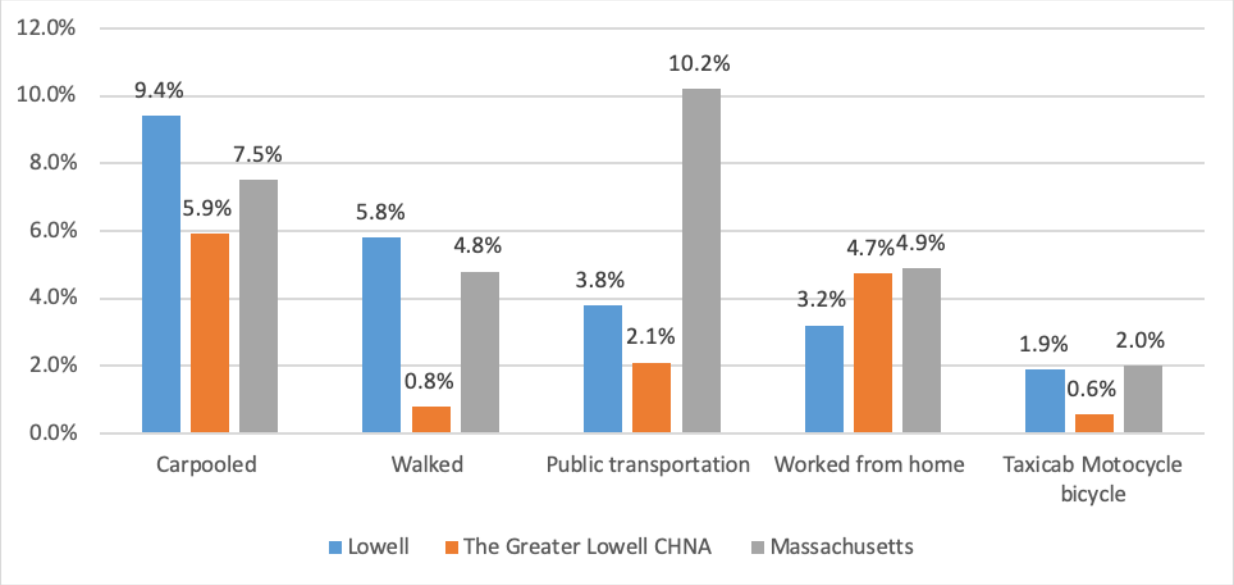
	Lead in Homes (%) (Percentage of houses built before 1978)	Lead Screening, 2017 (%) (Percentage of children age 9 months to less than 4 years screened for lead)	Prevalence of BLL ≥5ug/dL (per 1000) (5-year annual average rate per 1,000 from 2013-2017 for children age 9 months to less than 4 years with an estimated confirmed BLL ≥5ug/dL)	High Risk Status (as of 2016)
Billerica	65	71	7.9	No
Chelmsford	66	78	7.2	No
Dracut	51	72	4.4	No
Dunstable	39	93	Below state level, unstable	No
Lowell	**79**	**68**	**28**	**Yes**
Tewksbury	51	72	6.5	No
Tyngsborough	38	84	6.4	No
Westford	43	76	8	No
MA State Total	71	73	19.2	

Source: Massachusetts Environmental Public Health Tracking, Community Profiles

Another important determinant of health are risk levels associated with the living environment. A community is deemed as a high risk lead community if it meets three criteria based on: the number of old houses in stock, the percent of families with low to moderate income, and rate of first-time blood lead levels ≥10 µg/dL that occurred within the past 5 years. The reference level of 5 micrograms per deciliter (µg/dL) was set by the Center of Disease Control and Prevention (CDC) to identify children with elevated blood lead levels (Lead, 2019). Based on these measures, Lowell is the only community in the Greater Lowell region with a high risk status. Although the percent of homes with lead and the percent of lead screenings of the towns of Billerica and Chelmsford are relatively close, the prevalence of blood lead levels greater than or equal to five micrograms per deciliter is much lower than Lowell's prevalence (7.9 and 7.2 compared to 28).

Transportation

Figure 6 – Mode of Transportation to Work



Source: US Census Bureau, 2013-2017 ACS 5-Year Estimates

Transportation access and commuting time and style impact an individual's health and wellness. The most common mode of transportation to work for all areas was to drive alone. A higher proportion of residents of the Greater Lowell CHNA reported driving alone (84.6%) than those of Lowell (75.8%) or Massachusetts (70.7%) (not shown). The mean travel time to work for residents of Lowell is 25.8 minutes, for the Greater Lowell CHNA the mean travel time is 30.4 minutes and in Massachusetts the mean travel time to work is 29.3 minutes (not shown). Following driving alone, the most common modes of transportation to work for Lowell residents is to carpool (9.4%) or walk (5.8%). For the Greater Lowell CHNA, after driving alone the most common modes of transportation are carpooling (5.9%) and working from home (4.7%). For the state of Massachusetts, after driving alone the most common mode of transportation is to utilize public transportation (10.2%) followed by carpooling (7.5%).

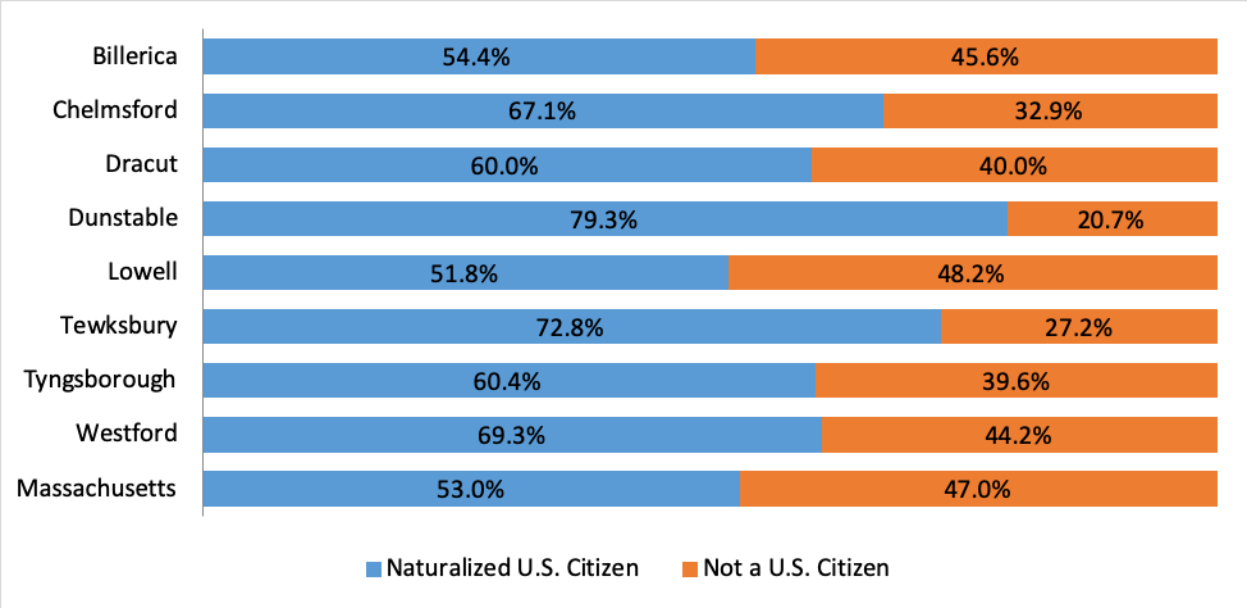
Social Environment

Social environmental factors include but are not limited to social connections, social participation, social cohesion, social capital and a neighborhood's collective efficacy (Woolf & Aron, 2013). The stability of social connections and relationships strongly influences health behavior. Social support is a mechanism that can also enhance health. It is theorized that the support that people who have immigrated to the United States provide to each other increases their health outcomes despite their level of income and education compared to other groups (Matthews et al., 2010). Having the ability to build and maintain relationships with one another through trust and norms develops this social capital.

Community Teamwork, Inc. is a community action agency, regional non-profit housing agency, and community development corporation that serves over 50,000 people with low incomes across towns of Middlesex and Essex Counties (About Us, 2019). In a report of their 2017 Community Needs Assessment the cities and towns of Billerica, Chelmsford, Dracut, Lowell, Tyngsborough, and Westford were some of the areas represented. The top three community strengths mentioned by their respondents were a sense of community and social connections, diversity, and the number of resources that exist to help people. Other strengths mentioned were a positive sense of identity, sense of pride in the community, and appreciation of history and culture (Community Needs Assessment, 2017).

Immigration

Figure 7 – Citizenship Status of Residents Born Outside the United States

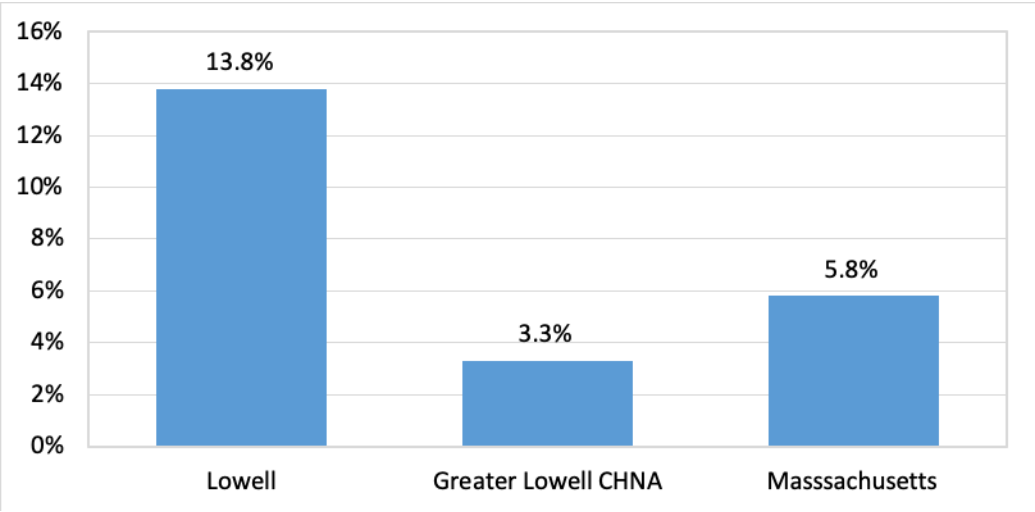


Source: US Census Bureau, 2013-2017 ACS 5-Year Estimates

As previously mentioned, Lowell has the greatest percentage of residents who were born outside the United States. Of this cohort, less than 50% are not currently U.S. Citizens and nearly 52% are naturalized citizens. Compared to the statewide level, Lowell has a slightly greater proportion of residents who were born outside the United States, who are not U.S. citizens (48.2% versus 47.0%).

Language

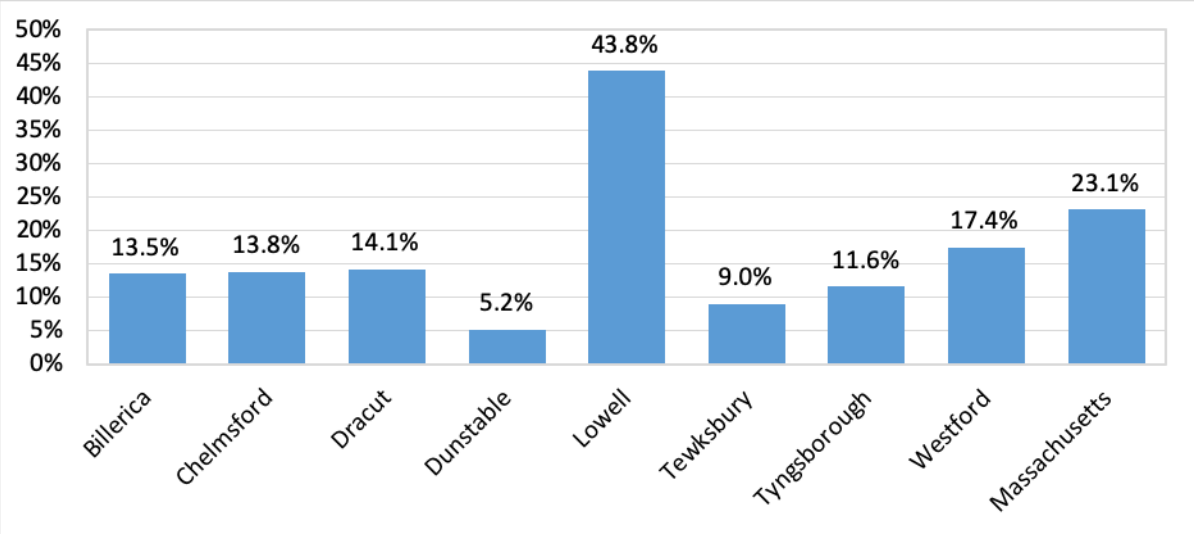
Figure 8 – Percent of Households with Residents Who Speak Limited English (All)



Source: US Census Bureau, 2013-2017 ACS 5-Year Estimates

Communication is an integral part of social cohesion. Language ability can impact health and access to services. Despite interpreter services that may exist, individuals with limited English proficiency tend to experience higher rates of medical-related errors, poorer clinical outcomes, and lower quality of care compared to counterpart individuals who speak proficient English (Green & Nze, 2017). At least 14% of all households in Lowell are households with residents who speak limited English. This is more than double the rate of the state level (5.8%) and three times the rate of all the communities of Greater Lowell (3.3%).

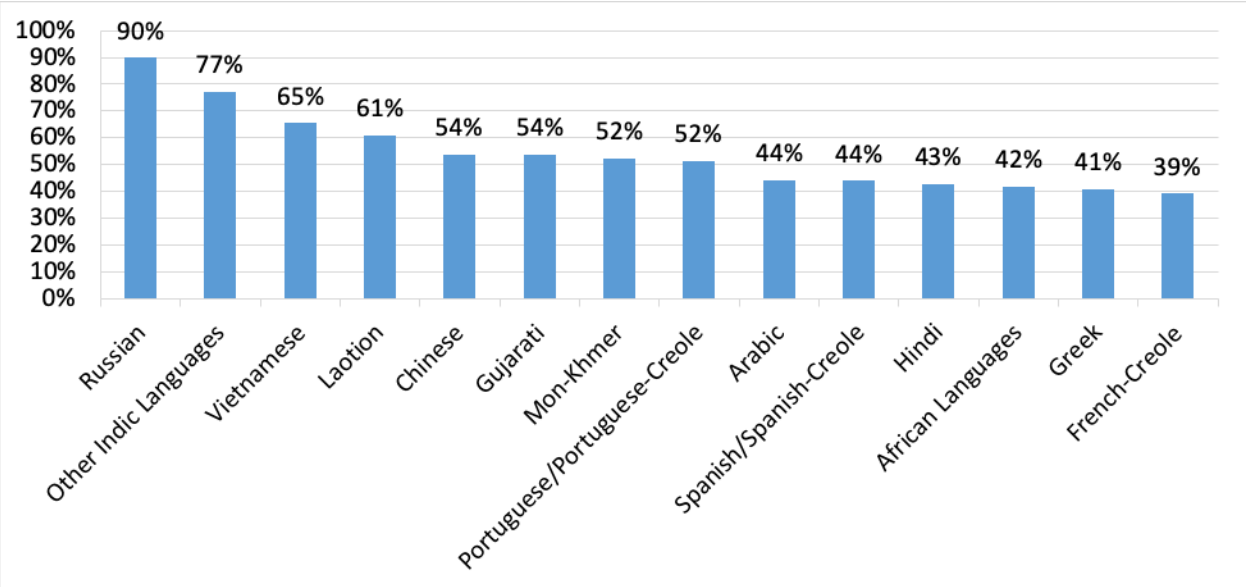
Figure 9 Percent of Population 5 Years and Over Who Speak a Language Other than English



Source: US Census Bureau, 2013-2017 ACS 5-Year Estimates

Nearly 44% of the population in Lowell speaks a language other than English at home, whereas the statewide level is at 23.1%. Within the Greater Lowell area, Westford has the second highest rate at 17.4% followed by Dracut, Chelmsford, and then Billerica. At least 95% of the population of Dunstable speaks only English.

Figure 10 – Languages Spoken at Home that Speak English Less than "Very Well" in Lowell



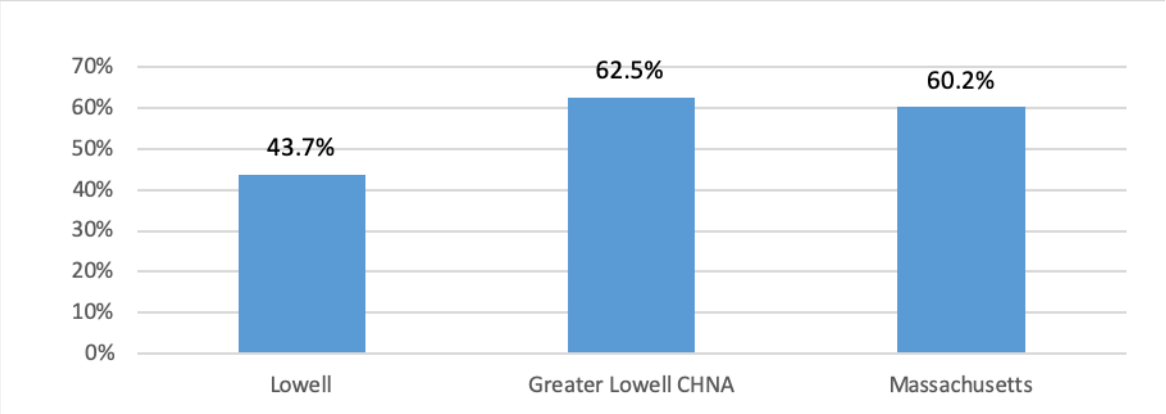
Source: US Census Bureau, 2013-2017 ACS 5-Year Estimates

Following Khmer and Spanish, the most popular spoken languages in Lowell are Portuguese or Portuguese Creole, African languages, Vietnamese, French, Laotian, and Gujarati (not shown). Lowell represents the second largest Cambodian-American population in the country with more than 12,000 residents who speak Khmer. More than 52% of those residents older than 5 years old speak English less than "very well." About 44% of the Spanish or Spanish-Creole speaking community also speak English less than "very well." Within the small population of Russian speaking residents, 53 of the 59 individuals (90%) speak English less than "very well."

The most popular languages other than English spoken by residents of Westford include Spanish or Spanish-Creole, Chinese, Hindi, French, and then Portuguese or Portuguese-Creole (not shown). Fewer than 10 of the residents in Westford speak Laotian. All of these individuals were categorized as speaking English less than "very well." This is also true for 85.5% of the Korean-speaking community.

Voting

There is a potential association between voting participation and health due to implementation of social policies or indirectly measuring social capital (BARHII,2015). In communities where there are higher levels of participation, there is also greater social capital. Higher social capital is associated with lower mortality rates and better health outcomes. In areas with lower voter participation of vulnerable populations, there is greater risk for reductions in social resources intended to support them.



Source: Massachusetts Midterm Election 2018 Results via NBC News

The 2018 voter turnout in Massachusetts was generally very high. Since it was a midterm election the actual turnout is significantly lower than a presidential election. In Massachusetts, about 2.75 million people cast a ballot in the 2018 election for a voter turnout of 60.2%. The voter turnout of the Greater Lowell region was higher than the state at 62.5%. Within the Greater Lowell area, Westford had the highest turnout with 70% of registered voters casting a ballot, and Lowell had the lowest turnout at 43%.

Voter turnout showed how active citizens are in their government on a state and federal level, as a significant economic indicator in the United States. Multiple studies have shown that higher income strongly correlates to higher voter turnout (Akee, 2019). The reason for this is not entirely clear, but there are a few possible explanations. Since education makes it easier for people to consume political information and education is linked to wealth, this might be a driving factor in the correlation. It is also possible that more education gives people a greater sense of civic duty, or they believe more strongly in the benefits of voting. Other possible reasons may include the fact the voting can be a costly activity in which you need time, skills, information, health, and transportation in order to participate, and that higher income provides people with such resources that make voting easier. Whatever the case, higher levels of income generally correlate with higher voter turnout rates in national elections (Simeonova et al., 2018).

Housing

Evidence of housing quality and accessibility has been known to be closely associated with health and morbidity (Krieger & Higgins, 2002). Chronic respiratory conditions can be exacerbated from environmental exposures from poor ventilation to pest infestations. Overcrowding in a residential space allow infectious disease to spread. Old housing stock or housing instability increases the risk of asthma, lead exposure, and malnutrition for developing children as well.

According the Out of Reach 2018 report, it is not possible for a person to afford a two-bedroom rental at the fair market rate while working a 40-hour week at minimum wage anywhere in the country. The federal standard for affordability indicates that no more than 30% of a household's gross income should be attributed to rent and utilities. Households are "cost burdened' if a household is paying over 30% of their income and "severely cost burdened" if they are paying over 50% of their income.

Lowell's median home value to median household income ratio, the basic measure to determine housing affordability was 4.95. This is the highest ratio compared to all Greater Lowell communities, making Lowell the least affordable community for existing residents in the area. Like the previous assessment in 2016, Lowell 's HUD Metro Fair Market Rents Area (HMFA) remains at the fourth most expensive area in Massachusetts (Out of Reach, 2018). This HMFA includes the cities and towns of CHNA-10 and towns of Groton and Pepperell. The minimum hourly wage to afford a two-bedroom apartment in the Lowell HMFA is $26.77 per hour based on the 2018 Fiscal Year Fair Market Rent. The annual income needed to afford a two-bedroom is $55,680 or $4,640 per month without paying more than 30% of income on housing. With a minimum wage job ($11.00/hour) in 2018, a person would have to work 97 hours in one week to afford a two-bedroom apartment. In the table below, the percentage of rental units and owner costs that spend 30% or more of their household income is indicated for each city and town.

Table 11 – Housing Affordability

	Gross Rent as Percentage of Household Income		Selected Monthly Owner Costs as Percentage of Household Income		Median Home Value/Median Household Income	Median Home Value	Median Household Income
	Percent Units 30%+	Total Occupied Units Paying Rent	Percent Units 30%+	Total Housing Units with a Mortgage			
Billerica	43.4%	2,628	29.7%	8,627	3.74	371,500	99,453
Chelmsford	42.8%	2,085	24.8%	7,881	3.46	368,500	106,432
Dracut	51.1%	2,531	31.6%	6,382	3.52	304,800	86,697
Dunstable	13.2%	38	28.3%	803	3.32	460,600	138,700
Lowell	57.7%	21,282	35.1%	11,831	4.95	240,500	48,581
Tewksbury	51.3%	1,417	31.5%	7,138	3.81	357,700	93,817
Tyngsborough	40.8%	549	23.1%	2,773	3.44	348,300	101,303
Westford	42.9%	829	22.1%	5,481	3.51	458,600	138,006
Massachusetts	50.1%	918,649	31.5%	1,122,877	4.75	351,600	74,167

Source: US Census Bureau, 2013-2017 ACS 5-Year Estimates

Table 12 – Housing Characteristics of Occupied Housing Units

	MA	Billerica	Chelmsford	Dracut	Dunstable	Lowell	Tewksbury	Tyngsborough	Westford
% Lacking complete plumbing	0.4%	0.4%	0.1%	1.3%	0%	0.9%	0.4%	0%	0.3%
% Lacking complete kitchen	0.8%	0.6%	1.9%	0.6%	0%	0.8%	0.7%	0%	0.3%
% No telephone service	1.7%	1.2%	1.9%	0.2%	0%	2.8%	1.3%	1.9%	1.1%

Source: US Census Bureau, 2013-2017 ACS 5-Year Estimates

Table 13 – Overcrowding

	MA	Billerica	Chelmsford	Dracut	Dunstable	Lowell	Tewksbury	Tyngsborough	Westford
% of Units with 1 to 1.5 Occupants per Room	1.3%	1.2%	0.5%	1.4%	0%	2.7%	0.5%	1.9%	0.8%
% of Units with more than 1.5 Occupants per Room	0.7%	0.6%	0.2%	0.1%	0%	1.3%	0%	0.4%	0.3%

Source: US Census Bureau, 2013-2017 ACS 5-Year Estimates

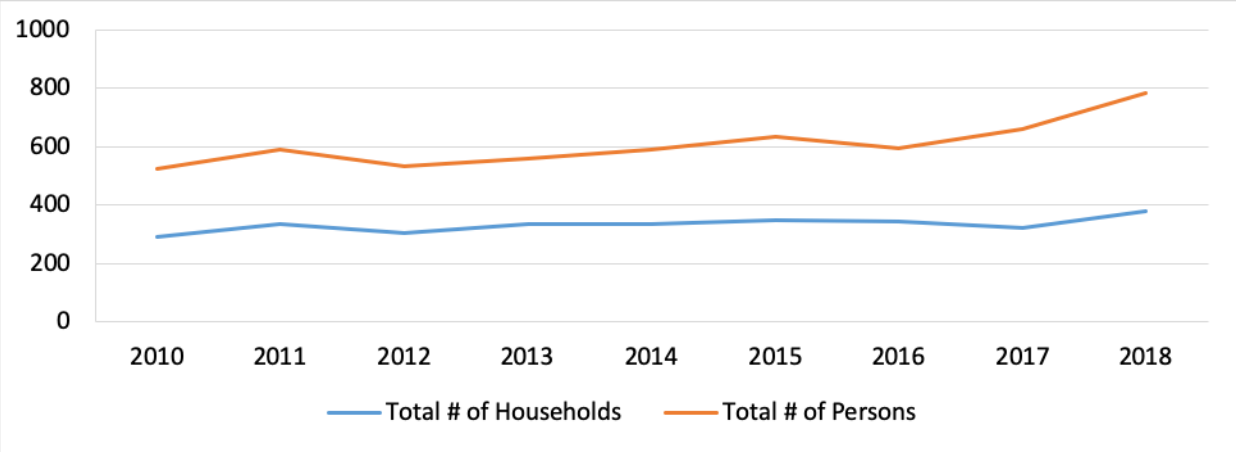
Substandard housing and overcrowding can potentially affect a person's physical and mental health. Limited affordable housing can force families into older homes with water leaks and poor heating or cooling systems. It can also lead to families or individuals moving in together to cover costs. Having more than two people in a bedroom or more than one family in a residence is considered overcrowding. Healthy People 2020 explain that these living conditions can increase risk of infectious disease, mental health issues, increased stress, deteriorating relationships and decreased sleep (Housing Instability, 2019). Data from the Census indicates that 1.3% of the units in Lowell has overcrowding. Nearly 2% of units in Chelmsford lack complete kitchen facilities and more than 1% of units in Dracut lack complete plumbing facilities.

Table 14 – Point-in-Time Homeless Counts in Lowell (2010-2018)

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total # of Households	290	333	306	335	333	348	344	324	381
Total # of Persons	526	589	534	559	588	635	594	658	783

Source: HUD Continuum of Care

Figure 15 – Point-in-Time Counts of People Experiencing Homelessness in Lowell (2010-2018)



Source: HUD Continuum of Care

A 2018 study found that in communities where rental costs surpass 23% of income, there are more people experiencing homelessness. When this threshold passes 32%, homelessness increases at a faster-rising rate and can lead towards a homelessness crisis (Glynn & Casey, 2019). This supports the federal standard of the 30% threshold and when it is surpassed, there is an increased risk of housing insecurity and homelessness. Nearly all the communities of CHNA-10 exceed this 30% threshold for rental properties. More than half of all the rental units of Dracut, Lowell, and Tewksbury cost more than 30% of household incomes.

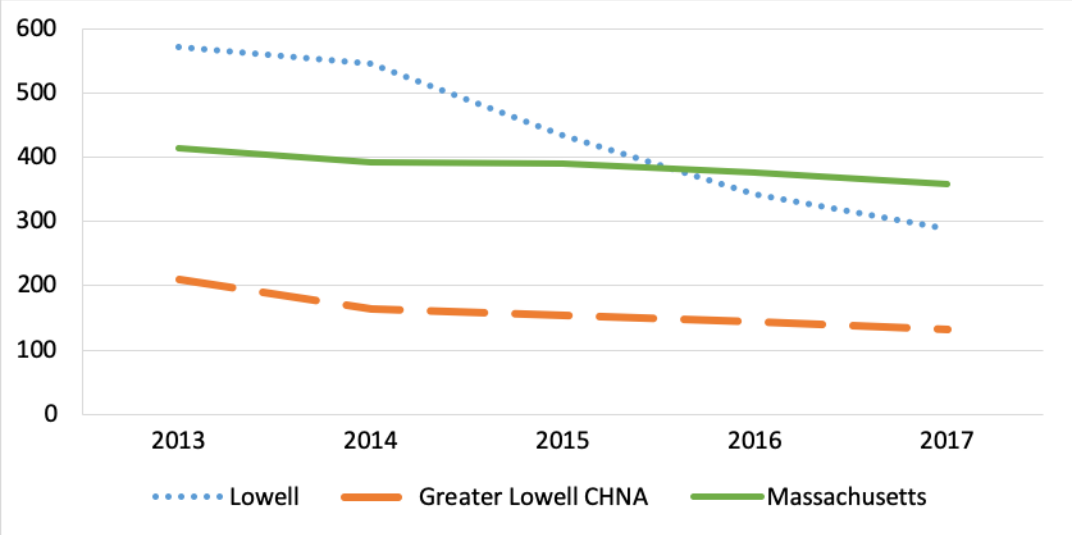
The counts of people experiencing homelessness provided by the U.S. Department of Housing and Urban Development (HUD) show that between 2010 and 2018 there has been an overall increase of people experiencing homelessness in Lowell. Between 2011-2012 and 2015-2016, there was a decrease. However, between 2016 and 2018, there was an increase of nearly 200 more individuals experiencing homelessness accounted for in Lowell. Experiencing homelessness can have significant and chronic impacts on health and mortality.

The Continuum of Care (COC) Homeless Populations and Subpopulations Reports by the Housing of Urban Development (HUD) Exchange provides Point-in-Time (PIT) counts of sheltered and unsheltered homeless persons. Of the communities in the Greater Lowell CHNA-10, Lowell is the only area that is a COC with yearly counts.

Violence

Exposure to crime or violence can lead to short and long-term effects. An individual can also be exposed from direct victimization, witnessing, or hearing about it in the community. Childhood trauma from any type of exposure to violence or crime increases the risk of poor mental and behavioral health such as depression, anxiety, and increased aggression (Crime and Violence, 2019). Having repetitive exposures to crime and violence increases the risk of negative health outcomes (Margolin et al., 2010).

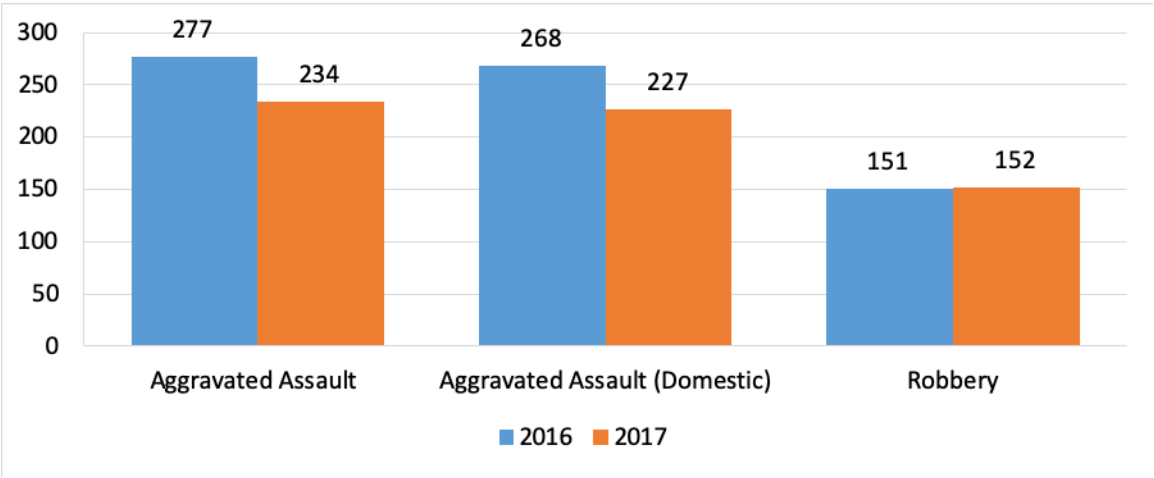
Figure 16 – Incidents of Violent Crime per 100,000 (2013-2017)



Source: FBI-Uniform Crime Report Program

Violent crime from the figure above refers to murder, non-negligent manslaughter, rape, robbery, and aggravated assault. For all three geographical areas, there has been a decreasing trend of incidents of violent crime between 2013 and 2017.

Figure 17 – Lowell Crime Summary (2016-2017)



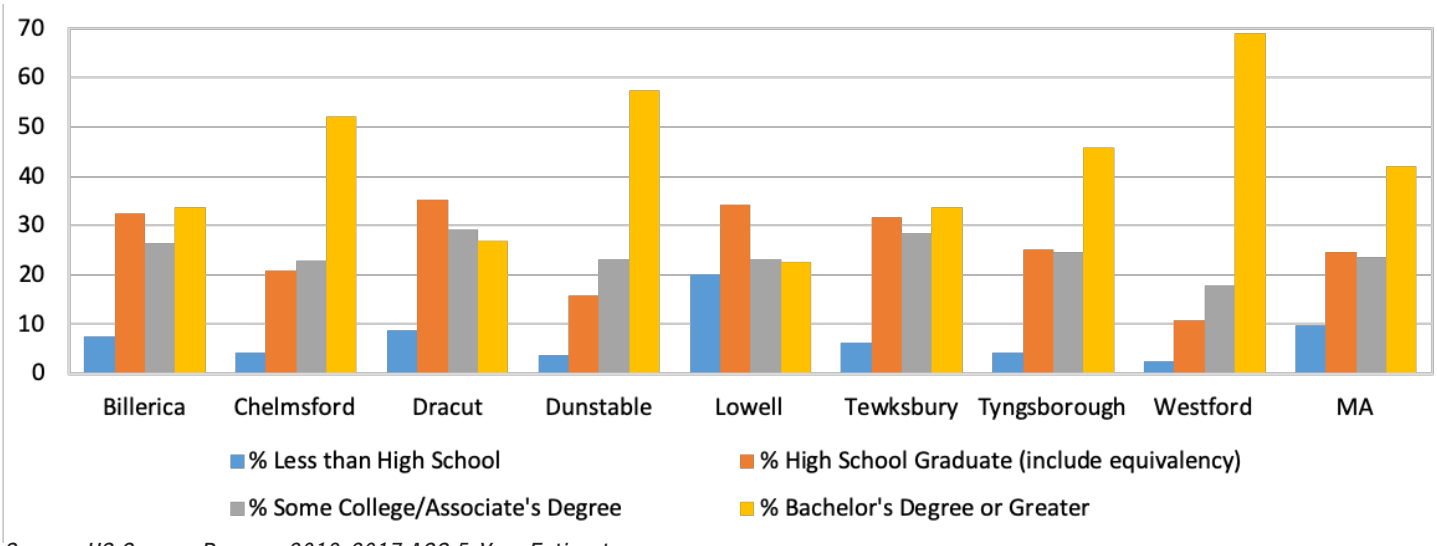
Source: Lowell Police Department Compstat Crime Summary

Between 2016 and 2017 the number of crimes attributed to aggravated assault that were both domestic and nondomestic decreased by 15% and 16% respectively (Lowell Police Department, 2018). There was one more incidence of robbery in 2017 than 2016. When combined, Lowell's violent crime rate decreased by 12% in 2017 compared to 2016.

Education

The level of educational attainment is a predictor of health outcomes (Education, 2019). Obvious returns on education include higher earnings from job opportunities. Postsecondary education has become a minimum requirement to afford resources needed for better health (Shankar et. al, 2013) In the United States, there has been a large gap of health outcomes amongst individuals with high and low education (Telfair & Shelton, 2012). Education provides an individual with "hard and soft skills" that create better opportunities to gain economic and social resources. It also allows people to navigate health care resources, participate in patient-physician communication and make better lifestyle and personal health choices. Other findings related to health include lower life expectancy of those without high school diplomas and an eight percent increase of diabetic prevalence of those without a high school education compared to college graduates (Zimmerman, Woolf & Haley, 2014). Those with higher education are also less likely to engage in risky behaviors and lower exposure to stress.

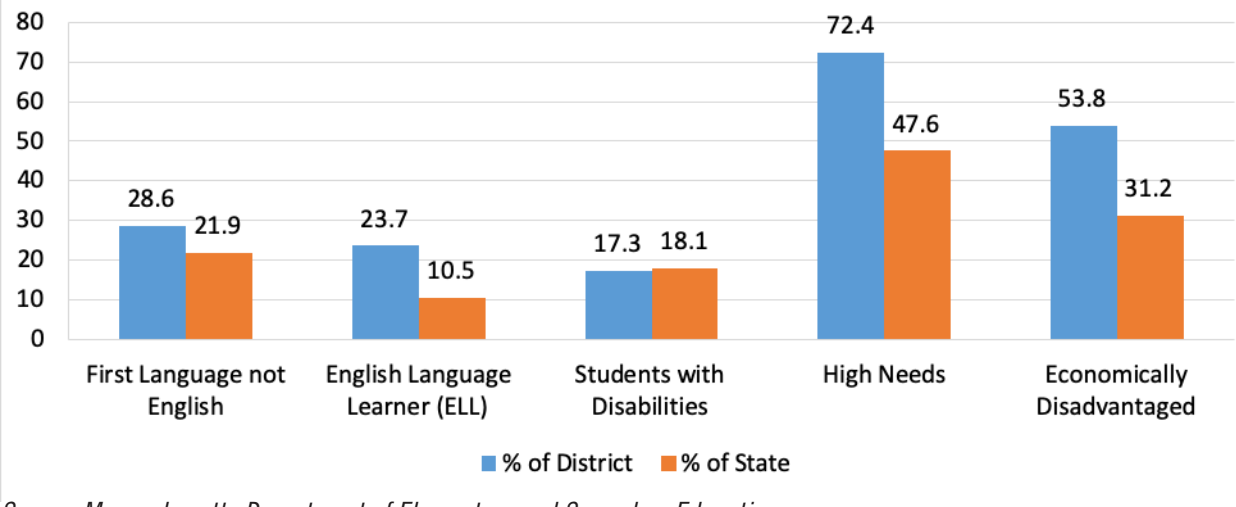
Figure 18 – Percent of Population by Highest Level of Education for Population 25 Years and Older



Source: US Census Bureau, 2013-2017 ACS 5-Year Estimates

The highest level of educational attainment for about one third (34.2%) of Lowell's population 25 years and older was graduation from high school. In Westford, graduating high school was the highest level of education for about 11% of the population. However, 69.1% of Westford's population who are 25 years and older has a bachelor's degree or greater. Chelmsford, Dunstable, Tyngsborough and Westford had higher percentages of adults who attained a bachelor's degree or higher than the Massachusetts state level. These four communities, along with Billerica and Dracut also had a lower percentage of adults with less than a high school education than the state level.

Figure 19 – Selected Populations of Lowell Public Schools (2017-2018)



Source: Massachusetts Department of Elementary and Secondary Education

Lowell has twice as many adults over the age of 25 years than state level and greater population and diversity than other towns in the Greater Lowell region. Lowell also has a greater percentage of public schools students whose first language was not English, who are designated as an English language learner (ELL), economically disadvantaged, and have high needs compared to state levels. The percentage of students with disabilities is the only category that the state level is higher, but by less than 1%. Students who are part of at least one state-administered program are considered economically disadvantaged. These programs include the Supplemental Nutrition Assistance Program (SNAP), Transitional Assistance for Families with Dependent Children (TAFDC), the department of Children and Families' (DCF) foster care program, and MassHealth. The measure of high needs comes from the number of students accounted for the other four categories (low-income, economically disadvantaged, ELL or former ELL, and students with disabilities) divided by the adjusted enrollment of students.

These factors further contribute to the graduation rates seen in the table below, as Lowell has a graduation rate of less than 80%. Dracut and Lowell also had a higher drop-out rate (5.3%) than the state (4.8%).

Table 20 – 4-Year Graduation Rate (2018)

	MA	Billerica	Chelmsford	Dracut	Dunstable	Lowell	Tewksbury	Tyngsborough	Westford
% Graduated	87.9	87.2	92.9	88.8	--	79.6	92.6	96.9	98.0
% Dropped Out	4.8	2.9	3.9	5.3	--	5.3	2.0	0.8	0.5

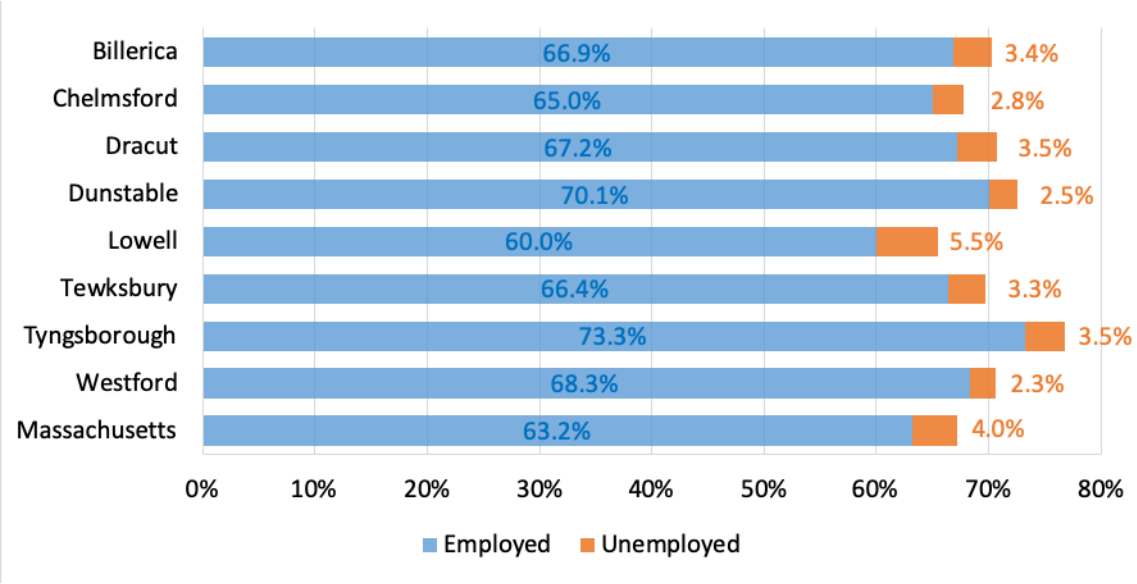
Source: Massachusetts Department of Elementary and Secondary Education

Employment
Employment allows individuals the opportunity to seek health benefits and engage in health promoting activities. Employee-sponsored health insurance provides health benefits for the employee and their dependents to access health services. A steady income and job security influences where people choose to live and what products they can afford (Employment, 2019).

However, employment type can negatively impact health. Exposures include but are not limited to: long working hours, repetitive motions, workplace hazards and unsafe working conditions, which worsen health overtime. Individuals considered "working poor" are those whose income falls below the poverty line. Rates of the individuals classified as "working poor" are twice as high amongst people who identify as Black and Hispanic compared to people who identify as White or Asian American (BLS, 2016). Socially disadvantaged groups are more likely to work in areas with low-paying wages but high occupational hazards and health risks. Despite being a working group, they are also less likely to experience the health benefits or have sick leave as those with higher earnings.

Unemployment also influences physical and mental health due to lowered income and living standards, increased stress, and behavioral health risks (RWJF, 2008). Similarly, job insecurity also contributes to poorer health. Changes of unemployment or loss of income makes it difficult to afford or seek nutritious food or health care. Risky coping behaviors of stress such as alcohol use or not taking vacation or sick leave increases health risks. Stress-related illnesses include high blood pressure, heart attack, stroke, and heart disease.

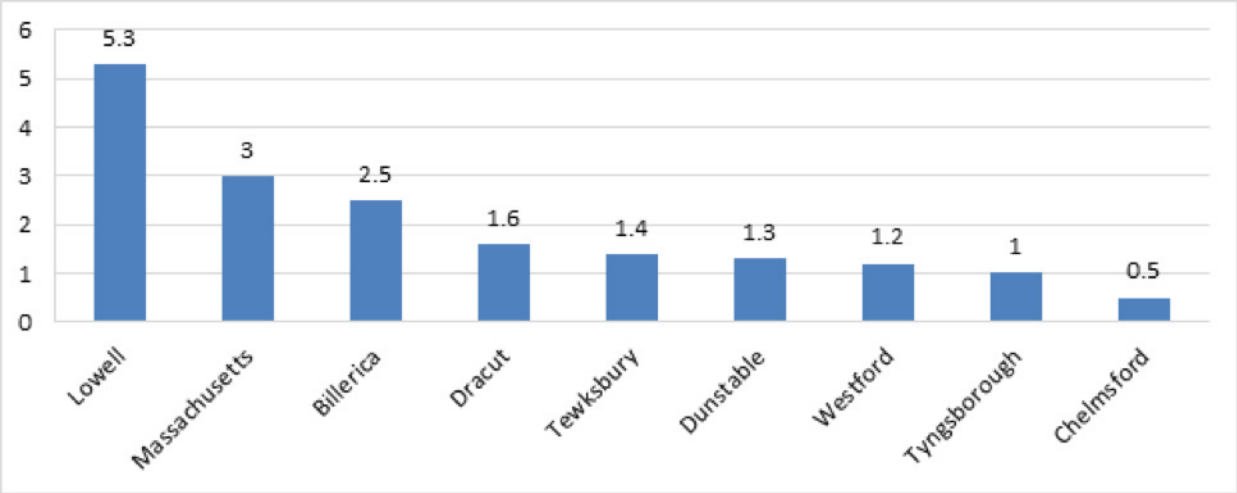
Figure 21 – Percent of Employment



Source: US Census Bureau, 2013-2017 ACS 5-Year Estimates

The average employment rates in the communities of The Greater Lowell CHNA (67.2%) are above the state rate of 62.7% (not shown). Compared to other communities of The Greater Lowell CHNA, Lowell has the lowest percent of individuals who are employed (60.0%) and highest percentage of individuals who are unemployed in the labor force at 5.5%. (Note: This is not the same as unemployment rate, see Basic Demographics Table.)

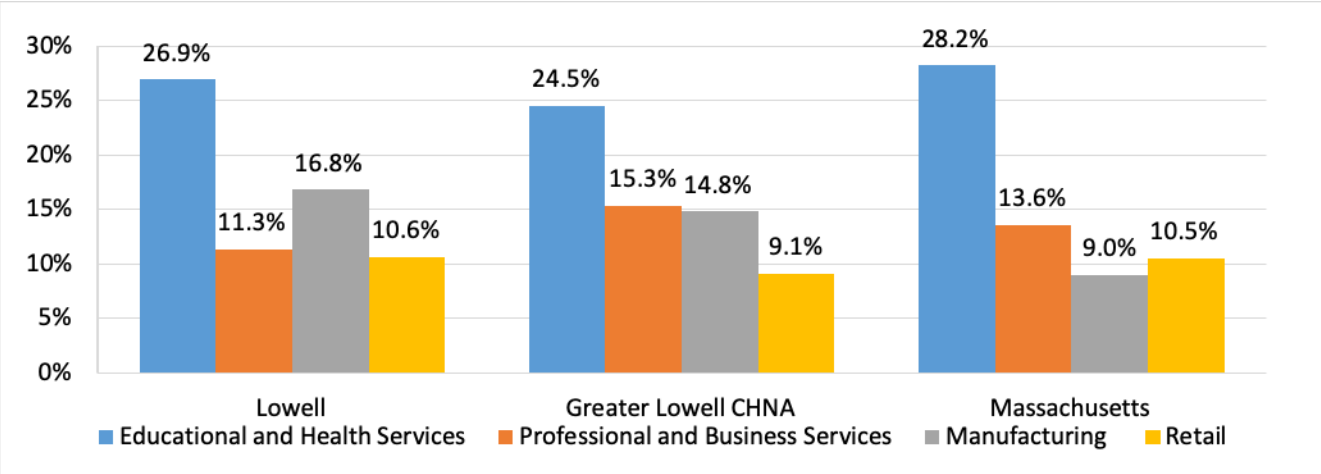
Figure 22 – Percentage of Population with No Health Insurance



Source: U.S. Census Bureau, 2013-2017 ACS 5-Year Estimates

Excluding Lowell and Billerica, less than 2% of the populations of the towns of Greater Lowell do not have any form of health insurance. The percentage of residents who did not have health insurance in Billerica was closer to the state level that was at 3%. Lowell had the highest proportion of people without public or private insurance at more than 5%.

Figure 23 – Top 4 Industries of Employment



Source: US Census Bureau, 2013-2017 ACS 5-Year Estimates

The top four industry sectors for residents of Lowell, The Greater Lowell CHNA communities, and state of Massachusetts are shown above. For all communities the supersector of Education and Health Services employs the most people. Within the supersector, the U.S. census groups educational services with health care and social assistance. The second highest supersector of Greater Lowell CHNA communities and state are the Professional and Business Services. This includes professional, scientific, and technical services, management, administrative and support, and waste management and remediation services. Only 11.3% of Lowell residents work in these fields. Nearly 17% of Lowell's working populations are employed in the manufacturing sector, which is higher than the rate of Greater Lowell CHNA and state.

Greater Lowell CHNA Survey Summary

The 2019 Greater Lowell CHNA included a comprehensive community health and safety survey. Inclusion of the survey portion was informed by stakeholder efforts to increase community participation in the CHNA, particularly in target populations. The CHNA Survey collects data cross seven domains: Demographics, Community Health Resources, Health Needs and Issues, Community safety, Incidence of Health Issues and Access Barriers, Service Utilization History, and Open Response Feedback. **See Appendix C for complete rank order lists of the data summarized in this section.*

SURVEY DEVELOPMENT AND DATA INTERPRETATION

An inter-agency, cross-disciplinary survey team convened to draft the 2019 Greater Lowell Community Health Needs Assessment (GLCHNA) Survey. Drafting was guided by three principles for the final data set.

Principle 1: The survey was designed to be *evidence-based*. It reflects the known social determinants of health as well as physiological basis for health.

Principle 2: The survey was designed with *application* in mind. The goal of this project was to create a baseline data set that could be deployed in community, health, and research settings to guide intervention and promotion efforts that yield the greatest and most immediate positive benefits to our community.

Principle 3 The survey was intended to be , particularly of populations that are regularly identified in community health research as high-risk or high-need groups while simultaneously being underrepresented as participants in survey data.

The data summary provided in this report attempts to provide interpretation of the data with these three principles in mind.

Demographics

A total of 448 paper surveys and 907 online surveys were completed by Greater Lowell residents, for a total count of 1,355 completed surveys. Residency representation was approximately proportional according to population level representation for Lowell, Billerica, Chelmsford, Westford, and Dunstable. Dracut and Tewksbury were slightly underrepresented compared to their density of the total Greater Lowell population, and Tyngsborough was overrepresented compared to its population density in the total area.

	Count	% survey	% population
Total Count	1,355		
Lowell	539	39.8%	38%
Dracut	113	8.3%	11%
Tyngsborough	108	8%	4%
Tewksbury	93	6.9%	11%
Billerica	210	15.5%	15%
Chelmsford	194	14.3%	12%
Westford	87	6.4%	8%
Dunstable	11	.8%	1%

Participants were able to select multiple race and ethnicities categories that best represented their understanding of their racial and ethnic backgrounds. The table below includes the frequency count per each race/ethnicity category, the percent representation of each category in the survey, as well as a comparison category that indicated the area representation of the total population according to census data.

	Count	% survey	% population
Total Count	1,550		
White	1194	77%	72%
Black/African American	56	3.6%	5%
American Indian or Alaskan Native	14	.9%	0%
Asian/Asian American	126	8.1%	12%
Middle Eastern/Arabic	7	.5%	NA
Native Hawaiian/Pacific Islander	3	.2%	0%
Hispanic or Latino/a	126	8.1%	8%
Other	24	1.6%	1%

Though a full report of demographics can be found in the Community Health Needs Assessment Survey Report, other notable demographics of interest include:

- Average participant age: 47.1
- Majority participant gender: female (78%)
- Lesbian, Gay, Bisexual, Transgender, and Queer participation: 8.3%
- Non-citizen participation: 5.6%
- Annual Income Below $25,000: 16.2%
- Not working/unemployed participation: 26.3%
- Participants from multilingual homes: 30%

COMMUNITY RESOURCE NEEDS AND PRIORITIES

Participants assigned three priority ranks to their top three priority community resources. Total Rank Count was calculated by summing the number of times an item was ranked as one, two or three. The top priority community resources for all participants are: **Affordable Housing** (35.9% total rank count), **Access to Mental Health Services** (34.0%), **Access to Healthy Food** (30.0%) **High-quality Public Education** (27.7%) and **Substance Abuse Prevention Programming** (23.3%).

COMMUNITY HEALTH NEEDS AND PRIORITIES

Participants assigned three priority ranks to their top three priority community health needs and issues. The top priority community needs for all participants are **Mental Health Issues** (41.9% total rank count), **Substance Addiction** (33.8%), **Alcohol Abuse/ Addiction** (31.2%), **Cancer** (18.9%), and **Nutrition** (18.2%).

COMMUNITY SAFETY NEEDS AND PRIORITIES

Participants assigned three priority ranks to their top three priority community safety issues. The top priority community safety issues for all participants are **Domestic Violence** (31.7%,) **Bullying** (30.8%), **Drug Trafficking** (24.3%), **Sexual Assault/Rape** (23.1%), and **Unsafe/Illegal Gun Ownership** (20.1%).

HEALTH ISSUE PREVALENCE

In order to assess health issue prevalence, participants were asked to indicate if they or someone they know has ever or is currently dealing with a range of specific health issues.

The most frequently reported issues for participants themselves are **Anxiety** (33.4%), **Depression** (26.2%), **Vision Problems** (25.5%), **Bone, Joint, and Muscle Illness** (21.2%), and **High Cholesterol** (17.6%).

The most frequently reported issues for people participants know are **Cancer** (65.6%), **Alcohol Abuse/Addiction** (65.2%), **Diabetes** (63.6%), **High Blood Pressure** (61.4%), and **Depression** (60.4%).

HEALTH BARRIER PREVALENCE

In order to assess the prevalence of barriers to accessing health services, participants were asked to indicate if they or someone they know has ever or is currently dealing with a range of known health access barriers.

The most frequently reported barriers for participants themselves are **Care Received from a Healthcare Provider was Negative** (19.9%), **Cannot Afford Medication** (16.8%), **Office is Not Open During Times When I am Available** (16.0%), **Cannot Afford Mental Health Services** (12.3%), and **Cannot Find a Provider Accepting New Patients** (11.3%).

The most frequently reported barriers for people that participants know are **Cannot Afford Medication** (46.9%), **Cannot Obtain Health Insurance** (38.1%), **No Transportation to Medical Facility** (33.0%), **Cannot Afford Mental Health Services** (32.6%), and **Cannot Afford Long-Term Health Services** (29%).

PARTICIPANT COMMENTS

Participant comments were coded into thematic groups using NVivo software. Approximately 154 participants opted to include written comments. Nine themes emerged in the analysis of participant comments.

Access Barriers and Burdens: challenges participants have experienced in trying to access health services. These barriers include cost, transportation limitations, and systems failures like wait-times and understaffing.

Mental Health and Substance Use Disorders: concerns or personal experiences with mental health needs, services, or drug and substance problems.

Safety and Community Relationships: concerns about violence, safety, community climates and the role of police.

Environment, Space and Housing: concerns about the physical landscape of the community. These concerns include lack of housing, green space, and walkability.

Specific Illnesses: comments that reference participants own experience with specific illnesses or their concerns about specific illnesses that were not explicitly addressed in the report.

Negative Service Experiences: specific participant descriptions of their negative experiences seeking healthcare or other social services.

Suggestions and Requests: participants' specific ideas about how we could improve the health and safety of our community and its members.

General Negative and General Positive: general comments about either positive or negative thoughts or experiences with health and safety or with the survey itself.

SURVEY CONCLUSIONS

In line with most public health data and data from CHNA listening sessions, survey participants indicated that their top priority health needs are Mental Health, Substance Addition, Alcohol Abuse, Cancer, and Nutrition. The ability to address these needs are significantly impacted by a range of environmental and social health determinants; most specifically, survey participants cite Affordable Housing, Access to Services (including availability, cost, and physical access to via transportation), Public Education, and Prevention Programming as highest priority resources for maintaining health lives.

Importantly, the summary for this report only includes findings for the total participant group. Priorities and incidence rates change when considering, for example, responses by town, by race, by citizenship status, by age, by incomes, etc. Some of these differences are included in Appendix C to illustrate these discrepancies, and should be considered when making determinations about health priorities, needs, and barriers for specific populations and geographic locations.

FINDINGS ABOUT COMMUNITY HEALTH AND NEEDS FROM LISTENING SESSIONS/INTERVIEWS

The following statements are expressed as opinions and perceptions from participants of listening sessions and key informant interviews.

Overall Perception about Community Health

The majority of the key informants described the overall health of the community as '*good*' and described residents as relatively healthy. They based the determination of 'relatively healthy' on the community having adequate emergency services, effective collaborations with health agencies and organizations, and increased mental health awareness. It was mentioned in most listening sessions that communities in the Greater Lowell area face behavioral and mental health challenges, especially anxiety and depression, across all age groups. A professional from a listening session stated, "*I have seen folks with a lot of mental health issues in the last 6 or 9 months, a lot of new cases*." Most professionals mentioned that communities in the Greater Lowell area are stigmatized with substance use disorder and alcohol use disorder, which lead to continuous visits to the emergency department. They also acknowledged that teens and adolescents are a high-risk population for mental and behavioral health problems and indicated they suffer from emotional distress due to family-school-work life imbalance. Participants indicated that parents also face socio-emotional distress and may eventually resort to substance use. Hence, mental and behavioral health problem remain a community health burden. In addition, the lack of support services especially during early teenage years adds to the toll of poor community health and safety.

Most key informants acknowledged that the lack of dual diagnosis services has negative consequences on the overall health of communities. Most clients have co-occuring mental and behavioral health concerns and the health care system is unfortunately limited in treatment of co-morbidities in a concurrent manner. Participants mentioned the increased demand for integrated care due to the side effects from long-term medication use, especially among the elderly. For instance, listening session participants indicated that medications used to

treat mental health problems may have negative consequences on physical health, including diseases such as diabetes, obesity, high cholesterol and heart diseases. A majority of the listening sessions acknowledged that the high prevalence of diabetes and obesity may also be attributed to a lack of appropriate nutrition.

The general health of the Westford population was described as 'good' by a number of professionals in the listening sessions as health care services are not significantly utilized by community members. In addition, the Chelmsford population was perceived to have more seniors, creating geriatrics-oriented health needs. However, some professionals from a listening session mentioned that the 'Healthy' Westford and Chelmsford is a misconception since they have specific neighborhoods within the community with important health needs. A professional from a listening session stated, "*Most people in these communities are still looking for ways to get healthier*."

TOP HEALTH PROBLEMS IN THE COMMUNITY

This section lists in order of importance, the top health problems identified during 20 listening sessions and 17 key informant interviews. Complementary public health data about these topics is provided in the following section.

Mental Health Issues

Mental health issues, such as depression and anxiety, were identified as the top health problem facing Greater Lowell communities by most listening session participants. For instance, it was stated that sleep disorders associated with migraines and visual problems are common among youth, that loneliness is predominant in the aging population, and that children may increasingly develop substance use disorders due to academic pressures. Participants noted that a significant number of children in elementary school are seeing mental health specialists and are on antidepressants and anti-anxiety medications. The rationale is that children lack coping skills in managing family-school-work lifestyle challenges. In addition, it was perceived that more children suffer from Attention-Deficit Hyperactivity Disorders (ADHD). Other vulnerable populations identified include families of children on the autism spectrum and pregnant women who have limited access to health care services and are at risk of compromised mental health. Participants of the TeenBlock listening sessions mentioned that racism also brings socio-emotional stress to youth.

Substance Use/Alcohol Disorders

The majority of the listening sessions and key informant interviews acknowledged that mental health issues often co-occur with substance use disorder. One of the most vulnerable populations to substance use disorders are elders. Substance use disorders were mentioned as a major concern among people experiencing homelessness due to chronic pain or from opioid use such as methadone and suboxone use. Most key informants acknowledged that individuals with co-occurring illnesses experience opioid use disorder. A key informant specifically mentioned cocaine, heroin, and fentanyl as common among people with substance use disorders. In addition, a professional who was part of the Lowell Community Health Center Physicians and Staff listening session acknowledged that organ failure from previous substance use disorder related health issues often leads to future complications. Patients with substance use disorders often perceive unfair treatment and judgement by health care providers. A professional from one of the listening sessions stated, "*When I had pancreatitis it took me three months to go to the hospital because you get judged [for having an alcohol use disorder]*." This can cause individuals to be reluctant to identify as a patient seeking health care related to substance use. Most professional groups from the listening sessions mentioned that substance use disorder often stems from previous history of inappropriately managed physical trauma. A professional at a listening session stated: "*Sometimes the substance abuse disorder, addiction, starts at the hospital after a drug prescription*."

Obesity

The majority of listening sessions cited obesity as a major issue. Professionals in some listening sessions acknowledged mobility is a difficulty among the adult population due to joint-related chronic pain

that is predominantly associated with obesity and aging. It was also mentioned that sedentary living also adds to the disease burden. A professional at a listening session noted, "*Assisted technology is a double edge sword with muscular atrophy until you eventually can't walk or move independently*." Others remarked that most elders who suffer from joint-related problems eventually develop disabilities. Obesity was also mentioned as a burden among children.

Diabetes
The majority of professional and community listening sessions identified diabetes and related health concerns as a top health problem. Several participants noted the risk of cellulitis and amputations among people with diabetes due to inadequate self-management including insulin use, and lack of a primary care provider to authorize prescription refills. Diabetes was observed to be increasing tremendously among children and prevalent among refugees.

Infectious Diseases
Most participants at the listening sessions remarked that communities in the Greater Lowell area experience infectious diseases including Human Immunodeficiency Virus (HIV) that lead to Acquired Immunodeficiency Syndrome (AIDS). One professional from a listening session stated: "*Clients who started the HIV medications in the 80's now have full-blown AIDS since medications from those days only slowed down the manifestation of AIDS, unlike recent medications*." In addition, communities in the Greater Lowell area were stated to have a high burden of Hepatitis. Another professional in a listening session commented: "*Now that there are new medications for infectious diseases, people think it is not an issue anymore and so they share needles*." Some of the listening sessions recognized the predominance of specific types of Hepatitis in specific populations including Hepatitis A among people who inject substances and people experiencing homelessness, and Hepatitis C among the refugee community. Only one listening session mentioned the recent resurgence of vaccine preventable diseases like measles.

Asthma and Chronic Obstructive Pulmonary Disease (COPD)
Respiratory illnesses, especially Asthma, were reported by listening session participants as a significant concern among children and elders. Smoking was stated to be common among the elderly population, predisposing individuals to respiratory disorders such as asthma and COPD. Asthma was also reported to be prevalent in the refugee population.

Other health related issues raised by listening session participants include cancer and cardiovascular diseases. A few listening sessions acknowledged increased cancer prevalence in the community. Although specific cancers were not mentioned during the listening sessions, it was stated that most cases of cancer were associated with smoking.

POPULATIONS AT GREATEST RISK

Older Adults
Older adults were named as a population at great risk by many participants. A professional at the Elder Services of the Merrimack Valley stated, "*People are living much longer and there are not enough resources*." Loneliness and isolation, especially social isolation, were stated to be common among seniors. Seniors were thought to not be as enthusiastic to venture into the community and engage in social activities, preferring to be home. In addition, listening session participants indicated many elders may be overweight and obese because they do not leave the house due to the cold weather. Those who live with family may not be easily convinced to leave the house. It was reported that there are limited transportation resources for the elderly to and from doctor visits. Additionally, listening session participants expressed that seniors find it difficult to maneuver online resources and there is an increased need for home services. Another professional stated, "Seniors are home-bound and isolated. *Therefore, even with resources out there, they do not even know how to access them. No one is there to take care of them*."

Population of People Who Work for Low Wages
Several listening session participants noted that many people who work for low wages typically do not qualify for assistance because their income is marginally above the income limit guideline. According to the Lowell Early Childhood Council listening session, the increase in minimum wage has worked against families not to qualify for services. Individuals of moderate income do not qualify for MassHealth (cannot afford health insurance with high deductibles) and Supplemental Nutritional Assistance Program (SNAP). People who work for low wages also have limited access to mental health services.

Homelessness
Many listening session participants noted that people experiencing homelessness have limited access to medical services and regularly have long wait times for medical care. Some people experiencing homelessness believe that they do not receive quality care because of substance use disorders. During the Hunger and Homeless Commission listening session, a professional stated, "*I think poverty also impacts mental health*." Another professional also stated, "*Clients who have mental health issues might be put on a hold for 3 to 5 days*." Other participants mentioned that when people experiencing homelessness experience substance overdoses, they may refuse medical treatment. Additionally, many individuals experiencing homelessness are hesitant to accept emergency shelter. Acquiring housing with requirements for abstinence from substances is a cumbersome process with limited accountability and can delay recovery. Listening session participants stated that many people experiencing homelessness have a criminal record which also creates complications. In addition, online resources may not be easily accessible because of barriers to access electronic devices (computers and phones).

Teenagers and Youths
Listening session participants cited several risk factors affecting youth populations. College students are at risk of housing instability due to low wages and lack of affordable housing. It was also stated that they experience food scarcity and housing problems that impact their emotional well-being and physical health. A professional at one of the listening sessions stated, "*I work in a food pantry. Lowell has food insecurity, about 23,000 people, increasing since 2011*." There is a perceived increased proportion of teenagers experiencing poverty leading to food insecurity from limited access to food. Listening session participants mentioned that although food stamps are available for low-income populations to access, it can be complicated for immigrant youth, non-English speaking communities especially due to health insurance constraints. Adolescents in middle and high school may face social anxiety, depression, psychosocial stress and suicides. Listening session participants stated that teenagers get the flu, strep throat, and common cold outbreaks in schools. Listening session participants also spoke to the fact that children in foster care are afraid to seek support for basic needs. Moreover, there are cases of malnutrition among families from refugee camps because of limited healthy diet options here in the United States. Part of the issue was stated to be limited access to healthy foods not acculturated to the American diet. Listening session participants indicated that there are nohealthy fresh food options in food pantries. Another professional stated, *"People who travel from other parts of the world may weigh 90 pounds back then and now weigh 300 pounds."* (See Figure 35 & 36 for data of youth obesity, overweight, or underweight.) Several participants noted that teenagers and adolescents who are at risk of emotional distress from family-school-work life imbalance go into marijuana use, vaping and alcohol use. (See figure 52 for information regarding prevalence of alcohol, tobacco, and other substance use among high school students.)

Lesbian, Gay, Bisexual, Transgender, Queer (LGBTQ) Community
Several health professionals noted limited services available to the LGBTQ community due to social stigma and marginalization in mainstream health, and a lack of awareness among providers of health needs within this community. Listening session participants mentioned that teenagers who identify as transgender can be stigmatized due to oppositions from their parents to seek hormone therapy. Therefore, they can be limited in their ability to make medical decisions for their own health and well-being, thus potentially increasing their risk of mental health issues.

Immigrants/Refugees

The majority of the listening sessions agree that immigrants are at high risk for adverse health outcomes. Participants reported that many immigrants fear seeking services because of their immigration status, which negatively impacts their options, especially with limited health insurance. People who are non-naturalized immigrants may not only live in fear but can be unaware of what health services are available. Several listening sessions noted that the immigrant community including refugees and asylum seekers find the US health system very difficult to understand, especially the health insurance system. This may be because the immigrants speak multiple languages while available language translation agencies only provide services for a few languages (mostly Spanish and Khmer). Some non-English speaking communities also have difficulties navigating the US health system and adapting to health policies different from the cultural norms of their home country, especially with prenatal care. Additionally, listening session participants stated that the non-naturalized immigrant communities may be reluctant to access health resources because of fear of deportation. Participants also mentioned that individuals who emigrated for less than 5 years do not qualify for MassHealth and non-citizens only qualify for emergency MassHealth. Several physicians acknowledged that reproductive health resources are limited in general. Additionally, teenagers were identified as being at great risk as they struggle with racism, as well as being an immigrant or refugee. Many immigrants were also stated to be unable to access western medicine partly because of language barrier and inadequate translation of native medicine by interpreters. A professional from one of the listening sessions stated, "*There are interpreters, but often only one on duty. They have a family member that can speak for them, but doesn't speak or understand the medical part of the language in English or [the] native language*."

The following additional information on ethnic and immigrant communities was provided by members of these communities during the listening sessions.

Cambodian Community

A member of the Cambodian community listening session stated, "*The Cambodian community has chronic pain and trauma. Most of the Cambodian communities are genocide survivors or the children of genocide survivors*." Several participants contended that many members of the Cambodian community are predisposed to substance use especially among refugees who have a diagnosis of Hepatitis due to alcohol. Post-traumatic stress disorder (PTSD) and dementia was stated to be common among Cambodian elders. Another community member stated, "*Cambodian elders with PTSD believe that it does not exist as a disease*." In addition, according to participants in the Cambodian community listening session, about 40% or more of their community are unhealthy because severe health conditions such as high blood pressure, heart disease, diabetes, and kidney disease go untreated for long periods. Many are at high risk because of a lack of compliance to scheduled doctor visits and regular check-ups due to language barrier, transportation, and negligence. A community member asserted, "*I worked with elders of the Cambodian diaspora. As you know, a study showed that 65% have mental health related issues and these lead to diabetes and depression 'very severe*.'" Listening session participants expressed fear of receiving bad news from the doctor and believe that home remedies such as coining and cupping have curing abilities. Another community member said, "*They are not educated enough to know that some cold symptoms are similar to pneumonia or other viruses that can become deadly without proper treatments*." In addition, cancer is a community health concern according to the Cambodian community listening session.

African Community

Many from this listening session expressed concern about the health of African community members. Several noted that people who work for low wages have problems with seeking medical care because they will have to call out of work. A member of the African community mentioned that women are healthier than men because men do not pay close attention to their health. Health problems of concern of African community participants include increasing Hepatitis due to alcohol use disorder, marijuana use

by youth and obesity due to a lack of healthy eating habits that could also lead to diabetes, stroke and heart disease. Participants also mentioned the lack of knowledge about resources available to assist with health insurance including coverage and termination as well as avoidance of 911 calls in the case of an emergency because of fear of hospital and ambulance bills. Therefore, it was expressed that many believe that the lack of knowledge about the health care system in general increases the predisposition to depression and psychological stress. It was stated that suicides are common in the African community. African seniors were identified as a high-risk population. Although African seniors have access to health insurance, cultural differences, especially language barriers may make it difficult for seniors to communicate their health concerns to their primary care provider. Participants asserted that elders are more comfortable to return to their home country to seek health care from someone they identify with culturally. As community member stated, "*We don't have an African senior center like Cambodians or Spanish. They stay home because of the cultural and language barriers*."

Spanish-speaking Community

Listening session participants stated that members of the Spanish-speaking community worry about suicidal deaths due to long wait time before a mental health specialist sees patients. Some suffer from overdoses from substance use disorders and psychosocial stress. Alcohol use was also expressed as a concern in this community. Other health problems of concern of participants include obesity among youth, cancer, and infectious diseases such as Tuberculosis, Hepatitis (A, B and C) and acquired immunodeficiency virus (AIDS) caused by the human immunodeficiency virus (HIV). Latino seniors were identified as vulnerable, as they can lack support from their families and the community, while not receiving adequate attention. Participants stated that many community members believe that some providers are not warm enough during doctor visits. One listening session participant stated, "*There is a gap between the American culture and Latino culture on how they treat the elderly*."

Portuguese-speaking Community

The Portuguese-speaking participants identified diabetes, cardiovascular disorders, unhealthy diets, and dental care as top health problems facing the community. Nevertheless, participants acknowledged that they feel well treated by staff at Lowell General Hospital and appreciate that they do not face long wait times for their appointment, although managing the health insurance system can be difficult. They also expressed appreciation for the ease at which signs make it easy to navigate the hospital environment. A member of the Portuguese speaking community stated, "*I appreciate being well treated by medical staff here, because in Portugal it's not like that, they are harsher*." Participants noted that the translation services could be improved and recommended that Brazilian translators should translate for patients from Brazil and Portuguese translators should translate for those patients originating from Portugal to improve the quality of communications.

Major Strengths of Health Services

Listening session participants were asked about the strengths of health services in the Greater Lowell area. The most frequently mentioned strength was the Lowell Community Health Center (LCHC) because its health care providers work closely with collaborating agencies and partners. LCHC's Opioid Based Addiction Treatment Program and the Greater Lowell Health Alliance Substance Use Prevention Taskforce were also mentioned. In addition, teenagers and youths have access to sex health education and school fitness programs. LCHC provides comprehensive care and social support services to patients. A professional stated, "*Lowell Community Health Center serves half the population of the city with trusted organization and translators too*." Due to the strength of these collaborations, participants stated that the existing delivery system, which includes social services, has the ability to effectively address social determinants of health.

In addition to the robust community health center program offerings, the services at Lowell General Hospital were also identified as a strength. The majority of participants from listening sessions for organizations acknowledged that Lowell General

Hospital (LGH) has a well-established elderly care program that includes robust home health and hospice services, transportation services, and Medicaid service expansion. The availability of two LGH campuses has made access to emergency care services easy. The availability of urgent care facilities has eased the workload in the emergency department. Although a majority of organizations and community members mentioned the lack of mental health services in the Greater Lowell area, a few listening sessions indicated that substance use disorder services in the Greater Lowell area might have a promising future because of collaboration between the Massachusetts Department of Mental Health and LGH.

A few listening sessions acknowledged the following additional strengths of LGH: language interpretation services through video box, the availability of a Tuberculosis clinic, and the ability of patients without health insurance to enroll with MassHealth during walk-in visits. The Lowell Community Health Needs Assessment process was also acknowledged as a strength to the Greater Lowell area as it involves discussions with key stakeholders regarding their health needs and recommendations to improve the health and well-being of the community.

An additional strength to the health care system is the availability of a grant-funded recovery coach shared by the Tewksbury, Dracut and Chelmsford police departments for mental health related concerns. A key informant in the police department acknowledged that the Middlesex County Sheriff's office is invested in addressing the opioid crisis as a significant health care concern.

Major Weaknesses of Health Services

Key informants and listening session participants were asked to identify major weaknesses of the health services in the Greater Lowell area. A shortage of health care providers was noted, especially psychiatrists and health care personnel specialized in violence or sexual assault. Patients experience long wait times with specialist referrals and expressed concern that medical conditions could get worse or become fatal. Another professional from a listening session stated, "*If teenagers are dealing with suicidal, self-harming behaviors, urgent cares are not provided in the best ways for these specific needs*." Such patients who go into short-term care programs can get discharged without referrals. This process is indicative of reduced consistency in the continuum of care, especially if patients run out of medications.

In addition, most participants mentioned that the time spent with patients during doctor visits is limited. "*Providers only have sometimes 15 minutes with a patient and this can be a disadvantage to a patient dealing with domestic violence*." There can be long wait times during an emergency room visit according to a community listening session participant. A professional from one of the listening sessions stated, "*When they get you into the emergency room, there are not enough cubicles to put you into. So you are put into the hall until they can put you in a room*."

The majority of the listening sessions acknowledged the increased need for culturally competent health care providers to serve the Greater Lowell area due to its ethnic diversity. For instance, some ethnic traditional/holistic approaches to health are considered malpractice in the United States.

Most listening sessions noted the limitations in language translation and interpretation services in the health system as there are not enough interpreters and translators for multiple languages. The majority of the listening sessions indicated a limitation in the availability of bilingual health care providers and support groups to service the diverse Greater Lowell area. Language barriers were also noted impact the ability to utilize the transportation system especially with interpretation of maps. Listening session participants stated that patients are reluctant to see health care providers because they feel overwhelmed with language barrier and literacy issues. Another professional stated, "*There is a big difference between translator and interpreter. They translate information without the client understanding and the communication is broken*." There is the lack of support resources for families with language barrier challenges, especially with domestic violence when the interpreter may be the family member responsible for abuse or assault.

There are limited health resources among people experiencing homelessness to meet demand, especially with substance use disorder and alcohol use disorder according to a professional at a listening session. Listening session participants mentioned a recent epidemic of fentanyl use disorder due to underlying mental or psychological problem. There was noted to be limited access to mental health services and unavailability of mental health professionals in school systems and after-school program. The lack of continuity of health services is a concern that was expressed at several listening sessions. One example given was when youths grow to adulthood, they do not have the same mental health personnel assigned to their case management. The capacity of mental and behavioral health services is limited in specialists' care and access to health services, increasing the toll of mental and behavioral diseases and illnesses. There are difficulties with navigating mental and behavioral health services, exacerbated by limited access and transportation problems. There are also high rates of absenteeism from schools due to substance use disorders among children, indicating a need for additional education among parents.

Barriers to Obtaining Health Services

When asked to identify barriers to obtaining health services, listening session and key informant interview participants noted transportation problems to be a predominant barrier to the health systems in the Greater Lowell area. Particularly challenging instances are during cold seasons, during emergency situations, or to a substance use treatment facility. Transportation is also more challenging for people with disabilities, and people who do not speak English according to most providers/professionals at listening sessions. For instance, patients may not be able to adhere to specialist referrals because it is difficult to navigate the transportation system, and language barrier is a challenge where there is need for communication with transportation personnel. Some patients cannot afford to pay for rides, especially families with children who have special needs. Listening session participants indicated that although MassHealth covers transportation, reservations have to be made four weeks in advance, even in cases of urgent need. Walking was mentioned to not be feasible with children and those with disabilities, especially during the winter season. In addition, refugees are required to be seen at a tuberculosis clinic on arrival into the United States but can miss appointments because the public transportation system is difficult to navigate.

Another potential barrier identified was low-income guidelines as a barrier for access to subsidized health care services in the Greater Lowell area. Several listening session participants stated that individuals and families who exceed the income limit for subsidized health care services cannot afford most health care plans, which results in delay of treatment of care. Specialized care centers may not accept Medicare and Medicaid covered patients. Listening session participants also mentioned that the MassHealth connector website is complicated and difficult to navigate. Participants expressed concern that health insurance policies and procedures could predispose patients to anxiety from the risk expensive self-pay care. A professional from one of the listening sessions stated, "*I am an amputee and I need a new prosthetic because the one I have is cracked, before the 5-year guarantee time for a new replacement. MassHealth could only approve a new one in about 6 weeks and if not approved, I would have to pay $10,000 to $14,000 out of pocket*." Physicians acknowledged that the insurance system is a barrier to health care access because in some instances it does not allow patients to see different providers or make multiple visits in one day. Physicians also noted the lack of consistency in health insurance billing. Another professional also stated, "[Health care professionals] *didn't know what the cost for the treatment would be and told me to check with my insurance*." Some listening sessions acknowledged that medical bills are on the rise with a negative impact on co-pays and medications. For instance, co-pays for health care support services such as physical and occupational therapy or that require multiple visits per week become a financial burden to patients. There are also limits to the number of provider visits endorsed by insurance companies, which is a challenge for patients with chronic, on-going medical concerns.

Listening session participants expressed concern that many mental health issues are undiagnosed due to stigma and discrimination for those with substance use disorders and mental health issues. Many individuals and families believe a social stigma exists when seeking behavioral health services. Listening session participants noted that patients can lack the awareness of the available health and social services needed to improve their health and well-being. It was also stated that health practitioners may also lack awareness to inform patients about health and social services, resources and benefits.

Some public health professionals mentioned that some areas have faced resistance to walkable communities, such as "Healthy Westford" because many residents do not want sidewalks in front of their houses. A professional at one of the listening sessions stated, "*They want all the health benefits and say they are a great healthy community, yet there is huge resistance*."

Analysis of Public Health Data

To complement and supplement the qualitative listening session and key informant interview data and the quantitative current local survey data, this report also includes an analysis of publically available public health data. Dependent on data availability, data was presented over time, by community within the Greater Lowell CHNA, or compared between the City of Lowell, Greater Lowell CHNA, and the state of Massachusetts.

CAUSE OF DEATH

Figure 24 – Age-Adjusted Death Rate per 100,000 (2016)

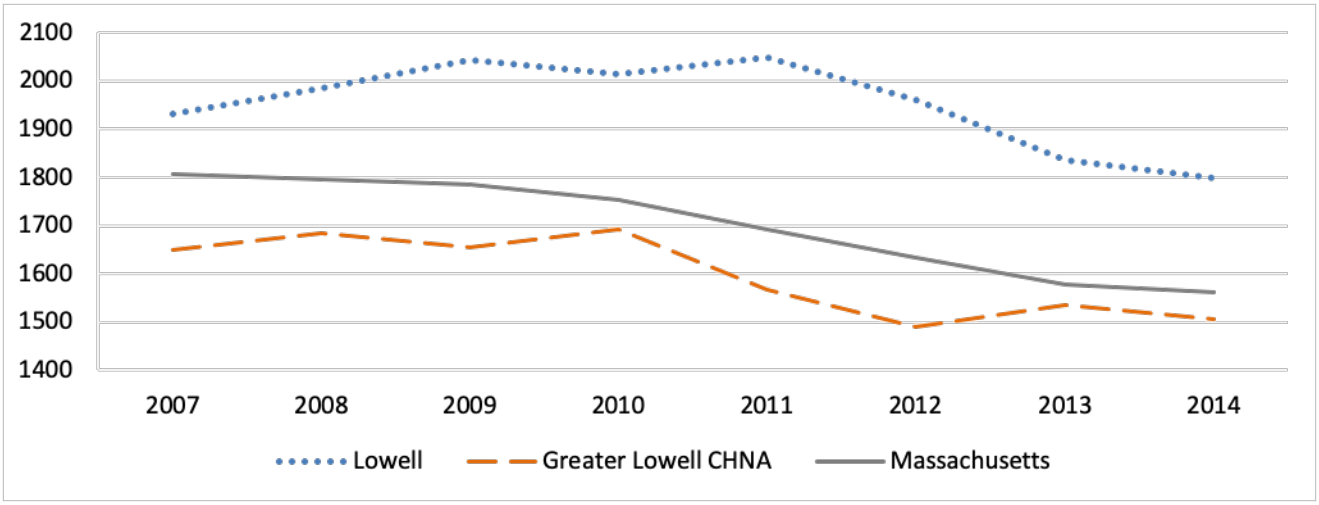
	Lowell		Greater Lowell (CHNA)		Massachusetts	
1	Heart Disease	165	Heart Disease	470	Heart Disease	11,923
2	Opioid related	67	Lung cancer	156	Lung Cancer	3,168
3	Lung Cancer	57	Opioid related	110	Chronic Lower Respiratory Disease	2,676
4	Chronic Lower Respiratory Disease	29	Chronic Lower Respiratory Disease	100	Stroke	2,468
5	Stroke	28	Stroke	81	Opioid related	2,034

Source: Massachusetts Vital Records, 2016

The leading cause of death in Massachusetts, the Greater Lowell CHNA, and Lowell in 2016 was heart disease at 11,923, 470, and 165 per 100,000 respectively. Opioid related deaths were the second highest cause of death in Lowell, at 67 per 100,000. Opioid related deaths were the 5th highest cause of death in Massachusetts and 3rd highest in the CHNA at 2,034 and 110 per 100,000 respectively.

CARDIOVASCULAR DISEASE

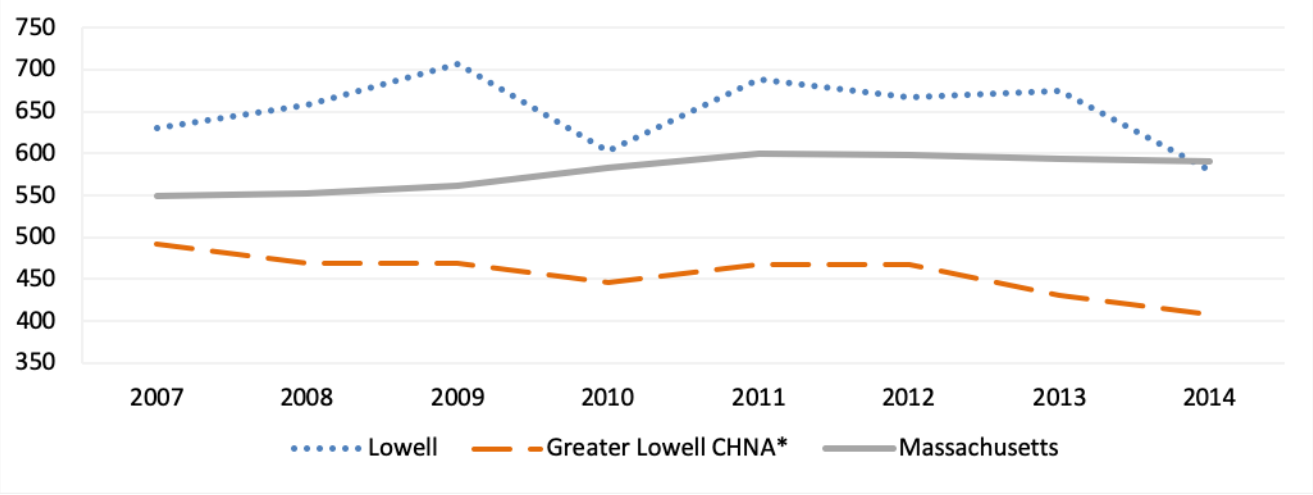
Figure 25 – Age-Adjusted Rates of Admissions/Hospitalizations for Cardiovascular Disease per 100,000



Source: Center for Health Information and Analysis (CHIA) via PHIT

Hospitalization rates for cardiovascular disease have consistently been higher in Lowell than rates at the State and CHNA levels overall. The highest hospitalization rate for Lowell was in 2011 with 1691.2 per 100,000. Since then, there has been a gradual decrease, with the lowest rate of 1798.5 per 100,000 in 2014. In 2014, the Massachusetts and Greater Lowell CHNA rates were at 1563.1 and 1505.3 respectively.

Figure 26 – Age-Adjusted Rates of Emergency Department Visits for Cardiovascular Disease per 100,000

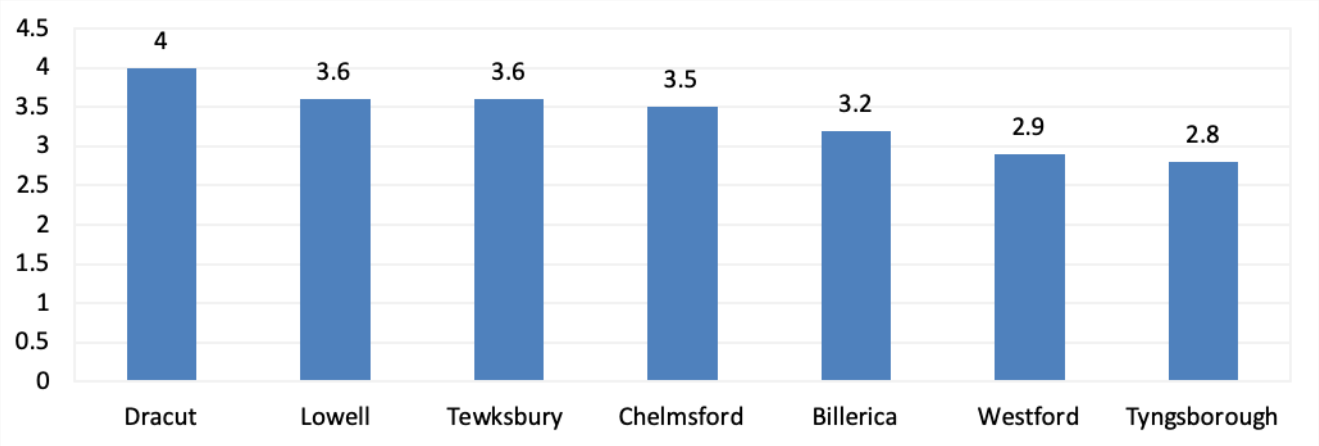


Source: Center for Health Information and Analysis (CHIA) via PHIT

**Note: Dunstable not included in Greater Lowell CHNA data (Statistics from this area is suppressed to protect confidentiality when number of cases is ≤ 10.)*

Until 2014, emergency department (ED) visits were higher in Lowell than other areas. In 2014 the statewide level rates were the highest at 590 per 100,000 than Lowell (579.8) and the Greater Lowell CHNA (407.1). Between 2013 and 2014, there was a 14% decrease in ED visits in Lowell with a change from 375.3 to 579.8. Although relatively stable compared to the other areas, there has been a consistent downward trend between 2011 and 2014 for statewide rates. The rates for the CHNA area have also been decreasing between 2012 and 2014 by about 13%.

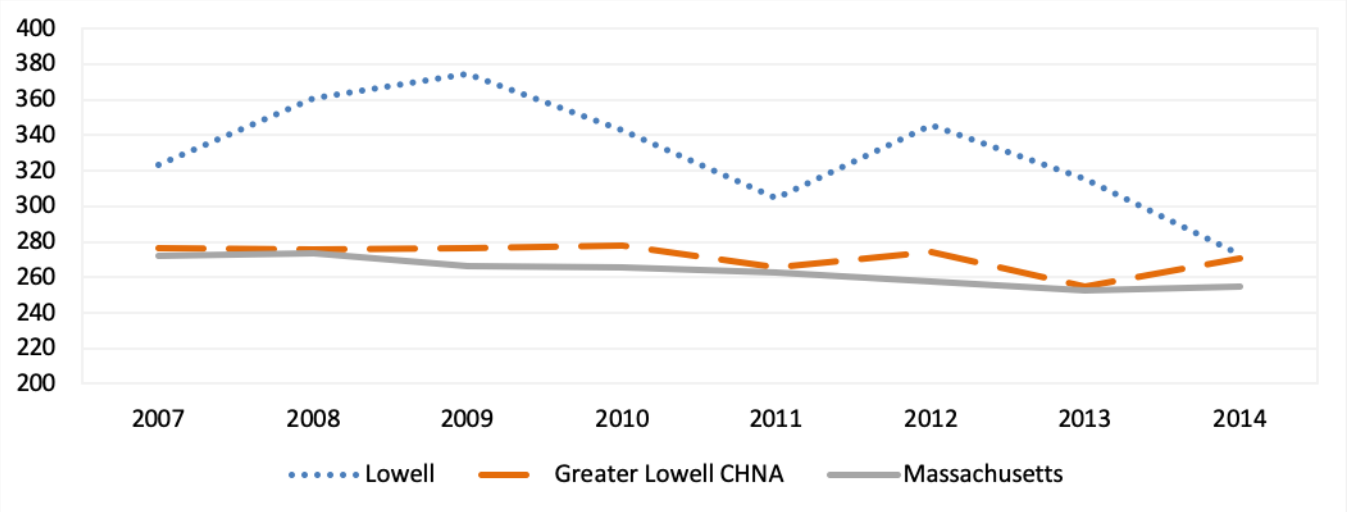
Figure 27 – Percent of Angina or Coronary Heart Disease (CHD) Amongst Adults (2012-2014)



Source: BFRSS Results via PHIT

When major blood vessels become blocked or damage from plaque build-up and limit blood flow, a person can develop coronary heart disease (CHD). Angina or chest pain is the discomfort that occurs when the heart muscle does not receive the oxygenated or nutrient rich blood. Aggregated results from 2012, 2013, and 2014 indicate that more adults in Dracut report having angina or CHD with a prevalence rate of 4%. Lowell and Tewksbury had a prevalence rate of 3.6% to round out the top 3 communities. Tyngsborough and Westford had a prevalence rates less than 3%.

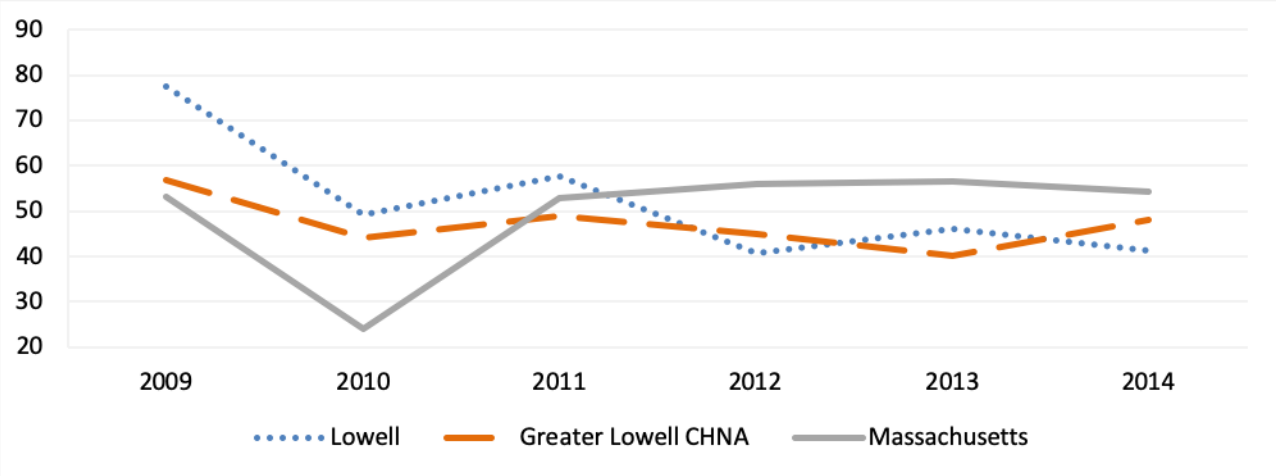
Figure 28 – Age-adjusted Rates of Hospital Admissions/Hospitalizations for Stroke per 100,000



Source: Center for Health Information and Analysis (CHIA) via PHIT

When blood flow to the brain is limited, brain cells damage and result in a stroke. The rates of hospitalizations related to stroke have been relatively high for Lowell compared to the other geographies with the highest rate of 374.6 per 100,000 in 2009. Beginning 2012, there has been a decreasing trend in Lowell with a 26.8% decrease by 2014 (from 345.9 to 272.8). By 2014 the rates of these hospitalizations were much closer to Greater Lowell CHNA and the overall state rates at 270.9 and 255.1 respectively.

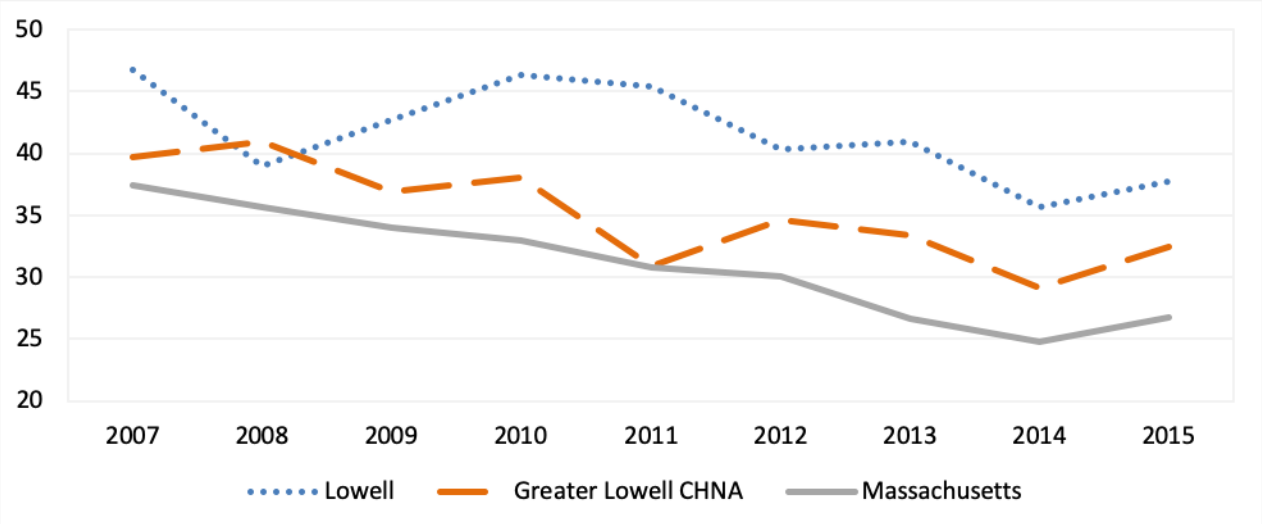
Figure 29 – Age-Adjusted Rates of Emergency Department Visits for Stroke per 100,000



Source: Center for Health Information and Analysis (CHIA) via PHIT

While hospitalization rates for stroke were higher for Lowell, the rates for emergency department (ED) visits for the state of Massachusetts were higher for this measure. Beginning 2010, there has been an increasing trend of ED visits at the state level with a dramatic rate increase of 28.8 more in 2011 (52.8) from the previous year (24.0). By 2014, the city of Lowell had the lowest rate of 41.4 per 100,000 when compared to Greater Lowell (48.2) and Massachusetts (54.2).

Figure 30 – Age-Adjusted Rates of Hospitalizations for Myocardial Infarction per 10,000

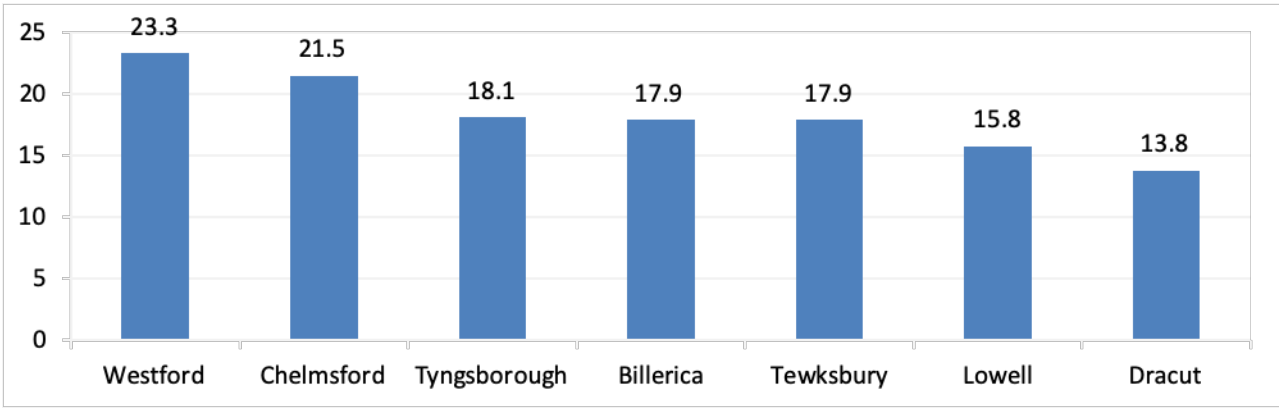


Source: Center for Health Information and Analysis (CHIA) via PHIT

A myocardial infarction is another term used for heart attack. When blood is not able to flow to the heart muscle from a blockage it can lead to tissue damage. Of the three geographic areas, Lowell has a higher rate of hospitalizations for myocardial infarctions than the Greater Lowell CHNA region and Massachusetts. Between 2008 and 2010 there was a 19.4% increase of hospitalization rates from 39 to 46.3 per 10,000. In 2014, all areas had its lowest rate of hospitalizations with 35.7 for Lowell, 29.1 for Greater Lowell CHNA, and 24.8 for Massachusetts. There was also an increase the following year.

DIET/OBESITY

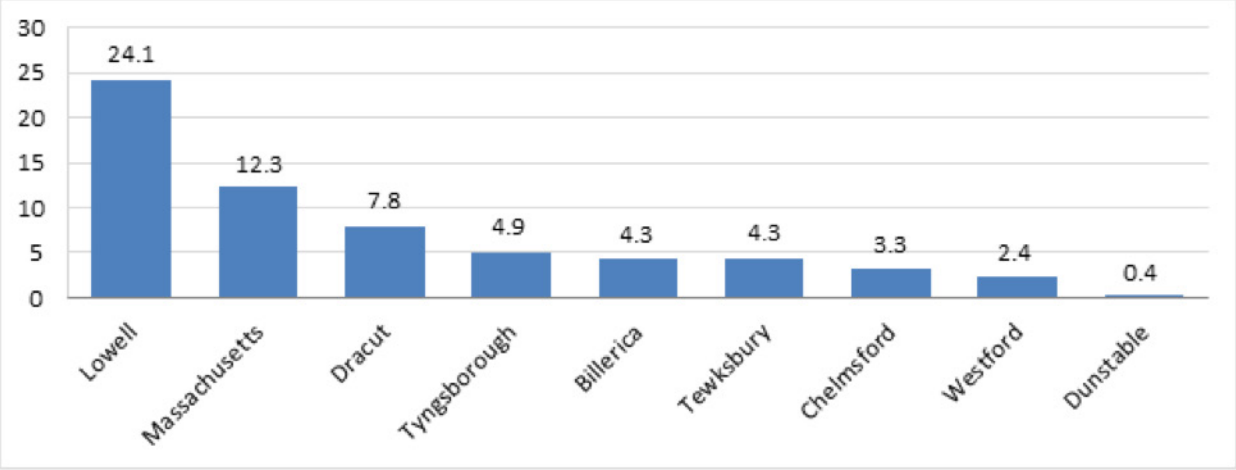
Figure 31 – Percent adequate fruit and vegetable intake amongst Adult (5+ Servings of Fruits and Vegetables Daily) (2011, 2013, 2015)



Source: BFRSS Results via PHIT

Aggregated results from the BFRSS show that more adults in Westford had the recommended five or more servings of fruits and vegetables per day at 23.3%. The community with the lowest percent of adults doing so was Dracut with 13.8%.

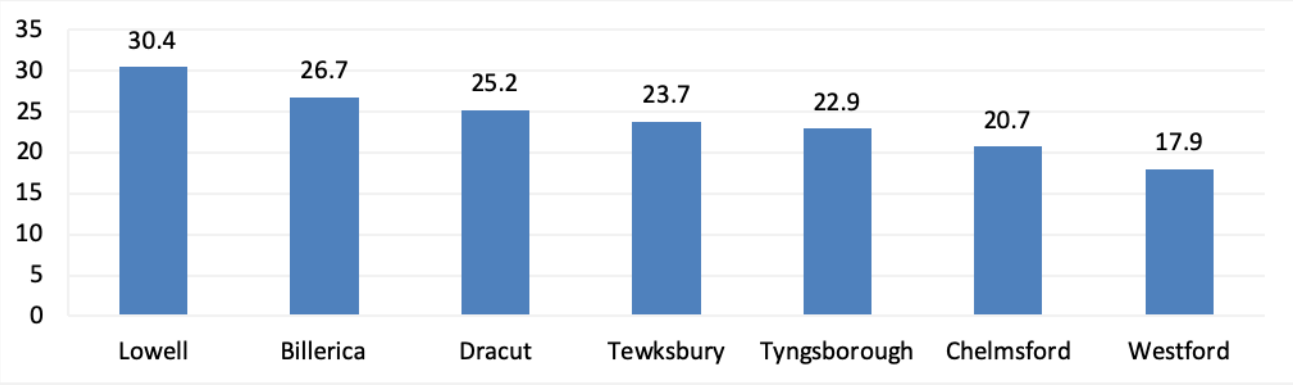
Figure 32 – Percentage of Population with Food Stamp/SNAP Benefits in Past 12 Months



Source: U.S. Census Bureau, 2013-2017 ACS 5-Year Estimates

The highest percentage of residents on Food Stamps or with SNAP benefits in the previous year was from Lowell at 24%. This is twice as much as the state average that was at about 12%. Within the Greater Lowell area, Dracut was the second highest at about 8% of their population. The proportion of the population in the other six towns who had these benefits was less than 5%, with Dunstable being the lowest at less than 1%.

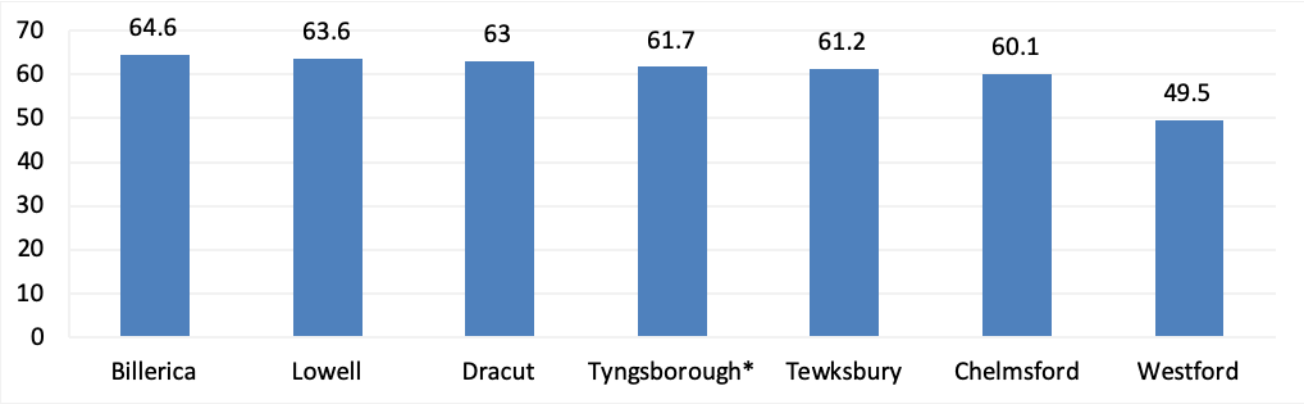
Figure 33 – Prevalence of Adults with Obesity - Percent (2012-2014)



Source: BFRSS Results via PHIT

The CHNA assessment from 2016 showed that obesity rates have substantially increased between 1998 and 2010 for all areas of Lowell, the Greater Lowell CHNA, and Massachusetts. If you were to divide a person's weight in kilograms by the square of height in meters and the quotient is 30.0 or higher, they fall within the range of obese (Defining Adult Obesity, 2019). Aggregated data from 2012, 2013, and 2014 indicate that Lowell has the largest percent of adults with obesity at 30.4%. The lowest prevalence was in the Westford community at 17.9 percent. The previous figure __ had Westford, Chelmsford, and Tyngsborough as the top three towns with highest healthy food intake. In this figure, the same three towns are the bottom three in regards to prevalence of adults with obesity.

Figure 34 – Prevalence of Adults Categorized as Overweight - Percent (2012-2014)

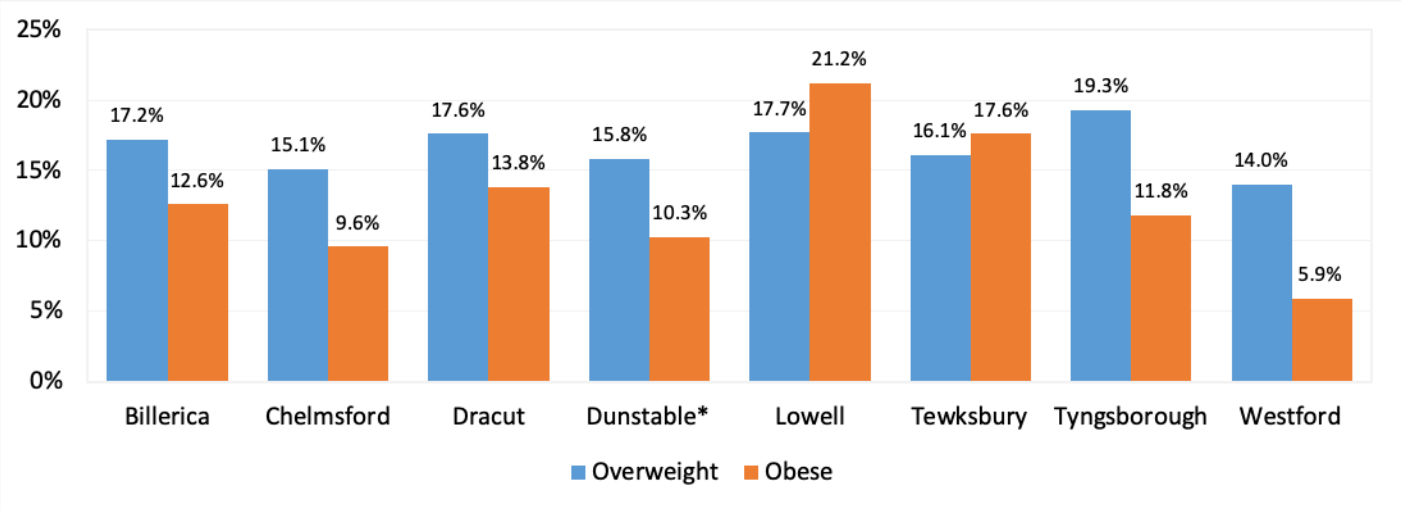


Source: BFRSS Results via PHIT

**Note: We include town level estimates that may be based on relatively few respondents or have standard errors that are larger than average. The confidence interval for this community is wider than the normal limits set by MDPH. Therefore, the estimate for this town should be interpreted with caution.*

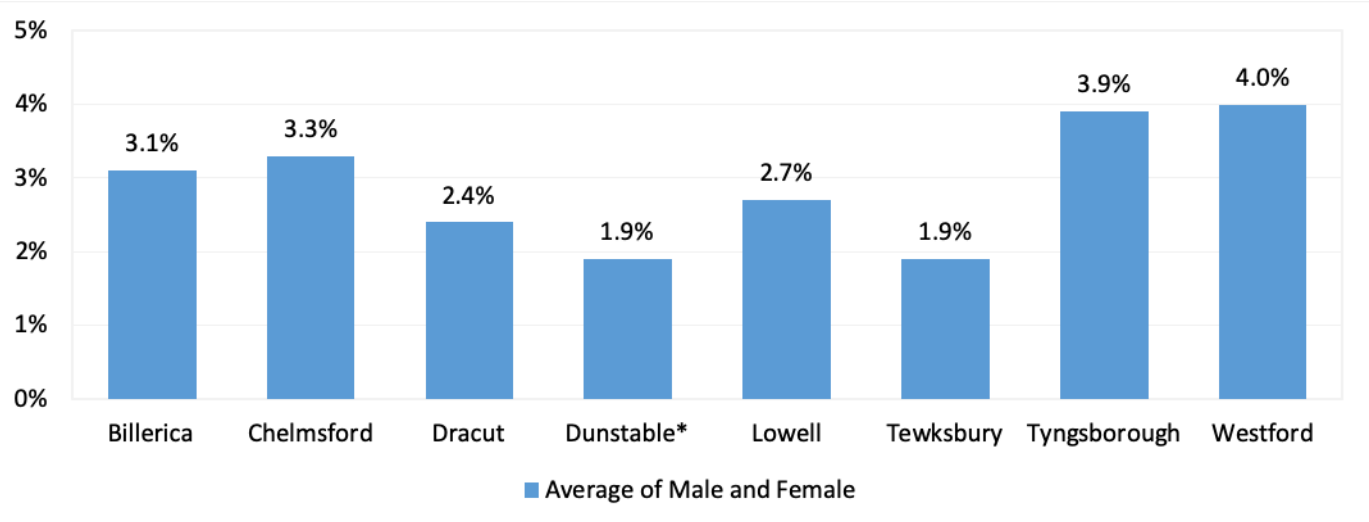
The CDC categorizes the overweight range if the calculated Body Mass Index (BMI) is between 25.0 to <30 (Defining Adult Obesity, 2019). Except for Westford, the data available shows that at least 60% of all adults in the region are overweight. The prevalence in Westford is 49.5%.

Figure 35 – Percent of Children with Obesity or Categorized as Overweight in Grades 1,4,7,10 in MA School Districts (2014-2015)



Source: BMI Screening in MA Public School Districts (2017)
** Dunstable data from Groton-Dunstable Regional School District*
**Children with a calculated BMI of ≥30.0 are obese*

Figure 36 – Percent of Children Categorized as Underweight in Grades 1, 4, 7, 10 in MA School Districts (2014-2015)

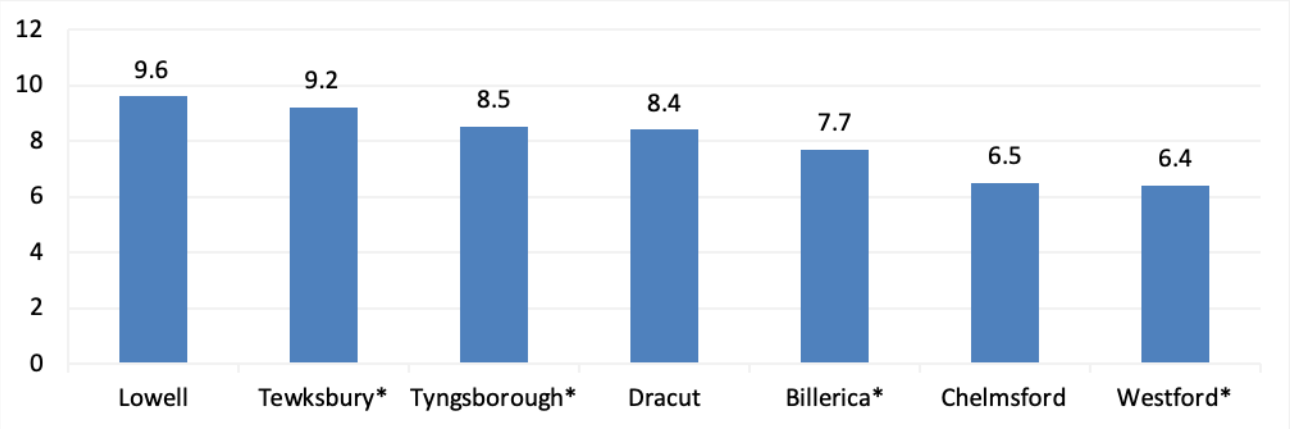


Source: BMI Screening in MA Public School Districts (2017)
** Dunstable data from Groton-Dunstable Regional School District*

Based on the 2017 Massachusetts Public School District Screening, the overall average of children in these grades who are categorized as overweight is about 17% and the average prevalence of children with obesity is at 13%. The highest prevalence of children who are categorized as overweight is from Tyngsborough (19%) and the lowest from Westford (14%). The highest prevalence of children with obesity is from Lowell at 21% and the lowest from Westford at 6%. About 4% of children from Tyngsborough and Westford were categorized as underweight. Tewksbury and Dunstable had the lowest prevalence at nearly 2%.

DIABETES

Figure 37 – Prevalence of Adults with Diabetes - Percent (2012-2014)



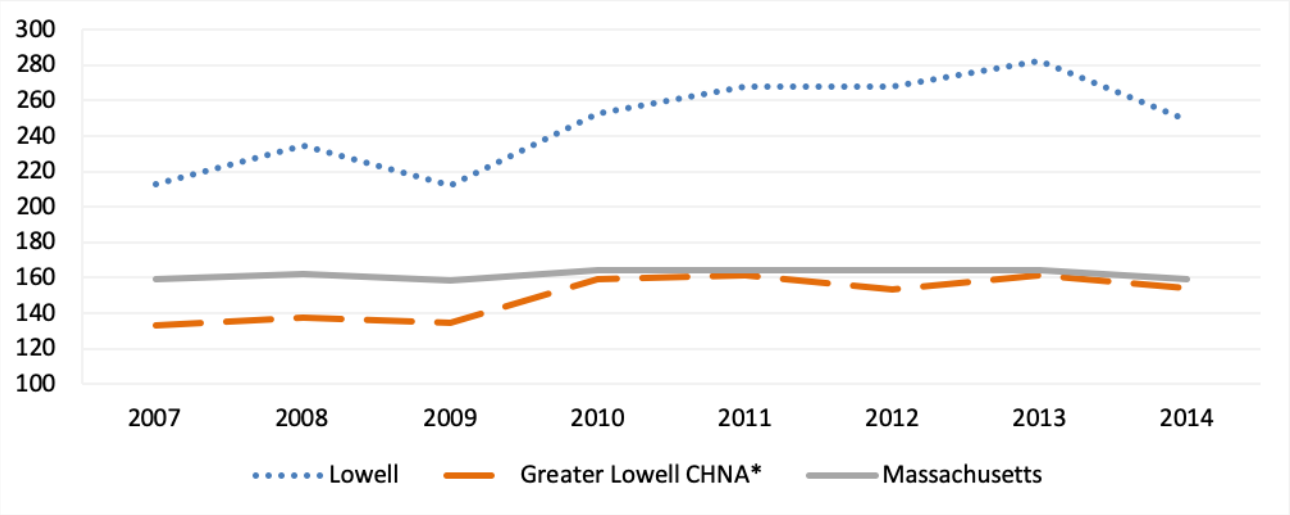
Source: BFRSS Results via PHIT

**Note: We include town level estimates that may be based on relatively few respondents or have standard errors that are larger than average. The confidence interval for this community is wider than the normal limits set by MDPH. Therefore, the estimate for this town should be interpreted with caution.*

Aggregated results from 2012, 2013, and 2014 in the towns with available data have an average prevalence of adults with diabetes of 8%. Lowell had the highest prevalence at 9.6% and Westford with the lowest at 6.4%. (Data from the previous CHNA in 2016 indicated the percent of adults who have or have had diabetes has been decreasing for Lowell and Greater Lowell CHNA area between 2012 and 2013. Since the current data includes an aggregate calculation, we cannot compare those yearly results to this data.)

At the state level, results from the 2015 BFRSS indicate that prevalence of diabetes among adults by race and ethnicity was higher in individuals who identify as Black, Non-Hispanic (12.3%) followed by Hispanic (11.7%) and White, non-Hispanic (8.7%). When comparing rates of diabetes related mortality, Asian, non-Hispanic residents had the lowest rate at 8.5 per 100,000. Black, non-Hispanic residents had the highest rate at 29.5 per 100,000 which was more than twice the rate of White, non-Hispanic at 13.8 per 100,000. (Massachusetts Diabetes Data, 2019)

Figure 38 – Age-Adjusted Rates of Hospital Admissions/Observations per 100,000 for Diabetes

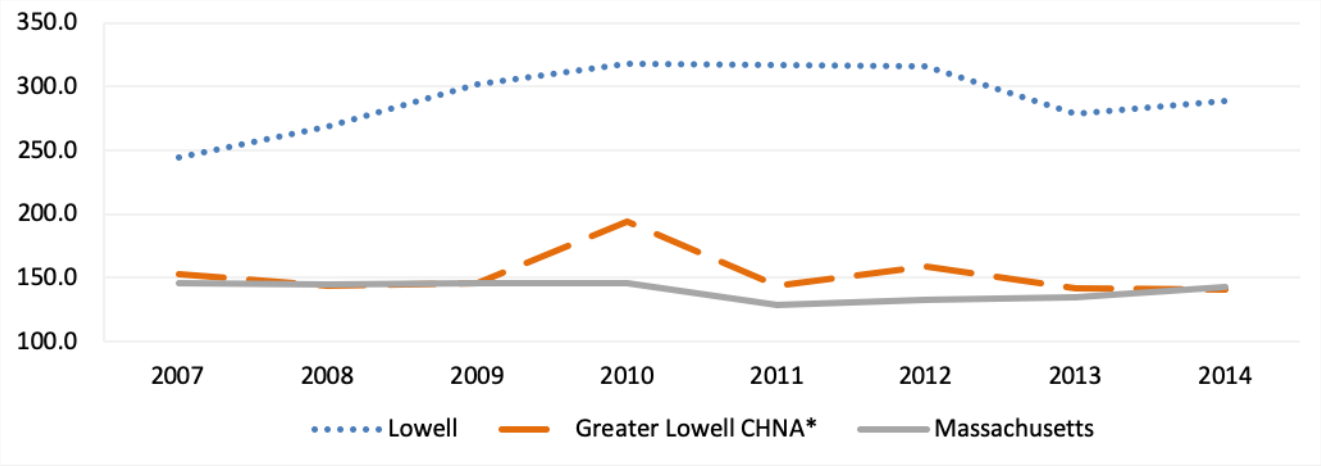


Source: Center for Health Information and Analysis (CHIA) via PHIT

**Note: Dunstable, Tyngsboro, Westford not included in Greater Lowell CHNA data (Statistics from these areas are suppressed to protect confidentiality when number of cases is ≤ 10.)*

The hospitalizations rates per 100,000 for diabetes have substantially been higher in Lowell than other areas. Massachusetts's diabetes-related hospitalizations have been consistently stable and hovering at the 160 rate. Excluding Dunstable, Tyngsborough, and Westford the rates for all the other areas of Greater Lowell CHNA have been slightly below the state rates as well. In 2013, Lowell's highest rate was at 283 per 100,000. By 2014 the age-adjusted rates of hospitalizations for Lowell, Massachusetts, and the CHNA were 249, 160, and 154 per 100,000 respectively.

Figure 39 – Age-Adjusted Rates of Emergency Department Visits per 100,000 for Diabetes



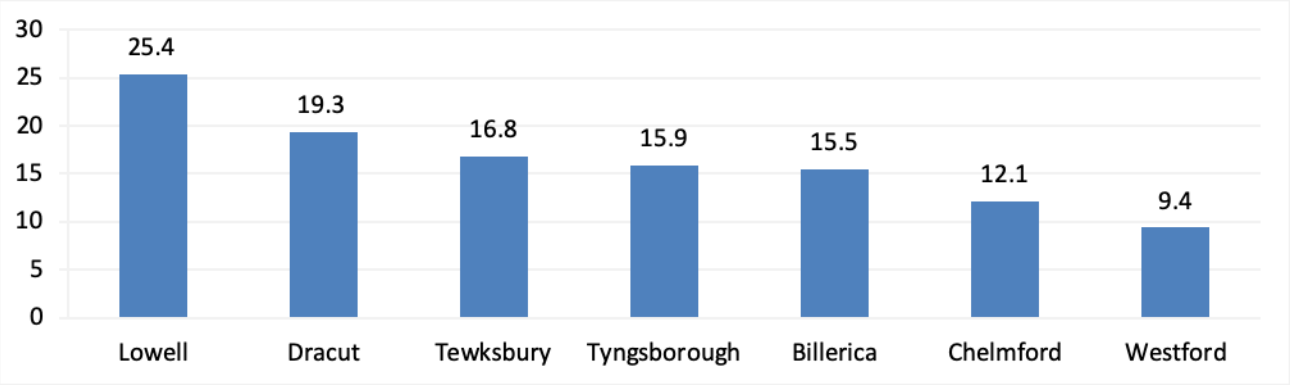
Source: Center for Health Information and Analysis (CHIA) via PHIT

**Note: Dunstable, Tyngsboro, Westford not included in Greater Lowell CHNA data (Statistics from these areas are suppressed to protect confidentiality when number of cases is ≤ 10.)*

Unlike the previous figure, between 2009 and 2013 age-adjusted rates of ED visits for diabetes from the Greater Lowell CHNA area (excluding Dunstable, Tyngsboro and Westford) were higher that the statewide level. Massachusetts level rates of ED visits have consistently been below 150, with a slow and gradual increase starting in 2011. By 2014, the rate of the CHNA area was at 140.9 compared to the state's rate of 143.1 per 100,000. The rate for Lowell in 2014 was at 289.0 per 100,000.

SMOKING

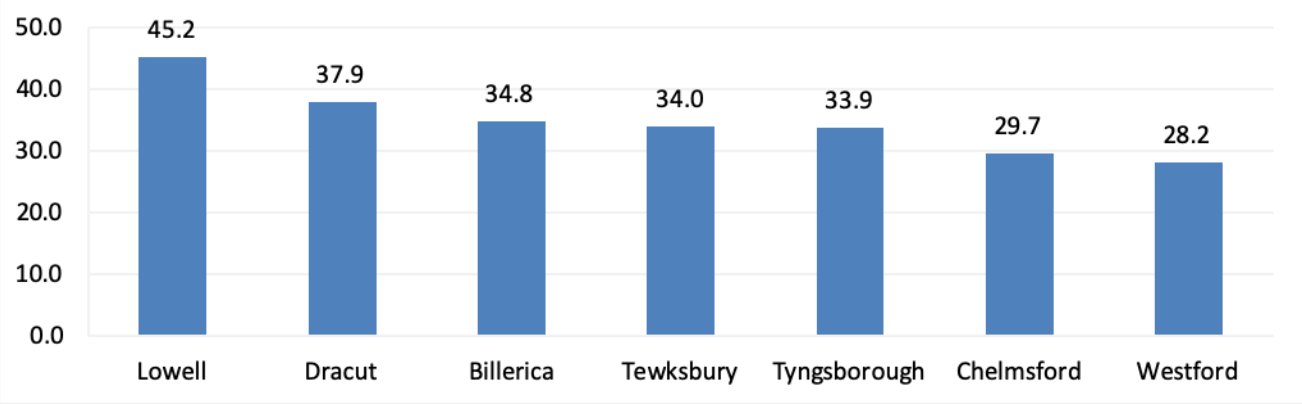
Figure 1.3 Prevalence of adults who report current smoking (2012-2014)



Source: BFRSS Results via PHIT

Prevalence of current smoking among adults is a valuable measure of the health and economic burden of tobacco and provides a baseline for evaluating the effectiveness of tobacco control programs over time. In The Greater Lowell CHNA, the average percentage of adults identifying as current smokers is 16.3%. Lowell has the highest percentage of current smokers at 25.4%, followed by Dracut at 19.3%. Tewksbury, Tyngsborough, and Billerica have similar percentages of adults identifying as current smokers, all near the average. Chelmsford and Westford have percentages lower than the average at 12.1 and 9.4% respectively.

Figure 1.4 Prevalence of adults reporting exposure to secondhand smoke (2012-2014)

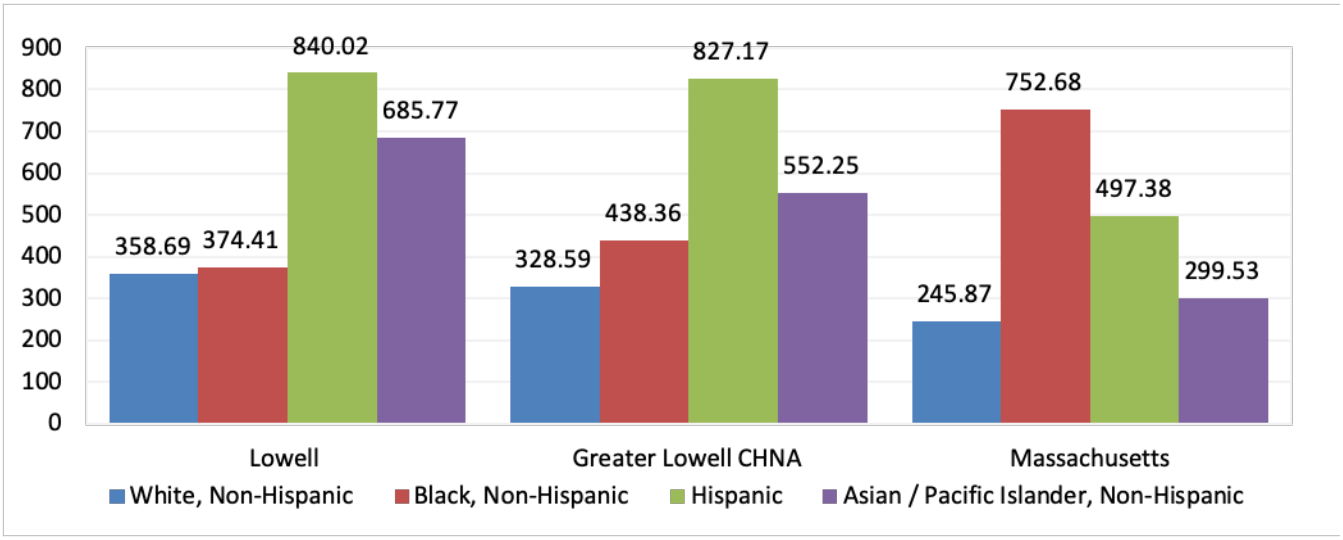


Source: BFRSS Results via PHIT

Secondhand smoke is smoke from burning tobacco products and smoke that has been exhaled by the person smoking. Tobacco smoke contains thousands of chemicals, including hundreds that are toxic and about 70 that can cause cancer (Asthma, 2019). More adults report exposure to secondhand smoke than those that identify as current smokers, with the minimum percentage of adults reporting exposure to secondhand smoke over one-quarter of the population. The prevalence by community follows a similar trend to that of adults who identify as current smokers, Lowell has the highest percentage of adults exposed to secondhand smoke at 45.2%, followed by Dracut at 37.9%. Billerica, Tewksbury, and Tyngsborough have similar percentages all near the average of 34.8%. Chelmsford and Westford have percentages lower than average at 29.7 and 28.2%.

RESPIRATORY DISEASES

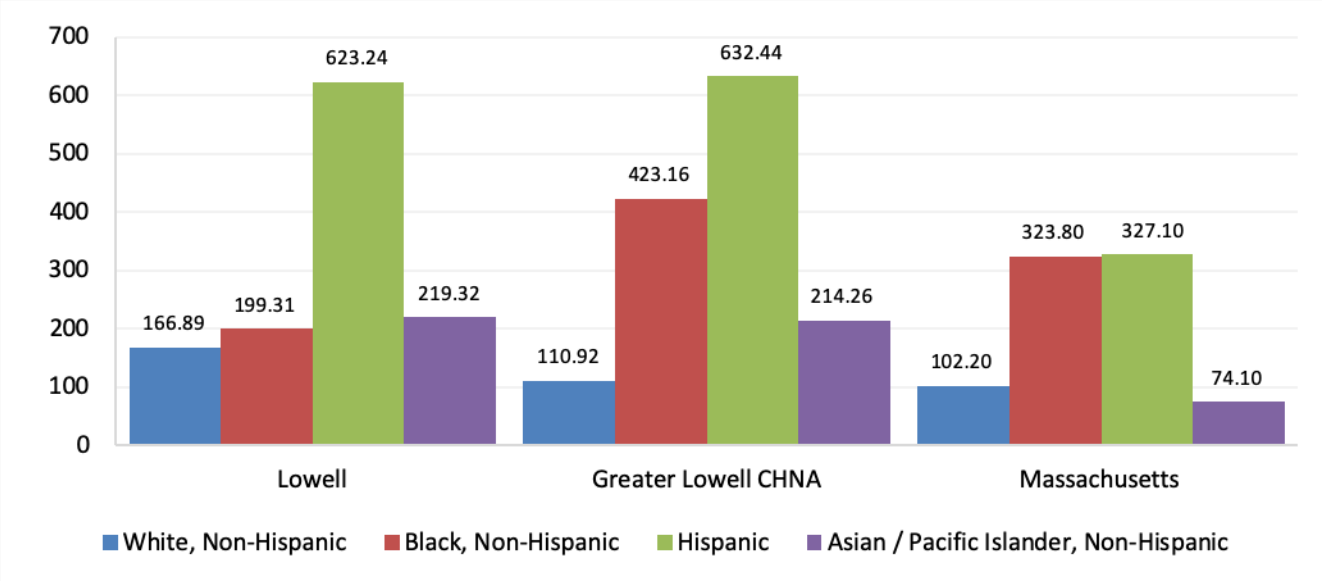
Figure 40 – Asthma Hospitalization Rates per 100,000 for Children Ages 0-4 (2002-2014)



Source: Massachusetts Casemix Discharge Database, Massachusetts Center for Health Information and Analysis (CHIA)

Asthma is a chronic health issue characterized by recurrent inflammation of airways causing wheezing, chest tightness, shortness of breath, and coughing. When distributed by racial and ethnic categories, Lowell and The Greater Lowell CHNA have similar patterns of asthma hospitalization rates per 100,000 for children ages 0-4, with individuals from the Hispanic population experiencing the most hospitalization, followed by those from the Asian/Pacific Islander, Non-Hispanic population, then those from the Black, Non-Hispanic population and those from the White, Non-Hispanic population. This differs from the distribution seen state-wide in Massachusetts, where the rates of asthma hospitalizations for children ages 0-4 are highest among individuals from the Black, Non-Hispanic population.

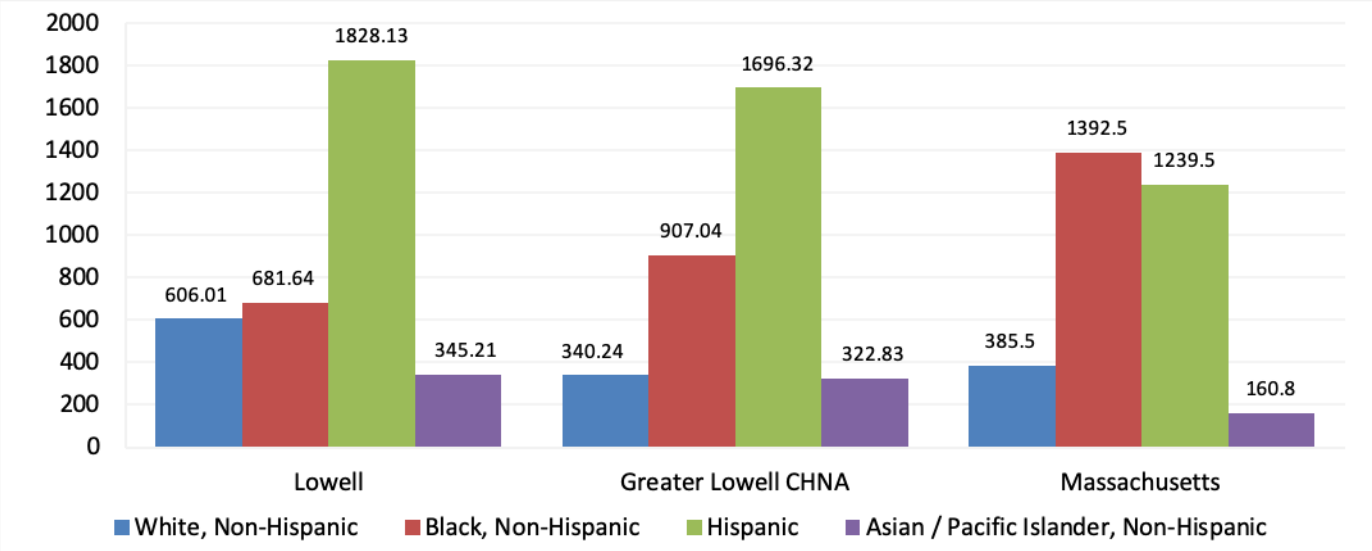
Figure 41 – Age-Adjusted 5–Year Average Annual Asthma Hospitalization Rates per 100,000 (2002-2014)



Source: Massachusetts Casemix Discharge Database, Massachusetts Center for Health Information and Analysis CHIA)

The racial and ethnic distribution of rates of 5-year average annual asthma hospitalization rates per 100,000 follow a similar pattern for the asthma hospitalization rates for children ages 0-4 years in Lowell and the Greater Lowell CHNA. The highest hospitalization rates are among the Hispanic population followed by the population of Black, non-Hispanic individuals, then Asian/Pacific Islander, Non-Hispanic individuals, then White, Non-Hispanic individuals. The asthma hospitalization rates in the Greater Lowell CHNA are higher within the Black, Non-Hispanic population than in Lowell. In the state of Massachusetts, the asthma hospitalization rates are almost equivalent between the Hispanic population and the population of Black, Non-Hispanic individuals. This is a marked difference than in Lowell, the Greater Lowell CHNA, and also different than the distribution of rates for asthma hospitalizations in the state for children ages 0-4 years.

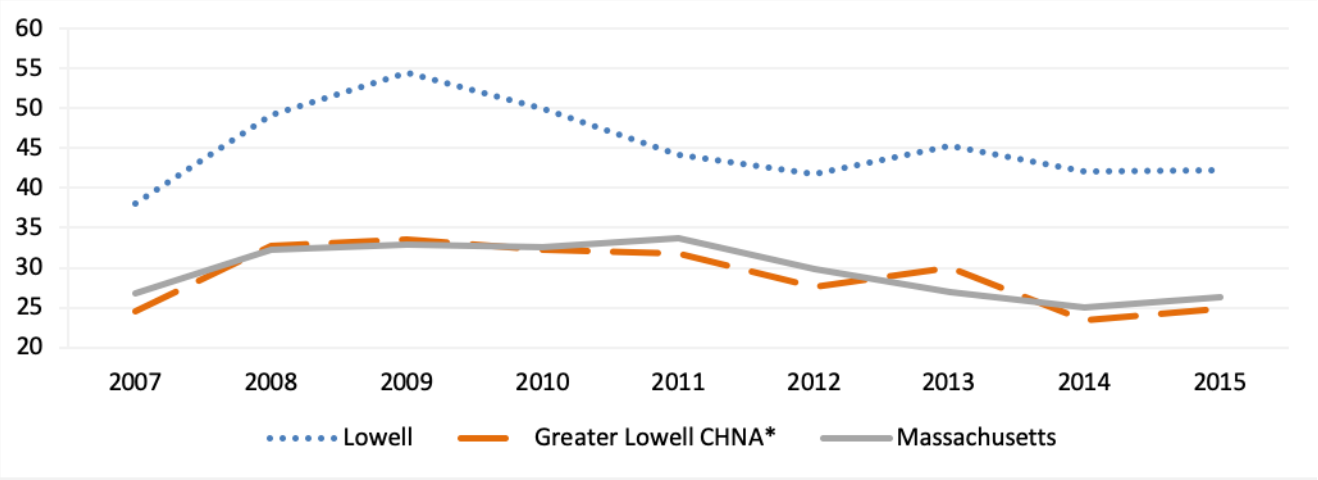
Figure 42 – Age-Adjusted 5-Year Average Annual Emergency Department Visit Rates per 100,000 for Asthma (2002-2014)



Source: Massachusetts Casemix Discharge Database, Massachusetts Center for Health Information and Analysis (CHIA)

The racial and ethnic distribution of the age-adjusted 5-year average annual emergency department (ED) visit rates per 100,000 for asthma are similar between Lowell and The Greater Lowell CHNA. The population with the highest rate of ED visits for asthma is the Hispanic population followed by the Black, Non-Hispanic population. In the Greater Lowell CHNA, the rates of ED visits for asthma are similar between the White, Non-Hispanic population and the Asian/Pacific Islander, Non-Hispanic population. In Lowell, the rate of ED visits for asthma are higher in the White, non-Hispanic population than that of the Asian/Pacific Islander non-Hispanic population. In Massachusetts the White, Non-Hispanic rate of ED visit for asthma is also higher than that of the Asian/Pacific Islander population. The Massachusetts distribution differs from that of Lowell and the Greater Lowell CHNA in that the population with the highest rate of ED visits for asthma is the Black, Non-Hispanic population.

Figure 43 – Age-Adjusted Rates of Hospital Admission for chronic obstructive pulmonary disease per 10,000

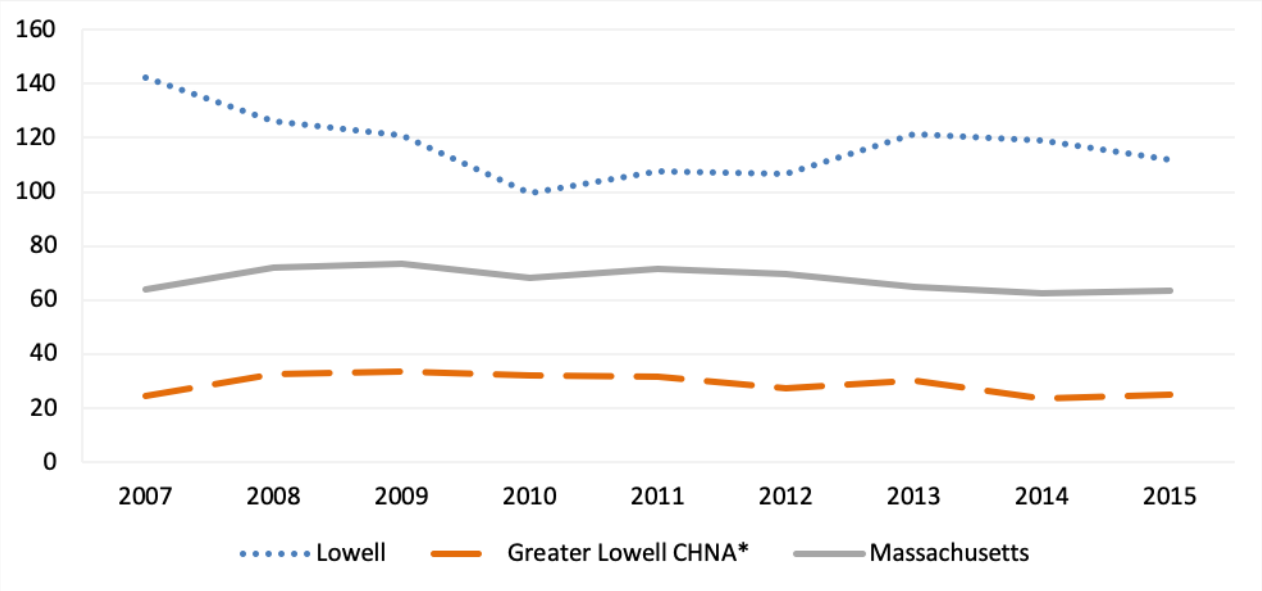


Source: Center for Health Information and Analysis (CHIA) via PHIT

**Note: Dunstable not included in Greater Lowell CHNA data (Statistics from this area is suppressed to protect confidentiality when number of cases is ≤ 10.)*

Chronic obstructive pulmonary disease (COPD) is a health issue that makes it hard to breathe as progressively less air flows in an out of the airways. COPD can include emphysema, chronic bronchitis, and refractory (non-reversible) asthma. The rate of hospital admission for COPD per 10,000 has followed similar, slowly decreasing trends in Lowell, The Greater Lowell CHNA, and Massachusetts. The Greater Lowell CHNA has had comparable rates to that of Massachusetts since 2007. The rate of hospital admission for COPD has been markedly higher in Lowell.

Figure 44 – Age-Adjusted Rates of Emergency Department Visits per 10,000 for COPD

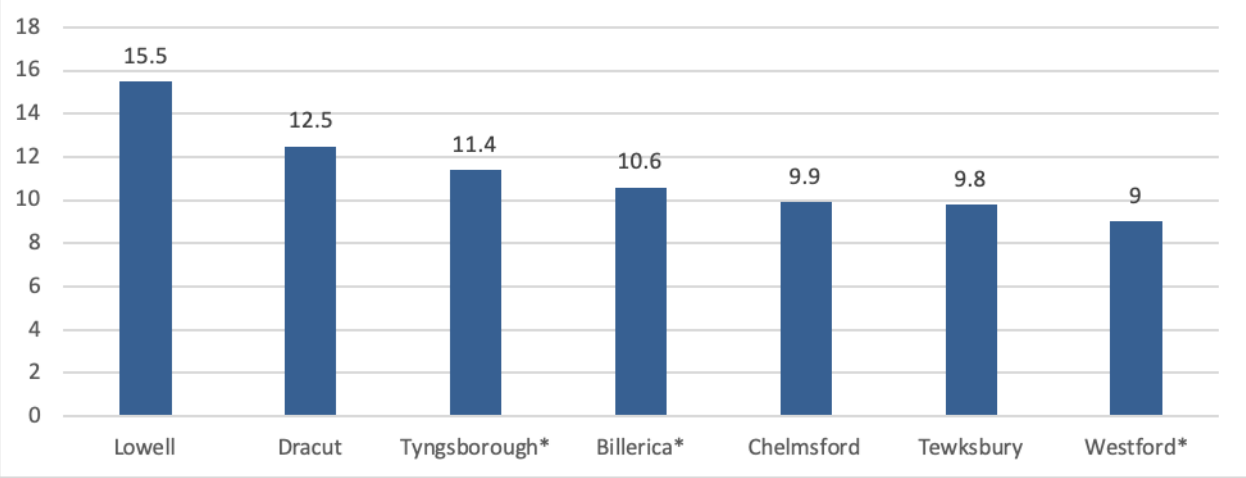


Source: Center for Health Information and Analysis (CHIA) via PHIT
**Note: Dunstable not included in Greater Lowell CHNA data*

The age-adjusted rate of Emergency Department (ED) visits per 10,000 has remained steady in The Greater Lowell CHNA and the state of Massachusetts, with The Greater Lowell CHNA consistently having a lower rate than that of the state. The rate of ED visits per 10,000 in Lowell has consistently been higher than both the state and Greater Lowell CHNA rates, and has also been more variable.

MENTAL HEALTH

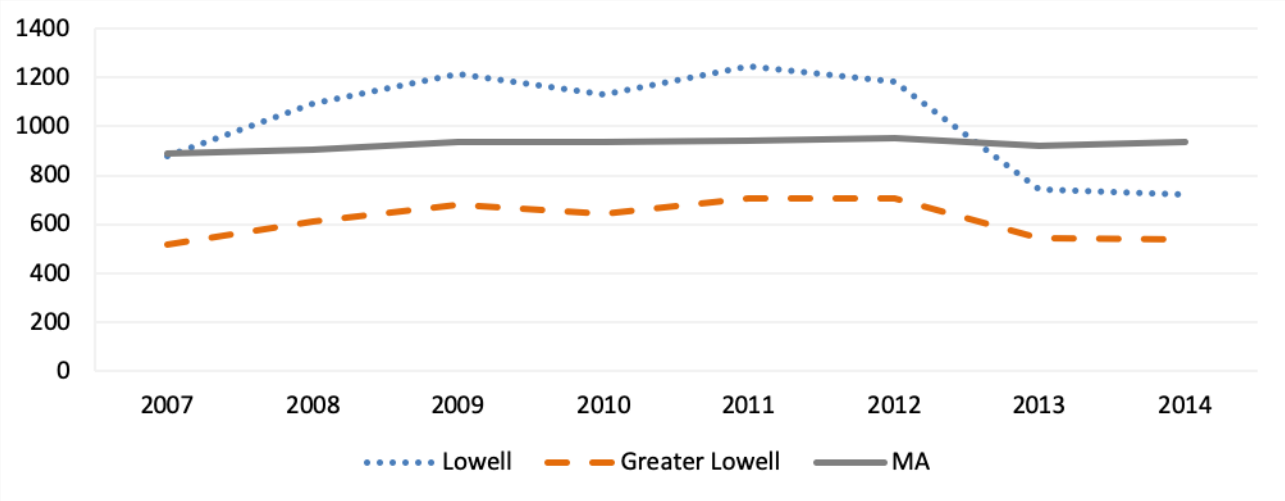
Figure 45 – Percent of Adults Reporting Poor Mental Health for 15 or more days (2012-2014)



Source: BFRSS Results via PHIT
**Note: We include town level estimates that may be based on relatively few respondents or have standard errors that are larger than average. The confidence interval for this community is wider than the normal limits set by MDPH. Therefore, the estimate for this town should be interpreted with caution.*

Self-reported mental health has been shown to be an important indicator of overall health (Levinson & Kaplan, 2014). The average percent of adults reporting poor mental health for 15 or more days in the Greater Lowell CHNA was 11.2%. Lowell and Dracut have percentages higher than the average at 15.5 and 12.5% respectively. The percent of adults reporting poor mental health for 15 days or more in Tyngsborough was 11.4%, similar to the average. Billerica, Chelmsford, Tewksbury, and Westford had lower than average percentages of adults reporting poor mental health for 15 or more days at 10.6, 9.9, 9.8 and 9% respectively.

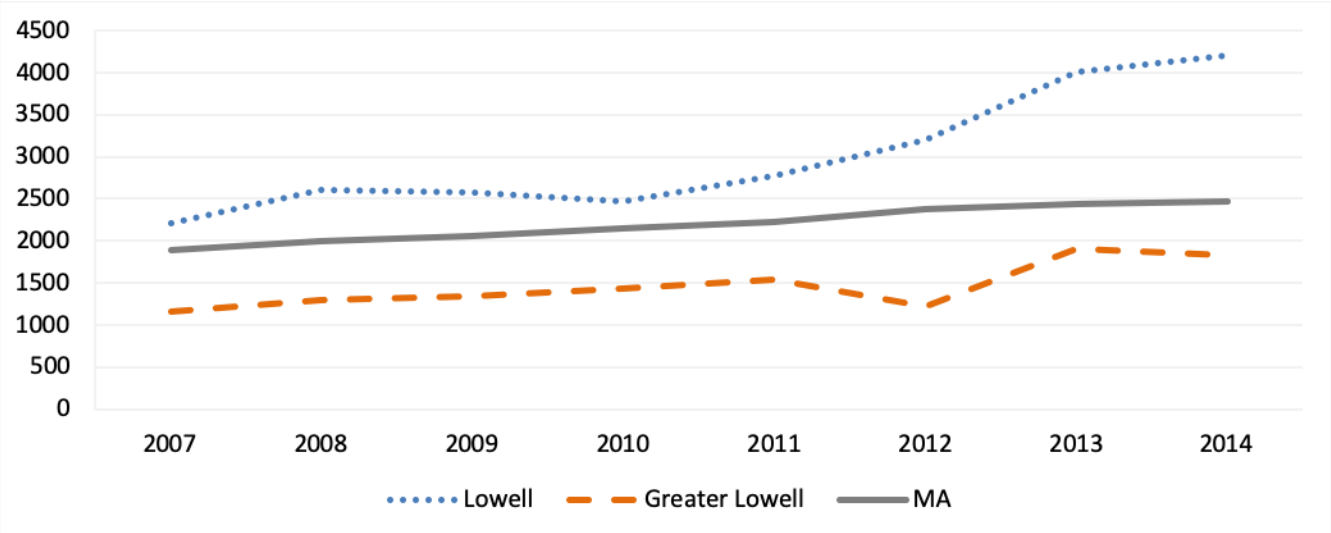
Figure 46 – Age-Adjusted Rates of Mental Health Hospitalizations per 100,000 (2007-2014)



Source: Center for Health Information and Analysis (CHIA) via PHIT

The 2014 mental health hospitalization rates were 719 per 100,000 people for Lowell, 541 for the Greater Lowell CHNA, and 934 for Massachusetts. Massachusetts rates have been relatively consistent. While Lowell's mental health hospitalizations have remained higher than the CHNA for all of the years of available data, there was a marked decrease in mental health hospitalizations in Lowell between 2012 and 2013, resulting in a rate in Lowell lower than the Massachusetts rate in 2013 and 2014.

Figure 47 – Age-Adjusted Mental Health Emergency Department Visits per 100,000

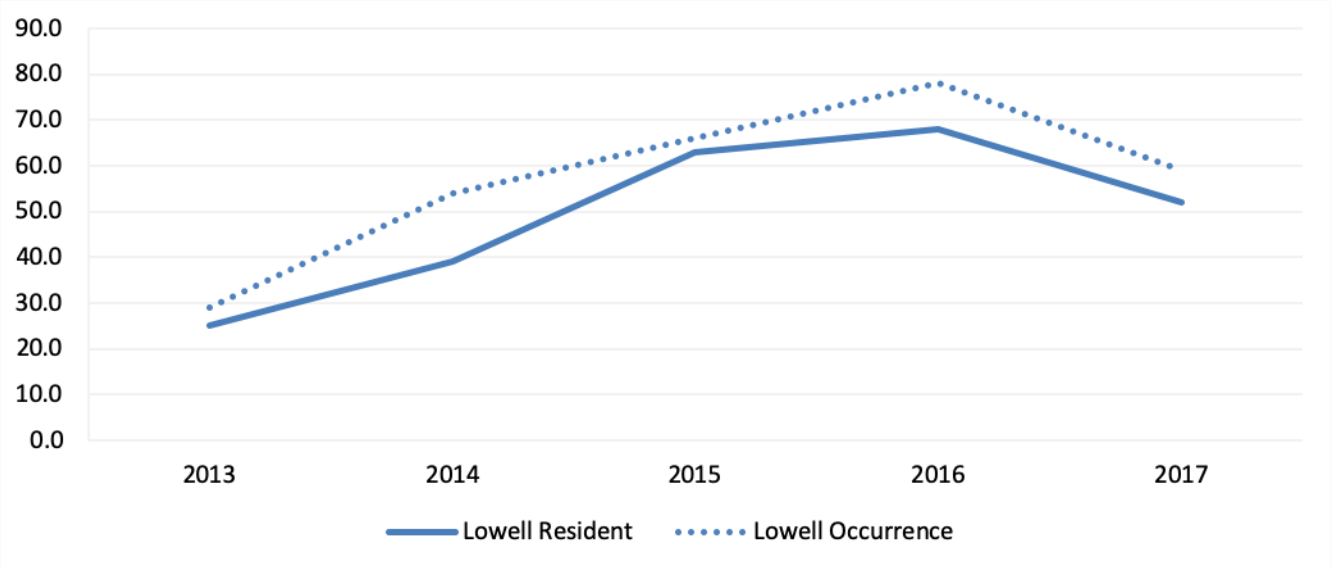


Source: Center for Health Information and Analysis (CHIA) via PHIT

The 2014 mental health emergency department visits were 4199 per 100,000 people for Lowell, 2466 for Massachusetts and 1834 for the Greater Lowell CHNA. While the mental health hospitalization rate in Lowell has decreased in recent years, the mental health emergency department visit rate has increased. The Massachusetts rate has also increased, but at a slower rate. The CHNA rate decreased slightly between 2013 and 2014.

SUBSTANCE USE DISORDER

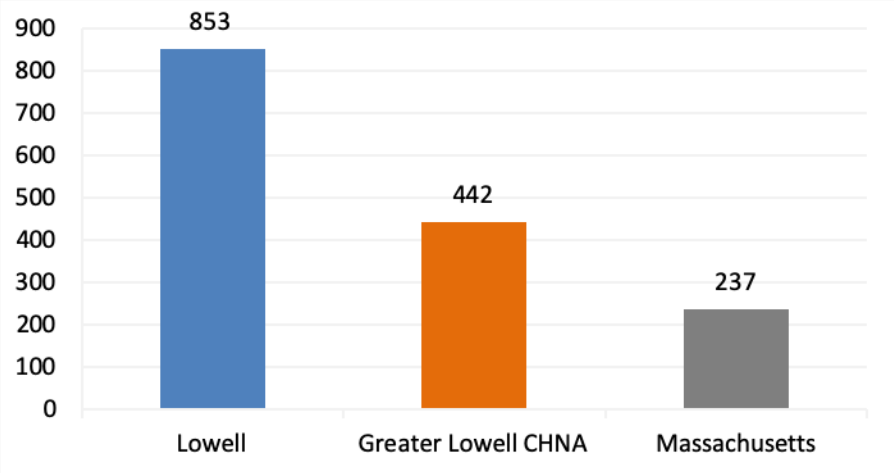
Figure 48 – Opioid Overdose Death Rate per 100,000



Source: Massachusetts Department of Health

The rate of opioid overdose death decreased in the city of Lowell from 2016 to 2017 after an increase from 2013 to 2016. The rate of opioid overdose death has consistently been lower among Lowell residents than among decedents in Lowell regardless of residency. The trend is similar between residents of Lowell and overdoses that occur in Lowell regardless of residency of the decedent.

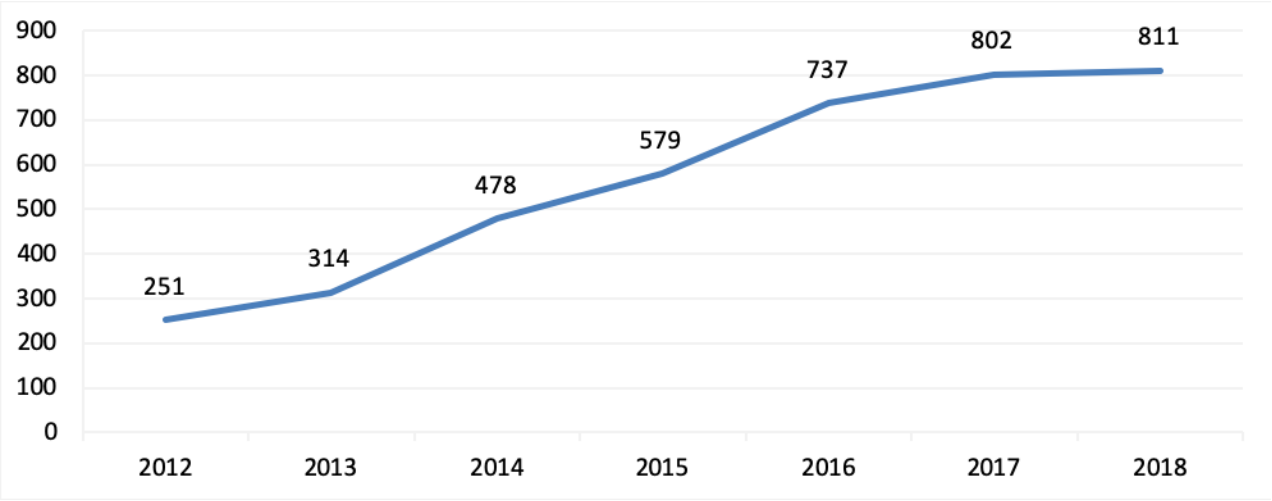
Figure 49 – Opioid-Related EMS Incidents per 100,000 in 2018



Source: Massachusetts Department of Health

Lowell has the highest rate of opioid related EMS incidents in 2018 at 853 per 100,000, followed by the Greater Lowell CHNA at 442, and Massachusetts at 237. Aside from Lowell, the only other community in the Greater Lowell CHNA with a rate higher than the state in Massachusetts was Tewksbury at 333 (not shown).

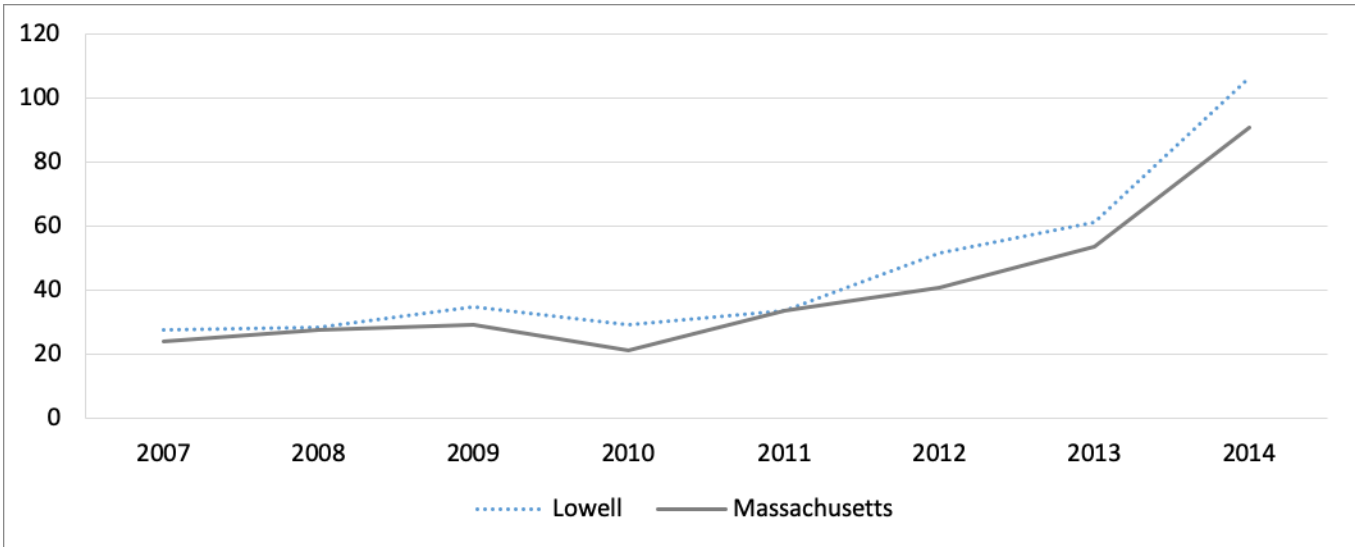
Figure 50 – Opioid-Related Trinity EMS Calls



Source: Trinity Emergency Medical Services, Inc.

The number of opioid related calls through Trinity EMS, Inc., an ambulance service in Lowell, has increased annually since 2012. The number of opioid related calls has been increasing at a slower rate since 2016. The annual percent increase in 2016 was 27% from 2015. From 2016 to 2017 the increase was 9%, from 2017-2018 the increase was 1%.

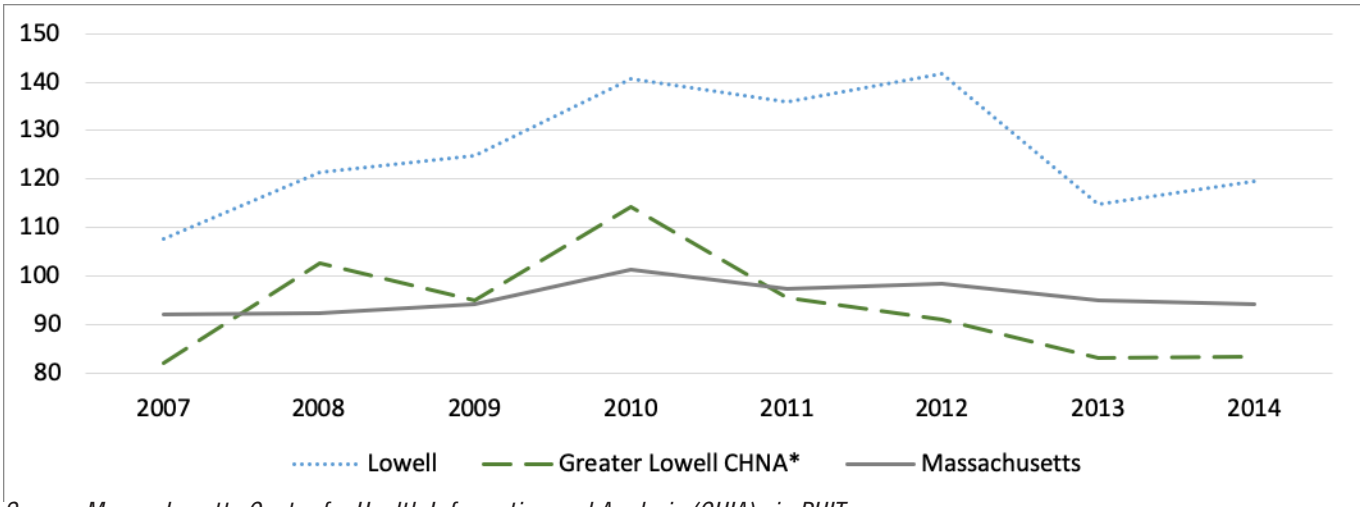
Age-Adjusted Rate of Emergency Department Visits for Opioid Overdose per 100,000 (2007-2014)



Source: Massachusetts Center for Health Information and Analysis (CHIA) via PHIT

The emergency department visit rate for opioid overdoses began a sharp and accelerating increase in 2010. The rates in Lowell exceed those of Massachusetts. The increase in rates in Lowell and the state of Massachusetts have been comparable.

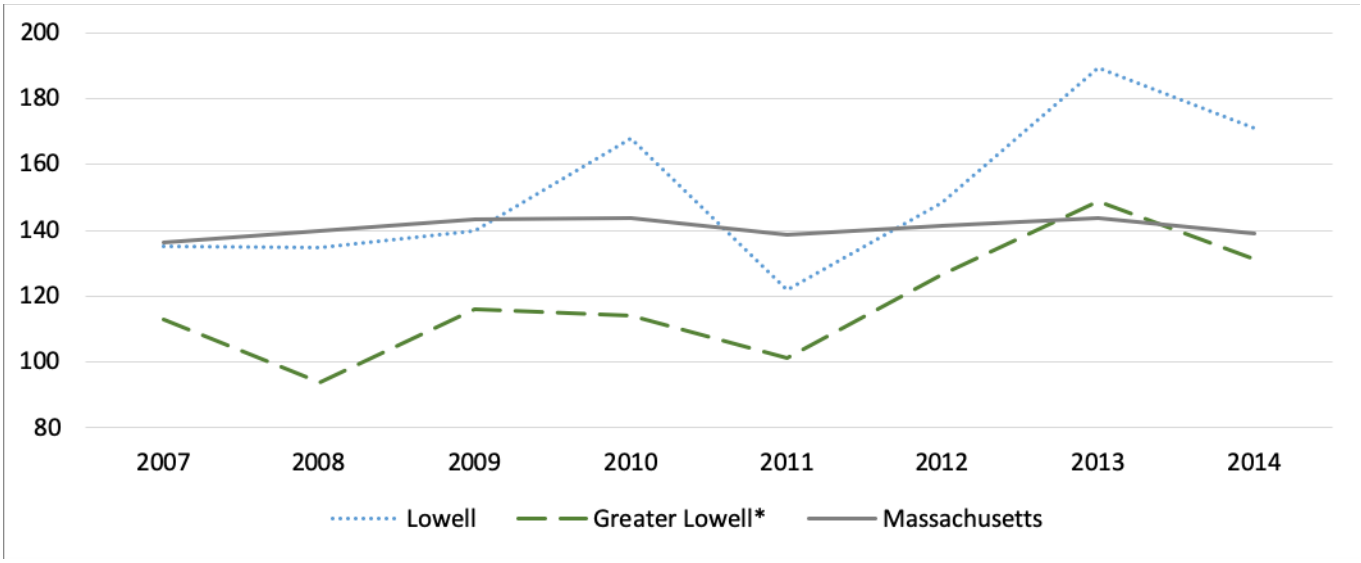
Age-Adjusted Rate of Admissions/Observations for Non-Opioid Substance Overdose per 100,000 (2007-2014)



Source: Massachusetts Center for Health Information and Analysis (CHIA) via PHIT
**Greater Lowell excludes Dunstable, Tyngsborough, Westford*

The rates of admissions and observations for non-opioid substance overdoses have consistently been higher in Lowell than in the Greater Lowell CHNA and in the state of Massachusetts. The rate within the Greater Lowell CHNA has been variable, with a decrease in 2011 that placed it below the rate of the state of Massachusetts.

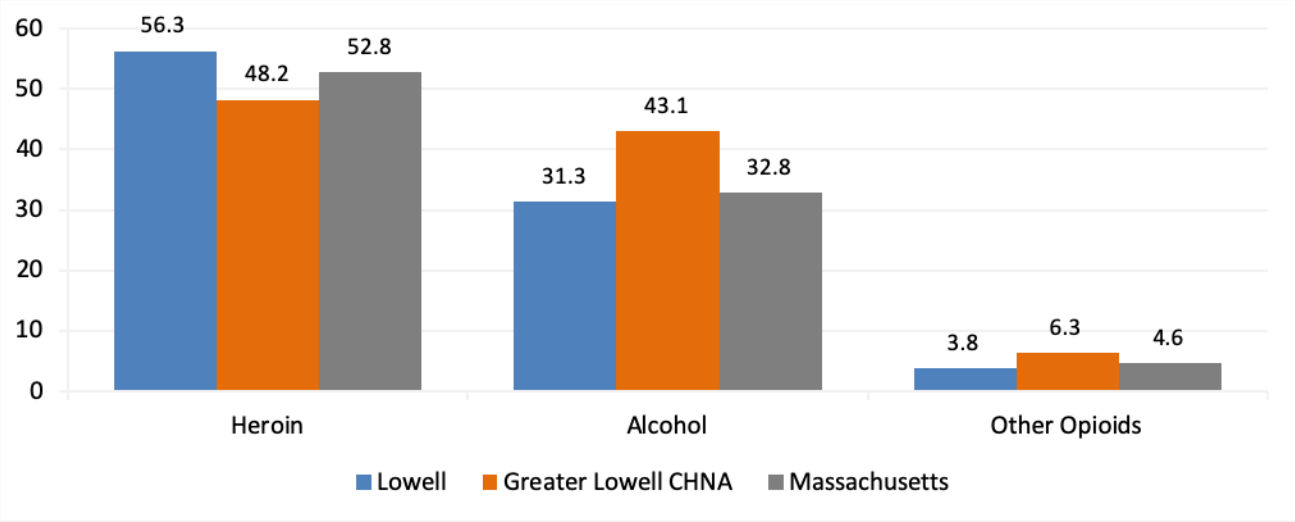
Age-Adjusted Rate of Emergency Department Visits for Non-Opioid Substance Overdose per 100,000 (2007-2014)



Source: Massachusetts Center for Health Information and Analysis (CHIA) via PHIT
**Greater Lowell excludes Dunstable, Tyngsborough, Westford*

Rates of emergency department visits for non-opioid substances have remained consistent in the state of Massachusetts. More variation has been seen in Lowell and the Greater Lowell CHNA, with Lowell appearing to drive the rates in the Greater Lowell CHNA by maintaining higher rates. The rates of non-opioid substance overdose emergency department visits have differed from the rates of hospital admissions/observations in that the rate of in Lowell has not been markedly higher than that of the state.

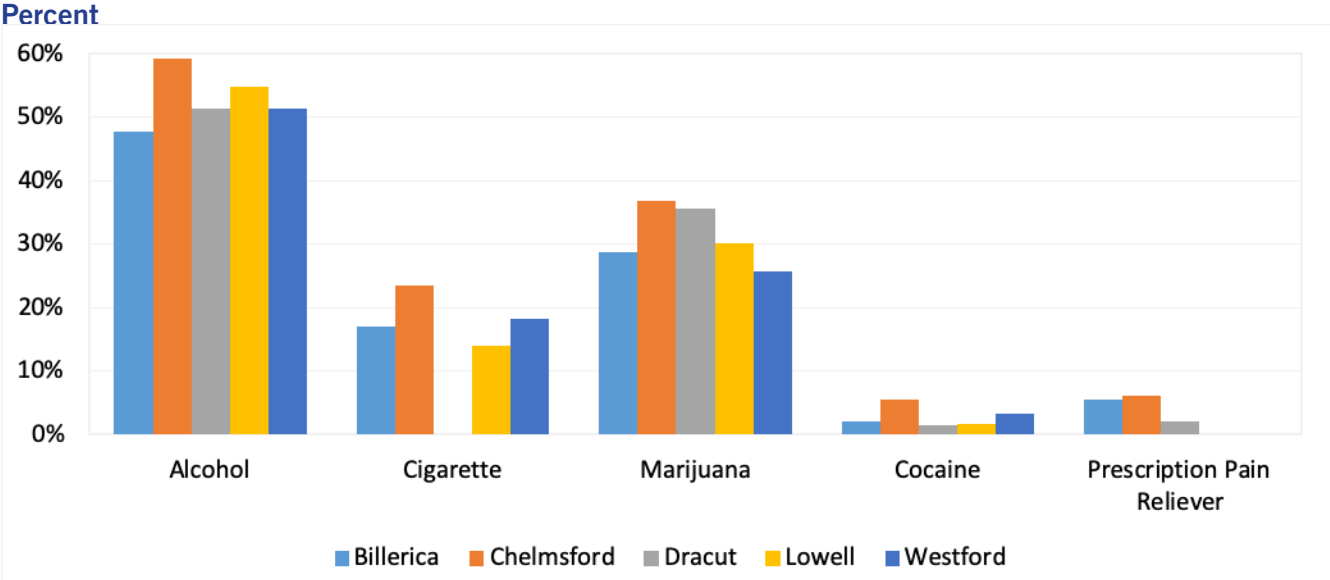
Figure 51 – Primary Substance of Use on Admission to State Treatment Facility in FY2017 – Percent



Source: BSAS via Massachusetts Department of Public Health
Note: "Other opioids" refer to Non-Rx Methadone, Other Opiates, Oxycodone, Non-Rx Suboxone, Rx Opiates, and Non-Rx Opiates.

The primary substance of use on admission to a state treatment facility in FY 2017 was heroin in Massachusetts, the Greater Lowell CHNA, and Lowell at 53%, 48% and 56% respectively. The second most common primary substance of use was alcohol, followed by other opioids. Lowell's rate of admissions for alcohol use (31%) were lower than the Greater Lowell CHNA (43%) and Massachusetts (33%). Lowell's rate of admissions for heroin use were higher than Massachusetts and the Greater Lowell CHNA (not shown).

Figure 52 – Overall Lifetime Use of Alcohol, Tobacco, and Other Drugs (ATOD) of High School Students - Percent

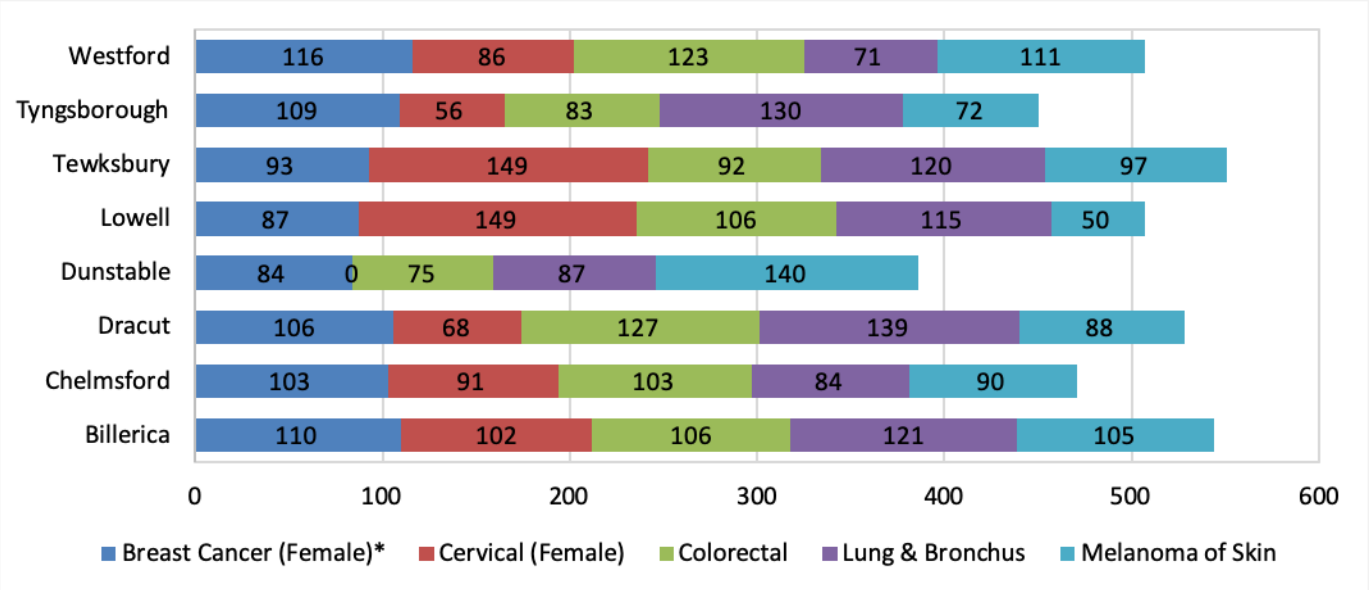


Source: Billerica 2015 CTCYS, Chelmsford 2014 YRBS, Dracut 2015 YBRS, Lowell 2016 CTCYS, Westford 2014 YRBS
Note: No information was available for Cigarette Use in Dracut and Prescription Rain Reliever Use in Lowell and Westford.

Results from Youth Risk Behavior Survey (YRBS) and the Communities that Care Youth Survey (CTCYS), from high school students indicate that more than half (53%) of these students reported ever drinking alcohol. When asked about drinking alcohol within the past thirty days about 33% of high school students in these areas reported do so (not shown). About 32% percent of high school students reported ever using marijuana in their lifetime. This was highest in the towns of Chelmsford (37%) and Dracut (36%). The highest lifetime prevalence of use for cigarette smoking was from Chelmsford (24%), followed by Westford (18%), Billerica (17%), and Lowell (14%). Other than the 6% of high school students from Chelmsford, less than 4% of students from other areas reported having ever used any form of cocaine. Results from Billerica, Chelmsford, and Dracut also provided information for prescription pain reliever usage (without it being prescribed) with about 6%, 6%, and 2% respectively.

CANCER

Figure 53 – Standardized Incidence Ratio of Selected Cancers by Town (2011-2015)



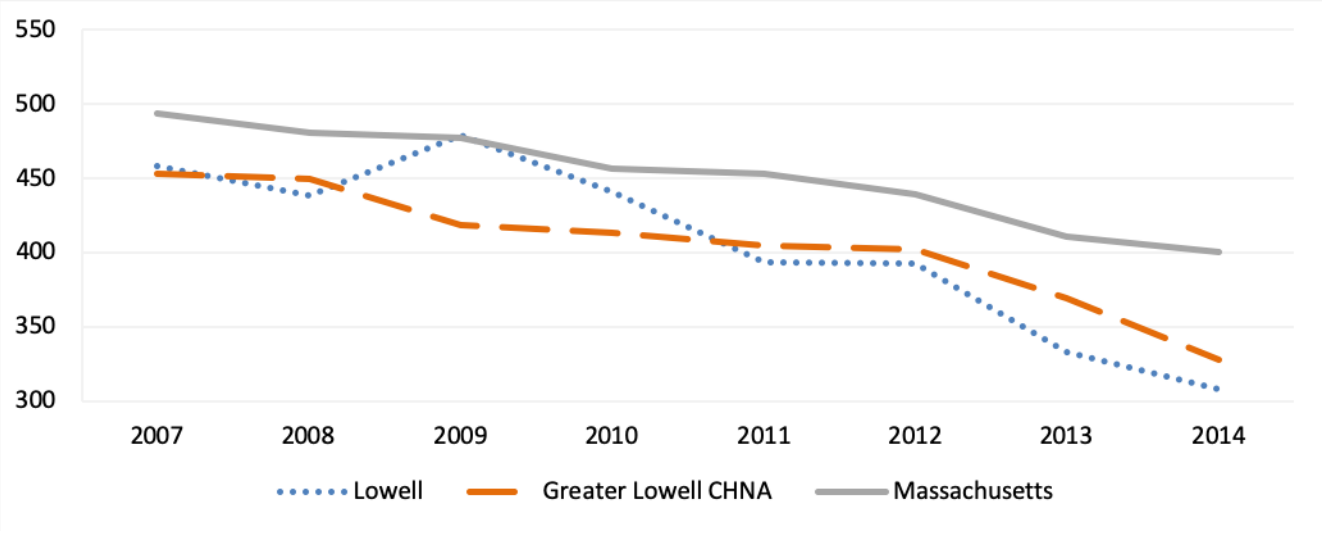
Source: Massachusetts Cancer Registry via Massachusetts Department of Public Health
Note: The SIR was not calculated for the Town of Dunstable because observations were <5 cases.

The above data represent standardized incidence ratios (SIR) of cancer incidence. An SIR is an indirect method of adjustment for age and sex that describes in numerical terms a town's average experience in 2011-2015 compared with that of the state as a whole. An SIR of exactly 100 indicates that a town's incidence for a certain type of cancer is equal to that expected based on statewide average age-specific incidence rates. An SIR of more than 100 indicates that a town's incidence for a certain type of cancer is higher than expected, and an SIR of less than 100 indicates that a town's incidence for a certain type of cancer is lower than expected.

The highest SIR of cancers in Dracut, Tyngsborough, and Billerica were lung and bronchus cancer (139, 130 and 121 respectively). In Lowell and Tewksbury, the highest rates were of cervical cancer with SIRs of 149 in each town. Colorectal cancer had the highest SIR in Westford (123). Melanoma of the skin had the highest SIR (140) of the cancers measured in Dunstable. Colorectal cancer and breast cancer had the highest SIRs of cancers seen in Chelmsford (103 each). Chelmsford's rates were the lowest among all the communities with two SIRs slightly above 100. Billerica's rates were the highest, with every cancer higher than 100.

Cancer incidence rates over time by town show a wide variety of patterns (not shown). Across all towns, the most variable cancer rate is that of cervical cancer, which shows high variability in Billerica, Dracut, Dunstable, Lowell, Tewksbury and Westford. The rate of lung and bronchus cancer has remained steady throughout most communities, as has melanoma of the skin.

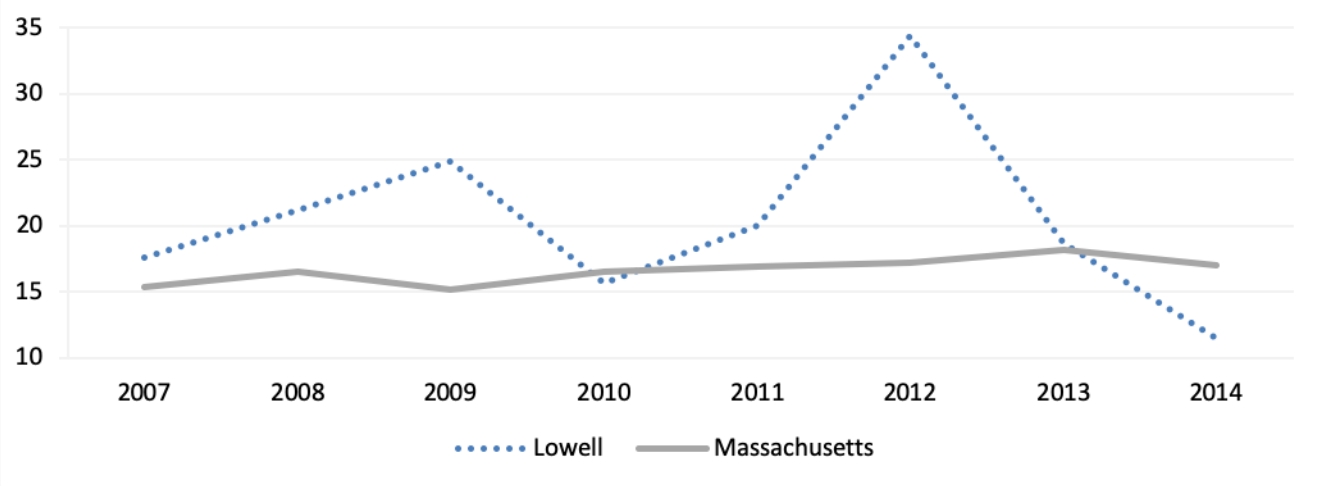
Figure 54 – Age-Adjusted Rate of Cancer Hospitalizations (Admissions/Observations) per 100,000



Source: Center for Health Information and Analysis (CHIA) via PHIT

Patients with cancer are often hospitalized for acute conditions or refractory symptoms with increasing frequency in the last months of life (Numico et al, 2015). The age adjusted rate of cancer hospitalizations per 100,000 has decreased since 2007 in Lowell, the Greater Lowell CHNA, and in the state of Massachusetts. Lowell has seen the largest decrease and, as of the most recent available data, has a lower rate of cancer hospitalizations than the Greater Lowell CHNA or Massachusetts.

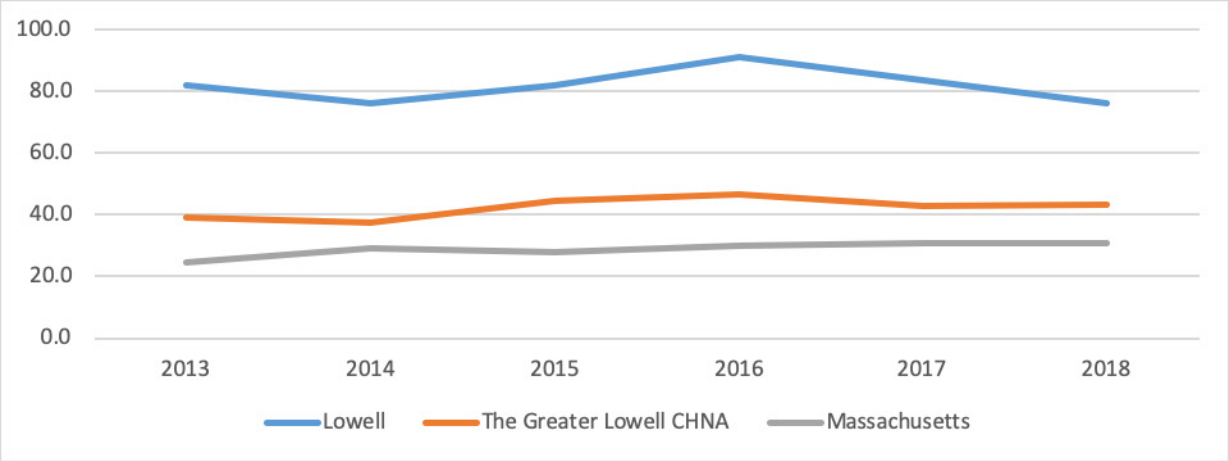
Figure 55 – Age-Adjusted Rate of Cancer Emergency Department Visits per 100,000 (2007-2014)



Source: Center for Health Information and Analysis (CHIA) via PHIT

Patients with cancer often seek treatment in the Emergency Department (ED). The age-adjusted rate of ED visit per 100,000 in the state of Massachusetts has increased slightly and slowly since 2007. In Lowell, the rate of cancer ED visits has varied greatly with a marked increase in 2009, decrease in 2010, an increase in 2012 and finally a decrease in 2014 to below the Massachusetts rate.

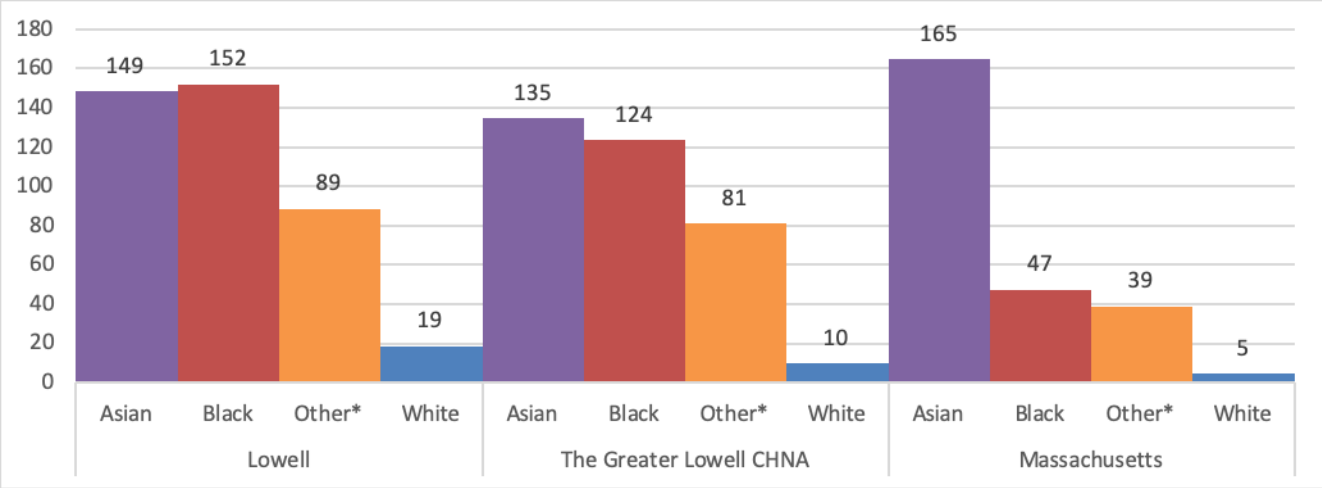
Figure 56 – Newly Reported Confirmed and Probable Chronic Hepatitis B Cases in Selected Geographic Region per 100,000 (2013-2018)



Source: Massachusetts Department of Public Health

Hepatitis B is a liver infection caused by the hepatitis B virus that is transmitted through blood or another body fluid. Hepatitis B can be prevented through vaccination. The rates of hepatitis B have remained steady between 2013 and 2018. The rate in Lowell has consistently remained higher than that of The Greater Lowell CHNA which has also been higher than the state of Massachusetts.

Figure 57 – Newly Reported Confirmed and Probable Chronic Hepatitis B Cases by Race in Selected Geographic Region per 100,000 (2018) *

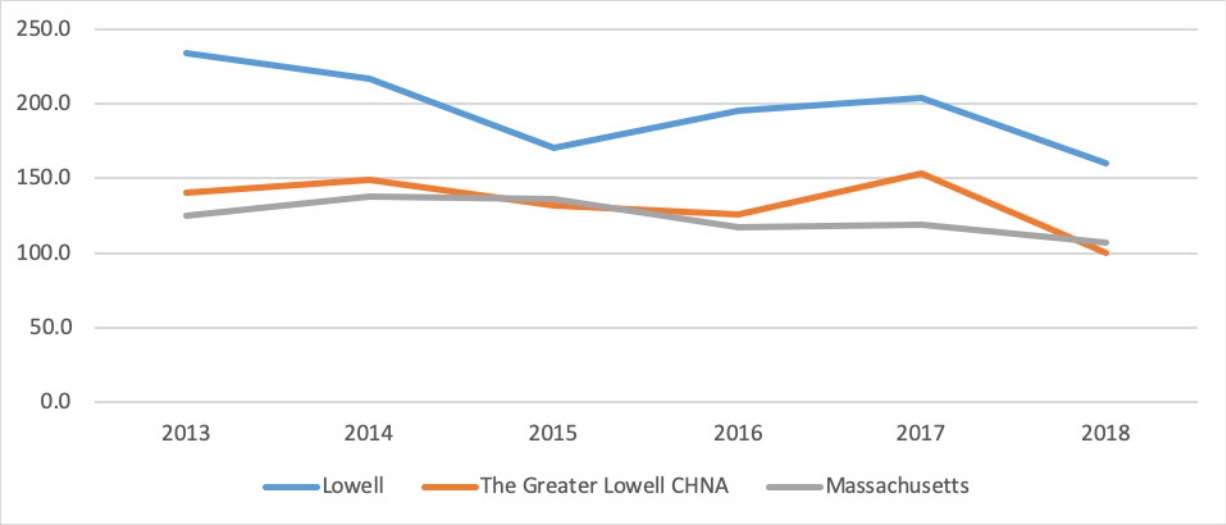


Source: Massachusetts Department of Public Health

** Other race may include American Indian/Alaskan Native, Native Hawaiian/Pacific Islander, other races and individuals reporting more than one race.*

The distribution of hepatitis B infection rate by race follows a similar pattern between The Greater Lowell CHNA and the state of Massachusetts with the highest rate in the Asian population followed by the Black population, then the population categorized as other, then the White population. In Lowell, the hepatitis B infection rate is higher in the Black population than the Asian population. While the hepatitis B infection rate in the Asian and Black populations in the Greater Lowell CHNA and Lowell are comparable, the Asian population of Massachusetts is markedly higher than the Black population.

Figure 58 – Rate per 100,000 of Newly Reported Confirmed and Probable Hepatitis C Cases in Selected Geographic Region (2013-2018)**

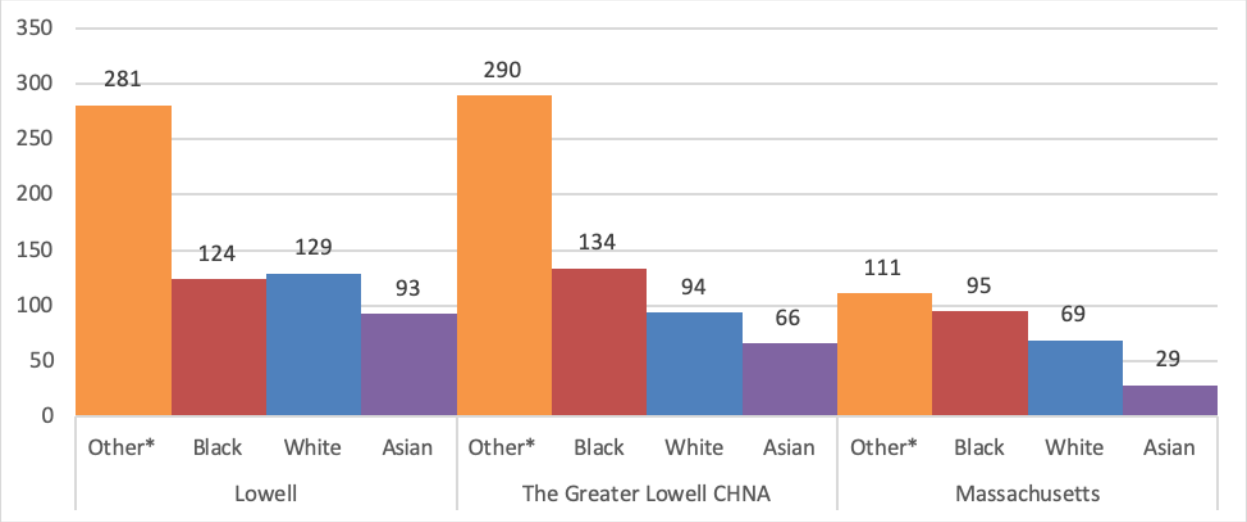


Source: Massachusetts Department of Public Health

*** The surveillance case classification for hepatitis C changed in 2016. Individuals with positive antibody results with negative RNA results within one year of initial report and no other tests in that time period indicating virus is present, are no longer considered confirmed or probable cases. Prior to 2016, individuals with either past or present infections may have been considered confirmed or probable.*

Hepatitis C is a liver infection caused by the hepatitis C virus that is transmitted through blood. There is no vaccine for hepatitis C. The rate of hepatitis C cases has been slowly declining in Lowell, The Greater Lowell CHNA, and Massachusetts since 2013. In 2018, the Greater Lowell CHNA rate decreased below that of the state of Massachusetts. The rate of hepatitis C cases in Lowell has been consistently higher than that of the Greater Lowell CHNA and the state of Massachusetts.

Figure 59 – Rate per 100,000 of Newly Reported Confirmed and Probable Hepatitis C Cases by Race in Selected Geographic Region (2017)

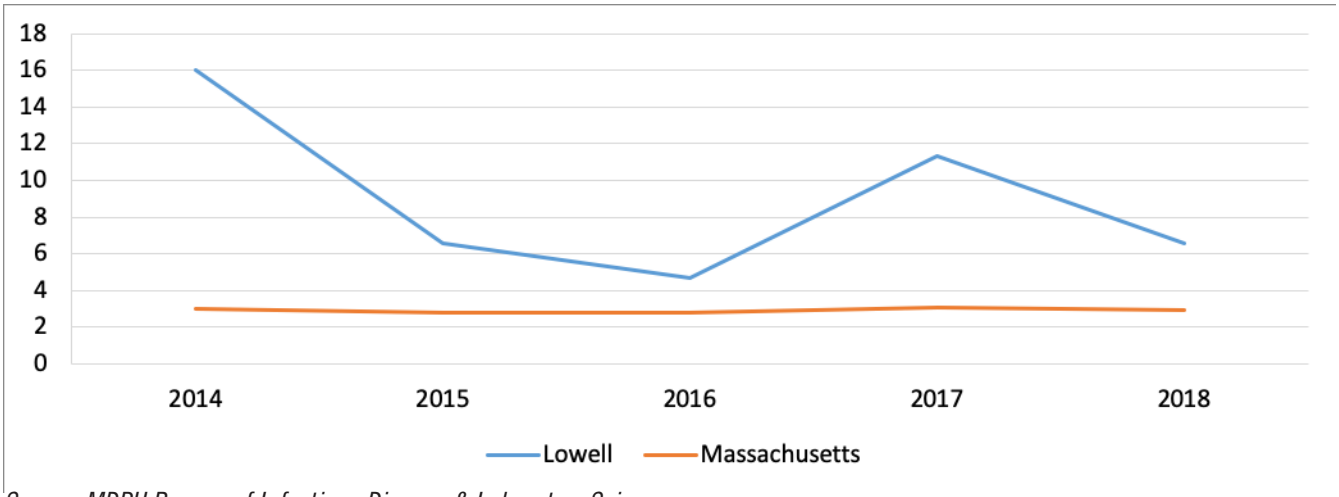


Source: Massachusetts Department of Public Health

** Other race may include American Indian/Alaskan Native, Native Hawaiian/Pacific Islander, other races and individuals reporting more than one race.*

The distribution of hepatitis C cases by racial category in Massachusetts and The Greater Lowell CHNA follow similar patterns, with the population with the highest rate of hepatitis C impacting individuals in the population of race categorized as other, followed by the population of Black individuals, then the population of White individuals, then the population of Asian individuals. In Lowell, the rate of hepatitis C is higher in the population of White individuals than the population of Black individuals. The racial distribution for hepatitis C infections differs significantly from that of hepatitis B.

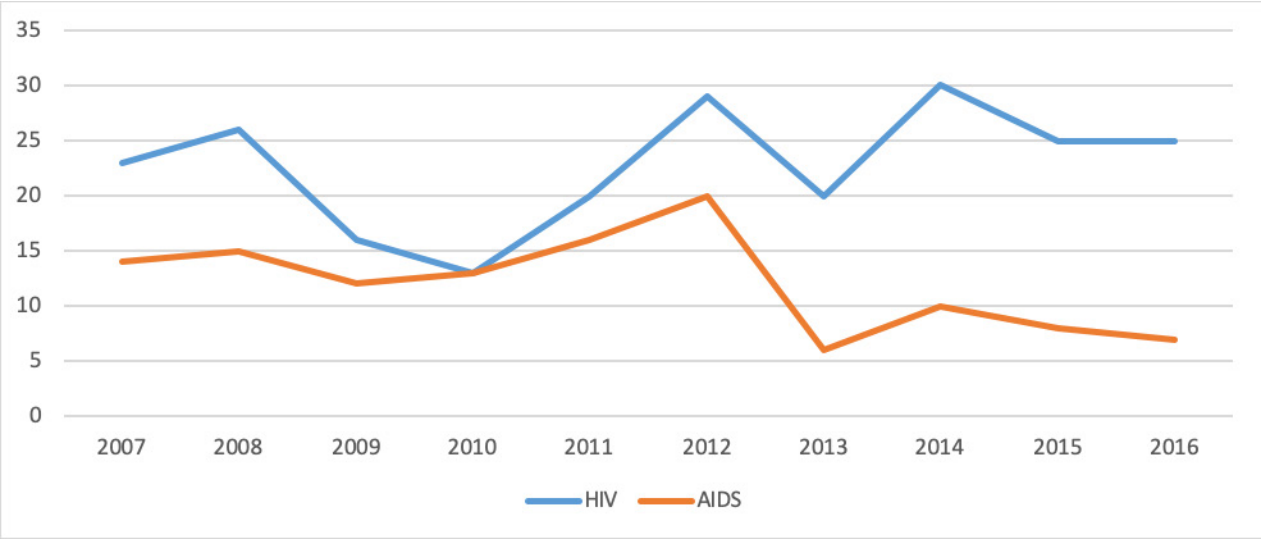
Figure 60 – Tuberculosis Rate per 100,000 (2014-2018)



Source: MDPH Bureau of Infectious Disease & Laboratory Sciences

Tuberculosis (TB) is a bacterial infection usually found in the lungs that is spread through the air from one person to another. TB rates per 100,000 have consistently been higher in Lowell than the statewide rates. The five year average for the state has remained at 2.9 per 100,000. The rate for Lowell was three times higher at 9 per 100,000 between 2014 and 2018. Between 2014 and 2016 there was a decline from 16 to 5 cases per 100,000. In 2017 there was an increase to 11 per 100,000 before decreasing again in 2018 to 7 per 100,000.

Figure 61 – Number of Individuals Diagnosed with HIV or AIDS in Lowell (2007-2016)



Source: MDPH Bureau of Infectious Disease and Laboratory Sciences

Human Immunodeficiency Virus (HIV) is a viral infection that compromises a person's immune system and is spread through transmission of bodily fluids – most often through sexual behaviors or needle or syringe use. Acquired Immunodeficiency Syndrome (AIDS) is the most serious stage of HIV infection and is determined by the diagnosis of certain opportunistic infections or low CD4 blood cell counts. The number of individuals newly diagnosed with HIV in Lowell has varied over time, with its lowest count in 2010 (14 cases) and highest in 2014 (30 cases). There were 25 individuals newly diagnosed in 2016. The number of individuals diagnosed with AIDS in Lowell has also varied, but has seen a downward trend and has remained consistently lower than the number of individuals diagnosed with HIV. In 2012, there was a high of 20 individuals diagnosed with AIDS, while 2016 saw 7 individuals diagnosed.

Recommendations to Improve the Health and Quality of Life of Residents

Participants of listening sessions with providers, professionals and community members were asked for recommendations to improve the health and quality of life of the Greater Lowell Community.

Most of the provider, professional and community listening sessions recommended outreach programs and education to improve the health and quality of life of the community. Professional groups specifically recommended the design of standardized education programs that better increase community awareness on disease symptoms, viral infections and environmental risk factors to prevent negligence to health and safety in the long term. They also recognized the importance of education, health promotion and outreach events at social gatherings including schools, faith-based organizations, and non-profit organizations. Additional suggestions were resources available in multiple native languages to align with the cultural and ethnic backgrounds of the community. One key informant recommended organizing regular listening sessions to engage the community in discussions regarding their health and social well-being. Listening session participants also identified the need for a culturally competent health system with alternative forms of therapy integrated into clinical practice for a more holistic approach to health. Youth participants noted that cultural competency training programs would be important for all health care providers and the larger community. Most listening sessions stated that immigrants needed a better health care navigation system through health promotion and funding programs such as the State Health Benefits Programs. A key informant also mentioned the importance of creating a training program that will build qualified community support teams to bridge the gap between community and the health care system.

The majority of the providers, professional and community groups recommended educating the community on navigating health care regulations and guidelines. For instance, there is the increasing need for a smooth transition of patients' medical information between social service centers, hospitals and clinics in the Greater Lowell area. A professional from the police department mentioned the need to strategize with community partners in coordinating appropriate sharing of health information among service providers while maintaining HIPAA (Health Insurance Portability and Accountability Act) regulations. Listening sessions also cited the increased need for the community to understand how the health insurance system works including health care coverage, reimbursements and co-pays. A key informant also mentioned the need for the creation of educational institutes whose goal is to create strategies to ease navigation of federal level policies and procedures. Immigrants and people who do not speak English would benefit from additional education on the laws regarding the right to interpretation services while seeking medical care. Most professional groups recommended disease prevention strategies, especially for young school-age children and families. Suggestions included the need for available health and wellness programs to adopt a preventive approach rather than focus on best treatment options.

Listening session participants recognized the need for an easy-to-navigate transportation system especially for immigrants, seniors, and people with disabilities. Other key recommendations to improve the health care transportation system included, using Uber health and expanding the availability of public transportation system outside peak hours and weekends. One key informant recommended a transportation summit with community members to discuss ways to improve the transportation system including funding opportunities, proximity of central locations within the CHNA communities and special transportation services for the aging population and the disabled.

Other important recommendations mentioned in listening sessions included the need for integrated care through effective communication between the medical team and the community health team, more mental health facilities and substance use disorder crisis programs, more shelters for people experiencing homelessness and expanded support services for caregivers of individuals with dementia and Alzheimer's disease due to the current need. They also recommended increased advocacy for policies and procedures to improve the health

and safety of vulnerable populations including pregnant women, children, and the elderly. Several professional listening sessions advocated for expanding affordable and safe housing in the Greater Lowell area. One key informant recognized the need for recovery coaches to work in the hospitals and primary care facilities so that follow ups can be done for people with mental health issues or substance use disorders.

The African/faith community had the following suggestions for additional changes to improve the health of the African community:

- More engagement with African leaders on ways to improve the health of the African community.
- Expanded outreach efforts and education on mental health and safety awareness programs.
- Create strategies on how to destigmatize the African community and increase trust with communicating their HIV/AIDS and STD status with health care providers and family members.
- Increase efforts to address alcohol use disorder, especially its impact on women.

The Latino community had the following suggestions for additional changes to improve the health of their community:

- More listening sessions on a regular basis to share and have discussions on their issues, problems and learn about resources available to the community.
- More community engagement with the health system through education organized by the community health center.
- More access to mental health services.

The Cambodian community had the following suggestions for additional changes to improve the health of their community:

- Increase the number of workshops/trainings/ info-sessions within the Cambodian community on certain health risks and on why it is important to go see a doctor on a regular basis.
- More increased outreach efforts to enhance community awareness on resources available to the local community
- More education and outreach materials translated in Khmer language.

The Portuguese community had the following suggestions for additional changes to improve the health of their community:

- Community health education on diabetes and healthy diet
- More availability of language interpretation and translation services because sometimes most translators are Brazilians and not Portuguese.

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Appendix A

Description of Resources Potentially Available

Multi-sector Collaboratives & Community Health Partnerships
Billerica Substance Abuse Prevention Committee
Centerville Neighborhood Action Group
Greater Lowell Health Alliance
Lowell Alliance for Families and Neighborhoods
Lowell Hunger Homeless Commission
Local Health Departments
Billerica Board of Health
Chelmsford Board of Health
Dracut Health Department
Lowell Health and Human Services Department
Tewksbury Police Department
Tyngsboro Health Department
Westford Health Department
Wilmington Health Department
Worcester Department of Public Health
Private, Community-based Social Service & Community Health Agencies
Adult Education
Lowell Adult Education Center
Merrimack Valley Area Health Education Center(AHEC)
Services for the Formerly Incarcerated
THRIVE Communities
Early Childhood, Youth, and Adolescent Services
Early Childhood Services
Acre Family Child Care
Community Teamwork Inc.
Healthy Families
Lowell Women, Infants and Children (WIC)
March of Dimes
Maternal Child Health Task Force-Greater Lowell Health Alliance
Project BEAM Early Intervention
South Bay Community Services
Thom Anne Sullivan Center
Elder Services
Atrius Health-Chelmsford
Caregiver Homes
Chelmsford Senior Center
Circle Home
D'Youville Life and Wellness Community
Elder Services of the Merrimack Valley
Element Care
Fairhaven Healthcare
Fallon Health

Genesis Healthcare
Glenwood Care and Rehab
Greater Lowell Elder Mental Health Collaborative
Home Away from Home
Lowell Senior Center
Senior Whole Health
Summit Elder Care-Lowell
Town and Country Healthcare Center
Employment Services
Greater Lowell Workforce Board
Merrimack Valley Workforce Investment Board
Faith-based Organizations
Bethany Christian Services
Chelmsford Unitarian Church
Christ Jubilee International Ministries
Merrimack Valley Catholic Charities
Salvation Army
Food Security and Healthy Eating
Community Garden Programs
Mill City Grows
Food Bank
Merrimack Valley Food Bank
Food Pantries
Central Food Ministry
Chelmsford Community Exchange
Christ Church United
Christ Jubilee Food Pantry
Community Christian Fellowship
Dharma Food Pantry
Dracut Food Pantry
Dwelling House of Hope
Hope Dove
Lowell Public Schools Pantry-Rogers Street
Merrimack Valley Catholic Charities
Open Pantry Greater Lowell
Salvation Army
Tewksbury Community Food Pantry
Westford Food Pantry

Legal Aid Services
Justice Resource Institute CBS
Merrimack Valley Legal Services, Inc.
Northeast Legal Aid
Multi-Service Cultural Agencies
African Center of the Merrimack Valley
Asian Task Force Against Domestic Violence
Cambodian Mutual Assistance Association (CMAA)
International Institute of New England-Lowell
Latin American Health Institute
Massachusetts Alliance of Portuguese Speakers (MAPS)
PFLAG
Recreational Services
Chelmsford Wellness Center
Cultivating Qi
Greater Lowell YMCA
Lowell National Historical Parks
Lowell Parks and Conservation Trust, Inc.
Lowell Parks and Recreation
Shape Up Somerville
SLS Fitness
Shelter & Domestic Violence Services
Alternative House
Brigid's Crossing
House of Hope
Living Waters, Center of Hope
Lowell Transitional Living Center
Transportation
Mighty Drum
Youth & Adolescents
Boys and Girls Club of Greater Lowell
Greater Lowell Pediatrics
Healthy Futures
History UnErased
Middlesex Partnership for Youth
Safe Families for Children
Safe Routes to School
Tewksbury Cares
United Teen Equality Center (UTEC)

Wayside Youth and Family Support Network
The NAN Project
YWCA of Lowell
Other Community-Based Organizations
Health Care Services
Hospital Services/Primary Care and Medical Specialty Care Services
Blue Cross Blue Shield of Massachusetts
Boston Medical Center HealthNet Plan
CHC Nursing
Circle Health
Damien Folch Family Practice
Fallon Community Health Plan
Greater Lawrence Family Health Center
Hallmark Health
Healthcare for All
Healthcentric Advisors
Lahey Emergency Services
Lowell Community Health Center
Lowell Crisis Team
Lowell General Hospital
Mass Health
Metta Health Center
Network Health
Pawtucket Pharmacy
Tewksbury Hospital
United Health Care
Walgreens Pharmacy
Wellforce
Behavioral Health (Mental Health & Substance Use)
Adcare
Arbour Counseling Services Haverhill
Billerica Substance Abuse Program
Bridgewell/Pathfinder
Center for Hope and Healing
Clean Slate Centers
Column Health
Farnum Center
Habit Opco, Inc.
Institute for Health and Recovery
Lahey Health Behavioral Services
Learn to Cope
Life Connection Center
Lowell House Addiction Treatment and Recovery Inc.
Lowell & Lawrence Drug Courts

Lowell Tobacco Control
Massachusetts Department of Mental Health
Megan's House
Mental Health Association of Greater Lowell
Northeast Behavioral Health
Northeast Tobacco Free Partnership
Northeast Recovery Learning Community
Place of Promise
Samaritans of the Merrimack Valley
Solomon Mental Health Center
Tewksbury Detox Center
Tewksbury Treatment Center
Tobacco Free Mass
The Phoenix
Vinfen
Post-Acute Services
Afya Home Care
Care One
Hand Delivered Hope
Northeast Independent Living Center
Next Step Living
New England Community Cares
Ambulance Services
Lowell General Hospital-Paramedics
PRIDEStar EMS
Trinity EMS
Education, Advocacy, Research & Planning Organizations
Academic
Billerica Public Schools
Chelmsford Public Schools
Dracut Public Schools
Greater Lowell Technical High School
Innovation Academy Charter School
Lowell Middlesex Academy Charter School
Lowell Public Schools
Middlesex Community College
Salem State University
Tewksbury Public Schools
Tyngsboro Public Schools
University of Massachusetts Lowell
Westford Public Schools
Wilmington Public Schools

Business and Community Development
Aramark
Coalition for a Better Acre
Entrepreneurship for All (E for All)- Lowell
Eastern Bank
Enterprise Bank
Gallagher & Cavanaugh, LLP
Greater Lowell Chamber of Commerce
Lowell Telecommunications Corporation
Marcia Cassidy Communications
Project Learn
Health Education & Advocacy
Philanthropy
Greater Lowell Community Foundation
Resource Inventory
WellConnected.net

Appendix B

Evaluation of Impact since 2013 Greater Lowell CHNA

ACCESS TO HEALTHY FOOD

Eat the Rainbow – Eat the Rainbow was a healthy snacking program the hospital offered at Girls, Inc., which included education about healthy eating and healthy snack sampling for the young girls throughout the year. This program served over 75 girls ages 8-12.

Mobile Market Partnerships – The hospital hosted (21) Mobile Markets with Mill City Grows (MCG) from June thru October once a week at both hospital campuses in Lowell. Between both locations, there were 883 purchases of fresh, locally grown vegetables and fruits, and 165 of those purchases were with SNAP/WIC. The hospital also participated in the Community Market Program over the summer with the Merrimack Valley Food Bank. The Community Market Program serves residents of four Lowell Housing Authority properties, offering them the opportunity to supplement their food by enjoying fresh produce at no cost. Staff volunteers attended the weekly markets to provide nutrition education and blood pressure screenings to approximately 150 residents in need.

School Garden Program – Through its partnership with Fresh Start Food Gardens, the hospital was able to provide Girls, Inc. of Lowell with onsite gardens to teach 50 young girls how to grow their own fresh vegetables, the importance of healthy eating and why it matters to our health, gardening skills and the science behind gardening success.

ASTHMA

CME Asthma Education – The hospital's medical library provided one Continuing Medical Education (CME) program for 60 physicians to improve education about accurately diagnosing and providing referrals for effective asthma management.

Media Campaign for Asthma – Lowell General's marketing team helped disseminate approximately 50 informative messages on the hospital's social media accounts to help raise awareness about asthma triggers and how to minimize risk of asthma complications in adults and children. We reach nearly 6,000 followers on Facebook and 3,503 on Twitter.

MENTAL HEALTH

Mental Health First Aid Trainings – The hospital supported the internationally recognized and evidence-based curriculum known as Mental Health First Aid. Mental Health First Aid is an 8-hour training program that teaches members of the public how to help a person who is developing or struggling with a mental health problem or in a mental health crisis. In partnership with the American Foundation for Suicide Prevention, the hospital offered four trainings. Altogether, we served 73 people in need.

Wellforce Care Plan Launch – The hospital, in partnership with Fallon Health and Wellforce members Tufts Medical Center and Melrose Wakefield Healthcare, launched the Wellforce Care Plan, a MassHealth Accountable Care Organization (ACO) Partnership Plan on March 1, 2018, which affects 30,000 community members covered by MassHealth.

PHYSICAL ACTIVITY

Fitness Classes – In FY 2018, the hospital offered over 40 fitness programs to the public for both adults and children. We provide sessions on-site at the hospital and partner with local organizations to provide programs upon request. In total, we served more than 460 adults and 300 youths.

Project Fit Funding – This year Lowell General Hospital funded over $21,000 to implement Project Fit America (PFA) at the McAuliffe Elementary School in Lowell. This grant provides the school with a state of the art outdoor "Fit Pit" playground specifically designed to address the deficit areas where children fail fitness tests, as well as indoor fitness equipment, installation of the equipment, and a dynamic curriculum with games, activities and challenges for kids with the PFA outdoor & indoor equipment.

SOCIAL DETERMINANTS OF HEALTH

Careers in Healthcare Program – Our Careers in Healthcare program immerses high school students considering a career in healthcare. In FY 2018, we collaborated with 11 local high schools to provide a 4-hour Careers in Healthcare Tour each month during the school year for students interested in the medical field. During each tour, students meet with clinical and nonclinical staff, tour departments, and get a broad overview of different careers available in healthcare. Additionally for students seeking an extended program, the hospital provides the Careers in Healthcare Experience Program, a weeklong summer camp for 20 high school students who are interested in pursuing a career in the healthcare field. This program gives high school students from within Greater Lowell hands-on experience in various departments and disciplines.

Internship Programs – Lowell General Hospital has built strong relationships with local colleges and universities to provide workforce development opportunities to students of various degrees and clinical programs. In FY 2018, the hospital dedicated approximately 10,500staff hours to more than 1,000 students.

SUBSTANCE ABUSE

Hackathon Opioid Project – In the fall of 2017, we sponsored the health and wellness track in the 2017 America East Hackathon hosted at UMass Lowell in order to attract innovative and preventative solutions to address the opioid epidemic in Greater Lowell. The hackathon is designed to gather America East students to solve real world challenges by developing software and hardware projects that address them.

Opioid Awareness Campaign – Throughout 2018, the hospital assisted in disseminating opioid awareness campaign materials (large posters, coffee sleeves, and bus ads) to provide education and awareness on opioid misuse and addiction. As part of the Substance Use and Prevention (SUP) Task Force of the Greater Lowell Health Alliance, we aid in the work to strengthen new and existing collaborations in the Greater Lowell community to prevent and reduce the use of substances among our community members. The SUP Task Force partnerships have led to engagement of over 2,500 residents and drug prevention education to over 2,000 students (grades 3-12) annually.

Appendix C

Complete Rank Orders for Total Survey Participants

Rank Order of First, Second, and Third Priority Resources, in Total Rank Order, All Participants

Rank	Resource	Rank 1		Rank 2		Rank 3		Total Rank Count	
		%	n	%	n	%	n	%	n
1	Affordable housing	17.6%	238	11.6%	157	6.79%	92	35.9%	487
2	Access to mental health services	14.2%	192	10.3%	139	9.59%	130	34.0%	461
3	Access to healthy food	13.3%	180	10.1%	137	6.57%	89	30.0%	406
4	High-quality public education	10.0%	136	8.9%	121	8.78%	119	27.7%	376
5	Substance abuse prevention programming	8.0%	109	6.3%	86	8.93%	121	23.3%	316
6	Affordable prescription drugs	3.8%	51	6.8%	92	5.54%	75	16.1%	218
7	Preventative health services	2.7%	37	4.9%	67	6.35%	86	14.0%	190
8	Emergency health services	3.2%	43	4.9%	67	5.54%	75	13.7%	185
9	Services for seniors	2.3%	31	3.4%	46	5.54%	75	11.2%	152
10	Services for adolescents	0.7%	10	3.2%	44	3.32%	45	7.3%	99
11	Accessibility for people with disabilities	2.0%	27	2.1%	29	2.95%	40	7.1%	96
12	Public transportation	1.0%	14	2.8%	38	3.03%	41	6.9%	93
13	Public parks	0.3%	4	1.4%	19	2.21%	30	3.9%	53
14	Emergency housing	0.5%	7	1.3%	17	2.14%	29	3.9%	53
15	Dental services	0.4%	5	0.7%	10	0.81%	11	1.9%	26
16	Vision care services	0.1%	2	0.5%	7	0.89%	12	1.5%	21

Rank Order of First, Second, and Third Priority Health Issues, in Total Rank Order, All Participants

Rank	Health Issue	Rank 1		Rank 2		Rank 3		Total Rank Count	
		%	n	%	n	%	n	%	n
1	Mental health issues	16.5%	224	13.7%	186	11.7%	158	41.9%	568
2	Substance Addiction	13.9%	188	12.0%	162	8.0%	108	33.8%	458
3	Alcohol abuse/addiction	14.0%	190	8.5%	115	8.7%	118	31.2%	423
4	Cancer	7.5%	102	6.3%	86	5.0%	68	18.9%	256
5	Nutrition	5.9%	80	5.6%	76	6.6%	90	18.2%	246
6	Obesity	2.8%	38	3.8%	52	6.3%	86	13.0%	176
7	Heart disease	3.4%	46	4.7%	64	4.3%	58	12.4%	168
8	Diabetes	2.3%	31	5.6%	76	3.5%	48	11.4%	155
9	Infectious diseases	2.0%	27	1.9%	26	5.2%	71	9.2%	124
10	Tick/insect illnesses	1.7%	23	1.8%	25	3.2%	43	6.7%	91
11	Prenatal care	1.0%	13	2.2%	30	2.3%	31	5.5%	74
12	Post-partum health	0.3%	4	1.7%	23	2.2%	30	4.2%	57
13	High blood pressure	0.7%	9	1.8%	25	1.4%	19	3.9%	53
14	Bone, joint, and muscle health	0.7%	9	1.5%	21	1.4%	19	3.6%	49
15	Asthma	1.2%	16	1.0%	13	0.9%	12	3.0%	41
16	HIV/AIDS	0.8%	11	0.5%	7	1.4%	19	2.7%	37
17	Breastfeeding	0.5%	7	1.0%	13	1.0%	13	2.4%	33
18	Hepatitis	0.1%	1	0.7%	10	0.5%	7	1.3%	18
19	Chronic Lung disease	0.2%	3	0.4%	6	0.6%	8	1.3%	17

Rank Order of First, Second, and Third Priority Community Safety Issues, in Total Rank Order, All Participants

Rank	Safety Issue	Rank 1		Rank 2		Rank 3		Total Rank Count	
		%	n	%	n	%	n	%	n
1	Domestic violence	11.1%	151	12.5%	169	8.1%	110	31.7%	430
2	Bullying	15.8%	214	6.8%	92	8.2%	111	30.8%	417
3	Drug trafficking	8.9%	121	8.5%	115	6.9%	93	24.3%	329
4	Sexual assault/rape	6.0%	81	8.9%	121	8.2%	111	23.1%	313
5	Unsafe/illegal gun ownership	8.3%	112	4.4%	59	7.5%	101	20.1%	272
6	Human trafficking	4.6%	63	6.5%	88	5.5%	74	16.6%	225
7	Discrimination based on race	5.0%	68	5.0%	68	4.9%	66	14.9%	202
8	Gang activity	2.3%	31	3.2%	43	4.7%	64	10.2%	138
9	Discrimination based on immigration status	3.3%	45	3.5%	47	2.4%	32	9.2%	124
10	Discrimination based on class or income	2.7%	36	2.7%	36	3.5%	47	8.8%	119
11	Discrimination based on gender identity	1.4%	19	2.9%	39	2.6%	35	6.9%	93
12	Theft	1.2%	16	2.8%	38	2.9%	39	6.9%	93
13	Discrimination based on sexuality	0.7%	10	1.6%	22	2.1%	28	4.4%	60
14	Discrimination based on sexism	0.7%	9	1.7%	23	1.5%	21	3.9%	53
15	Vandalism	0.4%	6	0.7%	9	1.7%	23	2.8%	38
16	Street harassment/cat-calling	0.3%	4	0.4%	6	0.9%	12	1.6%	22

Health Issue Prevalence, Self and Others, In Rank Order by Participant Prevalence, All Participants

Rank	Health Issue				
		n	%	n	%
1	Anxiety	33.4%	453	56.0%	759
2	Depression	26.2%	355	60.4%	819
3	Vision problems	25.5%	345	44.4%	602
4	Bone, joint, and muscle illness	21.2%	287	41.3%	560
5	High cholesterol	17.6%	238	48.4%	656
6	High blood pressure	17.5%	237	61.4%	832
7	Obesity and related illnesses	16.2%	219	49.4%	669
8	Asthma	15.6%	211	49.1%	665
9	Hearing problems	9.8%	133	46.6%	631
10	Other mood/personality disorders	9.2%	125	52.8%	716
11	Diabetes	9.0%	122	63.6%	862
12	Limited mobility	8.6%	116	41.5%	563
13	Post-partum health problems	7.4%	100	27.0%	366
14	Suicide/suicidal thoughts	7.3%	99	42.7%	579
15	Cancer	6.6%	89	65.6%	889
16	Heart disease	5.7%	77	56.7%	768
17	Chronic lung disease	4.2%	57	29.6%	401
18	Alcohol abuse/addiction	4.2%	57	65.2%	883
19	Tick/insect illnesses	4.0%	54	39.4%	534
20	Hepatitis C	3.2%	44	19.3%	261
21	Hepatitis B	3.0%	41	15.6%	212
22	HIV/AIDS	3.0%	40	20.6%	279
23	Substance addiction	2.8%	38	52.2%	707

Barriers to Healthcare Prevalence, Self and Others, In Rank Order by Participant Prevalence, All Participants

Rank	Barrier	I have experienced this barrier		Someone I know experienced this barrier	
		%	n	%	n
1	Care received from a healthcare provider was negative (rude, disrespectful, etc.)	19.9%	269	26.1%	354
2	Cannot afford prescription medication	16.8%	227	46.9%	636
3	Office is not open during times when I am available	16.0%	217	21.5%	291
4	Cannot afford regular mental health services (therapy, counseling, etc.)	12.3%	166	32.6%	442
5	Cannot find a provider accepting new patients	11.3%	153	26.2%	355
6	Cannot find a provider that accepts my insurance	9.0%	122	22.5%	305
7	Cannot find a specialist with expertise in my health issue	8.1%	110	17.7%	240
8	No transportation to medical facility	6.7%	91	33.0%	447
9	Cannot obtain health insurance	6.7%	91	38.1%	516
10	Cannot afford long term health services (hospice, in-home care, etc.)	5.6%	76	29.0%	393
11	Do not know how to find a provider	4.4%	60	16.8%	228
12	Cannot find a doctor who respects my culture	3.3%	45	15.1%	205
13	Cannot find a doctor who speaks my language	2.9%	39	17.5%	237

Ranked Community Resource Priorities, by Selected Participant City

Rank	Lowell	Dracut	Tyngsborough	Tewksbury	Chelmsford
1	Affordable Housing	Mental Health Services	Mental Health Services	Mental Health Services	Affordable Housing
2	Mental Health Services	Affordable Housing	High-Quality Public Education	Affordable Prescription Drugs	Healthy Food
3	Healthy Food	Healthy Food	Healthy Food	Substance Abuse Prevention	Mental Health Services
4	High-Quality Public Education	High-Quality Public Education	Substance Abuse Prevention	Affordable Housing	High-Quality Public Education
5	Substance Abuse Prevention	Substance Abuse Prevention	Affordable Housing	High-Quality Public Education	Affordable Prescription Drugs

Ranked Health Issue Priorities, by Selected Participant City

Rank	Lowell	Dracut	Tyngsborough	Tewksbury	Chelmsford	Billerica	Westford
1	Mental Health	Mental Health	Mental Health	Mental Health	Mental Health	Mental Health	Mental Health
2	Substance Use	Alcohol Abuse	Alcohol Abuse	Substance Use	Substance Use	Substance Use	Alcohol Abuse
3	Alcohol Abuse	Substance Use	Substance Use	Alcohol Abuse	Alcohol Abuse	Alcohol Abuse	Substance Use
4	Cancer	Nutrition	Cancer	Cancer	Nutrition	Cancer	Cancer
5	Nutrition	Cancer	Nutrition	Diabetes	Cancer	Nutrition	Tick/ insect illnesses

Ranked Safety Issue Priorities, by Participant Race

Rank	White	Non-white
1	Domestic Violence	Bullying
2	Bullying	Discrimination based on race
3	Drug trafficking	Domestic Violence
4	Sexual Assault	Discrimination based on Immigration Status
5	Unsafe gun ownership	Sexual Assault

Appendix C

Listening Session Participants

Phillip Abad
Lisa Abramouich
Mercy Anampiu
Shirley Archambault
Barney Arnold
Gerouge Asamouah
Veronica Baez
Felicia Balbi
Stephanie Barry
Frank E. Baskin
Leslie H. Baskin
Laurie Blair
Andrea Blanchard
Lisa Bourdea
Matt Brown
Stephanie Buchholz
Elizabeth Cannon
Carla Caraballo
Migdalia Castro
Sacheat Chan
Elizabeth Chenng
Yun-Ju Choi
Elmoundion Chukuiezi
Bernadette Chukwuego
Maria Clauto
Amanda Clermont
Nancy Coan
Paul Cohen
Domaris Coistenanos
Darcie Coleman
John C. Curran
Johanna Danas
Colleen DaSilva
Kerrie D'entremont
Hope Desruisseaux
Laura Diaz
Emily Donovan
Alyson Downs
Christine Durkin
Barbara Duusford
Jim Dyment
Olivia Echteler
Kate Elkins
Aurora Erickson
Marie N. Eugene
John Feeley
Levcnia Fereesa
Elaine Fernandes
Amrith Fernandes Prabu
Dulu A. Ferreira
Levinia Ferresa
Eduardo Ferrev
Cheryl Finney
Cheryl Finney
Becca Fipphen
Stephen Fisher
David Fitzgerald
Suzanne Flechette
Wilmary Flores
Karen Frederick
Lindaura Freitas
Evengelina Furtado
William Garr
Julia Gavin
Siboney Gomez
Ana Gonzalez
Andres Gonzalez
Shantay Gonzalez
Brenda Govid
Marilyn Graham
Amada Gregory
Ellen Grondirie
Laurie Guay
Gordon Halm
Kathy Hicking
Heather Hilbert
Jeff Hillam
Edina A. Hint
Elizabeth Hughes
Denise Hulse
Daniela Johnson
Eric Johnson
Gail Johnson
Michael Jordan
Maria Jose Dias
Ruth Joseph
Erika Kennedy
Sauda Keo
Lindsay Kilgour
Lorna Kiplagat
Harry Kortikere
Aime Kouadio
Julie Le
Jenny Lee
Diego Leonardo
Jay Linnehan
Ines Madrid
Ed Mahoney
Richard Makokha
Tami Marshall
Connie Martin
Pamela Maynard

Karen Meyers
Nadode A. Mukamyarwaya
Stephany Munoz
Nandi Munson
Roger Muyanja
Carnie Nagle
Hussein Nahimana
Peter Naihi
Danial Nakamoto
Diana Newell
Lucy Nyanburg Nyotu
Sheila Och
Lori O'Connor
Meghan O'Connor
Ruth Ogumbo
Abisola Ogunsaye
Evelyn Ortiz
David Ouellette
Kerri C. Oun
Stephanie Owen
Lucy Paynter
Manuela Pereira
Janelle M. Perez
Deborah Perry
Amy Pessia
Maria Helena Piana
Roger Pin
Catherine Poirier
Heather Prince Doss
Rosa Realejo
Eda Recarte
Emily Reiniger
Domingo Reis
Grazielle Reis
Maria A. Reis
Ruth Richards
Rev Sylvia T. Robinson
Cindy Robles
Luisa Rodriguez
Sue Rosa
Maria Ruggiero
Julie Salvato
Dawn Saune
Susan Sawyer
Dean Shapley
Meghan Siembor
Maria Silva
Michael Silva
Francey Slater
Mckenzie Smith
Pam Smith
Angelina Sok
Sousalina Sok
Thiva Son
Kerry Sorrentino
Keanhuy Sour
Kate Sout Sorm
Jeff Stephens
Connor Stuart
Imogene Stulken
Amanda Sullivan
Patricia Sylvester
Mary Tauras
Susan Taylor
Eva Terzis
Susan Thomson Tripathy
Molyka Tieng
Sokha Van
Lisa Van Thiel
Sreypov Vary
Luz Vasudevan
Kerran Vigroux
Troy Vongpheth
Sialy Wamunyu
Jackie Wangutusi
Bernard Wasaidy
Diane Welch
Christine West
Kelly Will
Kristen Williams
Jeffrey Winward
Isa Woldeguiorguis
Patron Yemery
Juana E. Zapato

Appendix D

Listening Session and Interview Questions

1. Could you tell me your thoughts about the overall health of the populations that you are aware of in the Greater Lowell region?

2. What do you think are the top three health problems facing these populations in the Greater Lowell region?

3. Which populations are at greatest risk or have the greatest unmet needs and why?

4. What are the strengths of current health services provided within Greater Lowell?

5. What are the weaknesses or unmet needs of current health services provided within Greater Lowell?

6. Can you describe an example or of an obstacle your clients or patients or others faced in accessing health services?

7. Are there other barriers to improve the health of these populations and their individual health needs?

8. What does the Greater Lowell community need to do to improve the health and quality of life of its residents?

9. How good a job do you think the Greater Lowell health services system is doing at meeting the health needs of the [mention specific group] community, specifically?

10. What are the specific health problems you would like to see the health services system become more involved with, for the community in general? What should their top health priorities be in order to address the needs and improve the health of the community?

Appendix E

Listening Session and Interview Facilitators and Note Takers

Valerie Acquaye	University of Massachusetts Lowell
Kelechi Adejumo	University of Massachusetts Lowell
Krysta Brugger	University of Massachusetts Lowell
Raphael Marinho	University of Massachusetts Lowell
Veronica Mukundi	University of Massachusetts Lowell
Am Ngeth	Cambodian Mutual Assistance Association
Naike Saint-Pierre	University of Massachusetts Lowell
Resmi Thekkedath	University of Massachusetts Lowell
Van Tooch	Cambodian Mutual Assistance Association
Kim-Judy You	University of Massachusetts Lowell

Appendix F

2019 Community Health Needs Assessment Advisory Committee

Jayne A. Andrews

Jeannine Durkin

Irene Egan

Damian Folch

Karen Frederick

Cecelia "Cece" Lynch

Deirdra A. Murphy

Sovanna Pouv

Susan M. Rosa

Andrea Saunders Batchelder

Jeffrey P. Stephens

Kerran Vigroux

Susan West Levine