TECHNICAL REPORT

Massachusetts Healthy Aging Data Report

Overview

This technical appendix contains details about the development of the healthy aging community profiles. It contains the technical definitions of all reported healthy aging indicators, information on all data sources and the years of data employed, definitions of the geographic units employed for different types of indicators, and the statistical methods used to estimate the indicators that were estimated from micro-level data.

1. Healthy aging indicator definitions

Due to resource limitations all healthy aging indicators had to be derived from secondary data sources. Healthy aging indicators were limited to those for which secondary data was available for geographic subareas within Massachusetts. Table A-1 contains technical definitions for all the healthy aging indicators reported in this study. This does not contain definitions for the socio-demographic variables used to describe the population composition of Massachusetts cities because these are basic population characteristics that do not require further explanation.

2. Data Sources

Multiple data sources were used in this study. Table A-2 contains a summary of all data sources and the specific years of data used for each population composition and healthy aging indicator. Estimates of community-level indicators of physical/mental health, chronic disease prevalence, access to care, wellness and prevention health behaviors, service utilization, and nutrition and diet were derived from two major data sources: the Medicare Master Beneficiary Summary File and the Behavioral Risk Factor Surveillance System. Population composition measures were drawn from the 2010 Decennial Census and 5-year American Community Survey produced by the U.S. Census Bureau. These major data sources and other data sources used for other community, safety, and economic variables are described below.

<u>Medicare Master Beneficiary Summary File</u>

Medicare claims data from the Centers for Medicare and Medicaid Services (CMS) are a rich source of data for measuring chronic disease prevalence and Medicare service utilization rates for individual cities and towns. The *Master Beneficiary Summary File (MBSF)* is a annual data file constructed by the Chronic Conditions Warehouse that includes individual records for all persons eligible for Medicare for at least one month during a calendar year. The MBSF is comprised of three data files containing different types of information:

(1) The *Master Beneficiary Summary File-A/B/D (MBSF-A/B/D)* includes standard Medicare administrative data fields (e.g., sex, race, dates of birth and death), flag

variables indicating specific months of Medicare eligibility, managed care enrollment status, and Medicaid state buy-in status, as well as geographic residence identifiers (state, county, zip code) based on residence address used for Social Security Administration correspondence for individual beneficiaries.

(2) The *Master Beneficiary Summary File-Chronic Conditions (MBSF-CC)* includes indicators derived from algorithms applied to diagnostic codes on individual Medicare fee-for-service provider claims for 27 prevalent chronic conditions (e.g., diabetes, stroke, depression, Alzheimer's disease or related dementia, chronic obstructive pulmonary disease, hip fracture, cancer), as well as the earliest date since 1997 that these diagnostic criteria were first met.

(3) The *Master Beneficiary Summary File-Cost and Use (MBSF-CAU)* contains aggregated summaries of annual service utilization and reimbursements for various types of Medicare services (e.g, inpatient hospitalizations, physician visits, home health visits, skilled nursing facility stays, emergency room visits, hospital readmissions, and filled Part D prescriptions).

Each person record contains an encrypted individual identifier so that information from the three data files can be merged together to derive prevalence and service utilization rates. The three MBSF data files were purchased from CMS for all Medicare beneficiaries age 65 or older on January 1st with a state residence code of Massachusetts for each of the calendar years 2010 and 2011. The data were obtained from CMS under a formal data use agreement required for privacy protection of health information reported in research-identifiable data files

A major strength of the MBSF data is their coverage of 100% of aged Medicare beneficiaries living in Massachusetts which permits the estimation of indicators for relatively small individual towns. These rates can be potentially updated annually. The major shortcoming of the MBSF data are that they are derived from claims data. Since chronic condition prevalence is identified from diagnoses on Medicare claims, prevalence rates of chronic disease and service use can also only be measured for Medicare beneficiaries who receive their care from fee-for-service providers since managed care providers such as Medicare Advantage plans do not submit claims data to Medicare for processing. In addition, beneficiaries whose condition is undiagnosed because they do not have access to a physician will not be identified as having a chronic condition. Finally, the health indicators that can be constructed with MBSF data are limited in scope since they are based on administrative data. Nevertheless, these are rich data with respect to their geographic specificity relative to other common data sources for health indicators.

Behavioral Risk Factor Surveillance System (BRFSS)

The Behavioral Risk Factor Surveillance System (BRFSS) is a state-based system of annual health surveys established by the Centers for Disease Control and Prevention (CDC) that collects information on health risk behaviors, preventive health practices,

and health care access primarily related to chronic disease and injury. The BRFSS provides a rich source of information about individual health behaviors such as smoking, excessive drinking, obesity, preventive health service use, which are relevant for the development of healthy aging indicators. A core set of questions about such health behaviors are included every year. The Massachusetts Department of Public Health (MDPH) is responsible for collecting BRFSS data for Massachusetts. The MDPH adds questions beyond the core CDC questions on relevant topics to support health care policy planning, to guide preventive health interventions, and as tool to assess population health status and its change over time in Massachusetts. BRFSS data for were obtained from the Massachusetts Department of Public Health under a formal data use agreement required for individual privacy protection of health information.

The BRFSS survey is carried out under a complex survey design intended to enhance the efficiency of using limited sample population to produce reliable state-level estimates of health indicators. Interviews are administered in three alternative languages (English, Spanish, Portuguese) depending upon respondents' preferences. Respondents are oversampled in larger cities in the state under the BRFSS complex survey design to increase the representation of racial/ethnic minority respondents. Before 2008 BRFSS data were obtained entirely through land-line telephone surveys. A cell phone survey was piloted in 2008 and a mail survey was piloted in 2010. Because of the rising prevalence of households with only cell-phones, the BRFSS survey design was modified as of 2011 to include both land-line and cell phone samples. Furthermore, the method used to derive post-stratification factors was changed in 2011 to a raking procedure that permitting finer adjustments to population weights based on more population attributes than in earlier surveys. These changes in the 2011 BRFSS survey design introduce some complexities in studies, such as this one, that employ multiple years of BRFSS data. How these changes in survey design were addressed will be discussed later in the description of estimation methods.

A major strength of the BRFSS data is its rich information on health behaviors. To our knowledge no other secondary dataset has the range of health behavior data contained in the BRSS for older Massachusetts residents The BRFSS has several limitations as well, however. The BRFSS survey design was not developed for the purpose of developing small area estimates within states. Accordingly, the respondent sample population sizes for most individual towns in Massachusetts in any year are far too small for producing reliable estimates for most towns. Even if appropriate adjustments are made for the fact that samples for many small towns may be unrepresentative, the development of small area estimates requires that BRFSS survey data be pooled over multiple years. For example, the number of respondents 60 years or older with valid geographic residence identifiers in the entire state BRFSS sample has ranged from 6,353 in 2009 to 8,689 in 2011. This is far too small to estimate town-level rates for all 351 cities and towns in Massachusetts.

Because of the small sample sizes of annual BRFSS surveys, survey data were pooled together over multiple years and multiple cities and towns were aggregated together into larger geographic areas containing multiple cities and towns. While most

estimates were derived pooling three years of BRFSS survey data (2009-2011), one or two additional years of earlier data were also pooled to obtain some estimates based questions that were not asked to the full BRFSS sample every year. Table A2 shows the specific years of data used to derive estimates for each indicator based on BRFSS data. Further details about estimation methods are provided later on in the section describing BRFSS estimation methods.

U.S. Census Bureau

Data on population composition were downloaded from the U.S. Census Bureau Fact Finder website <http://factfinder2.census.gov>. Total population estimates were obtained from 2010 Decennial Census data. All other population estimates reported in the community profiles were derived from American Community Survey data pooled over five years (2007-2011). Data were downloaded for all 351 individual cities and towns. In addition, census tract data were downloaded and aggregated for16 planning districts within the city of Boston. Census tract definitions of Boston planning districts were downloaded from the Boston Redevelopment Authority website <http://www.bostonredevelopmentauthority.org/research-maps/research-publications/neighborhoods >.

Walk Score®

The current Walk Score software creates a score for walkability for any address that is based on straight-line distance to various types of places defined as commercial and public facilities (e.g., grocery stores, coffee shops, restaurants, banks) and amenities (e.g., parks). Points are assigned to several categories of place types based on straight-line distance from the address to the site. The greatest points are assigned to places located within a five-minute walk from an address (operationalized as ¼ mile) with lesser points assigned to more distant places. Places comprised of facilities and amenities are assigned to a set of discrete categories. The categories are assigned relative weights and for any address points are assigned to each of the categories based on straight-line distance using a distance-decay function in which the greatest points are assigned to places located within a 5-minute walk (about ¼ mile from an address.

The beta testing version of Street Smart Walk Score uses actual walking routes rather than straight line distance to places. It also provides individual scores for different types or categories of places that are used in the Street Smart Walk Score. Individual category scores are reported in this study. Types of places or amenities with wider range of scores (e.g., 0-20 rather than 0-6) are given greater weight in calculating the overall walk score for a location. Higher scores indicate greater accessibility by foot. The average block length measures are intended to measure pedestrian friendliness and the degree to which an individual can walk on a direct path from one place to another. It is easier to walk a direct path to a destination if there are shorter blocks and a greater density of intersections. The scores of good, fair, and poor assigned to these measures does not reflect concern about the safety of walkers crossing intersections.

Hence, it is not clear whether the good, fair, and poor rankings are as applicable for older persons who may have difficulty crossing streets.
The developers of the Walk Score have sought to refine its methodology to improve its reliability and validity as a measure of the walkability of the geographic environment at different locations. For example, planned future enhancements to the Walk Score include the integration of safety-related metrics. While additional research on its validity is needed, one study has already provided some empirical support for the validity of the current Walk Score as an indicator of walkability (Duncan, Aldstadt, Whalen, Melly, & Gortmaker, 2011),

Data on the "walkability" of individual cities and towns and Boston planning districts were downloaded from the website < http://www.walkscore.com/>. A total walkability score scaled to range from 0 (least walkable) to 100 (most walkable) was downloaded for each community using the search term "city/town name, Massachusetts."

Access scores, measured for specific types of places (e.g., grocery stores, banks), and two measures of the physical road infrastructure (average block length and the spatial density of intersections) were drawn from the newer test "Beta version" of the Street Smart Walk Score using the search term "City/town name, MA." The scores reported in the community profiles were downloaded from the Walk Score website during July and August 2013. Current scores for some communities may differ from these since Walk scores are updated as commercial or public facilities open or close over time.

Elder Economic Security Standard™ Index

The Elder Economic Security Standard™ Index contains county estimates of the minimum income needed by older households to attain a modest standard of living in the community that reflects economic security. "The Elder Index defines economic security as the financial status where elders have sufficient income (from Social Security, pensions, retirement savings, and other sources) to cover basic and necessary living expenses" (Gerontology Institute, University of Massachusetts Boston (2012), p 5). Elder Index estimates are available at the county-level for 18 different types of community-resident households with a head 65 years or older defined by health status (excellent, good, poor), living situation (alone, couple), housing costs (owner with mortgage, owner without mortgage, renter). We report the Elder Index estimates for four types of households in good health (single renters, single owners without mortgages, couple renters, and couple owners without mortgages). For each of these types of older household, the Elder Index serves as a geographic comparative cost of living index among counties in Massachusetts. Elder indices were downloaded for all counties in Massachusetts from the Wider Opportunities for Women Economic Security Database < http://www.basiceconomicsecurity.org/EI/ >.

Federal Bureau of Investigation Uniform Crime Reports

Data from 2007-2011 on violent crime and property crime rates were downloaded from the Federal Bureau of Investigation website <http://www.fbi.gov/stats-

services/crimestats>. Since 2011 crime data were not available for all cities and towns in Massachusetts, we developed a simple procedure for assigning rates to towns. We first assigned crime rate data to towns using the most recent year of data available starting with 2011 through 2007. When town-specific information was not available in any of the five years, we computed the crime rate for an aggregated geographic area comprised of all towns that bordered any town without any reported crime data. Additional details about which towns were assigned rates based on aggregated town data are provided in a later section describing community geographic definitions.

Area Health Resources File

County level data for one indicator on the supply of active dentists per 100,000 persons was derived from the 2012-2013 Area Health Resources File data posted on the Health Indicators Warehouse website <http://healthindicators.gov/ >.

3. Geographic Area Definitions of Communities

Data availability also limited the geographic specificity of the community definitions for which healthy aging indicators could be measured. There were two major practical factors that affected how finely geographic communities could be defined. The first is the relatively small sample size of the Massachusetts BRFSS data. The second constraint was the sparse actual populations of older persons residing in a number of towns in Massachusetts, most of which are located in Western Massachusetts. Even with complete data on all older persons in some of these towns, the populations were too small for public reporting of town-level estimates.

In this study we addressed the problems associated with sparsely populated towns by selectively aggregating some smaller towns together into larger geographic areas. In these situations data for residents from multiple smaller towns was pooled together to increase the sample size used for estimation of healthy aging indicators. The estimates derived for the larger aggregated geographic area were then assigned to all individual cities/towns that comprised it for town-level reporting purposes. This is an acknowledged limitation of this study.

Geographic areas for Medicare MBSF indicators

Although the Medicare MSBF contains individual records for 100% of beneficiaries who were eligible for Medicare in at least month in a calendar year, some towns in Western Massachusetts still had to be aggregated together. We generated town-level estimates from Medicare MBSF data for individual towns that had at least 200 aged Medicare beneficiary residents who satisfied sample selection requirements (described below). Towns with fewer than 200 such beneficiaries were combined with one or more adjacent towns to form an aggregate geographic area with a combined sample of more than 200 beneficiaries. Combined towns had to border each other. The aggregation of specific bordering smaller towns together was guided by the following principles:

1. It is preferable to combine a smaller town with another smaller town rather than a larger town.

2. It is preferable to combine fewer towns rather than more towns together (e.g., a two-town geographic area is preferable to a three-town geographic area).

3. It is preferable to combine towns that are located in the same geographic Primary Care Service Area as defined by the Dartmouth Atlas of Health Care (citation).

4. It is preferable to combine towns located within the same county relative to towns in different counties.

5. It is preferable to combine towns located in the same Aging Services Access Point (ASAP) geographic service area relative towns in different ASAP areas.

Using these principles as a guide, we defined 310 geographic communities in Massachusetts for estimating indicators derived from Medicare MBSF data. Among these 310 communities there were 262 stand-alone individual actual cities and towns. There were 32 aggregated geographic areas that were comprised of two or more individual towns. One example of such an aggregate geographic area is comprised of three Massachusetts towns: Granville, Tolland, and Southwick. Table A-3 contains a list of the individual towns that were combined into 32 aggregated geographic areas. The same common value for any indicator derived from MBSF data was reported in the town community profiles of all individual towns that were combined together to form these aggregate geographic areas.

The city of Boston was disaggregated into 16 subareas corresponding to planning districts defined by the Boston Redevelopment Authority (BRA). A cross-walk file employed in previous research by Li, Kelsey, Zhang, Lemon, Mezgebu, Boddie-Willis, & Reed (2009) and Li, Land, Zhang, Keithly, & Kelsey (2009) was used to assign beneficiaries residing in individual 5-digit zip code areas in Boston to these 16 BRA Planning Districts (i.e., Charlestown, Central, Back Bay, Fenway/Kenmore, Allston/Brighton, South End, East Boston, South Boston, Mattapan, Roxbury, South Dorchester, North Dorchester, West Roxbury, Roslindale, Hyde Park, Jamaica Plain).

<u>Geographic areas for BRFSS indicators</u>

Given the small sample size of BRFSS respondents it was generally infeasible to estimate indicators for any individual towns except for the largest cities in the state. We used the geographic service areas of Aging Service Access Points (ASAPs) in Massachusetts as the starting point for defining aggregate geographic areas for indicators derived from BRFSS data. We defined 33 modified ASAP geographic areas for the state of Massachusetts as follows:

- 17 modified ASAP areas were actual ASAP geographic service areas;

- 6 modified ASAP areas were larger cities: Brockton, Fall River, Lowell, New Bedford, Springfield, Worcester;

- 6 modified ASAP areas were each comprised of all towns in actual ASAP service areas other than the larger core cities listed above;

- 4 modified ASAP areas within the combined geographic area defined by Boston and the ASAP service area of Chelsea, Revere, and Winthrop. The four modified ASAP areas were defined on the basis of grouping together Boston Planning Districts, Chelsea, Revere, and Winthrop on the basis of similarities in their populations as defined by median family income, percentage white/nonwhite population composition, and percentage of adults with less than a high school education. The four modified Boston ASAP areas were defined as: (1) Charlestown, Central, Back Bay, Fenway/Kenmore, Allston/Brighton, South End, (2) East Boston, South Boston, Chelsea, Revere, Winthrop , (3) Mattapan, Roxbury, South Dorchester, North Dorchester, and (4) West Roxbury, Roslindale, Hyde Park, Jamaica Plain

It is important to reiterature that the six ASAP areas with larger cities were each split into two modified ASAP areas: (1) a core larger city, and (2) a residual peripheral area surrounding the core city that is comprised of multiple towns. This was done because the socio-economic population composition of these core cities tended to differ from that of the surrounding peripheral towns in the same ASAP service areas. The Chelsea Revere Winthrop Elder Services ASAP geographic service area was combined with several Boston Planning Districts in Northeast Boston because of the small number of BRFSS respondents living in Chelsea, Revere, and Winthrop. Table A-4 contains a list of modified ASAP service areas and their constituent towns and/or Boston Planning Districts. The individual towns combined together to form a modified ASAP service area were all assigned the same common value on indicators reported in community profiles.

Geographic areas for FBI crime rate data

As noted earlier since 2011 crime data were not available for all individual cities and towns in Massachusetts, we developed a simple procedure for assigning crime rate data to towns . We first assigned crime rate data to individual towns using the most recent year of data available starting with 2011 through 2008. There were 280 cities and towns where FBI crime data was reported for the individual city/town. Town-specific data for 2011 was available for 234 cities/towns. For 26 towns 2010 data was reported. Fourteen towns were assigned data from 2009, and six towns were assigned 2008 data. When town-specific data was not available in any of years, we computed the crime rate for an aggregated geographic area comprised of all towns that bordered a town without any reported crime data. We defined these aggregated geographic areas so that they corresponded with the geographic areas defined for Medicare BRFSS indicators whenever it was possible to do so. Otherwise, remaining towns with missing crime data were combined with other small bordering towns which reported crime data. These rates were computed from the combined reported data from constituent reporting towns.

All individual towns combined with other towns were assigned the same crime rates. Table A-5 contains a list of towns that were grouped together with other small towns in this way. For two towns, grouping together adjacent towns was not deemed to produce reasonable results. The 2011 computed crime rates for all adjacent towns (themselves reported individually) were assigned to Millis, and 2011 crime rates for Franklin County were assigned to Buckland. We did not disaggregate crime rate data for the City of Boston into Boston Redevelopment Authority Planning Districts. The same Boston-wide crime rates are reported for all Boston Planning Districts.

Geographic areas for Elder Economic Standard Index and dentist supply

Secondary data on the geographic distribution of dentists and the Elder Economic Standard Index were only available for the 14 counties in Massachusetts. For these indicators all cities and towns within the same county were assigned common values.

4. Geographic data sources

Geographic information was used in this report in a variety of ways, ranging from the creation of cross-walk tables between different geographic units (e.g., 5-digit zip code areas to towns) to the mapping of our indicator estimates with GIS software. This section summarizes the sources of other geographic data used in the study.

Zip code database

A comprehensive list of valid 5-digit zip codes in Massachusetts was obtained from a 2011 zip code data file produced by the United States Postal Service. The data file was downloaded from an internet website (http://www.unitedstateszipcodes.org/zip-code-database/). The data file contains individual records for all valid 5-digit zip codes, the city/town, county, and state it is located in, and the latitude and longitude coordinates of the centroid of the zip code area. It also contains an indicator of whether the zip code value represents a standard geographic zip code area, a point zip code (e.g., post office box), or a unique zip code assigned to certain entities such as a university.

Zip code shape file

A zip code shape file used for mapping of 5-digit zip code areas was obtained from the U.S. Census Bureau based on the 2010 Census. The shape file was downloaded from an internet website (http://www.census.gov/geo/maps-data/data/tiger-line.html).
The U.S. Postal Service zip code data base contained about 700 records for all types of 5-digit zip codes (standard, point, etc.) in Massachusetts. The Census zip code shape file only contains some 300 spatial 5-digit zip code areas. Zip code maps were used to checking the validity of matches between zip codes and towns in BRFSS data and to make decisions about assignments of certain zip codes to individual towns. Some zip code areas are located in more than one town, and some small towns do not have their own zip code. Small towns without their own 5-digit zip code were aggregated together with a bordering town within the same 5-digit zip code. When multiple towns shared a 5-

digit zip code, the entire zip code was assigned to the most populated town. Data from the zip code data base and zip code shape file were combined using GIS software.

Town, county, and Boston neighborhood shape files

Town and county shape files for Massachusetts were downloaded from the MASS GIS web site (http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/layerlist.html#polit). A shape file for Boston neighborhoods was downloaded from a city of Boston website (http://www.cityofboston.gov/MAPS/default.asp). These shape files were used with GIS software to produce maps of health indicators estimated in the main body of the report.

5. Estimation Methods for Medicare MBSF indicators

Sample selection criteria

While the Medicare MBSF contains data on all Medicare beneficiaries with at least once month of Medicare Part A or B eligibility in a calendar year, estimates of chronic condition prevalence and service utilization rates can only be derived for beneficiaries who receive care from fee-for-service providers who submit claims to Medicare for reimbursement. Beneficiaries with prevalent chronic conditions are identified through algorithms applied to the diagnostic codes reported on Medicare claims over a defined surveillance period. Chronic condition prevalence is determined by the presence of one or several claims (depending on the condition) containing appropriate condition-specific diagnostic codes within surveillance period.[1] Most of these claims algorithms scan claims for both Medicare Part A and B covered services. Claims are not submitted to Medicare during any time interval in which an individual is not eligible for Medicare Part A and/or B and when a beneficiary is enrolled in a Medicare managed care plan that does not submit claims to Medicare for reimbursement. To reliably estimate chronic condition prevalence rates the sample population used for rate estimation should exclude beneficiaries for whom Medicare does not receive claims for services used. To retain such beneficiaries in the sample amounts to an implicit assumption that these beneficiaries used no Medicare covered services when they were not Medicare eligible or enrolled in a Medicare Advantage plan. Hence, rates of chronic condition prevalence and service utilization will generally be underestimated unless such beneficiaries are excluded from the estimation sample.

There are several analytic options for restricting the population sample and rate estimation under these circumstances. O'Donnell, Schneider, & Dean (2008) discuss some of the pros and cons of several options for imposing restrictions on the estimation sample. The most extreme option is "full coverage" in which the sample is restricted to

[1] The diagnostic codes used in the algorithms used to flag Medicare beneficiaries are available from the Chronic Conditions Warehouse web site (https://www.ccwdata.org/web/guest/condition-categories).

beneficiaries with a full year of Medicare Part A and B eligibility and who were never enrolled in a Medicare managed care plan during the year. While requiring full coverage would ensure that claims were submitted for all Medicare services used by beneficiaries in a calendar year, such a restriction can result in underestimates of chronic condition prevalence rates because there are likely to be beneficiaries with partial- year coverage with claims indicating prevalent chronic conditions in the months that claims were submitted. Under the "partial coverage" option, beneficiaries with nearly a full-year of Medicare Parts A and B eligibility and care from fee-for-service providers are retained in the sample. O'Donnell, Schneider, and Dean note that "a common recommendation is to allow for a one month break in coverage per year of surveillance. This is an attractive option to avoid losing many cases with the condition of interest (i.e., known cases, as indicated in claims) due to the occurrence of only partial FFS coverage" (O'Donnell, Schneider, & Dean (2008), p 7).

In this study we chose to use this "partial coverage" option for estimating population-based chronic condition prevalence and service utilization rates. The sample selection criteria used to apply the partial coverage requirements differed depending on the length of the claims surveillance period employed for the chronic condition of interest. While a one-year claims surveillance period is used for most chronic conditions reported in the Medicare MBSF, for some conditions such as congestive heart failure and diabetes the claims surveillance period is two years. For Alzheimer's disease or related dementias the claims surveillance period is three years. With only two years of Medicare MBSF data (2010-2011) available to this study, we applied the two-year surveillance sample selection criteria for Alzheimer's disease or related dementia. Since Part A and B Medicare service utilization rates are based on single-year claims surveillance, the same sample selection criteria were employed for single-year surveillance chronic condition prevalence and all Medicare service utilization rates except for Part D prescription drug utilization.

Single-year surveillance chronic conditions and Parts A & B service utilization

We followed the partial year coverage requirements recommended by O'Donnell, Schneider, & Dean (2008) that differed depending upon whether or not a beneficiary survived the full calendar year. It is important to retain beneficiaries who die during the year in the estimation sample to mitigate bias because some beneficiaries may die following an event such as a heart attack and the well-known high costs that many beneficiaries incur in their last year of life.

For all single-year surveillance chronic conditions and for all service utilization rates except Part D prescription fills and hospital readmission rates, partial year coverage for beneficiaries alive at the end of 2011 requires that:

- a beneficiary have at least 11 months of both Medicare Part A and B eligibility and at most one month of Medicare managed care enrollment in 2011.

Beneficiaries who died in 2011 were required to have full coverage (Medicare Part A and B eligibility and no Medicare managed care enrollment) in all months that they were alive in 2011. All beneficiaries were further required to have a valid 5-digit residence zip code recorded in the 2011 Medicare MBSF for residence assignment to towns. There were 623,305 Medicare beneficiaries who met these sample selection requirements.

For the readmission rate indicator, we naturally imposed an additional condition that a beneficiary must have been hospitalized at least once during 2011. There were 220,050 Medicare beneficiaries who met this additional sample selection requirement for hospital readmissions.

Two-year surveillance chronic conditions

For all othe 2-year chronic conditions, partial year coverage for beneficiaries alive at the end of the 2011 required that:

- a beneficiary have at least 22 months of both Medicare Part A and B eligibility and at most two months of Medicare managed care enrollment over the two calendar years 2010-2011.

Beneficiaries who died in 2011 were required to meet the partial year coverage requirements in 2010 and meet full coverage requirements in the months they were alive in 2011. Beneficiaries were also required to have a valid 5-digit residence zip code recorded in the 2011 Medicare MBSF. There were 557,036 Medicare beneficiaries who met these sample selection requirements.

Since 2010 MBSF data were extracted based on beneficiary residence in Massachusetts in 2010, there were some beneficiaries with records in the 2011 MBSF who did not meet the two-year surveillance sample selection criteria because they did not have state code of Massachusetts in 2010. Unfortunately these beneficiaries had to be excluded from the two-year surveillance estimation sample. If Medicare beneficiaries who recently moved to Massachusetts tend to have systematically better/worse health status than longer term resident beneficiaries, this difference will not be reflected in the town-level estimated prevalence and service utilization rates.

While beneficiaries younger than 65 years of age can be entitled to Medicare due to disability, most beneficiaries are not entitled to Medicare until they reach 65 years of age under Old Age Survivors Insurance status. Accordingly, to satisfy the one-year surveillance sample selection criteria most beneficiaries must have been 65 years old by February 1st of 2011. The two-year surveillance sample selection criteria require that such beneficiaries be 65 years old as of March 1st of 2010. While we do not make this distinction in our general descriptions of the chronic condition prevalence indicators, the prevalence rates for two-year surveillance period chronic conditions strictly pertain to an older population than the population for single-year conditions and service utilization rates. It is also possible that by employing the two-year sample selection criteria for

Alzheimer's disease or related dementias, this may have produced underestimates of prevalence rates for this condition.

Part D prescription drug utilization rates

In contrast to other Medicare covered services the Medicare MBSF contains summary information about Part D prescription drug utilization for both beneficiaries receiving care from fee-for-service providers and Medicare managed care enrollees. Furthermore, some Medicare beneficiaries with Parts A and B eligibility may not have opted to enroll for Part D Medicare coverage. Because of these factors, the sample selection criteria for the Part D prescription drug utilization indicator differed from that employed for other Medicare covered services.

For Part D prescription utilization partial year coverage for beneficiaries alive at the end of 2011 required that:

- a beneficiary have at least 11 months of Medicare Part D coverage.

Beneficiaries who died in 2011 were required to have Medicare Part D coverage in all months they were alive in 2011. Beneficiaries were also required to have a valid 5-digit residence zip code recorded in the 2011 Medicare MBSF. There were 401,888 Medicare beneficiaries who met these sample selection requirements.

Medicaid dual eligibility and Medicare managed care status

For our estimates of Medicare managed care enrollment status and dual eligibility for Medicare and Medicaid, no additional sample selection criteria were imposed beyond the basic age and state residence requirements used to select the MBSF data for Massachusetts. Beneficiaries had to be 65 years or older on January 1st, 2011, eligible for Medicare for at least one month in 2011, and have a state residence code for Massachusetts. There were 941,155 Medicare beneficiaries who met these sample selection requirements.

One-year age-sex adjusted mortality rates

Although 2011 dates of death are reported for all beneficiaries with at least one month of Medicare eligibility regardless of managed care status, additional sample selection requirements were imposed for estimates one-year mortality rates. We also required that beneficiaries reside in the same town in 2010 as 2011 to mitigate any potential bias associated with beneficiaries whose move to a town in 2011 may have been motivated by health concerns in their last year of life. There were 847,662 Medicare beneficiaries who met these sample selection requirements.

<u>Post stratification weights</u>

Medicare beneficiaries were assigned to towns based on their 5-digit residence zip code using a cross-walk file that we created to link all valid 5-digit zip codes to a specific city/town or planning district within Boston. Because of the sample selection criteria that were employed to ensure the potential presence of Medicare claims for all sample beneficiaries during the surveillance period, the age-sex distributions of these estimation samples in towns may differ from that of all aged Medicare beneficiaries actually residing those towns. Post stratification weights for 10 age-sex classes (males 65-69, males 70-74, males 75-79, males 80-84, males 85+, females 65-69, females 70-74, females 75-59, females 80-84, females 85+) were computed for each of the 311 geographic areas in the state defined for Medicare MBSF indicators. With post-stratification weights individual beneficiaries in age-sex groups that were under-represented (over-represented) in the town's estimation sample relative to the total town beneficiary population are assigned weights greater than (less than 1). These weights are computed so that when these post-stratification weights are applied, the weighted age-sex distribution of the estimation sample in each town matched the actual age-sex distribution of all Medicare beneficiaries in the town.

Different town-level post-stratification weights were computed for indicators depending upon on single-year versus two-year chronic condition surveillance periods, and for Medicare Part D versus Medicare Parts A & B service utilization rates. In addition for estimates of state-level prevalence and service utilization rates, another set of post-stratification weights were computed at the state level to ensure that the weighted age-sex distribution of the entire state estimation sample matched the actual beneficiary age-sex distribution for the state. These state-level post-stratification weights did not ensure that the age-sex distribution of the estimation sample in each town matched the town's actual beneficiary age-sex distribution. In other words, the target population for these adjustments was the state rather than the town.

The post-stratification weights for Medicare service utilization rates were applied to beneficiaries in the estimation sample after another adjustment weight based on the portion of the year that potential claims could have been submitted for Medicare reimbursement was applied. This first adjustment might best be explained with an example. If a beneficiary entitled for Medicare Parts A and B for a full calendar year was never enrolled in a Medicare Advantage plan had claims over the full year showing 6 physician visits these visits reflect an annual physician visit rate of 6 visits per year. Consider an otherwise identical beneficiary who had six physician visits before his/her death at the end of June. The annualized rate of physician visits for this beneficiary who died is 12 visits per year rather than 6 visits per year. However, in contrast to the former beneficiary who survived the full year, the latter beneficiary who died did was only at risk for making a physician visit for one-half of a year. Hence the decedent beneficiary contributed only ½ of a full person-year to the denominator used in calculating a mean physician visit rate for the town.

For all Medicare service utilization rate indicators, the service use reported in the MBSF for beneficiaries in the estimation sample was first annualized to reflect the expected utilization under full year coverage. Then individual person-weights were assigned to all

sample beneficiaries. These weights were equal to the fraction of the year (i.e., # months of full coverage/12) that they had full coverage. Sampled beneficiaries with full-year coverage are assigned a weight of one (12/12) and beneficiaries with less than full-year coverage were assigned a fractional weight less than one.

The post-stratification town-level weights were also computed differently for the one-year mortality rates. In this case the weights were computed so that the weighted age-sex distribution of the estimation sample in each individual town population matched the state-wide age-sex distribution of all aged Medicare beneficiaries. By computing the post-stratification weights in this manner, the one-year mortality rate in a town reflects the expected mortality rate if its age-sex beneficiary population composition matched that of the state.

Some caveats should be noted about what these post stratification weights do and do not do with respect to rate estimation. By applying these weights the prevalence and service utilization rate estimates are adjusted to reflect differences between the age-sex population composition of the sample and that of actual beneficiaries in the town. The age-sex distribution of all aged beneficiaries in each town contains beneficiaries who were excluded from the estimation sample because they did not have a sufficient history of fee-for-service Medicare claims. This includes the exclusion of Medicare Advantage enrollees. If such managed care enrollees are systematically younger than beneficiaries receiving care from fee-for-service providers, younger beneficiaries in the estimation sample will be assigned larger post-stratification weights to reflect the under-representation of younger beneficiaries in the town estimation sample. However, application of these post-stratification weights will not adjust health indicators to reflect any systematic unmeasured health status differences between Medicare Advantage enrollees and fee-for-service beneficiaries within the same age-sex class. Past research has consistently found that Medicare managed care enrollees tend to be healthier than their counterparts receiving care from fee-for-service providers. A recent study suggests that this still is true of the Medicare Advantage program (Morrissey, Kilgore, Becker, Smith, & Delzell 2013).

The reported healthy aging indicators derived from the Medicare MBSF strictly only reflect the health status of fee-for-service Medicare beneficiaries. For this reason we report the percentage of Medicare beneficiaries with at least two months of Medicare Advantage enrollment as a town population composition attribute. Some caution should be exercised in interpreting MBSF indicators for towns where the Medicare Advantage market penetration rate is very high.

Fixed Effects Estimation of Rates

Dummy variables were constructed for each beneficiary in the estimation samples defined for the various MBSF indicator groups defined above. Stata 12.0 was used to estimate separate fixed effects dummy variable ordinary least squares regressions with a suppressed constant were estimated on the full beneficiary estimation samples for each MBSF indicator noted in Tables A1 and A2. Beneficiary cases were weighted with

individual population weights equal to the computed post-stratification weights for all MBSF indicators except Medicare service utilization rates where the additional partial-year weight adjustment was also made. These estimated dummy variable coefficients, corresponding to mean rates for towns or clusters of smaller towns, are the estimated MBSF rates reported in the main tables. Robust standard errors were estimated for the coefficient estimates. The 95% confidence intervals for these estimates are the reported margins of error for the estimates. The state-level estimates for the MBSF indicators along with their 95% confidence intervals were similarly estimated using weighted data with the full estimation samples for the entire state.

The estimates for health indicators derived from Medicare MBSF data and their margins of error are reported for all towns and planning districts within Boston in Appendix 3 of this report. We took a conservative approach in distinguishing those indicators where the difference between the town rate and the state rate is statistically significant at the 5% level. We only distinguish those indicators where the 95% confidence interval of the town estimate does not overlap with the 95% confidence interval of the state estimate as ones where the difference is estimated with enough precision so that the reported difference is unlikely to be due to chance associated with sampling variation.

5. Estimation Methods for Massachusetts BRFSS indicators

While there are some similarities in the methodology used to obtain estimates from Medicare MBSF and Massachusetts BRFSS, there were some important differences due to the complex survey design of the BRFSS and the much smaller respondent samples in the BRFSS.

Sample selection criteria

The selection criteria for the estimation samples used to estimate BRFSS indicators were straightforward. The estimation samples included all BRFSS respondents who were 60 years or older with a valid residence zip code or town code. These selection criteria were applied to BRFSS data from 2007 through 2011.

Assignment of respondents to geographic areas

As noted earlier, there were 33 modified ASAP geographic services areas defined for estimation of BRFSS indicators. Before assigning respondents to their appropriate ASAP area we examined the correspondence between the reported 5-digit residence zip codes and the town codes reported in the BRFSS data for respondents selected for the estimation sample. Using a zip code-to-town crosswalk file derived from a database maintained by the U.S. Postal Service (http://www.unitedstateszipcodes.org/zip-code-database/), we identified a relatively small number of cases where the reported zip codes and towns did not match those used by the U.S. Postal Service. These inconsistent reported zip code –town combinations were reviewed to assess whether

there was strong indication of a likely typographical error in the zip code or town code. While it was not possible to infer the basis for the majority of these inconsistent zip code-town combinations, for some of the cases there was a strong indication that the zip code was reported incorrectly. For example, there were cases where reversing two adjacent numbers in the zip code produced an exact cross-walk match with the reported town (e.g.,15 reversed to 51). In some other cases four consecutive digits of the five zip code digits matched the same four digits of a zip code for the reported town, suggesting that the fifth digit may not have been entered properly. In cases, such as these, where a modest change would produce a town match, we recoded the zip code to match the reported town. The reported town was accepted over the reported zip code in these situations. We recoded 367 such zip codes outside of Boston which did not match the reported town over the five years 2007-2011 of BRFSS data to achieve a match. We also recoded 49 zip codes to missing over the same time period for BRFSS respondents with a town code of Boston and a zip code far outside of Boston. After this modest zip code recoding for a small number of respondents, all respondents were assigned to their appropriate modified ASAP areas under the following procedure:

1. Respondents with a valid 5-digit zip code were assigned to the city or town mapped to that zip code in the U.S. Postal Service zip code to town cross-walk file.

2. If the zip code was invalid or missing then respondents were assigned to a city or town based on the reported town code with the exception of Boston. In the case of Boston, respondents had to be assigned to a BRA Planning District based on residence zip code.

3. Respondents were assigned to a modified ASAP area using a cross-walk created from data on the individuals towns and cities served by each of the 27 regional ASAPs that obtained from the internet site “800 AgeInfo” (.https://contactus.800ageinfo.com/FindAgency.aspx).

The estimation samples for specific BRFSS indicators varied depending upon whether the questions were asked of all respondents every year, to all respondents every other year, to all respondents in some years but to fewer respondents in other years, to a subset of respondents based on gender (e.g., use of mammograms). Due to occasional missing data for individual respondents, the sample sizes of the estimation samples also varied among indicators when the same years of BRSS data were used for estimation. For BRFSS indicators based on three years of data (2009-2011) most of the sample sizes exceeded 20,000 respondents. Sample sizes ranged from 15,066 for the colorectal cancer screening to 21,800 for having a regular doctor. Sample sizes for indicators estimated with four years (2008-2011) of BRFSS data were as follows: toothloss (13,591), disability (21,813), and fruit/vegetable consumption (14,157). Fall rates, the only indicator estimated on five years (2007-2011) of BRFSS data, was estimated on a sample of 17,740 respondents. The smallest estimation sample sizes were for life satisfaction (13,054), emotional support (12,704), and mammography (8,649) indicators estimated using two years (2008 and 2010) of BRFSS data. Table A2

contains information about the specific years of data were used to estimate each of the BRFSS indicators.

Survey design and post –stratification weights

The BRFSS data are derived from telephone surveys of the non-institutionalized adult population in Massachusetts. Since the BRFSS has a complex survey design in with unequal probabilities of respondent selection, statistical analyses of BRFSS data require the application of design weights to account for different probabilities of selection. The BRFSS uses disproportionate stratified sampling in its landline telephone surveys where the sampling rate differs depending on telephone density. There is also geographic stratification in the Massachusetts BRFSS sampling where some geographic areas are sampled at a higher rate than other ones. The probabilities of selection differ among BRFSS respondents due to this stratification, telephone availability, type of phone (cell versus landline in 2011), the number of adults in the household, the number of telephones in the household, and rates of nonresponse by households. Since these factors can affect the representativeness of the sample data, survey design weights are produced to adjust for these factors in statistical analyses of BRFSS survey data.

In addition to these survey design weights, post stratification weights (before 2011) or raking weights (2011) are computed so that summed counts of weighted BRFSS respondents match known state population totals along population characteristics such as age, sex, and race/ethnicity. The 2011 Massachusetts raking weights are also based on telephone source, education level, marital status, and renter/owner status. The change from using post-stratification weights to raking weights and the addition of cell phone surveys in the 2011 BRFSS introduce some issues for comparisons of indicators based on 2011 BRFSS data with indicators derived from earlier years of BRFSS data.[2]

The change from post-stratification to raking weights in 2011 did not really add many additional complications for this study because BRFSS data are being used to derive estimates for geographic subareas within Massachusetts. The “ready-to-use” post-stratification and raking weights provided with BRFSS data are only suitable for state-level estimates. Since we had to compute our own post-stratification weights to derive estimates for modified ASAP areas within the state, we decided to compute these weights the same way for BRFSS data from all years 2007-2011.[3]

[2] See Centers for Disease Control and Prevention (2013), Massachusetts Department of Public Health (2013), and Pierannunzi,Town, Garvin, Shaw, & Balluz (2012) for further discussion of the BRFSS sample design and changes made in 2011.

[3] In personal communication with Carol Pierrannunzi of the Centers for Disease Control and Prevention and Anthony Roman of the University of Massachusetts Boston Survey Research Center it was suggested that it was reasonable for us to address the problem

Town-level population estimates for 12 age-sex classes (males 60-64, males 65-69, males 70-74, males 75-79, males 80-84, males 85+, females 60-64, females 65-69, females 70-74, females 75-59, females 80-84, females 85+) were obtained from the 2010 Census of Population for all cities and towns within Massachusetts and for BRA Planning Districts within Boston (http://factfinder2.census.gov). Data for individual towns was aggregated into the 33 modified ASAP geographic areas described earlier. These ASAP-level age-sex population distributions served as the target population matrix for computation of raked post-stratification weights. Post-stratification weights were computed using an iterative raking procedure in which inflation weights were computed to match by sex and then recomputed to match by age group. This process was repeated until stable post-stratification were obtained. Individual respondents in age-sex groups that were under-represented (over-represented) in the estimation sample relative to the modified ASAP Census population distribution were assigned weights greater than (less than 1) so that when these post-stratification weights are applied, the weighted age-sex distribution of the estimation sample matched the 2010 Census age-sex distribution of the modified ASAP area.

Different post-stratification weights were computed for groups of indicators depending upon how many years and which years of BRFSS data were pooled together for the estimation sample. As noted earlier depending upon the health indicator, between two and five years of BRFSS data were pooled together over the years 2007-2011. For state-level BRFSS estimates another set of post-stratification weights were computed at the state level to ensure that the sum of weighted age-sex counts of the entire estimation sample matched the 2010 Census age-sex distribution for the state of Massachusetts. These state-level post-stratification weights did not ensure that the age-sex distribution of the estimation sample for each modified ASAP area matched the 2010 Census age-sex population distribution for the ASAP area. In other words, the target population for these latter adjustments was the state rather than modified ASAP areas.

The final population weights for individual BRFSS respondents were computed by multiplying the BRFSS survey design weights by our own computed raked post-stratification weights based on the 2010 Census age and sex population composition of either individual modified ASAP areas or the entire state.

Fixed Effects Estimation of Rates

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of pooling 2011 BRFSS data with earlier years by only using the supplied BRFSS survey design weights and to compute our own post-stratification weights the same way for all years of BRFSS data used. Regarding the issue of cell-phone survey respondents in 2011 we speculate that this will not have much of an effect on our rate estimation since our estimation sample is limited to BRFSS respondents 60 years or older.

Dummy variables were constructed for each respondent in the various sample populations used to estimating the set of BRFSS indicators. Because of the complex survey design of the BRFSS, a survey design effect regression procedure in Stata 12.0 "svy: regress" was used for parameter estimation. Separate fixed effects dummy variable ordinary least squares regressions with a suppressed constant were estimated on the appropriate estimation sample for all BRFSS indicators shown in Tables A-1 and A-2. Respondent cases were weighted with individual population weights equal to the BRFSS survey design weight multiplied by our computed raked post-stratification weights described above.[4] The estimated coefficients for the dummy variables from the regression models are the estimated rates for modified ASAP areas. The same rate is reported for all individual cities and towns comprising the modified ASAP area in the main table. The 95% confidence intervals for these estimates reflect the margins of error of the estimates. State-level estimates for each BRFSS indicator along with their 95% confidence intervals were similarly estimated using weighted data from the full state estimation samples.

The estimates for health indicators derived from BRFSS data and their confidence intervals are reported all towns and planning districts in Boston in Appendix 3. We take a conservative approach in distinguishing those indicators where the difference between the modified ASAP rate and the state rate is statistically significant at the 5% level. We only distinguish those indicators as significant where the ASAP area 95% confidence interval does not overlap with the state 95% confidence interval as ones where there the difference between the ASAP area and state estimates is unlikely to be due to chance associated with sampling variation. We note that fewer ASAP BRFSS indicator estimates are distinguished as differing significantly from the state estimates than was found for Medicare MBSF town-level estimates. This is a consequence of the much smaller sample populations used to estimate the BRFSS indicators.

Some caution should be exercised in interpreting differences between the BRFSS indicators reported for individual towns for several reasons. First, rates for which there is no distinction made regarding the statistical significance of the difference between the town and the state rate may be due to sampling variation. Second, data from multiple towns was pooled together to obtain estimates for the larger modified ASAP service areas and the same estimates are reported for all towns within the geographic area. Actual BRFSS indicators are likely vary among individual towns that comprise the modified ASAP areas. Unfortunately BRFSS samples were too small to generate town-level estimates for most individual cities and towns.

[4] Weighted ordinary least squares regression was also used to obtain estimates with robust standard errors without the standard Stata regress procedure.These estimates were virtually identical to those obtained with the Stata svy procedure.

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Table A-1: Healthy Aging Indicator Definitions

HEALTHY AGING INDICATORS	Definition
PHYSICAL/MENTAL HEALTH	
% with self-reported fair or poor health status	The percentage of persons 60 years or older reporting fair or poor to question: Would you say that in general your health is: excellent, very good, fair, poor?
% injured with a fall in last 3 months	The percentage of persons 60 years or older reporting to have fallen at least once in the past 3 months resulting in injury (defined as causing one to limit regular activities for at least a day or to go see a doctor).
% with 15+ physically unhealthy days last month	The percentage of persons 60 years or older reporting at least 15 days to the question- "Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good? "
% disabled for a year or more	The percentage of persons 60 years or older who are "disabled", defined as having one or more of the following conditions for at least one year: (1) impairment or health problem that limited activities or caused cognitive difficulties; (2) used special equipment or required help from others to get around; or (3) reported a disability of any kind.
Age-sex adjusted 1-year mortality rate	The percentage of Medicare beneficiaries 65 years or older on January 1st. 2010 who lived in the same community for both 2010 and 2011 and who died in 2011 (beneficiary population is weighted to match state age-sex distribution of aged Medicare beneficiaries.
% with 15+ days poor mental health last month	The percentage of persons 60 years or older reporting at least 15 days to the question- "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?"
% satisfied with life	The percentage of persons 60 years or older responding very satisfied or satisfied to the question- "In general, how satisfied are you with your life?"
% receiving adequate emotional	The percentage of persons 60 years or older

support	responding always or usually to the question- “How often do you get the emotional support you need?”
% ever diagnosed with depression	The percentage of Medicare beneficiaries 65 years or older in 2011 who ever met the claims-based criteria indicating depression since 1999. These criteria are having at least one inpatient, skilled nursing facility, home health, outpatient or Part B Medicare claim with appropriate diagnosis codes during a 1-year period.
CHRONIC DISEASE	
% with Alzheimer’s disease or related dementias	The percentage of Medicare beneficiaries 66 years or older in 2011 who ever met the claims-based criteria indicating Alzheimer’s disease or related dementia since 1999. These criteria are having at least one inpatient, skilled nursing facility, home health, hospital outpatient or Part B Medicare claim with appropriate diagnosis codes during a 3-year period.
% with diabetes	The percentage of Medicare beneficiaries 66 years or older in 2011 who ever met the claims-based criteria indicating diabetes since 1999. These criteria are having at least one inpatient, skilled nursing facility, home health Medicare claims, or at least two hospital outpatient or Part B Medicare claims with the appropriate diagnosis codes during a 2-year period.
% with stroke	The percentage of Medicare beneficiaries 65 years or older in 2011 who ever met the claims-based criteria indicating a transient ischemic attack (stroke) since 1999. These criteria are having at least one inpatient Medicare claim or at least 2 hospital outpatient or Part B Medicare claim with appropriate diagnosis codes during a 1-year period.
% with chronic obstructive pulmonary disease (COPD)	The percentage of Medicare beneficiaries 65 years or older in 2011 who ever met the claims-based criteria indicating chronic obstructive pulmonary disease since 1999. These criteria are having at least one inpatient, skilled nursing facility, or home health Medicare claim or at least 2 hospital outpatient or Part B Medicare claims with appropriate diagnosis codes during a 1-year period.

% with hypertension	The percentage of Medicare beneficiaries 65 years or older in 2011 who ever met the claims-based criteria indicating hypertension since 1999. These criteria are having at least one inpatient, skilled nursing facility, or home health Medicare claim or at least 2 hospital outpatient or Part B Medicare claims with appropriate diagnosis codes during a 1-year period.
% ever had a heart attack	The percentage of Medicare beneficiaries 65 years or older in 2011 who ever met the claims-based criteria indicating an acute myocardial infarction (heart attack) since 1999. These criteria are having at least one inpatient, skilled nursing facility, or home health Medicare claim or at least 2 hospital outpatient or Part B Medicare claims with appropriate diagnosis codes during a 1-year period.
% with ischemic heart disease	The percentage of Medicare beneficiaries 66 years or older in 2011 who ever met the claims-based criteria indicating ischemic heart disease since 1999. These criteria are having at least one inpatient, skilled nursing facility, or home health, hospital outpatient or Part B Medicare claim with appropriate diagnosis codes during a 2-year period.
% with congestive heart failure	The percentage of Medicare beneficiaries 66 years or older in 2011 who ever met the claims-based criteria indicating congestive heart failure since 1999. These criteria are having at least one inpatient, hospital outpatient or Part B Medicare claim with appropriate diagnosis codes during a 2-year period.
% with osteoarthritis/rheumatoid arthritis	The percentage of Medicare beneficiaries 65 years or older in 2011 who ever met the claims-based criteria indicating osteoarthritis/rheumatoid arthritis since 1999. These criteria are having at least 2 inpatient, skilled nursing facility, home health, hospital outpatient, or Part B Medicare claims (or any combination of claim types at least one day apart) with appropriate diagnosis codes during a 1-year period.
% ever had hip fracture	The percentage of Medicare beneficiaries 65 years or older in 2011 who ever met the claims-based criteria indicating a hip/pelvic fracture since 1999. These criteria are having at least 1 inpatient or skilled nursing

	facility Medicare claim with appropriate diagnosis codes during a 1-year period.
% with glaucoma	The percentage of Medicare beneficiaries 65 years or older in 2011 who ever met the claims-based criteria indicating glaucoma since 1999. These criteria are having at least one Part B Medicare claims with appropriate diagnosis codes during a 1-year period.
% women with breast cancer	The percentage of female Medicare beneficiaries 65 years or older in 2011 who ever met the claims-based criteria indicating breast cancer since 1999. These criteria are having at least one inpatient or skilled nursing facility Medicare claims or at least 2 hospital outpatient or Part B Medicare claims (or any combination of outpatient or Part B claims at least a day apart) with appropriate diagnosis codes during a 1-year period.
% with colon cancer	The percentage of Medicare beneficiaries 65 years or older in 2011 who ever met the claims-based criteria indicating colon cancer since 1999. These criteria are having at least one inpatient or skilled nursing facility Medicare claims or at least 2 hospital outpatient or Part B Medicare claims (or any combination of outpatient or Part B claims at least a day apart) with appropriate diagnosis codes during a 1-year period.
% men with prostate cancer	The percentage of male Medicare beneficiaries 65 years or older in 2011 who ever met the claims-based criteria indicating prostate cancer since 1999. These criteria are having at least one inpatient or skilled nursing facility Medicare claims or at least 2 hospital outpatient or Part B Medicare claims (or any combination of outpatient or Part B claims at least a day apart) with appropriate diagnosis codes during a 1-year period.
% with lung cancer	The percentage of male Medicare beneficiaries 65 years or older in 2011 who ever met the claims-based criteria indicating lung cancer since 1999. These criteria are having at least one inpatient or skilled nursing facility Medicare claims or at least 2 hospital outpatient or Part B Medicare claims (or any combination of outpatient or Part B claims at least a

	day apart) with appropriate diagnosis codes during a 1-year period.
% with osteoporosis	The percentage of Medicare beneficiaries 65 years or older in 2011 who ever met the claims-based criteria indicating osteoporosis since 1999. These criteria are having at least one inpatient, skilled nursing facility, home health Medicare claims or at least 2 hospital outpatient or Part B Medicare claims with appropriate diagnosis codes during a 1-year period.
% with 4+ chronic conditions (of 14)	The percentage of Medicare beneficiaries 66 years or older in 2011 who ever met the claims-based criteria indicating at least 4 of 14 chronic conditions since 1999. The 14 chronic conditions include Alzheimer's disease or related dementia, asthma, atrial fibrillation, cancer (breast, colorectal, lung, and prostate), chronic kidney disease, chronic obstructive pulmonary disease (COPD), depression, diabetes, congestive heart failure, hypertension, hyperlipedemia (cholesterol) ischemic heart disease, osteoporosis, and stroke.
% with no chronic conditions (of 14)	The percentage of Medicare beneficiaries 66 years or older in 2011 who never ever met the claims-based criteria indicating any of 14 chronic conditions since 1999.
% with complete tooth loss	The percentage of persons 60 years or older reporting to have had 6 or more teeth removed because of tooth decay or gum disease.
NUTRITION/DIET	
% with 5 or more servings of fruit or vegetables per day	The percentage of persons 60 years or older reporting to have eaten five or more servings of fruit or vegetables per day in the last month.
% obese	The percentage of persons 60 years or older with a body mass index of 30 or higher
% current smokers	The percentage of persons 60 years or older reporting to have ever smoked at least 100 cigarettes and who now smoke on some or all days
% excessive drinking	The percentage of persons 60 years or older reporting excessive alcoholic drinking during the past month. For

	men excessive drinking is defined as consuming 60 or more alcoholic drinks in the past month or consuming 5 or more alcoholic drinks on at least one occasion during the past month. For women excessive drinking is defined as consuming 30 or more alcoholic drinks in the past month or consuming 4 or more alcoholic drinks on at least one occasion during the past month. One drink is equivalent to a 12-ounce beer, a 5-ounce glass of wine, or a drink with one shot of liquor.
ACCESS TO CARE[5]	
% with a regular doctor	The percentage of persons 60 years or older reporting to have a personal doctor or health care provider
% did not see doctor when needed due to cost	The percentage of persons 60 years or older responding yes to the question-"Was there a time during the last 12 months when you needed to see a doctor but could not due to the cost?"
# dentists per 100,000 persons (all ages)	The number of professionally active dentists per 100,000 persons in the county
SERVICE UTILIZATION[6]	
Inpatient hospital stays/1000 persons 65+ years per year	A count of inpatient hospital discharges in 2011 per 1,000 Medicare beneficiaries 65 years or older
Inpatient hospital readmissions (as % of admissions)	The percentage of inpatient hospital discharges for Medicare beneficiaries 65 years or older which were followed by an admission to an acute care hospital for any cause within 30 days
Skilled nursing facility stays/1000 persons 65+ years per year	A count of skilled nursing facility discharges in 2011 per 1,000 Medicare beneficiaries 65 years or older
Home health visits per year	Average home health visits in 2011 per Medicare beneficiary 65 years or older
Physician visits per year	Average Part B physician office visit evaluation and management services received in 2011 by Medicare beneficiaries 65 years or older
Durable medical equipment claims per year	Average Part B durable medical equipment services received in 2011 by Medicare beneficiaries 65 years or older

Emergency room visits/1000 persons 65+ years per year	Average number of emergency department visits (where beneficiaries were released or admitted to a hospital) in 2011 per 1,000 Medicare beneficiaries 65 years or older
Part D monthly prescription fills per person per year	Average number of standard 30 days supplies of a filled Part D prescriptions in 2011 by Medicare beneficiaries 65 years or older
WELLNESS and PREVENTION[7]	
% any physical activity last month	The percentage of persons 60 years or older who answered yes to the question- "During the past month, (other than your regular job) did you participate in any physical activities such as running, calisthenics, golf, gardening or walking for exercise?"
% mammogram within last 2 years (women)	The percentage of women 60 years or older whose last mammogram was two years ago or less
% colorectal cancer screening	The percentage of persons age 60 years or older whose last proctoscopic exam was five years ago or less
% cholesterol screening	The percentage of persons age 60 years or older who had their cholesterol checked within past 5 years
% flu shot past year	The percentage of persons age 60 years or older who answered yes to the question- "During the past 12 months, have you had a seaonal flu shot (or seasonal flu vaccine that was sprayed in your nose[added in 2010])?"
% pneumonia vaccine	The percentage of persons age 60 years or older who reported ever having a pneumonia vaccination
% shingles vaccine	The percentage of persons age 60 years or older who answered yes to the question- "A vaccine for shingles has been available since May 2006, it is called Zostavax®, the zoster vaccine, or the shingles vaccine. Have you had this vaccine?"
% with physical exam in past year	The percentage of persons age 60 years or older who reporting seeing a doctor for a regular check up within the past year
% with annual dental exam	The percentage of persons age 60 years or older who reporting visiting a dentist or dental clinic within the past year

POPULATION COMPOSITION	
% Medicare managed care enrollees	The percentage of Medicare beneficiaries age 65 years or older enrolled in a Medicare managed care plan (Medicare Advantage) for at least 1 month in 2011
% dually eligible for Medicare and Medicaid	The percentage of Medicare beneficiaries age 65 years or older with at least one month of full or restricted Medicaid entitlement in 2011. (Beneficiaries with restricted Medicaid entitlement are only entitled to some Medicaid benefits (e.g., drug coverage only, and/or premium/copayments for services).
COMMUNITY VARIABLES	
Walkability score (0-100)	Walkability score categories: 90-100 "**Walker's Paradise"** **D**aily errands do not require a car **70-89 "Very Walkable"** **M**ost errands can be accomplished on foot **50-69 Somewhat Walkable** Some errands can be accomplished on foot **25-49 "Car-Dependent"** Most errands require a car **0-25 "Car-Dependent"** Almost all errands require a car
Access to groceries (0-20)	Accessibility score (places with greater accessibility have a higher score)
Access to restaurants (0-20)	Accessibility score (places with greater accessibility have a higher score)
Access to shopping (0-15)	Accessibility score (places with greater accessibility have a higher score)
Access to coffee shops (0-15)	Accessibility score (places with greater accessibility have a higher score)
Access to schools (0-6)	Accessibility score (places with greater accessibility

	have a higher score)
Access to parks (0-6)	Accessibility score (places with greater accessibility have a higher score)
Access to bookstores (0-6)	Accessibility score (places with greater accessibility have a higher score)
Access to entertainment (0-6)	Accessibility score (places with greater accessibility have a higher score)
Access to banking (0-6)	Accessibility score (places with greater accessibility have a higher score)
Average block length in feet	Shorter block lengths are thought to be better for shorter walks to a destination Good : average block length less than 490 feet Fair: average block length 490- 525 feet Poor: average block length greater than 525 feet
# of intersections per square mile	More intersections are thought to better for shorter walks to a destination Good : 150 or more intersections per square mile Fair: between 120-149 intersections per square mile Poor: fewer than 120 intersections per square mile
SAFETY	
Violent crimes / 100,000 persons	The number of violent crimes (murder and nonnegligent manslaughter, forcible rape, robbery, and aggravated assault) in 2011 (or earlier year 2007-2010) known to law enforcement per 100,000 persons
Property crimes / 100,000 persons	The number of property crimes (burglary, larceny-theft, motor vehicle theft, and arson) in 2011 (or earlier year 2007-2010 for some towns) known to law enforcement per 100,000 persons
ECONOMIC VARIABLES	
% households with annual income < $20,000	The percentage of households with a householder (i.e., the person (or one of the people) in whose name the housing unit is owned or rented (maintained))age

	65 years or older with an annual income in 2010 less then $20,000.
Elder Economic Security Standard Index	
Single, homeowner without mortgage, good health	Annual income needed for a single homeowner with no mortgage in good health to attain a modest standard of living in the county
Single, renter, good health	Annual income needed for a single renter in good health to attain a modest standard of living in the county
Couple, homeowner without mortgage, good health	Annual income needed for a couple who are homeowners with no mortgage in good health to attain a modest standard of living in the county
Couple, renter, good health	Annual income needed for a couple who are renters in good health to attain a modest standard of living in the county

Table A1: Years and Data Sources for Community Profile Indicators

INDICATOR	SOURCE AND YEARS
POPULATION COMPOSITION	
Total population all ages	United States Census Bureau / American FactFinder. "P12 : SEX BY AGE." *2010 Census*.U.S. Census Bureau, 2010. Web. 2013. <http://factfinder2.census.gov>
Population 65 years or older as a % of total population, Total population 65 years or older, % female	United States Census Bureau / American FactFinder. "B01001 : SEX BY AGE." *2007 – 2011 American Community Survey*. U.S. Census Bureau's American Community Survey Office, 2011. Web. 2013. <http://factfinder2.census.gov>.
65 yrs+ age composition: % 65-74 years, 75-84 years, 85 years or older	United States Census Bureau / American FactFinder. "B01001 : SEX BY AGE." *2007 – 2011 American Community Survey*. U.S. Census Bureau's American Community Survey Office, 2011. Web. 2013. <http://factfinder2.census.gov>.
% living alone	United States Census Bureau / American FactFinder. "B09017: RELATIONSHIP BY HOUSEHOLD TYPE (INCLUDING LIVING ALONE) FOR THE POPULATION 65 YEARS AND OVER." *2007 – 2011 American Community Survey*. U.S. Census Bureau's American Community Survey Office, 2011. Web. 2013. <http://factfinder2.census.gov>.
Race/Ethnicity: % White, % African American, % Asian, % Other race, % Hispanic/Latino	United States Census Bureau / American FactFinder. "B010001A-B01001I." *2007 – 2011 American Community Survey*. U.S. Census Bureau's American Community Survey Office, 2011. Web. 2013. <http://factfinder2.census.gov>.
Marital status: % married, divorced/separated, widowed, never married	United States Census Bureau / American FactFinder. "B12002 : SEX BY MARITAL STATUS BY AGE FOR THE POPULATION 15 YEARS AND OVER." *2007 – 2011 American Community Survey*. U.S. Census Bureau's American Community Survey Office, 2011. Web. 2013 <http://factfinder2.census.gov>.
Education: % with less than a high school education, high school education or some college, with college degree	United States Census Bureau / American FactFinder. "B15001 : SEX BY AGE BY EDUCATIONAL ATTAINMENT FOR THE POPULATION 18 YEARS AND OVER." *2007 – 2011 American Community Survey*. U.S. Census Bureau's American Community Survey Office, 2011. Web. 2013 <http://factfinder2.census.gov>.

% Medicare managed care enrollees	2011 Master Beneficiary Summary File –A/B/D from the CMS Chronic Condition Data Warehouse <www.ccwdata.org>.
% dually eligible for Medicare/Medicaid	2011 Master Beneficiary Summary File –A/B/D from the CMS Chronic Condition Data Warehouse <www.ccwdata.org>.
PHYSICAL/MENTAL HEALTH	
% with self-reported fair/poor health status, 15+ unhealthy days last month, 15+ days with poor mental health last month,	2009-2011 Behavioral Risk Factor Surveillance Survey from the Massachusetts Department of Public Health.< http://www.mass.gov/eohhs/gov/departments/dph/programs/health-stats/health-survey/brfss/>.
% injured with a fall in last 3 months	2007-2011 Behavioral Risk Factor Surveillance Survey from the Massachusetts Department of Public Health. < http://www.mass.gov/eohhs/gov/departments/dph/programs/health-stats/health-survey/brfss/>.
% disabled for a year or more	2008-2011 Behavioral Risk Factor Surveillance Survey from the Massachusetts Department of Public Health. < http://www.mass.gov/eohhs/gov/departments/dph/programs/health-stats/health-survey/brfss/>.
Age-sex adjusted 1-year mortality rate	2010 & 2011 Master Beneficiary Summary File –A/B/D from the CMS Chronic Condition Data Warehouse <www.ccwdata.org>.
% satisfied with life, receiving adequate emotional support	2008-2010 Behavioral Risk Factor Surveillance Survey from the Massachusetts Department of Public Health. < http://www.mass.gov/eohhs/gov/departments/dph/programs/health-stats/health-survey/brfss/>.
% ever diagnosed with depression	2011 Master Beneficiary Summary File –A/B/D; 2011 Master Beneficiary Summary File- Chronic conditions from the CMS Chronic Condition Data Warehouse <www.ccwdata.org>.
CHRONIC DISEASE	
% with stroke, chronic obstructive pulmonary disease, hypertension, heart attack, hip fracture, glaucoma, breast cancer, colon cancer, prostate cancer, lung cancer,	2011 Master Beneficiary Summary File –A/B/D; 2011 Master Beneficiary Summary File- Chronic conditions from the CMS Chronic Condition Data Warehouse <www.ccwdata.org>.

osteoporosis	
% with Alzheimer's disease or related dementias, diabetes, ischemic heart disease, congestive heart failure, osteoarthritis/ rheumatoid arthritis, 4+ chronic conditions, no chronic conditions	2010, 2011 Master Beneficiary Summary File –A/B/D; 2010,2011 Master Beneficiary Summary File- Chronic conditions from the CMS Chronic Condition Data Warehouse <www.ccwdata.org>.
% with complete tooth loss	2008-2011 Behavioral Risk Factor Surveillance Survey from the Massachusetts Department of Public Health. < http://www.mass.gov/eohhs/gov/departments/dph/programs/health-stats/health-survey/brfss/>.
NUTRITION/DIET	
% with 5 or more servings of fruit or vegetables per day	2008-2011 Behavioral Risk Factor Surveillance Survey from the Massachusetts Department of Public Health. < http://www.mass.gov/eohhs/gov/departments/dph/programs/health-stats/health-survey/brfss/>.
% obese, smokers, excessive drinkers	2009-2011 Behavioral Risk Factor Surveillance Survey from the Massachusetts Department of Public Health. < http://www.mass.gov/eohhs/gov/departments/dph/programs/health-stats/health-survey/brfss/>.
ACCESS TO CARE	
% with a regular doctor, did not see doctor due to cost	2009-2011 Behavioral Risk Factor Surveillance Survey from the Massachusetts Department of Public Health. < http://www.mass.gov/eohhs/gov/departments/dph/programs/health-stats/health-survey/brfss/>.
# dentists per 100,000 persons	*Area Health Resources Files (AHRF)*. 2012-2013. US Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, Rockville, MD. Downloaded October,2013 Health Indicators Warehouse <http://healthindicators.gov/ >.
SERVICE UTILIZATION	
Inpatient hospital stays, skilled nursing facility stays,	2011 Master Beneficiary Summary File –A/B/D; 2011 Master Beneficiary Summary File- Cost and Use from the CMS Chronic

emergency room visits /1000 persons 65+ years per year	Condition Data Warehouse <www.ccwdata.org>.
Inpatient hospital readmissions (as % of admissions)	2011 Master Beneficiary Summary File –A/B/D; 2011 Master Beneficiary Summary File- Cost and Use from the CMS Chronic Condition Data Warehouse <www.ccwdata.org>.
Home health visits, physician visits, durable medical equipment claims, Part D monthly prescription fills per year	2011 Master Beneficiary Summary File –A/B/D; 2011 Master Beneficiary Summary File- Cost and Use from the CMS Chronic Condition Data Warehouse <www.ccwdata.org>.
WELLNESS and PREVENTION	
% any physical activity last month	2009-2011 Behavioral Risk Factor Surveillance Survey from the Massachusetts Department of Public Health. < http://www.mass.gov/eohhs/gov/departments/dph/programs/health-stats/health-survey/brfss/>.
% with colorectal cancer screening, cholesterol screening, flu shot, pneumonia vaccine, shingles vaccine, physical exam in past year	2009-2011 Behavioral Risk Factor Surveillance Survey from the Massachusetts Department of Public Health. < http://www.mass.gov/eohhs/gov/departments/dph/programs/health-stats/health-survey/brfss/>.
% mammogram within last 2 years (women), with annual dental exam	2008-2010 Behavioral Risk Factor Surveillance Survey from the Massachusetts Department of Public Health. < http://www.mass.gov/eohhs/gov/departments/dph/programs/health-stats/health-survey/brfss/>.
COMMUNITY VARIABLES	
Walkability score, Access scores for groceries, restaurants, shopping, coffee shops, schools, parks, bookstores, entertainment, banking; Block length, Density of intersections	Walkability scores downloaded from < http://www.walkscore.com/> in July-August, 2013 using the finder term “city/town name, Massachusetts.” The access scores, block length, and intersection measures from Street Smart Walk Score <http://www.walkscore.com/professional/street-smart.php (Beta version)> in July-August 2013 using the finder term “city/town name + MA”.
SAFETY	

Violent and property crime rates per 100,000 persons	United States Department of Justice, Federal Bureau of Investigation. *Crime in the United States, 2011.* Web. October 2013. <http://www.fbi.gov/stats-services/crimestats>. Data for years 2008-2011 used for reporting of rates.
ECONOMIC VARIABLES	
% households with annual income < $20,000 (65+ householder)	United States Census Bureau / American FactFinder. "B19037" *2007 – 2011 American Community Survey*. U.S. Census Bureau's American Community Survey Office, 2011. Web. 2013. <http://factfinder2.census.gov>.
Elder Economic Security Standard Index (4 household types)	Gerontology Institute, University of Massachusetts Boston, "The National Economic Security Standard Index" (2012). *Gerontology Institute Publications.* Paper 75. <http://scholarworks.umb.edu/gerontologyinstitute_pubs/75 >. Data downloaded from website September 2013. < http://www.basiceconomicsecurity.org/EI/ >.

Table A-3: Towns Combined Together for Medicare MBSF Indicators

North Adams-Clarksburg-Florida-Savoy
Chesire- Windsor
Lanesborough-Hancock- New Ashford
Hinsdale-Peru
Beckett-Washington
Monterey-Tyringham-Otis
Alford-Great Barrington
Egregmont- Sheffield- Mount Washington
New Marlborough- Sandisfield
Monroe-Rowe- Heath- Charlemont-Colrain- Hawley
Bernardston-Leyden
Northfield-Gill-Erving- Wendell
Orange-Warwick- Royalston
Athol- Petersham-Phillipston
Ashfield- Buckland-Conway
Deerfield- Whately
Shutesbury- Sunderland-New Salem-Leverett
Plainfield-Cummington-Ghoshen
Chesterfield-Middlefield-Worthington
Westhampton-Easthampton
Amherst-Pelham
Chester- Blandford-Russell
Granville-Southwick- Tolland
Brimfield-Wales-Holland
East-Brookfield-Brookfield-North Brookfield
New Braintree-Hardwick- Oakham
Hubbardston-Templeton
Ashby-Townsend
Millvale-Mendon
Gosnold-Falmouth
Aquinnah-West Tisbury-Chilmark
Montgomery-Westfield

Table A-4: Towns and BRA Planning Districts Comprising Modified ASAP Areas

ASAP Name	Towns
Baypath Elder Services	Ashland, Dover, Framingham, Holliston Hopkinton, Hudson, Marlborough, Natick Northborough, Sherborn, Southborough, Sudbury, Wayland, Westborough
Elder Services of Berkshire	Adams, Alford, Becket, Cheshire, Clarksburg, Dalton, Egremont, Florida, Great Barrington, Hancock, Hinsdale, Lanesborough, Lee, Lenox, Monterey, Mount Washington, New Ashford, New Marlborough, North Adams, Otis, Peru, Pittsfield, Richmond, Sandisfield, Savoy, Sheffield, Stockbridge, Tyringham, Washington, West Stockbridge, Williamstown, Windsor
Elder Services of Cape Cod	Barnstable, Bourne, Brewster, Chatham, Chilmark, Dennis, Eastham, Edgartown, Falmouth, Aquinnah, Harwich, Mashpee, Nantucket, Oak Bluffs, Orleans, Provincetown, Sandwich, Tisbury, Truro, Wellfleet, West Tisbury, Yarmouth
Franklin County Home Care Corporation	Ashfield, Athol, Bernardston, Buckland, Charlemont, Colrain, Conway, Deerfield, Erving, Gill, Greenfield, Hawley, Heath, Leverett, Leyden, Monroe, Montague, New Salem, Northfield, Orange, Petersham, Phillipston, Rowe, Royalston, Shelburne, Shutesbury, Sunderland, Warwick, Wendell, Whately
Greater Lynn Senior Services	Lynn, Lynnfield, Nahant, Saugus, Swampscott
Health and Social Service Consortium	Canton, Dedham, Foxborough, Medfield, Millis Norfolk, Norwood, Plainville, Sharon, Walpole, Westwood,Wrentham
Highland Valley Elder Services	Amherst, Blandford, Chester, Chesterfield, Cummington, Easthampton, Goshen, Granville, Hadley, Hatfield, Huntington, Middlefield, Montgomery,Northampton, Pelham, Plainfield, Russell, Southampton, Southwick, Tolland, Westfield, Westhampton, Williamsburg, Worthington
Minuteman Senior Services	Acton, Arlington, Bedford, Boxborough, Burlington, Carlisle, Concord, Harvard, Lexington, Lincoln, Littleton,

	Maynard, Stow, Wilmington, Winchester, Woburn
Montachusetts Home Care Corporation	Ashburnham, Ashby, Ayer, Berlin, Bolton, Clinton, Fitchburg, Gardner, Groton, Hubbardston, Lancaster Leominster, Lunenburg, Pepperell, Princeton, Shirley, Sterling, Templeton, Townsend, Westminster, Winchendon
Mystic Valley Elder Services	Everett, Malden, Medford, Melrose, North Reading, Reading, Stoneham, Wakefield
North Shore Elder Services	Danvers, Marblehead, Middleton, Peabody, Salem
Senior Care	Beverly, Essex, Gloucester, Hamilton, Ipswich, Manchester, Rockport, Topsfield, Wenham
Somerville / Cambridge Elder Services	Cambridge, Somerville
South Shore Elder Services	Braintree, Cohasset, Hingham, Holbrook, Hull, Milton, Norwell, Quincy, Randolph, Scituate, Weymouth
Springwell	Belmont, Brookline, Needham, Newton, Waltham, Watertown, Wellesley, Weston
Tri-Valley Elder Services	Bellingham, Blackstone, Brookfield, Charlton, Douglas, Dudley, East Brookfield, Franklin, Hopedale, Medway, Mendon, Milford, Millville, North Brookfield, Northbridge, Oxford, Southbridge, Spencer, Sturbridge, Sutton, Upton, Uxbridge, Warren, Webster, West Brookfield
West Massachusetts Elder Care	Belchertown, Chicopee, Granby, Holyoke, Ludlow, South Hadley, Ware
Bristol Elder Services	Fall River
Bristol Elder Services	Attleboro, Berkley, Dighton, Freetown,Mansfield, North Attleborough,Norton, Raynham, Rehoboth, Seekonk, Somerset, Swansea,Taunton, Westport
Coastline Elder Services	New Bedford
Coastline Elder Services	Acushnet, Dartmouth, Fairhaven, Gosnold, Marion, Mattapoisett, Rochester

Elder Services of Merrimack Valley	Lowell
Elder Services of Merrimack Valley	Amesbury, Andover, Billerica, Boxford, Chelmsford, Dracut, Dunstable, Georgetown, Groveland, Haverhill, Lawrence, Merrimac, Methuen, Newbury, Newburyport, North Andover, Rowley, Salisbury, Tewksbury, Tyngsborough, West Newbury, Westford
Elder Services of Worcester Area	Worcester
Elder Services of Worcester Area	Auburn, Barre, Boylston, Grafton, Hardwick, Holden, Leicester, Millbury, New Braintree, Oakham, Paxton, Rutland, Shrewsbury, West Boylston
Greater Springfield Senior Services	Springfield
Greater Springfield Senior Services	Agawam, Brimfield, East Longmeadow, Hampden, Holland, Longmeadow, Monson, Palmer, Wales, West Springfield, Wilbraham
Old Colony Elder Services	Brockton
Old Colony Elder Services	Abington, Avon, Bridgewater, Carver, Duxbury, East Bridgewater, Easton, Halifax, Hanover, Hanson, Kingston, Lakeville, Marshfield, Middleborough, Pembroke, Plymouth, Plympton, Rockland, Stoughton, Wareham, West Bridgewater, Whitman
Boston Northwest	Charlestown, Central, Back Bay/Beacon Hill, South End, Fenway/Kenmore, Allston/Brighton
Boston Northeast	Chelsea, Revere, Winthrop, East Boston, South Boston
Boston Southeast	Roxbury, North Dorchester, South Dorchester, Mattapan
Boston Southwest	Jamaica Plain, Roslindale, West Roxbury, Hyde Park

Table A-5: Towns Combined Together for Reported Crime Rates

North Adams- Clarksburg-Florida-Savoy
Chesire- Windsor
Lanesborough-Hancock- New Ashford
Hinsdale- Peru
Beckett-Washington
Monterey-Tyringham-Otis
Alford- Great Barrington
Egregmont- Sheffield- Mount Washington
New Marlborough- Sandisfield
Monroe-Rowe- Heath- Charlemont-Colrain- Hawley
Bernardston-Leyden
Warwick- Royalston
Athol- Petersham-Phillipston
Ashfield- Conway
Shutesbury- New Salem
Plainfield-Cummington
Chesterfield-Middlefield-Worthington
Chester- Blandford-Russell- Huntington-Montgomery
East-Brookfield-Brookfield
New Braintree-Hardwick- Oakham
Gosnold-Falmouth
Richmond-West Stockbridge
Buckland (Franklin County)*
Dunstable-Tynesborough
Millis (Medway, Norfolk, Medfield, Sherborn)*

*The town was assigned the 2011 crime rates for the geographic area shown in parentheses.