

The 2016 Massachusetts Employer Health Insurance Survey

FIELD REPORT

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I. Background and Redesign of the MES

The Massachusetts Employer Survey (MES) is a critical tool to the Center for Health Information Analysis's (CHIA) that contributes to its mission of monitoring the Massachusetts health care and health insurance systems, and providing reliable information and meaningful analysis for those seeking to improve health care quality, affordability, access, and outcomes.

The MES was first fielded in 2001 and then re-administered multiple times since then, with the most recent fielding taking place in 2014. With more than 10 years of data, the MES provide a unique lens on changes in Massachusetts health insurance markets in both pre- and post-reform periods, including the more recent implementation of the Affordable Care Act (ACA). Throughout this period, the MES has been the primary and most relied upon source of information on employer health insurance in the state, as the national employer surveys, Medical Expenditure Panel Survey, and the Kaiser Family Foundation Employer surveys, have not had large enough sample sizes to make reliable estimates for Massachusetts, and do not address state specific issues.

Drawing from extensive experience conducting employer health insurance surveys, a literature reviews, and interviews with national experts and state stakeholders, John Snow Inc. (JSI) and the NORC at the University of Chicago have implemented several key enhancements to the 2016 MES:

- **New questions on current and emerging issues.** There is a growing interest in benefit redesigns, migration to high deductible health plans, employer decision making toward the selection of health plans, migration to alternative payment models (APMs), value based insurance design, and other emerging issues. Questions on these topics have been incorporated in the survey.
- **Improved comparability to national data.** The MES sample has shifted to capture responses from firms (e.g. CVS as an organization) rather than establishments (e.g. an individual CVS store). This change better aligns with the fact that decision-making about health benefits is almost always made at the firm rather than the establishment levels. This change also makes comparisons between Massachusetts and national data more reliable. A second key change was increasing the stratification of the employer sizes to categories similar to the Kaiser survey, which allows for a number of useful analyses and comparisons that were not possible in earlier version of the MES.
- **Increased sample size and inclusion of large firms.** The 2016 MES includes responses from 910 Massachusetts employers, which is higher than any previous MES survey since 2001. The larger sample size allows more stratification on employer characteristics and the ability to conduct analyses on more specific topics such as low-wage employers, factors associated with cost of insurance premiums, and small firm purchasing. Additionally, large firms were extensively oversampled in order to accurately represent large firms in these analyses.
- **Multi-modal survey administration strategy to increase response rates.** Up through 2014, the MES was administered primarily as a mail survey. The 2016 survey relied on multiple modes for administration, including mail, web, and phone. The use of this multi-modal strategy increased response rates, especially among small employers that may prefer completing a survey by mail or on the web.

This report describes the design of the 2016 MES survey, data collection results, and methods for weighting and analysis.

II. Survey Design

Questionnaire Design

The 2016 questionnaire was based on previous CHIA survey instruments administered in 2001, 2003, 2005, 2007, 2009, 2010, 2011, and 2014. The central components of the survey have remained over time, though changes to the questionnaire over time have been documented in field reports from each of the survey years, and can be found at www.mass.gov/chia.

One key change between the 2016 and 2014 MES instruments was to convert the language of the questions from asking about establishments to firms. In some cases, the 2014 MES and 2015 Kaiser/HRET Employer Health Benefits Survey had similar questions for the same topics (e.g. unionized workers). In such cases, the 2016 MES language was most often based on the Kaiser/HRET question to allow for greater comparability between Massachusetts and national estimates, though it was modified to be specific to Massachusetts. The 2016 instrument also included questions on several new topics (sources for questions based on other surveys in parentheses where applicable):

1. **Enrollment by carrier**, rather than only enrollment by plan type
2. **Alternative plan designs**, including health benefit plans that encourage the spread of ACOs and value-based insurance design
3. **Services that brokers or consultants provide** (Commonwealth Fund Survey of Small Employers)
4. **Use of private exchanges** (from Health Policy Commission Survey)
5. **Use of the Health Connector**, specifically the extent of consideration and use, as well as reasons for not using it (from Health Policy Commission Survey)
6. **Employer decision-making towards health benefits**, including cost control strategies thought to be effective and those enacted within the past year, and most important reasons the firm offers health insurance
7. **Additional questions for firms that do not offer health insurance**, including whether they have ever offered health insurance, whether they had to pay a penalty for not offering, why they did not offer health insurance (from Kaiser/HRET survey), and considerations for offering health insurance in the future (from Kaiser/HRET survey)

Once the questions and formatting were finalized, the questionnaire was printed and programmed for administration via mail, telephone, and online.

Sample Design

Unlike previous years of the MES, the 2016 MES sample uses firms (e.g. CVS as an organization) rather than establishments (e.g. an individual CVS worksite) as the unit of measurement. There are two key reasons for this change:

- 1) Decision-making about health benefits is almost always done at the firm level rather than the establishment level.
- 2) National surveys on employment insurance also typically use the firm as the unit of measurement, which allows for more reliable comparisons between state and national data.

The population for the survey contains firms, standalone and headquarters only, with establishments located in the state of Massachusetts, including firms fully located in the state as well as

firms headquartered outside but with establishments inside the state. We excluded federal and state employees, as well as employers with less than 3 employees.

We built the sample frame using Dun’s Market Identifiers (DMI) business database available from Survey Sampling International (SSI). The DMI contains extensive information on U.S. firms, including business size in terms of the number of employees and the North American Industry Classification System (NAICS) that can be used to classify firms into industry sectors. The JSI/NORC team obtained from SSI a distribution of eligible firms by size and industry, as shown in Table 1, in order to stratify the sample by these characteristics.

Another key change in the 2016 sample was the increased stratification of the firm size categories similar to the Kaiser survey, which allows for a number of useful analyses and comparisons that were not possible in earlier version of the MES. The 2016 survey sample uses the following stratification scheme:

- Stratum 1: employers with 3-9 employees
- Stratum 2: employers with 10-24 employees
- Stratum 3: employers with 25-49 employees
- Stratum 4: employers with 50-199 employees
- Stratum 5: employers with 200-999 employees
- Stratum 6: employers with 1,000-4,999 employees
- Stratum 7: employers with 5,000 or more employees

Because both firm size and industry type were expected to be highly correlated with variables of interest, we explicitly stratified by firm size, and had implicit stratification by industry within each explicit stratum (see Table 1 for the sampling strata by firm size). The purpose of stratification was to support separate estimation for subpopulations and to improve the precision of sample estimates.

Table 1: Population Size, Sample Size, Sampling Rate, and Margin of Error per Stratum

Firm size	Population size	Sample size	Sampling rate	MOE per class	MOE per domain	MOE overall
3-9	86,119	110	0.13%	9.3%	7.3%	6.7%
10-24	19,577	100	0.51%	9.8%		
25-49	7,448	100	1.34%	9.7%		
50-199	6,178	120	1.94%	8.9%	6.6%	
200-999	2,647	220	8.31%	6.3%	5.3%	
1000-4999	1,794	240	13.38%	5.9%		
5000+	448	160	35.71%	6.2%		
Total	124,211	1,050				

The sample was selected independently from each of the size strata; within each stratum, the sample was selected systematically after the frame was sorted by industry. Systematic sampling from a sorted frame imposes an implicit stratification on the sample that ensures that the sample will represent employers in different industries proportionally to their share in the population. This stratification

allowed us to apply different sampling rates to the strata through disproportional sample allocation to the strata.

A third key change in the 2016 sample is the extensive oversampling of large firms, given CHIA’s interest in fully representing large businesses. Large firms employ the vast majority of workers covered by health insurance. Table 1 contains the sample size and their allocation per stratum. As exemplified in the sampling rate column, the allocation of more of the sample to large strata helps to improve the precision for large firms. The sample size figures in Table 1 represent the allocation of complete surveys. The initial sample size or raw sample size per stratum is presented in Table 2. The raw sample size is estimated by inflating the number of complete surveys by the expected survey completion rate per stratum.

Table 2: Raw Sample Size per Stratum

Firm size stratum	Sample needed
3-9	440
10-24	300
25-49	300
50-199	411
200-999	754
1000-4999	823
5000+	549
Total	3,577

Pulling and Screening the Sample

In March 2016, JSI submitted a request to SSI to pull sample from the Dun & Bradstreet database. SSI’s D&B database was last updated January 21, 2016. Below are the specifications developed by NORC and provided to SSI.

- 1) The universe should contain firms (standalone and headquarters only) with establishments located in Massachusetts (i.e., firms fully located in MA, or headquartered outside of MA with establishments inside MA)
- 2) The total sample is 3,577 across 7 size classes. The table below shows the number of firms to be selected from each size class.
- 3) The sample for each size group should be sorted first by 2-digit NAICS code, then by zip code, and then by phone number, and then drawn systematically.
- 4) Along with the sample pull, we need to receive universe counts for each of the 7 classes.
- 5) Each record should include firm name, secondary business name, mailing address, phone number, NAICS code, SIC code, exact total employee count, and DUNS number.

A sample of 3,577 firms was delivered to JSI in late March. Starting in May 2016, JSI researched each organization to determine the name, title, direct phone number, and email address of the Health Benefits Manager or other individual (president/owner for small firm) who makes health benefits decisions at the firm.

The following questions were asked of 35% of the sample, the firms with fewer than 100 employees (N=1,260) during sample screening calls to establish eligibility and identify the primary survey respondent at the firm:

1. Does your firm currently have employees in MA?
2. Is your firm part of the federal, state, or city governments?
3. Does your firm employ 3 or more employees in Massachusetts?
4. Can you provide contact information for the Health Benefits Manager (person who makes benefits decisions) for your firm?

Firms with greater than 100 employees (N=2,217) were assigned to JSI interviewers for web research to find the appropriate contact for the survey. Google and Linked in were mainly used to find names and titles of health benefits staff at each firm. A sub-group of these firms (N=673) were then assigned to telephone screening after web research proved unsuccessful. If a firm was found to be out of business, had less than 3 employees in MA, was not currently doing business in MA or was a government entity, then the firm was deemed ineligible.

We tracked the outcome of the sample screening efforts, including: successfully screened (deemed eligible), unable to locate (firm not found in telephone directory/internet searches), ineligible (out of business, government/public sector, <3 employees in MA, duplicate case), and refused to participate. Those included in the final sample for the initial mailing are those firms found eligible during the pre-calls, firms that listed relevant survey contact information from web research and those that were called (with working phone numbers) but did not pick up. For those phone numbers that were non-working, JSI dropped those from the final sample. A total of 560 firms were screened out of the survey. Among those firms that were screened out of the survey, 247 firms were ineligible (44%), 161 firms were unable to be found (29%), and 152 refused to participate (27%). A total of 3,017 firms remained in the sample.

Survey Modalities

JSI used a multi-method approach to data collection to offer maximum flexibility to the respondents to facilitate their response to the survey. The survey was offered in three modalities:

- The mail survey. A printed version of the questionnaire, each with a unique survey ID, was mailed to sampled firms. The final version of the paper survey was programmed in Teleform, a data capture system that allowed us to scan the completed, returned surveys and create an electronic database for analysis.
- The online survey. An online version of the survey was programmed in SurveyGizmo. The unique survey link was printed on the cover of the mail survey, provided in all reminder letters, and in all follow up email correspondence with the firms. The online survey data was exported and appended to the mail survey data file.
- The telephone survey. The telephone survey was conducted with non-responders to the mail survey. Responses were entered into the online survey. The sample of non-responders and call attempts was managed in CASES software (described in more detail below).

Each firm was assigned a unique survey ID number to track sample response and firm response across modalities.

Data Collection Process

The data were collected between July and November 2016. An initial mail packet was sent to all firms in the sample. The initial mailing included a paper copy of the survey, a postage-paid return envelope, and a letter with a link to the online survey. Firms with fewer than 100 employees (N=1,034) received a \$10 cash incentive.¹ The letter explained the purpose of the study and value of the survey data to the state and each participating organization. The letter also explained that after survey completion, all participating employers would receive (via email) a short benchmarking report on the findings that allows them to compare premiums, benefits, and programs to other employers in the state. JSI sent new copies of the mail packet to all non-responding firms at four weeks after the initial mailing and to all small firms at eight weeks.

At two weeks and six weeks after the initial survey packet was mailed out, JSI sent a first -class letter reminder. JSI also sent a reminder to large firms at eight weeks after the initial mailing. These letters reminded respondents of the importance/usefulness of the information; the confidentiality of the information provided; and value to their firm to know where they stand relative to other Massachusetts firms. One day after the reminder letters were sent, JSI also sent an email to all respondents for whom we had a valid email address with duplicate information contained in the letter. The reminder letters included a link to the online survey and a personalized ID number to enter into the survey (to be used for accessing the online survey and helpful for tracking purposes).

In all mailings and emails inviting participation in the survey, JSI invited respondents to complete the survey either by mail or online. For those firms for which there were email contacts, JSI sent 10 separate email reminders over the course of the data collection period. Four weeks after the initial packet mailings, all non-respondents were contacted and attempts were made to complete the survey online or over the telephone. Professional JSI Interviewers received in-depth training by Drs. Maxwell and Mangione on the content of the survey as well the broader perspective on employer health insurance issues. JSI used the Berkeley CATI system (CASES) to manage the call sample (i.e. ensure that all respondents are called at a variety of times of the day and days of the week) and outcomes of the calls. Interviewers could over-ride this call manager when they made a specific appointment for a call-back. JSI called up to 12 times to obtain an interview as long as there was no informed refusal given. If an individual answered the phone, but s/he refused to participate, JSI still obtained minimum information (# of employees in MA, if the firm offers health insurance, and #/% of employees enrolled in coverage). As mentioned above, the online survey was used to complete the survey with phone respondents. In the last two weeks of data collection, JSI concentrated on reaching firms with over 1,000 employees. In total, JSI spent over 1900 hours conducting phone follow-up over 8 weeks and made approximately 14,000 calls.

¹ Based on small firm response rates from past Massachusetts Employer Surveys and others surveys in researchers' experiences, incentives were used as a way to increase likelihood of their response. These incentives were not sent to larger firms given expected response rates, and also because the incentives would be less likely to reach the person who would be filling out the survey in larger firms.

III. Data Collection Results

Table 3 shows the final (screened) sample size and response rate per size stratum. Response rate was calculated as a ratio: the numerator is the number of completed surveys, and the denominator is the total sample size minus the number of ineligible firms as well as those with an invalid address. Despite the changes to the sample (sampling firms rather than establishments, oversampling large firms), the overall response rate was 37%, which is comparable to previous MES surveys and the Kaiser Health Benefit Surveys. The response rate varies significantly by size, with the lowest response rates among the 3-9 size category and over 1,000 employee size categories. All of the other size categories had response rates in the 40s with the exception of 50-99 where we had a 50% response rate.

A total of 206 firms had invalid addresses and 335 firms were ineligible (7% and 11% of the screened sample, respectively). These rates are not comparable to past MES surveys given differences in methodology. The 2016 MES collected survey data via mail, telephone, and web, unlike previous years which administered the survey via mail with telephone reminders. The use of telephone and web surveys and inclusion of larger firm sizes is likely associated with the higher refusal rate (611 firms, or 20% of the screened sample, compared to 7% for the mail-only survey in 2014).

The majority of surveys were collected through the online version, followed by paper and phone. Small firms differed from large firms in their preference for completing the survey on paper or online, with large firms showing a market preference for completing it online.

Table 3. Final Sample Size and Response Rates

Firm Size	Survey Sample	Completed Paper	Completed Online	Completed Telephone	Refusals	Invalid Address	Ineligible	Target Completes	Total Completes	Response Rate
3-9	326	29 (13%)	31 (5%)	9 (19%)	57 (9%)	30 (15%)	95 (28%)	98 (9%)	69 (8%)	34%
10-24	231	40 (18%)	38 (6%)	3 (6%)	53 (9%)	25 (12%)	22 (5%)	92 (9%)	81 (9%)	44%
25- 49	257	40 (18%)	55 (9%)	9 (19%)	51 (6%)	16 (8%)	18 (5%)	103 (10%)	104 (11%)	47%
50-99	220	29 (13%)	66 (10%)	3 (6%)	38 (6%)	12 (6%)	12 (4%)	77 (7%)	98 (11%)	50%
100-199	117	7 (3%)	35 (5%)	4 (9%)	20 (3%)	12 (6%)	10 (3%)	41 (4%)	46 (5%)	48%
200-299	624	38 (18%)	171 (26%)	6 (13%)	116 (19%)	40 (19%)	60 (18%)	218 (21%)	215 (24%)	41%
1000-4999	735	29 (13%)	169 (26%)	11 (23%)	146 (24%)	47 (23%)	66 (20%)	257 (24%)	209 (23%)	34%
5000+	507	5 (2%)	81 (13%)	2 (4%)	130 (21%)	24 (12%)	52 (16%)	177 (17%)	88 (10%)	20%
Total	3017	217	646	47	611	206	335	1063	910	37%

The percentages in table are based on the column totals.

A total of 817 (27%) of the 3,017 employers either refused to answer the screening questions or could not be reached to determine eligibility.

iv. Weighting and Imputation Methods

As discussed earlier, the 2016 MES is a firm-based survey. A final analysis weight is assigned to each responding firm to support firm level analysis. In addition to firm weight, we also computed employee weight, covered employee weight, and eligible employee weight to support various employee level analyses. The employee level weights are derived directly from the firm level weight. This section describes the procedures for calculating the firm level weights and the associated employee level weights. In addition, to control for potential item nonresponse bias, we imputed the missing data on a selected set of survey variables.

To support comparisons with past surveys, we also developed establishment level weights for all Massachusetts establishments associated with the responding firms. The procedures for calculating the establishment level weights are presented later in this section.

Procedures for Computing Firm-Level Weights

The final weights, adjusted for potential bias due to unequal selection probabilities, nonresponse, and frame coverage, may be interpreted as the number of firms (and the number of Massachusetts-based employees within them) in the population that they represent. The final weights were developed in four steps:

1. Base Weight
2. Nonresponse Adjustment
3. Post-stratification Adjustment
4. Weight Trimming

Base Weight

The base weight compensates for firms on the frame not selected into the sample. We calculated it as the inverse of the selection probability for each firm. The sum of the base weight across all sample firms equals the number of firms on the frame both overall and within each sampling stratum.

Nonresponse Adjustments

The nonresponse adjustments compensate for sample firms that failed to respond to the survey. We used a weighting class method to compute the nonresponse adjustments, where the weighting classes are defined by firm size and industry.

For firm size, we used the following classification:

Firm Size	Number of Employees in State
1	3 - 9
2	10 - 24
3	25 - 49
4	50 - 199
5	299 - 999
6	1000 - 4999
7	5000+

For industry, we used the following classification:

SIC Code Range	Description
0001-4999	Agriculture, Forestry, Fishing, Mining, Construction, Manufacturing, Transportation, Public Utilities
5000-6999	Wholesale Trade, Retail Trade, Finance, Insurance, Real Estate
7000-7999 and 8100-8999	Lodging and non-Health Related Services
8000-8099	Health Services

The nonresponse weighting classes were formed by the cross-classification of firms by these two groupings. Within each weighting class, the nonresponse adjustment factor was calculated as the ratio of the total weight over all sample firms to the total weight over all responding firms. We then computed the nonresponse weight as the product of the nonresponse adjustment factor and the base weight.

Poststratification Adjustments

The purpose of post-stratification adjustments is to align the sample distribution to external data sources that are considered more accurate or more up to date than the original sampling frame. For poststratification, we used the Census Bureau’s Statistics of U.S. Businesses (2014), which provides counts of firms by size and industry:

http://www2.census.gov/programs-surveys/susb/tables/2014/us_state_naicssector_large_emplsize_2014.xlsx

For each state, there are counts of firms according to NAICS code (either for a single value or a range of the values for the first two-digits) and “Enterprise Employment Size.” Note that since an enterprise includes “groups of one or more establishments under common ownership or control,”²

² <http://www.census.gov/programs-surveys/susb/technical-documentation/methodology.html> (see first paragraph).

enterprise employment size is determined by the sum of employment under each of the comprised establishments. Each firm is assigned to a fixed set of ranges (some of which overlap):

Enterprise Employment Size Categories:

- 01: Total
- 02: 0-4
- 03: 5-9
- 04: 10-19
- 05: <20
- 06: 20-99
- 07: 100-499
- 08: <500
- 09: 500-749
- 10: 750-999
- 11: 1,000-1,499
- 12: 1,500-1,999
- 13: 2,000-2,499
- 14: 2,500-4,999
- 15: 5,000+

To use these control totals, we aggregated the firm counts according to the combination of post-stratification firm-size level and post-stratification industry-level as shown below. Because these control totals included firms with fewer than 3 employees and our frame did not, for the smallest Post-Stratification Size-Level, 1 – 19 employees, we adjusted the control total by the ratio of

“Count of firms with 3 – 19 Employees” / “Count of firms with 1 – 19 Employees”

This ratio is estimated based on information provided by Survey Sampling Inc. This ratio was applied for firms in each post-stratification industry-level separately. By applying this ratio, our control should be the approximate count of firms with 3 – 19 employees instead of 1 – 19 employees as it was originally.

Because the industry classification used for the control totals is based on NAICS code and our SSI frame data shows industry according to SIC code, we needed to use a crosswalk to determine the appropriate NAICS code for each SIC code. The crosswalk we use is this:

http://www.census.gov/eos/www/naics/concordances/2002_NAICS_to_1987_SIC.xls

In some cases this crosswalk maps a single SIC code to multiple NAICS codes. In this situation, we arbitrarily assigned the lowest of the NAICS codes shown for that SIC.

The post-stratification adjustment is performed cell-wise (similarly to the nonresponse adjustment), with cells defined by firm size and industry. However, because the controls are provided in grouping that are not consistent with those we used for nonresponse adjustment, the classification levels used for firm size and industry differ. For firm size, we used the following classification scheme:

<i>Post-Stratification Firm-Size Level</i>	<i>Number of Employees</i>
1	3 - 19
2	20 - 99
3	100 - 499
4	500+

For industry we used the following classification scheme:

<i>Post-Stratification Industry Level</i>	<i>NAICS Code First Digit</i>	<i>Description</i>
1	1 - 2	Natural Resources, Mining, and Utilities
2	3	Manufacturing
3	4	Trade, Transportation, and Warehousing
4	5	Information, Financing Activities, and Professional and Business Services
5	6	Education and Health Services
6	7 - 8	Leisure, Hospitality, and Other Services

Within each cell formed by the crossing of firm size level and industry level, we computed the post-stratification adjustment factor as the ratio of the count of firms provided by the Statistics of U.S. Businesses to the sum of the nonresponse-adjusted weight. We then computed the preliminary firm weight (after post-stratification adjustment) as the product of the nonresponse-adjusted weight from the previous step and the post-stratification adjustment factor. This resulting preliminary firm weight should then produce cell-wise sums that are exactly equal to the controls from the Statistics of U.S. Businesses.

Weight Trimming

Finally, we trimmed outlier weights in order to reduce their influence on sample estimates. Within each size class defined by firm size stratum, we defined outlier weights as those that are greater than the median plus six times of the interquartile range of the weight distribution. We trimmed weights exceeding this level down to it. Finally, for each of the size classes, we redistributed the trimmed weight amounts back to the responding firms within the size class by inflating the post-stratified firm weight by

the ratio of the sum of pre-trimmed weights to the sum of post trimmed weights, and this yielded final firm weight.

With the firm level weight, we then computed the employee weight as the product of final firm weight and the reported number of Massachusetts-based employees, the covered employee weight as the product of final firm weight and the reported number of covered employees, and the eligible employee weight as the product of the final firm weight and the reported number of coverage-eligible employees.

Table 4 displays the distribution of firms by size and industry in the 2016 sample. It presents how the firm counts change as a result of the firm level weights. Several observations were deleted from the dataset due to lack of key information (i.e. missing both MA employee and national employee counts) or ineligibility (e.g. firm size in MA less than 3), which resulted in N=906.

Table 4: Distribution of Firms by Size and Industry, 2016.

	Firms		
	Sample Size in Survey	Weighted Count	Weighted Percent of Total
All	906	64,679	100%
Enterprise Number of Employees in MA			
3-9 Workers	127	34,869	53.90%
10-24 Workers	148	14,464	22.40%
25-49 Workers	134	6,224	9.60%
50-199 Workers	262	6,424	9.90%
200-999 Workers	169	2,049	3.20%
1,000-4,999 Workers	56	475	0.70%
5,000 or More Workers	9	164	0.30%
Firm Industry (OSHA Classification)			
Agriculture, Forestry and Fishing	10	2,372	3.70%
Mining	2	46	0.10%
Construction	34	3,385	5.20%
Manufacturing	162	2,754	4.30%
Transportation, Communications, Electric, Gas and Sanitary Services	46	1,725	2.70%
Wholesale Trade	79	7,577	11.70%
Retail Trade	82	10,732	16.60%
Finance, Insurance and Real Estate	78	5,066	7.80%
Services	412	31,022	48%

The distribution of firms, number of employees, and covered employees by firm size for the MES 2016 analyses can be seen in Exhibit 1 and Table 5.

Exhibit 1: Distribution of firms, number of employees, and covered employees by firm size.

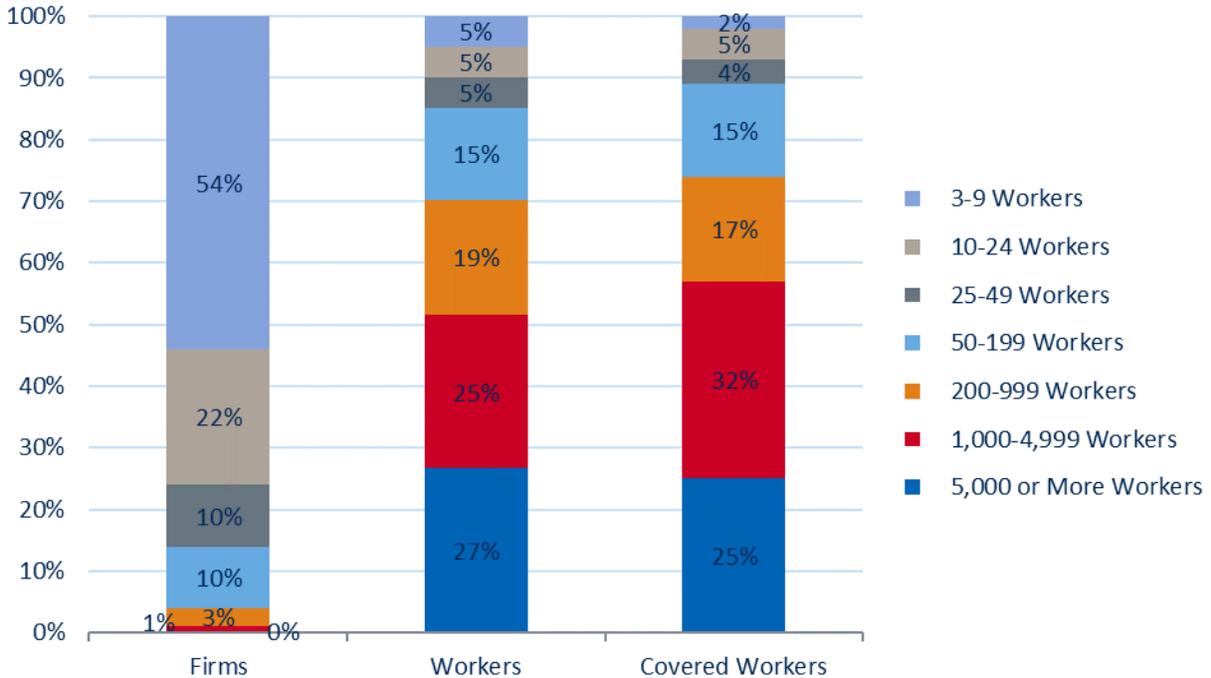


Table 5: Distribution of firms, number of employees, and covered employees by firm size

Number of Employees in Massachusetts	Firms		
	Percent of Firms	Percent of Workers	Percent of Covered Workers
Enterprise Number of Employees in MA			
3-9 Workers	53.93	4.53	2.18
10-24 Workers	22.36	5.39	4.53
25-49 Workers	9.62	5.20	3.89
50-199 Workers	9.93	14.82	14.74
200-999 Workers	3.17	19.04	17.24
1,000-4,999 Workers	0.73	24.51	32.06
5,000 or More Workers	0.25	26.51	25.35

Imputation

To control for potential item nonresponse bias, we imputed the missing data on a select set of survey variables. Imputation is the process of replacing missing data with substituted values. We used the hot deck imputation method for this study. Under hot deck imputation, missing data on a responding unit is replaced with reported data from a “similar” unit. For each imputation variable, the donor was identified in two general steps. First, group the respondent data by the following classification variables to locate eligible donors (i.e., eligible donors must share the same values for the classification variables):

1. Plan Type (where this is relevant to the imputed variable)
2. Industry
3. US size category based on US-based employees
4. Massachusetts size category

For each imputation, there may be additional criteria required of a donor, disqualifying if not met. In cases where there is not donor available within the imputation cell, we repeated this procedure after removing the least important (the highest numbered from above list) classification variable remaining, repeating this until we found at least one eligible donor for each target.

Second, the unit that is closest to the missing data is designated as the donor, where proximity is the absolute difference between the potential donor firm weight and the target firm weight. In cases where more than one potential donor (i.e., within the same imputation cell) is exactly the same distance, we selected randomly among them.

We imputed nine variables as part of the analysis, listed below:

1. Number of employees in Massachusetts who are considered part-time (less than 30 hours a week)
2. Number of employees in Massachusetts eligible for health insurance
3. Whether part-time employees in Massachusetts are eligible for health insurance
4. How many hours per week employees in Massachusetts must work to be eligible for health insurance
5. Number of employees in Massachusetts covered by employer health insurance plan
6. Total monthly premium charged for employee (single coverage)
7. Monthly contribution to premium made by employee (single coverage)
8. Total monthly premium charged for employee (family coverage)
9. Monthly contribution to premium made by employee (family coverage)

Procedures for Computing Establishment-Level Weights for the 2016 Survey

Unlike its predecessors, the 2016 Massachusetts Employer Health Survey (MES) was conducted at the firm level. To support comparisons with estimates derived from the previous surveys conducted at the establishment level, JSI/NORC also calculated establishment level weights for the 2016 MES. In so doing, we consider the 2016 firm sample as a one-stage cluster sample where each firm is a cluster of establishments. As long as a firm is selected into the sample, all Massachusetts-based establishments

associated with the firm are considered part of the sample. Thus, the firm level sample is converted into an establishment level sample.

For the purpose of computing establishment weights, we obtained from SSI the following information for each sample firm: (1) the total number of Massachusetts-based establishments (excluding subsidiaries) associated with the firm, and (2) the size (i.e., number of employees) of each establishment. This information allowed us to generate multiple establishment records for each firm and create size classes at the establishment level. Suppose that sample firm F has k establishments. To support weight calculation at the establishment level, we created k records for firm F , each with its own size measure. All establishments from all sample firms form the establishment level data file. The next step is to assign the firm level response status to all establishments associated with the firm. For example, if firm F is a nonrespondent, all k establishments associated with F are classified as nonrespondents. Finally, we followed the same weighting procedures as described in the early part of this section to develop the establishment level weight, with the exception that no post-stratification adjustments were used. The rest of the Appendix describes the weighting procedures in more detail.

Base Weight

First we computed a base weight for each establishment. Under the assumed one-stage cluster design, the selection probability for each establishment is the same as that of the associated firm. Therefore, the base weight for each establishment is the same as that of the firm.

Nonresponse Adjustments

For nonresponse adjustments, we first defined weighting classes by crossing the original sampling strata (defined at the firm level) and the following set of industry groups:

<i>SIC Code Range</i>	<i>Description</i>
0001-4999	Agriculture, Forestry, Fishing, Mining, Construction, Manufacturing, Transportation, Public Utilities
5000-6999	Wholesale Trade, Retail Trade, Finance, Insurance, Real Estate
7000-7999 and 8100-8999	Lodging and non-Health Related Services
8000-8099	Health Services

We decided not to use establishment level size information to construct weighting classes as planned because the size data received from SSI were determined to be of insufficient quality. For example, the total number of employees across all establishments within a firm is not consistent to the number of employees for the firm. Within each weighting class, the nonresponse weighting adjustment factor is computed as the total base weight across all cases to the total base weight across respondents. For each responding establishment, the final weight is the product of the base weight and the nonresponse weighting adjustment factor.

We then trimmed outlier establishment level weights in order to reduce their influence on sample estimates. Within each of the sampling strata, we define outlier establishment weights as those that are greater than the median plus six times of the interquartile range of the weight distribution. We trimmed weights exceeding this level down to it. Next, we redistributed the trimmed weight amounts

back to the responding establishments in the stratum such that the total weight does not change after trimming.

V. Analysis

The analyses were conducted using the statistical computing package SAS. The firm size classification for these analyses was based on firms' self-reported number of employees in Massachusetts.

In some cases, the analytical approach for the 2016 MES data differed from past MES data analyses (e.g. means using eligible employee weights vs. medians using establishment weights for take-up rate). Table 6 summarizes the weight used for specific variables.

Table 6: Summary of Weights Used in 2016 MES Firm-Based Analysis

<i>Survey Weight</i>	<i>Analyses Using Weight</i>	<i>Reasoning Behind Weight</i>
Firm Weight	<ul style="list-style-type: none"> • Offer Rate • Self-Insurance • Reasons for Offering or Not Offering Insurance • Cost Control Strategies • Use of Broker • Use of Health Connector 	Firm-level weighting is used when the decision-making power rests with the firm rather than the employee. Since the decisions made by a firm apply to all employees, weighting by the size of the firm as a whole for these variables is most appropriate.
Employee Weight	<ul style="list-style-type: none"> • Eligibility Rate • Coverage Rate 	Employee-level weighting is used for analyses that apply to all employees regardless of whether they enroll in insurance or not, such as how many employees are eligible or covered by health insurance. While the firm makes the decision to offer insurance, it is the individual employee who is eligible or covered.
Covered Employee Weight	<ul style="list-style-type: none"> • Premiums • Cost-sharing • Enrollment by Carrier • Enrollment by Product Type 	Covered employee-level weighting is used for analyses that apply only to individuals that enroll in the employer's plan. Individuals that do not enroll in a plan are not subject to a plan's premium or cost-sharing requirements, so it is not appropriate to include them in analyses for these variables.
Eligible Employee Weight	<ul style="list-style-type: none"> • Take-up Rate 	Eligible employee-level weighting is used for only one analysis: take-up rate. Here, the decision about whether or not to enroll in insurance can only be made by those who are eligible to enroll. Thus, we would not want to include all employees, since not all have the ability to decide whether or not to enroll.

In the trend analyses, we used the same analytical approach as in past MES's to make the estimates across time more comparable. Also, because MES data prior to 2016 was collected on establishments rather than firms, for the trend analyses, we calculated estimates for 2016 using an establishment weight. Trend analysis estimates should be interpreted with consideration to this important difference in sampling frame and other key differences between the 2016 and past surveys as described earlier.

Where there are comparisons to national data, the national estimates come from the 2016 Kaiser Family Foundation and Health Research & Educational Trust Employer Health Benefits Survey (<http://kff.org/health-costs/report/2016-employer-health-benefits-survey/>).