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U.S. Department of Commerce

Medical Expenditure Panel Survey – Insurance Component (MEPS-IC)

2022 Non-response Bias Analysis of Private Establishments

Prepared for AHRQ by Ji Hyang Cheon with assistance from Brandon Flanders, Susanna Winder, Matthew Thompson, and Ruiyi Li from Census.

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Introduction

The Medical Expenditure Panel Survey – Insurance Component (MEPS-IC) is an annual survey of employers, including government and private establishments, on the health insurance offered to their employees. Respondents are given the opportunity to respond by mailout questionnaire, online or through the telephone. For the 2022 MEPS-IC, approximately 42,000 private establishments were sampled, 2,500 (5.8%) of which were out of business or undeliverable-as-addressed, leaving 40,000 (94.2%) establishments.¹ Of the 40,000 establishments, 22,000 (55.1%) responded and 18,000 (44.9%) did not respond. When an expected unit response rate is below 60 percent, [OMB Standards & Guidelines for Statistical Surveys](#) recommends conducting a nonresponse bias analysis. This nonresponse analysis explores the potential for nonresponse bias for the private establishments in sample. As shown in the formula below, nonresponse bias is a function of both the nonresponse rate and the difference between the respondent mean and the nonrespondent mean on the variable of interest:

$$\bar{Y}_r = \bar{Y}_n + \left(\frac{m}{n} \right) [\bar{Y}_r - \bar{Y}_m]$$

OR

Respondent Mean = Full Sample Mean + (Nonresponse Rate)*(Respondent Mean –Nonrespondent Mean)

In the MEPS-IC, we are most concerned about nonresponse bias in our key estimates; the percent of establishments offering health insurance, the percent of employees offered health insurance, and the percent of employees enrolled in health insurance. Unfortunately, we do not have these estimates for the nonresponding establishments so we cannot directly measure the potential nonresponse bias in these estimates. However, we have sampling frame data that are correlated with the key survey estimates for both responding and nonresponding establishments. These variables include the size of the firm the establishment is in (number of employees), and the industry group in which the establishment is classified. This analysis will compare the responding establishments to the nonresponding establishments on these sampling frame variables, using both a chi-square test of independence and a t-test to test differences in means and percentages.

We also analyzed the relationship between Prescreener refusals and the sampling frame variables. Prescreener is an operation conducted prior to mailing out/emailing the survey, where telephone interviewers research company contacts and reach out to potential respondents by telephone to confirm mailing and email information. The Prescreener operation also confirms whether the establishment does or does not have insurance. The 2022 Prescreener included all private establishments in sample except for those classified as Complex Multi-Units (CMUs). In total 37,000 private establishments were sent to Prescreener. Of these, 4,500 refused to participate in the Prescreener. These Prescreener refusals were still mailed a questionnaire but were not contacted again during Telephone Follow-up. This analysis will compare the refusal establishments to the nonrefusal establishments on these sampling frame variables, using both a chi-square test of independence and a t-

¹ The response rate numbers in the document have been rounded for nondisclosure.

test to test differences in means and percentages. Nonrefusal establishments may or may not decide to participate in the survey (i.e., they could be respondents or nonrespondents).

Lastly, we analyzed the relationship between Telephone Follow-Up (TFU) response and the sampling frame variables. Private establishments that did not respond by mail or online were sent to TFU. The TFU includes the Computer Assisted Telephone Interview (CATI) TFU and Paper TFU. CMUs are excluded from the following TFU analysis since they receive special handling by headquarter’s analysts and are not processed through CATI or Paper TFU. This analysis will use both a chi-square test of independence and an ANOVA to test differences in means and percentages.

The rest of this memo includes four sections where the results of the nonresponse analysis, the Prescreener refusal analysis, and the TFU response analysis were presented, followed by a conclusion section. All tables present the output of analyses using weighted samples except Tables 12 and 14.

Nonresponse Analysis

1. Response by Firm Size

Firm size was highly related with the survey response. Private firms with ‘Less than 10 employees’ and ‘1000 or more employees’ responded with rates of 50.9% and 43.8%, respectively, and were less than the average response rate (51.6%), whereas firms with other sizes had response rates over 51.6%. Also, the firm sizes of responding establishments were much smaller than those of nonresponding establishments.

Table 1. The results of a chi-square test of the relationship between firm size and response

	Firm Size	Responding	Nonresponding	Total
Frequency	Less than 10	2,196,000	2,116,000	4,312,000
Expected		2,223,000	2,089,000	
Percent		30.0	29.0	59.0
Row Pct		50.9	49.1	
Col Pct		58.3	59.7	
	10 to 24	500,600	362,200	862,800
		444,800	418,100	
		6.9	5.0	11.8
		58.0	42.0	
		13.3	10.2	
	25 to 99	328,800	231,100	559,800
		288,600	271,300	
		4.5	3.2	7.7
		58.7	41.3	
		8.7	6.5	
	100 to 999	252,400	201,700	454,100
		234,100	220,000	
		3.5	2.8	6.2

	55.6	44.4	
	6.7	5.7	
1,000 or more	491,200	631,200	1,122,000
	578,500	543,800	
	6.7	8.6	15.4
	43.8	56.2	
	13.0	17.8	
Total	3,769,000	3,542,000	7,311,000
	51.6	48.5	100

Statistic	DF	Value	Prob
Chi-Square	4	56,880	<.0001
Cramer's V		0.0882	

Table 2. The difference in the mean firm size between responding and nonresponding establishments

	N	Mean	Std Dev	Std Err
Responding	22,010	5,803	392,000	201.9
Nonresponding	17,960	13,430	1,002,000	532.3
Diff (2-1)		7,627	731,900	541.6
		DF	t Value	Pr > t
		23,120	13.40	<.0001

Table 3. The percent distribution of responding and nonresponding establishments across the firm size categories and the results of testing the difference in these percentages

Firm Size	Responding (%)	Nonresponding (%)	DF	t Value	Pr > t
Less than 10	58.3	59.7	38,460	2.99	0.0028
10 to 24	13.3	10.2	39,650	-9.51	<.0001
25 to 99	8.7	6.5	39,770	-8.31	<.0001
100 to 999	6.7	5.7	39,330	-4.16	<.0001
1,000 or more	13.0	17.8	36,080	13.12	<.0001
Total	100	99.9			

2. Response by Industry Group

The industries with a higher than the average response rate (51.6%) were mining and manufacturing (58.7%), wholesale trade (58.0%), and professional services (56.2%). The response rate for the remainder of industries was lower than the average response rate. As shown in Table 5, the difference between the response and the nonresponse rate was significant in most industry groups except for 'Agriculture, Fishing, and Forestry group' and 'Financial Services and Real Estate group'.

Table 4. The results of a chi-square test of the relationship between industry group and response

	Industry	Responding	Nonresponding	Total
Frequency	Agriculture, Fishing, and Forestry	71,920	74,610	146,500
Expected		75,530	71,000	
Percent		1.0	1.0	2.0
Row Pct		49.1	50.9	
Col Pct		1.9	2.1	
	Mining and Manufacturing	162,900	114,800	277,600
		143,100	134,500	
		2.2	1.6	3.8
		58.7	41.3	
		4.3	3.2	
	Construction	328,900	356,600	685,500
		353,300	332,100	
		4.5	4.9	9.4
		48.0	52.0	
		8.7	10.1	
	Utilities and Transportation	117,500	141,700	259,200
		133,600	125,600	
		1.6	2.0	3.6
		45.3	54.7	
		3.1	4.0	
	Wholesale Trade	199,900	145,000	344,900
		177,800	167,100	
		2.7	2.0	4.7
		58.0	42.0	
		5.3	4.1	
	Financial Services and Real Estate	451,000	409,100	860,100
		443,300	416,700	
		6.2	5.6	11.8
		52.4	47.6	
		12.0	11.6	
	Retail Trade	448,900	486,400	935,300
		482,100	453,200	
		6.1	6.7	12.8
		48.0	52.0	
		11.9	13.7	
	Professional Services	1,068,000	834,000	1,902,000
		980,500	921,600	
		14.6	11.4	26.0
		56.2	43.9	
		28.3	23.5	
	Other	919,500	980,200	1,900,000
		979,300	920,500	
		12.6	13.4	26.0

	48.4	51.6	
	24.4	27.7	
Total	3,769,000	3,542,000	7,311,000
	51.6	48.5	100

Statistic	DF	Value	Prob
Chi-Square	8	47,830	<.0001
Cramer's V		0.0809	

Table 5. The percent distribution of responding and nonresponding establishments across the industry group and the results of testing the difference in these percentages

Industry	Responding (%)	Nonresponding (%)	DF	t Value	Pr > t
Agriculture, Fishing, and Forestry	1.9	2.1	37,600	1.40	0.1616
Mining and Manufacturing	4.3	3.2	39,800	-5.68	<.0001
Construction	8.7	10.1	37,320	4.55	<.0001
Utilities and Transportation	3.1	4.0	36,240	4.70	<.0001
Wholesale Trade	5.3	4.1	39,710	-5.73	<.0001
Financial Services and Real Estate	12.0	11.6	38,600	-1.29	0.1966
Retail Trade	11.9	13.7	37,380	5.40	<.0001
Professional Services	28.3	23.5	39,170	-10.94	<.0001
Other	24.4	27.7	37,730	7.40	<.0001
Total	99.9	100			

Prescreener Refusal Analysis

1. Prescreener Refusal by Firm Size

The average Prescreener refusal rate was 19.4%. The refusal rate of private establishments increased as the firm size decreased. In other words, firms with 'less than 10 employees' had the highest refusal rate of 22.9%, whereas firms with '1,000 or more' had the lowest refusal rate of 3.1%. Therefore, the size of firms that refused the Prescreener was smaller than those of nonrefusal firms. As shown in Table 8, the difference between the refusal rate and the nonrefusal rate was significant for all firm size categories except the firm size with 10 to 24.

Table 6. The results of a chi-square test of the relationship between firm size and prescreener refusal

	Firm Size	Refusal	Nonrefusal	Total
Frequency	Less than 10	986,600	3,325,000	4,312,000
Percent		13.5	49.1	63.7
Row Pct		22.9	77.1	
Col Pct		75.2	60.9	
	10 to 24	175,300	687,600	862,800
		2.6	10.2	12.7
		20.3	79.7	

	13.4	12.6	
25 to 99	91,480	468,400	559,800
	1.4	6.9	8.3
	16.3	83.7	
	7.0	8.6	
100 to 999	40,060	411,100	451,100
	0.6	6.1	6.7
	8.9	91.1	
	3.1	7.5	
1,000 or more	17,950	568,200	586,200
	0.3	8.4	8.7
	3.1	96.9	
	1.4	18.4	
Total	1,311,000	5,460,000	6,772,000
	19.4	80.6	100.0

Statistic	DF	Value	Prob
Chi-Square	4	169,500	<.0001
Cramer's V		0.1582	

Table 7. The difference in the mean firm size between refusal and nonrefusal establishments

	N	Mean	Std Dev	Std Err
Refusal	4,540	99.64	17,740	15.49
NonRefusal	32,360	1,272	108,300	46.36
Diff (2-1)		1,172	101,600	98.84
		DF	t Value	Pr > t
		36,730	-23.97	<.0001

Table 8. The percent distribution of refusal and nonrefusal establishments across the firm size categories and the results of testing the difference in these percentages.

Firm Size	Refusal (%)	Nonrefusal (%)	DF	t Value	Pr > t
Less than 10	75.2	60.9	6,284	20.61	<.0001
10 to 24	13.4	12.6	5,816	1.44	0.1506
25 to 99	7.0	8.6	6,183	-3.92	<.0001
100 to 999	3.1	7.5	7,905	-15.19	<.0001
1,000 or more	1.4	10.4	15,550	-37.35	<.0001
Total	100.0	100.0			

2. Prescreener Refusal by Industry Group

The prescreener refusal rate of establishments was different depending on the industry group. Among the industry groups, the difference between the refusal and the nonrefusal rate was significant for 'Construction', 'Financial Services and Real Estate', 'Professional Services', and 'Other'.

Table 9. The results of a chi-square test of the relationship between industry group and prescreener refusal

	Industry	Refusal	Nonrefusal	Total
Frequency	Agriculture, Fishing, and Forestry	25,890	120,600	146,500
Percent		0.4	1.8	2.2
Row Pct		17.7	82.3	
Col Pct		2.0	2.2	
	Mining and Manufacturing	53,140	221,700	274,800
		0.8	3.3	4.1
		19.3	80.7	
		4.1	4.1	
	Construction	154,300	530,300	684,600
		2.3	7.8	10.1
		22.5	77.5	
		11.8	9.7	
	Utilities and Transportation	42,080	200,200	242,300
		0.6	3.0	3.6
		17.4	82.6	
		3.2	3.7	
	Wholesale Trade	58,210	271,700	330,000
		0.9	4.0	4.9
		17.6	82.4	
		4.4	5.0	
	Financial Services and Real Estate	113,000	624,900	737,900
		1.7	9.2	10.9
		15.3	84.7	
		8.6	11.4	
	Retail Trade	163,100	591,200	754,300
		2.4	8.7	11.1
		21.6	78.4	
		12.4	10.8	
	Professional Services	280,300	1,506,000	1,787,000
		4.1	22.2	26.4
		15.7	84.3	
		21.4	27.6	
	Other	421,400	1,394,000	1,815,000
		6.2	20.6	26.8
		23.2	76.8	
		32.1	25.5	
	Total	1,311,000	5,460,000	6,772,000

	19.4	80.6	100.0
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Statistic	DF	Value	Prob
Chi-Square	8	48,850	<.0001
Cramer's V		0.0849	

Table 10. The percent distribution of refusal and nonrefusal establishments across the industry group and the results of testing the difference in these percentages

Industry	Refusal (%)	Nonrefusal (%)	DF	t Value	Pr > t
Agriculture, Fishing, and Forestry	2.0	2.2	6,050	-1.06	0.2913
Mining and Manufacturing	4.1	4.1	5,888	-0.02	0.9808
Construction	11.8	9.7	5,667	4.06	<.0001
Utilities and Transportation	3.2	3.7	6,081	-1.62	0.1045
Wholesale Trade	4.4	5.0	6,049	-1.63	0.1021
Financial Services and Real Estate	8.6	11.4	6,297	-6.25	<.0001
Retail Trade	12.4	10.8	5,726	3.09	0.002
Professional Services	21.4	27.6	6,155	-9.45	<.0001
Other	32.1	25.5	5,705	9.01	<.0001
Total	100.0	100.0			

TFU Analysis

1. TFU by Firm Size

Among private, non-CMU establishments, 26,500 (71.6%) were eligible to be contacted by CATI TFU, and 10,500 (28.4%) by Paper TFU, if they did not respond by mail or online. CATI TFU was used for Single Unit (SU) establishments and Paper TFU was used for multiunit (MU) establishments. At the time the input file was created, there were 21,500 nonresponding establishments eligible to be sent to the TFU. Among these eligible establishments, 5500 (25.6%) responded to the TFU. In Table 11, TFU responding indicates the establishments that participated in the survey via the TFU. Non-TFU responding indicates the establishments that participated in the survey via mail or online, and Nonresponding indicates the establishments that did not respond to the survey. As shown in Table 12, the rate differences among the TFU responding, Non-TFU responding and the Nonresponding were significant for all firm size categories.

Table 11. The results of a chi-square test of the relationship between firm size and TFU response

	Firm Size	TFU Responding	Non-TFU Responding	Nonresponding	Total
Frequency	Less than 10	342,400	1,853,000	2,116,000	4,312,000
Percent		5.1	27.4	31.3	63.7
Row Pct		7.9	43.0	49.1	
Col Pct		49.2	64.1	66.4	
	10 to 24	75,170	425,400	362,200	862,800

	1.1	6.3	5.4	12.7
	8.7	49.3	42.0	
	10.8	14.7	11.4	
25 to 99	43,850	284,900	231,100	559,800
	0.7	4.2	3.4	8.3
	7.8	50.9	41.3	
	6.3	9.9	7.3	
100 to 999	49,480	203,000	198,700	451,100
	0.7	3.0	2.9	6.7
	11.0	45.0	44.0	
	7.1	7.0	6.2	
1,000 or more	184,500	123,900	277,800	586,200
	2.7	1.8	4.1	8.7
	31.5	21.1	47.4	
	26.5	4.3	8.7	
Total	695,300	2,890,000	3,186,000	6,772,000
	10.3	42.7	47.1	100.0

Statistic	DF	Value	Prob
Chi-Square	8	380,200	<.0001
Cramer's V		0.1676	

Table 12. The percent distribution of TFU establishments across the firm size categories and the results of testing the difference in these percentages (Unweighted)

Firm Size	TFU Responding	Non-TFU Responding	Nonresponding	R-Square	DF	F Value	Pr > F
Less than 10	13.8	27.2	26.0	0.01126	2	210.0	<.0001
10 to 24	6.2	13.6	10.2	0.006716	2	124.8	<.0001
25 to 99	8.6	18.4	13.1	0.009724	2	181.2	<.0001
100 to 999	14.5	21.4	17.6	0.003982	2	73.75	<.0001
1,000 or more	56.9	19.5	33.1	0.07341	2	1462	<.0001
Total	100.0	100.1	100.0				

2. TFU by Industry Group

The rates of TFU responding, Non-TFU responding, and nonresponding were different depending on the industry group. Among nine industry groups, the rate differences among the TFU responding, Non-TFU responding, and nonresponding were significant for eight industry groups except for Wholesale industry group.

Table 13. The results of a chi-square test of the relationship between industry groups and TFU response

	Industry	TFU Responding	Non-TFU Responding	Nonresponding	Total
Frequency	Agriculture, Fishing, and Forestry	11,380	60,480	74,610	146,500
Percent		0.2	0.9	1.1	2.2
Row Pct		7.8	41.3	50.9	
Col Pct		1.6	2.1	2.3	
	Mining and Manufacturing	24,660	137,400	112,700	274,800
		0.4	2.0	1.7	4.1
		9.0	50.0	41.0	
		3.6	4.8	3.5	
	Construction	57,190	271,500	356,000	684,600
		0.8	4.0	5.3	10.1
		8.4	39.7	52.0	
		8.2	9.4	11.2	
	Utilities and Transportation	25,330	86,170	130,800	242,300
		0.4	1.3	1.9	3.6
		10.5	35.6	54.0	
		3.6	3.0	4.1	
	Wholesale Trade	38,740	154,000	137,300	330,000
		0.6	2.3	2.0	4.9
		11.7	46.7	41.6	
		5.6	5.3	4.3	
	Financial Services and Real Estate	84,140	314,600	339,200	737,900
		1.2	4.7	5.0	10.9
		11.4	42.6	46.0	
		12.1	10.9	10.7	
	Retail Trade	83,420	320,800	350,100	754,300
		1.2	4.7	5.2	11.1
		11.1	42.5	46.4	
		12.0	11.1	11.0	
	Professional Services	186,200	831,600	768,700	1,787,000
		2.8	12.3	11.4	26.4
		10.4	46.6	43.0	
		26.8	28.8	24.1	
	Other	184,300	714,000	916,700	1,815,000
		2.7	10.5	13.5	26.8
		10.2	39.3	50.5	
		26.5	24.7	28.8	
	Total	695,300	2,890,000	3,186,000	6,772,000
		10.3	42.7	47.1	100.0

Statistic		DF	Value	Prob
Chi-Square		16	47,770	<.0001
Cramer's V			0.0594	

Table 14. The percent distribution of TFU response across the industry group and the results of testing the difference in these percentages (Unweighted)

Industry	TFU Responding	Non-TFU Responding	Nonresponding	R-Square	DF	F Value	Pr > F
Agriculture, Fishing, and Forestry	0.7	0.9	1.2	0.000293	2	5.41	0.0045
Mining and Manufacturing	7.8	8.7	7.7	0.000308	2	5.68	0.0034
Construction	5.1	7.6	7.5	0.001096	2	20.24	<.0001
Utilities and Transportation	4.6	3.5	4.2	0.000453	2	8.37	0.0002
Wholesale Trade	5.9	5.7	5.4	0.000059	2	1.09	0.3377
Financial Services and Real Estate	12.0	9.8	10.4	0.000579	2	10.69	<.0001
Retail Trade	11.8	10.8	9.6	0.000662	2	12.22	<.0001
Professional Services	27.7	28.5	25.6	0.000878	2	16.21	<.0001
Other	24.4	24.7	28.4	0.001810	2	33.45	<.0001
Total	100.0	100.2	100.0				

Conclusion:

This report presented six analyses including the nonresponse analysis, the Prescreener refusal analysis, and the TFU analysis by firm size and industry group, respectively. The nonresponse analysis showed the response rate was different depending on the firm size, and the firms with less than 10 employees and 1000 or more employees were the lowest responding groups. The prescreener refusal analysis showed that the refusal rate was the highest in the firms with less than 10 employees and the lowest in the firms with 1,000 or more employees. The difference between the prescreener refusal and the nonrefusal rate was only significant for four industry groups. The TFU analysis showed that the TFU response rate was generally increasing as the firm size was getting bigger. The TFU response rate was different depending on the industry group.

The response rate and the Prescreener refusal rate generally decreased as the firm size increased. However, the TFU response rate increased as the firm size increased. Therefore, the TFU may be an effective way to induce participation in the survey for the establishments with large sizes. Among industry groups, the nonresponse rates of Construction, Utilities and Transportation, Retail Trade, and Other industry groups were higher than the average nonresponse rates. Also, among industry groups, the Prescreener refusal rates of Construction, Retail Trade, and Other were higher than the average refusal rates. However, the TFU response rates of Utilities and Transportation, Wholesale Trade, Financial Services and Real Estate, Retail Trade, and Professional Services industry groups were higher than the average TFU response rates. Even though the TFU had the greatest effect on increasing the survey participation of Retail Trade industry group, the TFU may be an effective way to raise the survey participation for the most industry groups.