1   **Supplementary Appendix**

2   **Methods**

3   *Nonrespondent Survey*

4   A follow-up Nonrespondent Survey was sent to a random sample of 21.6% of panel

5   members who did not respond to the initial Screening Module. These participants were

6   recruited using the Screening Module, and completed demographic, headache frequency,

7   and symptom questions to assess migraine status in order to estimate possible

8   nonresponse bias. The AMS/AMPP diagnostic module and Silberstein-Lipton CM

9   criterions were used to make the same modified *ICHD-3b* migraine and Silberstein-

10   Lipton CM classifications used in the CaMEO sample. Cases not meeting criteria for EM

11   or CM were treated homogenously, though some might have met criteria for probable

12   migraine or other non-migraine headache types. Respondents to this survey are referred

13   to as Nonrespondent Survey respondents.

14   **Assessing Nonresponse Bias**

15   To assess nonresponse bias, the CaMEO total respondent sample (whether or not they

16   met inclusion criteria, including those without fully completed surveys) were compared

17   with nonrespondents on Research Now panel demographics. In order to fairly assess the

18   contribution of disease and comorbidity to nonresponse, an additional analysis was

19   conducted comparing the CaMEO baseline sample (those meeting inclusion criteria) with

20   the migraine subset of the Nonrespondent Survey respondent sample. Case rates for EM

21   and CM were also compared between the CaMEO and Nonrespondent Survey respondent

22   samples.

23   Descriptive and inferential statistics were used to compare nonrespondents with

24   respondents. Because of the exceedingly large sample sizes in CaMEO, even inferential

25   tests must be viewed as descriptive as a result of the extreme statistical power inflation.

26   **Results**

27   *Total Nonrespondent Sample Demographic Differences*

28   Comparing the panel demographics (Research Now panel demographics database) of

29   the CaMEO total respondent sample (n=80,783) with those of the baseline screener

30   nonrespondents (n=408,754) found that the groups differed significantly on several

31   demographic characteristics (**Supplementary Table 1**). However, because of large

32   sample sizes, all comparisons were over-powered resulting in significant *P* values for

33   even trivial differences between respondents and nonrespondents. For this reason, we

34   evaluated Nonrespondent Survey response rates and comparisons to the CaMEO

35   populations in greater detail, and elected to initiate a re-survey of nonrespondents to more

36   fully understand the effect of nonresponse (**Supplementary Table 2**).

37   *Nonrespondent Survey Response*

38   The Nonrespondent Survey was sent to 88,451 (21.6%) of the baseline nonrespondents

39   (n=408,754); 8,403 responses were received, and 8,225 of these contained usable data.

40   The proportion of baseline screener nonrespondents participating and contributing usable

41   data in this re-survey was 2.0% (8,225/408,754) of the total nonrespondent pool, and

42   9.3% (8,225/88,451) of those invited. The migraine case rate was slightly lower among

43   CaMEO respondents (28.7% [16,789/58,418]; **Figure 1**) than Nonrespondent Survey

44   respondents (33.3% [2,737/8,225]). Criteria for EM were met by 26.2% (15,313/58,418)

45 of respondents versus 31.3% (2,576/8,225) of the Nonrespondent Survey sample, and

46 2.5% (1,476/58,418) of CaMEO respondents met criteria for CM versus 2.0%

47 (161/8,225) of the Nonrespondent Survey sample. Of the CaMEO respondents

48 (n=16,789), 91.2% met criteria for EM and 8.8% met CM criteria (**Figure 1**); of the

49 Nonrespondent Survey sample with migraine (n=2,737), 94.1% and 5.9%, respectively,

50 met EM and CM criteria. Because of the brief nature of the re-survey, the completion

51 time inclusion criterion applied to CaMEO respondents was not applied to nonrespondent

52 re-survey completers, nor were the past year headache and migraine inclusion criteria,

53 though all other CaMEO inclusion criteria were applied.

54   As with the comparison of CaMEO total respondent sample and baseline screener

55 nonrespondent panel demographics, comparison of the migraine subset of the

56 Nonrespondent Survey respondent sample (n=2,737) and CaMEO respondents

57 (n=16,789) revealed exaggerated significance caused by the large sample sizes

58 (**Supplementary Table 2**). Even for trivial magnitudes of difference, relatively large and

59 significant odds ratios were observed; we therefore deemphasize these differences. An

60 additional bootstrap analysis (available upon request) was conducted, which demonstrates

61 that under repeated sampling of reasonably sized samples, these same differences are

62 statistically non-significant.

Supplementary Tables

Supplementary Table 1. **Demographic Comparison of Nonrespondents From the Research Now Panel Data and CaMEO Respondents***

Characteristic	Nonrespondent* (N=408,754)	CaMEO Respondent (N=80,783)	Respondents vs Nonrespondents	
			Point Estimate (95% CI)[‡]	*P* value[†]
Age (years), mean (SD)	39.2 (14.7)	45.8 (16.6)	6.65 (6.54–6.77)	<0.001
Female, n (%)[§]	232,996 (57.0)	47,480 (58.8)	1.08 (1.06–1.09)	<0.001
Race, n (%)[§]				
White	262,340 (65.8)	60,216 (76.2)	1.67 (1.64–1.70)	<0.001
Married, n (%)[§]	187,923 (46.7)	44,015 (54.8)	1.38 (1.36–1.40)	<0.001
Employed, n (%)[§]	250,173 (61.7)	45,170 (56.2)	0.80 (0.79–0.81)	<0.001
Annual household income above median, n (%)[§‖]	113,648 (30.5)	28,440 (38.3)	1.42 (1.40–1.44)	<0.001

*Data are from Research Now panel demographics database and compared with the total number of returns before data cleaning (n=80,783).

[†]Continuous variable contrasts based on *t* test for mean difference; binary variable contrasted based on logistic regression odds ratio for difference in proportions.

[‡]All point estimates are odds ratios, except for age, which is mean difference.

[§]Reference values are men, other race, not married/civil union, not employed full-time/part-time, and annual household income ≤ median income bracket ($50,000–$74,999).

[‖]Above median household income of the Research Now panel demographics.

Supplementary Table 2. Demographics of the Migraine-Only Nonrespondent Survey Population and CaMEO Respondents

Characteristic	Migraine NRS Subpopulation (N=2,737)	CaMEO Respondents (N=16,789)	Respondents vs Migraine NRS Population	
			Point Estimate (95% CI)	*P* value
Demographics				
Age (years), mean (SD)[*]	40.7 (13.2)	40.7 (14.4)	0.03 (–0.55 to 0.60)	0.93
Female, n (%)[†,‖]	1,975 (72.2)	12,495 (74.4)	**1.12 (1.03–1.23)**	0.01
Race, n (%)[†,‖]				
White	1,904 (71.7)	12,678 (78.5)	**1.44 (1.31–1.58)**	<0.001
Socioeconomics				
Married/civil union, n (%)[†,‖]	1,329 (48.7)	8,136 (48.6)	1.00 (0.92–1.08)	0.94
Education, ≥Bachelors degree, n (%)[†,‖]	1,130 (41.3)	8,724 (52.0)	**1.54 (1.42–1.67)**	<0.001
Current employment, full or part-time, n (%)[†,‖]	1,713 (62.6)	9,896 (58.9)	**0.86 (0.79–0.93)**	<0.001
Annual household income ≥median, n (%)[†,§,‖]	1,320 (54.8)	9,932 (59.6)	**1.21 (1.11–1.32)**	<0.001
Annual individual income ≥median, n (%)[†,§,‖]	980 (39.6)	6,692 (40.0)	1.02 (0.93–1.11)	0.72
Health insurance, n (%)[†,‖]	2,243 (82.0)	14,147 (84.3)	**1.18 (1.06–1.31)**	0.002
Headache/medical characteristics				
Episodic migraine, n (%)[†,‖]	2,576 (94.1)	15,313 (91.2)	**0.65 (0.55–0.77)**	<0.001
Chronic migraine, n (%)[†,‖]	161 (5.9)	1,476 (8.8)	**1.54 (1.30–1.82)**	<0.001
Headache days (last 90 days), mean (SD)[‡]	12.3 (15.8)	15.1 (18.0)	**1.23 (1.18–1.29)**	<0.001
Headache days (last 30 days), mean (SD)[‡]	3.8 (5.3)	4.7 (6.0)	**1.25 (1.20–1.32)**	<0.001
Age of headache onset (years), mean (SD)[*]	23.1 (11.4)	22.8 (11.6)	–0.29 (–0.76 to 0.18)	0.23

Zero non-migraine comorbidities, n (%)[†,‖]	1,605 (58.6)	9,209 (54.9)	**0.86 (0.79–0.93)**	<0.001

75 ANOVA=analysis of variance; NRS=nonrespondent survey.

76 *Modeled as continuous and normal variables. Descriptive statistics are means with SD. Mean difference contrasts and *P* values were obtained from ANOVA.

77 †Modeled as binary categorical variables. Descriptive statistics are N with %. Odds ratio contrasts and *P* values were obtained from binary logistic regressions.

78 ‡Modeled as negative binomial counts, associated descriptive statistics are means with SD in parentheses and associated rate ratio contrasts and *P* values were

79 obtained from negative binomial regressions.

80 §Individual and household median income estimates for 2012 were obtained from the US census estimates given in the 2013 American Community Survey

81 Report.

82 ‖Reference values are male, other race, not married/civil union, <Bachelors degree, not employed full-time/part-time, annual household income ≤ median income

83 bracket, individual household income ≤median income bracket, non-insured individuals, not episodic migraine, not chronic migraine, and have non-migraine

84 comorbidities present.

85 Contrasts reported in a bold font are statistically significant at the alpha=0.05 level. Note that of the n=8,245 nonrespondents n=2,745 met criteria for migraine,

86 but of these n=8 did not match age data and were therefore deleted resulting in an analysis sample of n=2,737.

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