

## **APPENDIX**

### **Appendix Exhibit A1. Burnout module survey questions**

#### **I FEEL BURNED OUT FROM MY WORK**

Every day  
A few times per week  
Once a week  
A few times a month  
Once a month or less  
A few times a year or less  
Never

#### **I HAVE BECOME MORE CALLOUS TOWARD PEOPLE SINCE I TOOK THIS JOB**

Every day  
A few times per week  
Once a week  
A few times a month  
Once a month or less  
A few times a year or less  
Never

SOURCE: American Board of Family Medicine recertification exam module.

## **Appendix Exhibit A2. Beneficiary attribution to physicians**

Using the two-step attribution method from the Merit-Based Incentive Payment System (MIPS) 2017 patient attribution logic, beneficiaries were attributed to a single TIN-NPI in a two-step process that based on the amount of primary care services received (as measured by Medicare allowed charges during the performance period) and the clinician specialties that performed these services. Only beneficiaries who received primary care services during the performance period were considered in attribution.

The following two steps were used to attribute beneficiaries to a TIN-NPI:

Step 1: If a beneficiary received more primary care services from an individual TIN-NPI that was classified as either a primary care physician (PCP), nurse practitioner (NP), physician assistant (PA) or clinical nurse specialist (CNS) than from any other TIN-NPI during the performance period, then the beneficiary is attributed to that TIN-NPI. Primary care services include evaluation and management services provided in office and other non-inpatient and non-emergency-room settings, as well as initial Medicare visits and annual wellness visit. If two TIN-NPIs tied for a largest share of a beneficiary's primary care services, the beneficiary was attributed to the TIN-NPI that provided primary care most recently.

Step 2: If a beneficiary did not receive a primary care service from a TIN-NPI classified as either a PCP, NP, PA or CNS during the performance period, then the beneficiary was assigned to a TIN-NPI if the beneficiary received more primary care services from a specialist physician's TIN-NPI than from any other provider's TIN-NPI during the performance period.

A beneficiary was excluded from the population measured if:

- 1) The beneficiary was not enrolled in both Medicare Parts A & B for every month of the performance period
- 2) The beneficiary was enrolled in a private Medicare health plan during any month of the performance period
- 3) The beneficiary resided outside the United States (including territories) during any month of the performance period.

If a beneficiary was enrolled in Medicare Parts A & B for a partial year because he/she newly enrolled in Medicare or he/she died during the performance period, then the beneficiary was included.

If a physician had more than one TIN, we used the TIN which was consistent with their TIN1 in MD-PPAS.

## Appendix Exhibit A3. Flowchart of physician inclusion/exclusion

1,505 respondents answered the burnout related questions (Q43)<sup>1</sup>

Excluded 222 physicians who didn't have any 2017

Excluded 6 physicians whose principle practice sites are "Workplace clinic" (Q6)<sup>2</sup>

Excluded 21 physicians whose principle practice sites are "Other" (Q6)<sup>2</sup>

Excluded 1 physician whose international education information is missing

1,255 physicians eligible for attribution

Excluded 191 physicians who didn't have any attribution logic

1,064 physicians w/ attributed patients

Q43: I FEEL BURNED OUT FROM MY WORK: Every day / A few times per week / Once a week / A few times a month / Once a month or less / A few times a year or less / Never

1. Q6: WHICH OF THE FOLLOWING DESCRIBES YOUR PRINCIPLE PRACTICE SITE: Hospital- or health system-owned medical practice (not including managed care or HMO) / Independently-owned medical practice / Managed care / HMO practice / Academic health center / faculty practice (residency or university teaching environment) / Federally Qualified Health Center or Look-Alike / Rural Health Clinic (federally qualified) / Indian Health Service / Government clinic, non-federal (e.g., state, county, city, maternal and child health, public health center, etc.) / Federal (Military, Veterans Administration/Department of Defense) / Workplace clinic / Other, please specify
2. Burned out defined as feeling burned out once a week or more.

**Appendix Exhibit A4. Physician, practice, and patient characteristics, by physician callous status**

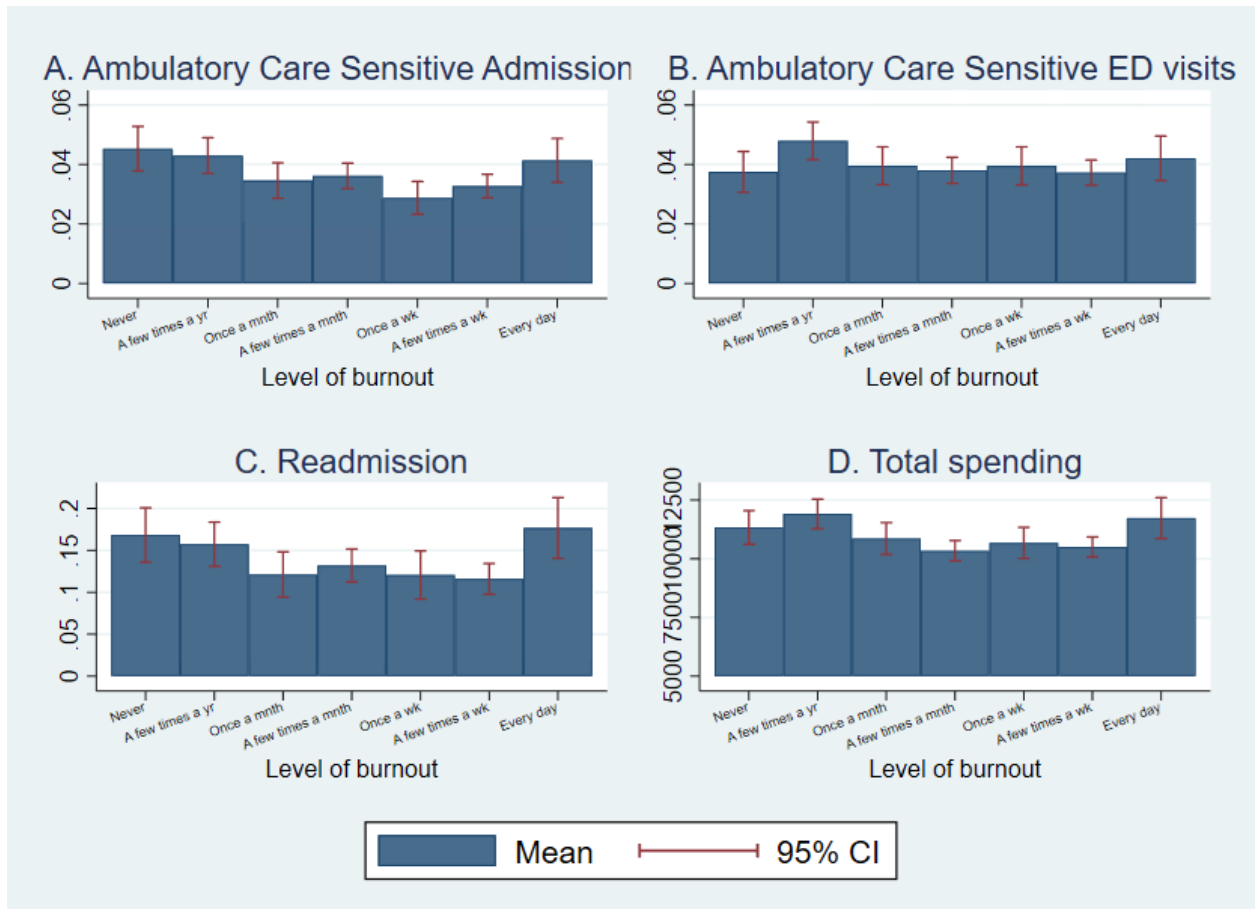
<b>Variable</b>	<b>All</b>	<b>Everyday</b>	<b>A few times per week</b>	<b>Once a Week</b>	<b>A few times a month</b>	<b>Once a month or less</b>	<b>A few times a year or less</b>	<b>Never</b>
<b><i>Panel A. Physician and practice characteristics</i></b>								
Number (%) of physicians	1,064 (100)	26 (2.4)	99 (9.3)	59 (5.6)	112 (10.5)	126 (11.8)	230 (21.6)	412 (38.7)
Age, %:								
<=39	10.2	3.9	13.1	15.3	16.1	12.7	8.3	7.8
40-49	36.2	34.6	47.5	52.5	38.4	32.5	37.8	30.8
50-59	33.9	50.0	29.3	28.8	26.8	37.3	34.4	35.4
>=60	19.7	11.5	10.1	3.4	18.8	17.5	19.6	26.0
Female	42.2	38.5	48.5	49.2	47.3	47.6	40.4	37.9
Practice Size:								
Solo	14.9	11.5	13.1	6.8	13.4	5.6	15.7	19.7
2 – 5 physicians	37.6	38.5	39.4	32.2	38.4	33.3	38.7	38.4
6 – 20 physicians	29.9	30.8	31.3	39.0	32.1	34.9	28.7	26.7
> 20 physicians	17.6	19.2	16.2	22.0	16.1	26.2	17.0	15.3
Ownership:								
Academic medical center	7.6	0.0	10.1	6.8	7.1	10.3	6.1	7.8
Hospital/health system	40.5	50.0	38.4	44.1	49.1	42.1	36.5	39.3
Government	4.1	0.0	3.0	5.1	4.5	1.6	5.7	4.4
Physicians	43.8	46.2	46.5	39.0	36.6	42.9	44.8	45.4
HMO	3.9	3.8	2.0	5.1	2.7	3.2	7.0	3.2

Percentage of vulnerable patients									
< 10	42.0	42.3	46.5	40.7	36.6	41.3	43.5	42.0	
10 - 49	43.2	42.3	37.4	52.5	51.8	49.2	45.7	37.9	
>= 50	14.8	15.4	16.2	6.8	11.6	9.5	10.9	20.1	
Burnout once a week or more	41.5	88.5	84.9	86.4	54.5	37.3	30.9	25.2	
<b>Panel B. Patient Characteristics</b>									
No. of patients	32,413	976	2,882	2,093	3,443	3,938	7,256	11,825	
Age, mean	76.7	77.5	76.0	76.7	77.0	76.6	76.5	76.8	
Female, %	58.4	59.7	59.0	57.4	61.6	57.4	60.0	56.7	
Dual-eligible, %	9.5	12.6	7.6	7.1	8.0	8.4	9.6	10.8	
HCC (Hierarchical Condition Category) score, mean	1.24	1.53	1.16	1.19	1.25	1.20	1.22	1.26	

SOURCES: Authors' analyses of Medicare claims data from Jan 1 to Dec 31 of 2017, linked to American Board of Family Medicine survey of all recertifying physicians in 2017.

NOTES: Each column shows means and proportions of variables for physicians who reported a given burnout level in the 2017 American Board of Family Medicine survey, and for their patients. Vulnerable patients include traditionally underserved groups such as uninsured, Medicaid, homeless, low income, non-English speaking, racial/ethnicity minority, etc. as reported by the physician.

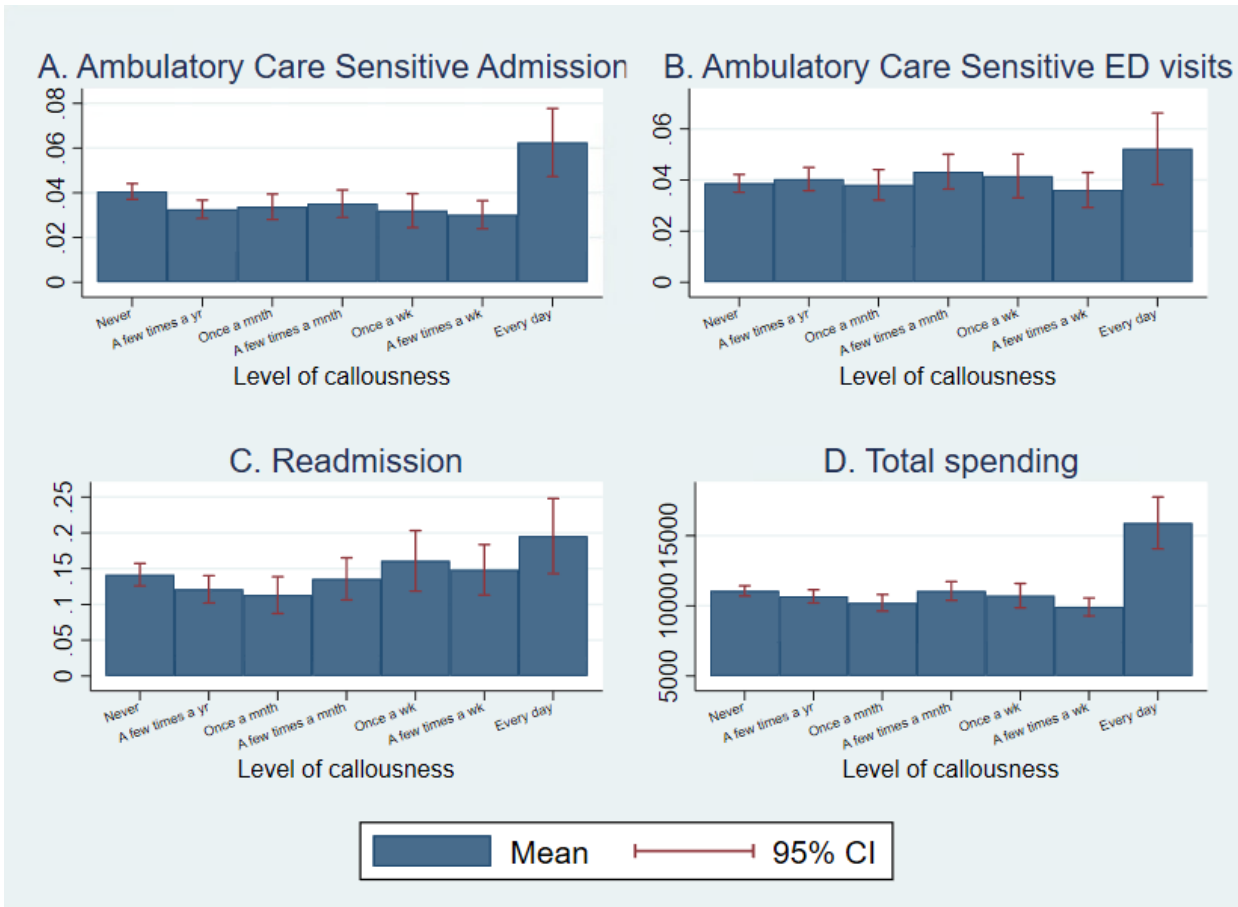
**Appendix Exhibit A5: Unadjusted means of quality and cost measures by seven levels of burnout**



SOURCES: Authors' analyses of Medicare claims data from Jan 1 to Dec 31 of 2017, linked to American Board of Family Medicine survey of all recertifying physicians in 2017.

NOTES Means and 95% confidence intervals of means are shown for each quality or cost measure among patients attributed to physicians reporting one of the seven frequencies of burnout. Panels A, B and C show the prevalence of having any adverse outcome (ACSA, ACSED, and Readmissions) among patients attributed to physicians by level of burnout. Panel D shows amount of per patient annual total Medicare spending/costs by level of physician burnout, geographically adjusted using an index defined as the ratio of actual Medicare fee-for-services spending to Medicare fee-for-service standardized spending in the county where the service was provided.

**Appendix Exhibit A6: Unadjusted means of quality and cost measures by seven levels of callousness**



SOURCES Authors' analyses of Medicare claims data from Jan 1 to Dec 31 of 2017, linked to American Board of Family Medicine survey of all recertifying physicians in 2017.

NOTES Means and 95% confidence intervals of means are shown for each quality or cost measure among patients attributed to physicians reporting one of the seven frequencies of callousness. Panels A, B and C show the prevalence of having any adverse outcome (ACSA, ACSED, and Readmissions) among patients attributed to physicians by level of callousness. Panel D shows amount of annual per patient total Medicare spending/costs by level of physician callousness, with spending geographically adjusted using an index defined as the ratio of actual Medicare fee-for-services spending to Medicare fee-for-service standardized spending in the county where the service was provided.

**Appendix Exhibit A7. Full regression results of the association between the seven levels of burnout and outcomes**

**Panel A. All Patients**

	(1) ACSA	(2) ACSED	(3) Readmission	(4) Cost
Omitted: Never	-	-	-	-
A few times a year	0.945 (0.152)	1.315* (0.183)	1.000 (0.173)	1006.51 (746.65)
Once a month	0.780 (0.132)	1.091 (0.174)	0.715 (0.125)	-78.85 (615.26)
A few times a month	0.847 (0.127)	1.061 (0.144)	0.773 (0.115)	-530.18 (529.02)
Once a week	0.672* (0.109)	1.138 (0.168)	0.730 (0.130)	76.75 (617.25)
A few times a week	0.749 (0.116)	1.044 (0.143)	0.700* (0.106)	-120.72 (550.18)
Every day	0.868 (0.161)	1.118 (0.169)	0.956 (0.183)	229.45 (739.08)
<u>Patient Characteristics</u>				
Age	1.043*** (0.00429)	1.034*** (0.00405)	1.012* (0.00535)	102.59*** (16.92)
Gender: Female	1.176* (0.0823)	1.313*** (0.0844)	1.157 (0.0984)	-175.59 (262.93)
Race/Ethnicity: Black	1.268 (0.162)	1.571*** (0.159)	0.835 (0.166)	-2098.28*** (499.35)
Race/Ethnicity: Asian or Pacific Islander	0.886 (0.206)	0.603* (0.149)	1.380 (0.450)	-1880.24* (820.87)
Race/Ethnicity: Hispanic	0.549 (0.180)	0.808 (0.231)	0.634 (0.305)	-2902.43** (901.52)
Race/Ethnicity: Other	1.061 (0.179)	1.306 (0.186)	1.041 (0.244)	-951.15 (874.14)
CMS-HCC Score	1.712*** (0.0356)	1.418*** (0.0257)	1.363*** (0.0320)	6246.63*** (201.01)
<u>Physician Characteristics</u>				
Gender: Female	0.867 (0.0742)	0.951 (0.0657)	0.959 (0.0920)	-440.55 (344.68)
Age: 30 - 39	1.194 (0.169)	0.906 (0.126)	1.119 (0.202)	1967.22** (650.04)
Age: 40 - 49	0.921 (0.0886)	0.959 (0.0869)	1.166 (0.134)	574.47 (384.65)
Age: 50 - 59	1.076 (0.108)	0.950 (0.0889)	0.957 (0.123)	476.69 (454.25)



Ownership: Academic medical center	0.911 (0.227)	0.704 (0.175)	0.991 (0.292)	-673.42 (1012.37)
Ownership: Hospital/health system	0.943 (0.0733)	1.073 (0.0793)	0.952 (0.0928)	-212.53 (350.19)
Ownership: Managed care / HMO	1.086 (0.308)	0.862 (0.273)	0.868 (0.268)	-3025.69** (1150.09)
Ownership: Other - Government	1.303 (0.356)	1.594* (0.304)	0.702 (0.227)	3183.19 (2023.26)
Practice Size: 2 - 5 physicians	1.153 (0.136)	1.157 (0.113)	0.990 (0.130)	-72.20 (530.29)
Practice Size: 6 - 20 physicians	0.957 (0.116)	1.010 (0.110)	0.965 (0.135)	-861.84 (541.95)
Practice Size: > 20 physicians	1.070 (0.150)	0.970 (0.119)	0.988 (0.157)	-1189.94* (595.14)
Percentage of Vulnerable Patients: < 10%	0.962 (0.159)	1.010 (0.126)	0.833 (0.144)	-217.03 (711.59)
Percentage of Vulnerable Patients: 10% - 49%	0.839 (0.145)	0.842 (0.103)	0.778 (0.136)	-502.29 (711.92)
N	32,413	32,413	5,040	32,413

#### Panel B. Patients eligible for Medicaid

	(1) ACSA	(2) ACSED	(3) Readmission	(4) Cost
Omitted: Never	-	-	-	-
A few times a year	0.872 (0.267)	1.431 (0.417)	0.700 (0.232)	1027.82 (2100.39)
Once a month	0.593 (0.216)	1.152 (0.333)	0.412 (0.206)	-3065.66 (2389.95)
A few times a month	0.937 (0.275)	1.207 (0.335)	0.464* (0.142)	-1792.11 (1844.34)
Once a week	0.591 (0.216)	1.678 (0.496)	0.430 (0.204)	-1837.77 (2788.25)
A few times a week	0.771 (0.224)	1.032 (0.300)	0.402* (0.155)	-3047.74 (2099.36)
Every day	1.035 (0.396)	1.053 (0.333)	1.069 (0.382)	138.98 (2487.14)



Patient Characteristics

Age	1.002 (0.00902)	1.006 (0.00794)	0.997 (0.0137)	29.12 (63.96)
Gender: Female	1.092 (0.170)	1.161 (0.186)	1.017 (0.236)	789.52 (1188.18)
Race/Ethnicity: Black	0.779 (0.181)	1.345 (0.247)	0.756 (0.295)	-4574.92** (1405.50)
Race/Ethnicity: Asian or Pacific Islander	0.999 (0.411)	0.211* (0.131)	0.654 (0.470)	-4011.53 (3271.14)
Race/Ethnicity: Hispanic	0.681 (0.284)	0.456 (0.246)	0.678 (0.548)	-7203.37*** (2182.33)
Race/Ethnicity: Other	0.808 (0.202)	1.202 (0.259)	1.719 (0.593)	-3144.08 (1783.22)
CMS-HCC Score	1.483*** (0.0679)	1.241*** (0.0511)	1.329*** (0.0638)	6480.79*** (671.15)

Physician Characteristics

Gender: Female	0.767 (0.133)	1.127 (0.171)	0.685 (0.178)	-1609.94 (1298.27)
Age: <= 39	1.535 (0.469)	0.779 (0.212)	1.590 (0.721)	3114.79 (2224.84)
Age: 40 - 49	1.003 (0.214)	0.707 (0.128)	0.999 (0.301)	-83.05 (1569.84)
Age: 50 - 59	1.077 (0.229)	0.634* (0.125)	0.921 (0.266)	1084.25 (1546.98)
Ownership: Academic medical center	1.148 (0.431)	0.474 (0.211)	0.594 (0.420)	-5006.35 (2944.11)
Ownership: Hospital/health system	0.839 (0.153)	1.028 (0.177)	0.839 (0.203)	-1975.57 (1350.92)
Ownership: Managed care / HMO	1.487 (0.751)	1.052 (0.664)	1 (.)	-6059.94 (3279.17)
Ownership: Other - Government	1.003 (0.342)	1.297 (0.409)	0.739 (0.388)	831.60 (3490.62)
Practice Size: 2 - 5 physicians	1.369 (0.339)	1.373 (0.325)	1.259 (0.355)	-391.10 (1736.10)
Practice Size: 6 - 20 physicians	1.222 (0.347)	1.536 (0.397)	1.671 (0.538)	-3939.31* (1968.41)
Practice Size: > 20 physicians	1.099 (0.372)	1.096 (0.329)	1.855 (0.695)	-2523.90 (2156.83)
Percentage of Vulnerable Patients: <	1.289 (0.325)	1.153 (0.231)	0.656 (0.176)	-1137.37 (1723.99)

10%				
Percentage of Vulnerable Patients: 10% - 49%	1.320 (0.343)	0.928 (0.194)	0.603 (0.169)	-1943.85 (1824.73)
N	3,068	3,068	713	3,068

Source: Authors' analyses of Medicare claims data from Jan 1 to Dec 31 of 2017, linked to American Board of Family Medicine survey of all recertifying physicians in 2017.

Coefficients shown in Columns (1)-(3) are odds ratios from the logistic regressions used to create Exhibit 2 which shows marginal effects. Coefficients shown in Column (4) of this Appendix (A9) are marginal effects from a generalized linear model identical to that in Column (4) of Exhibit 2. Standard errors in parentheses, clustered by physician\* p<0.05 \*\* p<0.01 \*\*\* p<0.001

**Appendix Exhibit A8. Full regression results of the association between the seven levels of callousness and outcomes**

**Panel A. All Patients**

	(1) ACSA	(2) ACSED	(3) Readmission	(4) Cost
Omitted: Never	-	-	-	-
A few times a year	0.837 (0.0770)	1.094 (0.0942)	0.891 (0.101)	91.31 (388.17)
Once a month	0.902 (0.112)	1.064 (0.115)	0.851 (0.131)	-434.57 (433.03)
A few times a month	0.863 (0.118)	1.137 (0.124)	0.988 (0.139)	-339.02 (571.11)
Once a week	0.862 (0.119)	1.216 (0.154)	1.339 (0.244)	-28.39 (539.21)
A few times a week	0.833 (0.125)	1.040 (0.135)	1.184 (0.220)	-413.51 (603.18)
Every day	1.152 (0.172)	1.170 (0.176)	1.231 (0.294)	2720.41 (2280.49)
<u>Patient Characteristics</u>				
Age	1.043*** (0.00426)	1.034*** (0.00404)	1.012* (0.00529)	101.52*** (16.98)
Gender: Female	1.180* (0.0824)	1.314*** (0.0845)	1.160 (0.0986)	-164.14 (262.73)
Race/Ethnicity: Black	1.257 (0.161)	1.590*** (0.164)	0.834 (0.168)	-2079.31*** (503.30)
Race/Ethnicity: Asian or Pacific Islander	0.887 (0.205)	0.610* (0.150)	1.388 (0.446)	-1885.37* (826.71)
Race/Ethnicity: Hispanic	0.555 (0.182)	0.811 (0.233)	0.654 (0.313)	-2805.81** (904.24)
Race/Ethnicity: Other	1.065 (0.178)	1.301 (0.188)	1.027 (0.243)	-959.36 (867.78)
CMS-HCC Score	1.710*** (0.0367)	1.418*** (0.0258)	1.365*** (0.0320)	6248.29*** (205.74)
<u>Physician Characteristics</u>				
Gender: Female	0.863 (0.0718)	0.934 (0.0640)	0.953 (0.0908)	-502.86 (347.94)
Age: 30 – 39	1.166 (0.167)	0.871 (0.117)	0.958 (0.175)	1943.40** (652.90)
Age: 40 – 49	0.916 (0.0900)	0.959 (0.0875)	1.098 (0.125)	578.88 (392.95)
Age: 50 – 59	1.030 (0.102)	0.938 (0.0883)	0.887 (0.110)	343.78 (403.25)

Ownership: Academic medical center	0.946 (0.237)	0.722 (0.181)	1.001 (0.288)	-436.84 (991.68)
Ownership: Hospital/health system	0.940 (0.0748)	1.074 (0.0792)	0.945 (0.0907)	-127.84 (326.92)
Ownership: Managed care / HMO	1.152 (0.347)	0.875 (0.267)	0.941 (0.290)	-2894.88** (1064.46)
Ownership: Other – Government	1.346 (0.373)	1.578* (0.301)	0.702 (0.234)	3515.78 (2032.78)
Practice Size: 2 – 5 physicians	1.147 (0.139)	1.168 (0.114)	0.950 (0.125)	-86.18 (525.43)
Practice Size: 6 – 20 physicians	0.936 (0.117)	1.000 (0.110)	0.901 (0.124)	-957.16 (533.83)
Practice Size: > 20 physicians	1.053 (0.152)	0.952 (0.119)	0.911 (0.146)	-1238.20* (615.50)
Percentage of Vulnerable Patients: < 10%	0.973 (0.170)	0.981 (0.121)	0.801 (0.149)	-121.92 (728.53)
Percentage of Vulnerable Patients: 10% - 49%	0.854 (0.156)	0.833 (0.101)	0.765 (0.146)	-364.28 (743.37)
N	32,413	32,413	5,040	32,413

#### Panel B. Patients eligible for Medicaid

	(1) ACSA	(2) ACSED	(3) Readmission	(4) Cost
Omitted: Never	-	-	-	-
A few times a year	0.690 (0.134)	1.184 (0.198)	0.802 (0.233)	381.72 (1391.51)
Once a month	1.071 (0.285)	0.941 (0.263)	0.764 (0.270)	-1372.40 (1934.94)
A few times a month	0.718 (0.177)	1.323 (0.329)	1.241 (0.397)	937.05 (1884.35)
Once a week	0.790 (0.274)	1.254 (0.385)	1.298 (0.578)	-1483.99 (2643.29)
A few times a week	1.154 (0.320)	1.039 (0.284)	0.872 (0.413)	-1868.41 (2587.68)
Every day	1.171 (0.523)	0.832 (0.248)	1.989* (0.615)	3781.20 (3482.48)

Patient Characteristics

Age	1.003 (0.00881)	1.004 (0.00787)	1.002 (0.0131)	31.58 (63.81)
Gender: Female	1.100 (0.170)	1.154 (0.185)	0.972 (0.230)	625.17 (1174.79)
Race/Ethnicity: Black	0.760 (0.172)	1.382 (0.261)	0.706 (0.274)	-4650.18*** (1384.68)
Race/Ethnicity: Asian or Pacific Islander	1.045 (0.428)	0.212* (0.134)	0.653 (0.468)	-3779.91 (3557.17)
Race/Ethnicity: Hispanic	0.701 (0.301)	0.456 (0.250)	0.710 (0.576)	-6954.66** (2308.62)
Race/Ethnicity: Other	0.790 (0.200)	1.186 (0.258)	1.486 (0.497)	-3558.40* (1754.36)
CMS-HCC Score	1.480*** (0.0658)	1.243*** (0.0494)	1.303*** (0.0640)	6547.20*** (702.34)

Physician Characteristics

Gender: Female	0.810 (0.133)	1.103 (0.164)	0.726 (0.185)	-1967.04 (1288.92)
Age: 30 – 39	1.368 (0.404)	0.747 (0.201)	1.270 (0.538)	2982.85 (2165.85)
Age: 40 – 49	0.953 (0.199)	0.733 (0.134)	0.952 (0.279)	241.03 (1548.00)
Age: 50 – 59	1.042 (0.219)	0.641* (0.125)	0.818 (0.238)	1040.14 (1560.42)
Ownership: Academic medical center	1.071 (0.416)	0.477 (0.219)	0.490 (0.342)	-4576.07 (3102.59)
Ownership: Hospital/health system	0.827 (0.149)	1.014 (0.175)	0.799 (0.199)	-2138.00 (1287.31)
Ownership: Managed care / HMO	1.439 (0.716)	1.080 (0.672)	1 (.)	-5807.40 (3362.12)
Ownership: Other – Government	0.875 (0.324)	1.359 (0.419)	0.621 (0.348)	1198.29 (3608.55)
Practice Size: 2 – 5 physicians	1.323 (0.332)	1.423 (0.317)	1.001 (0.301)	-1019.83 (1704.93)
Practice Size: 6 – 20 physicians	1.111 (0.316)	1.567 (0.397)	1.220 (0.401)	-4794.46* (1936.99)
Practice Size: > 20 physicians	1.049 (0.339)	1.159 (0.350)	1.375 (0.518)	-2954.26 (2199.10)
Percentage of Vulnerable Patients: <	1.275 (0.304)	1.097 (0.233)	0.541* (0.139)	-1533.62 (1712.97)

10%				
Percentage of Vulnerable Patients: 10% - 49%	1.232 (0.311)	0.979 (0.212)	0.484** (0.135)	-2029.90 (1780.10)
N	3,068	3,068	713	3,068

Source: Authors' analyses of Medicare claims data from Jan 1 to Dec 31 of 2017, linked to American Board of Family Medicine survey of all recertifying physicians in 2017.

Coefficients shown in Columns (1)-(3) are odds ratios from the logistic regressions used to create Exhibit 3 which shows marginal effects. Coefficients shown in Column (4) of this Appendix (A10) are marginal effects from a generalized linear model identical to that in Column (4) of Exhibit 3. Standard errors in parentheses, clustered by physician\* p<0.05 \*\* p<0.01 \*\*\* p<0.001



## Appendix Exhibit A9: Adjusted associations between a dichotomous measure of burnout and outcomes

### Panel A. All Patients

	(1) ACSA	(2) ACSED	(3) Readmission	(4) Cost
Omitted: Burned out less than once a week (including never)	-	-	-	-
Burned out at least once a week	-0.50* [-0.98, -0.03]	-0.12 [-0.61, 0.37]	-1.23 [-3.25, 0.79]	-19.20 [-689.81, 651.41]
Mean of Dep Var	3.66%	3.98%	13.71%	\$10897.38
N	32,413	32,413	5,040	32,413

### Panel B. Patients eligible for Medicaid

	(1) ACSA	(2) ACSED	(3) Readmission	(4) Cost
Omitted: Burned out less than once a week (including never)	-	-	-	-
Burned out at least once a week	-0.65 [-2.63, 1.34]	-0.11 [-2.10, 1.89]	-0.89 [-7.23, 5.45]	-912.28 [-3200.84, 1376.29]
Mean of Dep Var	7.53%	8.05%	18.1%	\$16242.94
N	3,068	3,068	713	3,068

Sources/Notes: SOURCES Authors' analyses of Medicare claims data from Jan 1 to Dec 31 of 2017, linked to American Board of Family Medicine survey of all recertifying physicians in 2017.

NOTES Coefficients shown are marginal effects, that is, adjusted differences in rates of quality measures (or cost) relative to the omitted category of burnout (less than once a week), estimated from regressions adjusting for physician, practice and patient characteristics in Exhibit 1, except callous once a week or more. Rates were the annual number of patients with ACSAs, ACSEDs, and readmissions per 100 patients. Logistic regressions were estimated for quality outcomes, and generalized linear model was estimated for the cost outcome. Ninety-five percent confidence intervals are in brackets. Standard errors clustered by physician\* p<0.05 \*\* p<0.01 \*\*\* p<0.001.

## Appendix Exhibit A10: Association between a dichotomous measure of callousness and outcomes

### Panel A. All Patients

	(1) ACSA	(2) ACSED	(3) Readmission	(4) Cost
Omitted: Callous less than once a week (including never)	-	-	-	-
Callous at least once a week (CI)	-0.03 [-0.61, 0.55]	0.23 [-0.36, 0.82]	3.06* [0.43, 5.70]	379.75 [-750.52, 1510.01]
Mean of Dep Var	3.66%	3.98%	13.71%	\$10897.38
N	32,413	32,413	5,040	32,413

### Panel B. Patients eligible for Medicaid

	(1) ACSA	(2) ACSED	(3) Readmission	(4) Cost
Omitted: Callous less than once a week (including never)	-	-	-	-
Callous at least once a week (CI)	1.15 [-1.42, 3.72]	-0.27 [-2.93, 2.39]	4.67 [-1.86, 11.19]	-246.10 [-3955.52, 3463.32]
Mean of Dep Var	7.53%	8.05%	18.1%	\$16242.94
N	3,068	3,068	713	3,068

Sources/Notes: SOURCES Authors' analyses of Medicare claims data from Jan 1 to Dec 31 of 2017, and the ABFM cross-section census of all recertifying physicians in 2017. NOTES Coefficients shown are marginal effects, that is, adjusted differences in rates of quality measures (or cost) relative to the omitted category of callousness (less than once a week), estimated from regressions adjusting for physician, practice and patient characteristics identical to those in Exhibit 1. Rates were the annual number of patients with ACSAs, ACSEds, and readmissions per 100 patients. Logistic regressions were estimated for quality outcomes, and a generalized linear model was estimated for the cost outcome. Ninety-five percent confidence intervals are in brackets. Standard errors clustered by physician\* p<0.05 \*\* p<0.01 \*\*\* p<0.001.

**Appendix Exhibit A11. Association between seven levels of burnout and outcomes, controlling for hospital referral region indicators**

**Panel A. All Patients**

	(1) ACSA	(2) ACSED	(3) Readmission	(4) Cost
A few times a year	-0.02 [-1.17,1.13]	1.40* [0.12,2.67]	1.21 [-3.51,5.93]	1649.93* [283.11,3016.76]
Once a month	-0.69 [-1.91,0.53]	0.94 [-0.42,2.30]	-3.28 [-8.19,1.63]	96.11 [-1346.06,1538.28]
A few times a month	-0.12 [-1.10,0.86]	0.53 [-0.66,1.72]	-2.65 [-6.57,1.28]	0.68 [-1249.56,1250.92]
Once a week	-1.28* [-2.46,-0.10]	1.22 [-0.11,2.55]	-3.12 [-7.76,1.52]	331.10 [-962.98,1625.19]
A few times a week	-1.01 [-2.07,0.04]	0.39 [-0.81,1.59]	-3.82 [-8.25,0.61]	-205.03 [-1449.38,1039.31]
Every day	-0.10 [-1.32,1.13]	0.74 [-0.62,2.10]	3.06 [-1.38,7.50]	309.26 [-1287.03,1905.55]
N	30,907	31,438	4,707	32,410

**Panel B. Patients eligible for Medicaid**

	(1) ACSA	(2) ACSED	(3) Readmission	(4) Cost
A few times a year	1.26 [-4.74,7.26]	4.15 [-2.16,10.46]	-2.90 [-31.90,26.10]	908.34 [-4929.69,6746.36]
Once a month	-4.15 [-11.14,2.84]	2.93 [-3.49,9.36]	-16.06 [-42.44,10.33]	-5042.13 [-10823.61,739.35]
A few times a month	2.10 [-2.89,7.09]	1.72 [-3.85,7.30]	-23.74** [-40.71,-6.77]	-2724.42 [-8015.30,2566.47]
Once a week	0.91 [-5.67,7.49]	3.34 [-2.68,9.36]	-14.96 [-44.95,15.04]	-5468.54 [-11882.42,945.34]
A few times a week	1.07 [-4.64,6.79]	0.02 [-5.97,6.01]	-15.14 [-36.94,6.66]	-4268.62 [-9900.22,1362.98]
Every day	6.05 [-0.41,12.52]	-3.04 [-9.84,3.76]	-6.23 [-36.47,24.00]	-1804.65 [-8713.53,5104.24]
N	2,257	2,485	460	3,068

Note: Coefficients shown are marginal effects, that is, adjusted differences in rates of quality measures (or cost) relative to the omitted category of burnout (never), estimated from regressions adjusting for physician, practice and patient characteristics identical to those in Exhibit 2. Rates were the annual number of patients with ACSAs, ACSEDs, and readmissions per 100 patients. Logistic regressions were estimated for quality outcomes, and generalized linear model was estimated for the cost outcome. Ninety-five percent confidence intervals are in brackets. Standard errors clustered by physician\* p<0.05 \*\* p<0.01 \*\*\* p<0.001.

**Appendix Exhibit A12. Association between seven levels of callousness and outcomes, controlling for hospital referral region indicators**

**Panel A. All Patients**

	(1) ACSA	(2) ACSED	(3) Readmission	(4) Cost
A few times a year	-0.25 [-0.88,0.39]	0.48 [-0.19,1.16]	0.74 [-2.33,3.80]	217.54 [-662.33,1097.42]
Once a month	0.70 [-0.17,1.57]	0.69 [-0.24,1.63]	-2.36 [-6.46,1.75]	-406.40 [-1355.20,542.41]
A few times a month	-0.48 [-1.30,0.34]	0.73 [-0.15,1.60]	0.51 [-3.54,4.56]	-418.69 [-1478.67,641.29]
Once a week	-0.18 [-1.19,0.84]	0.85 [-0.19,1.89]	4.48 [-0.06,9.03]	-117.60 [-1279.06,1043.85]
A few times a week	-0.56 [-1.63,0.51]	-0.32 [-1.29,0.65]	4.68* [0.52,8.84]	-1243.30* [-2435.11,-51.50]
Every day	0.45 [-0.80,1.69]	0.69 [-0.56,1.95]	6.67* [0.40,12.94]	2013.96 [-644.13,4672.05]
N	30,907	31,438	4,707	32,410

**Panel B. Patients eligible for Medicaid**

	(1) ACSA	(2) ACSED	(3) Readmission	(4) Cost
A few times a year	0.08 [-3.85,4.01]	2.92 [-0.94,6.77]	6.84 [-7.47,21.15]	166.54 [-3594.23,3927.32]
Once a month	4.16 [-1.06,9.37]	-1.78 [-6.47,2.90]	-5.32 [-22.91,12.27]	-2261.78 [-6884.73,2361.18]
A few times a month	0.22 [-5.43,5.88]	2.28 [-2.54,7.11]	15.87 [-0.02,31.75]	1183.86 [-3791.25,6158.97]
Once a week	-2.04 [-8.19,4.12]	-4.94 [-10.48,0.61]	29.32* [4.76,53.88]	-6531.13* [-11827.29,- 1234.97]
A few times a week	1.83 [-3.33,6.99]	-0.24 [-5.50,5.03]	-13.30 [-39.47,12.86]	-4806.30* [-9226.53,-386.08]
Every day	7.07* [0.26,13.89]	1.34 [-8.45,11.14]	32.81* [3.11,62.50]	5888.45 [-1965.26,13742.16]
N	2,257	2,485	460	3,068

Note: Coefficients shown are marginal effects, that is, adjusted differences in rates of quality measures (or cost) relative to the omitted category of callousness (never), estimated from regressions adjusting for physician, practice and patient characteristics identical to those in Exhibit 2. Rates were the annual number of patients with ACSAs, ACSEDs, and readmissions per 100 patients. Logistic regressions were estimated for quality outcomes, and generalized linear model was estimated for the cost outcome. Ninety-five percent confidence intervals are in brackets. Standard errors clustered by physician\* p<0.05 \*\* p<0.01 \*\*\* p<0.001.