

## Supplemental Online Content

Ligibel JA, Goularte N, Berliner JJ, et al. Well-being parameters and intention to leave current institution among academic physicians. *JAMA Netw Open*. 2023;6(12):e2347894. doi:10.1001/jamanetworkopen.2023.47894

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This supplemental material has been provided by the authors to give readers additional information about their work.

**eMethods.** Supplemental Methods:

### **Professional Fulfillment Index (PFI) Methodology**

**Burnout:** The PFI burnout measure assesses the two major components of physician burnout: work exhaustion and interpersonal disengagement.<sup>1</sup> The 10-item measure uses a 5-point Likert scale (0-4), with response options ranging from “Not at all” to “Extremely”. The 0-4 scale is subsequently normalized to 0-10. Burnout is dichotomized using a published cut-point, established using two scales from the Maslach Burnout Inventory as a comparator,<sup>1,2</sup> such that individuals with a score of  $\geq 3.325$  out of 10 are categorized as having burnout.

**Professional Fulfillment:** The PFI professional fulfillment measure assesses happiness, meaningfulness, satisfaction, and self-efficacy, as well as a sense of worthwhileness and contributing meaningfully at work.<sup>1</sup> The 6-item measure uses a 5-point Likert scale (0-4), with response options ranging from “Not at all true” to “Completely True” The 0-4 scale is subsequently normalized to 0-10. Professional Fulfillment is dichotomized based on a previously established and published cut-point, such that individuals with a score of  $\geq 7.5$  out of 10 are categorized as being professionally fulfilled.<sup>1</sup>

**Intent to Leave: Intention to leave one’s institution within 2 years was assessed through a 1-item Likert scale (0-4) with response options ranging from “None” to “Definitely”<sup>3</sup>** A score of 2 or higher (corresponding to a response of “moderate”, “likely”, or “definitely”) was defined as a moderate or higher intent to leave.

1. Trockel M, Bohman B, Lesure E, et al. A Brief Instrument to Assess Both Burnout and Professional Fulfillment in Physicians: Reliability and Validity, Including Correlation with Self-Reported Medical Errors, in a Sample of Resident and Practicing Physicians. *Acad Psychiatry*. 2018;42(1):11-24. doi:10.1007/s40596-017-0849-3
2. Brady KJS, Ni P, Carlasare L, et al. Establishing Crosswalks Between Common Measures of Burnout in US Physicians. *J Gen Intern Med*. 2022;37(4):777-784. doi:10.1007/s11606-021-06661-4
3. Hamidi MS, Bohman B, Sandborg C, et al. Estimating institutional physician turnover attributable to self-reported burnout and associated financial burden: a case study. *BMC Health Serv Res*. 2018;18(1):851. doi:10.1186/s12913-018-3663-z

**eTable 1.** Participating Institutions

|  |
|--|
| Boston Medical Center  |
| Children’s National Hospital   |
| Children’s Hospital of Philadelphia  |
| Cleveland Clinic   |
| Dana-Farber Cancer Institute   |
| Johns Hopkins Medicine   |
| Mass General Brigham   |
| Memorial Sloan Kettering Cancer Center                                       |
| Michigan State University  |
| Stanford Medicine  |
| UMass Memorial Healthcare and the University of Massachusetts Medical School |
| University of New Mexico   |
| University of Pittsburgh Medical Center                                      |
| University of Wisconsin Health   |
| Yale New Haven Health  |

**eTable 2.** Responses by Organization

| <b>Organization (De-identified)</b> | <b>No. responses (N=19,532)</b> |
|-------------------------------------|---------------------------------|
| 1                                   | 1476                            |
| 2                                   | 953                             |
| 3                                   | 110                             |
| 4                                   | 3262                            |
| 5                                   | 2275                            |
| 6                                   | 1124                            |
| 7                                   | 3776                            |
| 8                                   | 507                             |
| 9                                   | 375                             |
| 10                                  | 1861                            |
| 11                                  | 773                             |
| 12                                  | 256                             |
| 13                                  | 669                             |
| 14                                  | 1047                            |
| 15                                  | 1068                            |

**eTable 3.** Response Rate by Measure

| <b>Outcome Measures</b>  | <b>Original scale and response options</b>   | <b>No. responses with <math>\geq 75\%</math> of items in the measure</b> |
|--|--|--|
| <b>Professional Fulfillment</b> (6-items)                          | Likert scale, 0 (Not at all true) - 4 (Completely true)  | 18571  |
| <b>Burnout</b> (10-items)  | Likert scale, 0 (Not at all) - 4 (Extremely)   | 18217  |
| <b>Intent to Leave</b> (1-item)                                    | Likert scale, 0 (None) - 4 (Definitely)  | 15890  |
| <b>Determinants</b>  |  |  |
| <b>Supportive Leadership Behaviors</b> (9-items)                   | Likert scale, Items 1-8: 0 (Strongly disagree) - 4 (Strongly agree) Item 9: 0 (Very dissatisfied) - 4 (Very satisfied) | 17454  |
| <b>Personal-Organizational Values Alignment</b> (3-items)          | Likert scale, 0 (Not at all true) - 4 (Completely true)  | 17649  |
| <b>Self-Valuation</b> (4-items)                                    | Likert scale, 0 (Never) - 4 (Always)   | 14494  |
| <b>Negative Impact of Work on Personal Relationships</b> (4-items) | Likert scale, 0 (Not at all true) - 4 (Completely true)  | 14156  |
| <b>Depression</b> (4-items)  | Likert scale, 0 (Never) - 4 (Always)   | 14360  |
| <b>Anxiety</b> (4-items)   | Likert scale, 0 (Never) - 4 (Always)   | 14282  |
| <b>EHR Helpfulness</b> (4-items)                                   | Likert scale, 0 (Never) - 4 (Always)   | 17217  |
| <b>EHR Hassles</b> (3-items)                                       | Likert scale, 0 (Never) - 4 (Always)   | 9904   |
| <b>Control over Schedule</b> (5-items)                             | Likert scale, 0 (No control) - 4 (Complete control)  | 14605  |
| <b>Peer Support</b> (4-items)                                      | Likert scale, 0 (Not at all true) - 4 (Completely true)  | 10442  |
| <b>Sleep-Related Impairment</b> (4-item)                           | Likert scale, 0 (Not at all) - 4 (Very much)   | 12509  |
| <b>Meaningfulness of Clinical Work</b> (4-items)                   | Likert scale, 0 (Not at all true) - 4 (Completely true)  | 8554   |
| <b>(COVID) Organizational Support</b> (9-items)                    | Likert scale, 0 (Not at all) - 4 (Very much)   | 6643   |
| <b>Perceived Gratitude</b> (4-items)                               | Likert scale, 0 (Not at all) - 4 (Extremely)   | 9707   |

**eTable 4.** Prevalence of Intent to Leave by Specialty

| <b>Specialty</b>                                  | <b>N</b> | <b>Percent with Moderate or Higher Intent to Leave</b> | <b>95% CI</b>   |
|---|----------|--|-----------------|
| Allergy and Immunology                            | 92       | 28.3%  | (18.9% , 37.6%) |
| Anesthesiology                                    | 539      | 46.8%  | (42.5% , 51.0%) |
| Cardiovascular Disease                            | 369      | 36.3%  | (31.4% , 41.2%) |
| Child And Adolescent Psychiatry                   | 180      | 33.9%  | (26.9% , 40.9%) |
| Colon and Rectal Surgery                          | 41       | 29.3%  | (14.7% , 43.8%) |
| Critical Care                                     | 256      | 39.8%  | (33.8% , 45.9%) |
| Dermatology                                       | 225      | 28.9%  | (22.9% , 34.9%) |
| Emergency Medical Services                        | 145      | 26.2%  | (19.0% , 33.5%) |
| Emergency Medicine                                | 511      | 27.4%  | (23.5% , 31.3%) |
| Endocrinology, Diabetes and Metabolism            | 170      | 27.1%  | (20.3% , 33.8%) |
| Family Medicine                                   | 752      | 30.1%  | (26.8% , 33.3%) |
| Gastroenterology                                  | 218      | 41.3%  | (34.7% , 47.9%) |
| Geriatric Medicine - All Specialties              | 159      | 30.8%  | (23.6% , 38.1%) |
| Hematology/Oncology                               | 540      | 34.3%  | (30.2% , 38.3%) |
| Hospice and Palliative Medicine - All Specialties | 140      | 22.9%  | (15.8% , 29.9%) |
| Hospital Medicine                                 | 100      | 29.0%  | (20.0% , 38.0%) |
| Infectious Disease                                | 203      | 31.5%  | (25.1% , 38.0%) |
| Internal Medicine                                 | 1782     | 34.4%  | (32.2% , 36.6%) |
| Maternal–Fetal Medicine                           | 88       | 27.3%  | (17.8% , 36.8%) |
| Medical Genetics and Genomics                     | 49       | 38.8%  | (24.6% , 52.9%) |
| Neonatal-Perinatal Medicine                       | 245      | 24.9%  | (19.4% , 30.4%) |
| Nephrology  | 144      | 37.5%  | (29.5% , 45.5%) |
| Neurological Surgery                              | 95       | 40.0%  | (30.0% , 50.0%) |
| Neurology   | 467      | 34.9%  | (30.6% , 39.2%) |
| Neuroradiology                                    | 124      | 22.6%  | (15.1% , 30.0%) |
| Nuclear Medicine                                  | 22       | 13.6%  | (0.0% , 29.2%)  |
| Obstetrics and Gynecology                         | 499      | 33.3%  | (29.1% , 37.4%) |
| Ophthalmology                                     | 227      | 28.6%  | (22.7% , 34.6%) |
| Orthopaedic Surgery                               | 310      | 29.0%  | (24.0% , 34.1%) |
| Otolaryngology                                    | 175      | 37.7%  | (30.5% , 45.0%) |
| Pain Medicine - All Specialties                   | 107      | 33.6%  | (24.5% , 42.7%) |
| Pathology/Lab Medicine                            | 510      | 30.0%  | (26.0% , 34.0%) |
| Pediatric Anesthesiology                          | 167      | 36.5%  | (29.1% , 43.9%) |
| Pediatric Cardiology                              | 125      | 26.4%  | (18.6% , 34.2%) |
| Pediatric Critical Care Medicine                  | 101      | 23.8%  | (15.3% , 32.2%) |

|                                      |      |       |                 |
|--------------------------------------|------|-------|-----------------|
| Pediatric Emergency Medicine         | 198  | 26.8% | (20.5% , 33.0%) |
| Pediatric Hematology-Oncology        | 197  | 32.5% | (25.9% , 39.1%) |
| Pediatric Hospital Medicine          | 195  | 23.1% | (17.1% , 29.0%) |
| Pediatrics                           | 1030 | 25.4% | (22.8% , 28.1%) |
| Pediatrics - Other Subspecialty      | 129  | 33.3% | (25.1% , 41.6%) |
| Physical Medicine and Rehabilitation | 127  | 17.3% | (10.7% , 24.0%) |
| Plastic Surgery                      | 80   | 28.8% | (18.6% , 38.9%) |
| Psychiatry                           | 391  | 33.8% | (29.1% , 38.5%) |
| Psychiatry - Other Subspecialty      | 95   | 30.5% | (21.1% , 40.0%) |
| Pulmonary Disease                    | 215  | 37.7% | (31.1% , 44.2%) |
| Radiation Oncology                   | 142  | 31.7% | (23.9% , 39.4%) |
| Radiology                            | 274  | 39.8% | (33.9% , 45.6%) |
| Radiology - Other Subspecialty       | 359  | 26.2% | (21.6% , 30.8%) |
| Rheumatology                         | 102  | 35.3% | (25.9% , 44.7%) |
| Surgery                              | 332  | 33.1% | (28.0% , 38.2%) |
| Surgery - Other Subspecialty         | 153  | 34.6% | (27.0% , 42.3%) |
| Thoracic Surgery                     | 87   | 40.2% | (29.7% , 50.7%) |
| Urology                              | 166  | 35.5% | (28.2% , 42.9%) |

**eTable 5.** Prevalence of Burnout and Professional Fulfillment by Specialty

| Specialty   | Professional Fulfillment |  |                             |      | Burnout |                             |                            |      |
|---|--------------------------|--|-----------------------------|------|---------|-----------------------------|----------------------------|------|
|   | N                        | % of N with Professional Fulfillment present | Mean (high score favorable) | SD   | N       | % of N with Burnout Present | Mean (low score favorable) | SD   |
| Allergy and Immunology                            | 100                      | 41.0%  | 6.30                        | 2.24 | 101     | 29.7%                       | 2.76                       | 2.01 |
| Anesthesiology                                    | 624                      | 34.0%  | 6.14                        | 2.27 | 625     | 43.0%                       | 3.20                       | 2.05 |
| Cardiovascular Disease                            | 395                      | 39.7%  | 6.44                        | 2.19 | 389     | 36.5%                       | 2.77                       | 1.94 |
| Child And Adolescent Psychiatry                   | 211                      | 37.0%  | 6.60                        | 1.86 | 212     | 41.0%                       | 2.99                       | 1.86 |
| Colon and Rectal Surgery                          | 44                       | 45.5%  | 6.84                        | 1.95 | 44      | 31.8%                       | 2.91                       | 2.00 |
| Critical Care                                     | 277                      | 41.5%  | 6.48                        | 2.27 | 274     | 39.1%                       | 3.25                       | 2.02 |
| Dermatology                                       | 263                      | 48.7%  | 6.93                        | 2.07 | 263     | 32.7%                       | 2.80                       | 2.07 |
| Emergency Medical Services                        | 157                      | 42.7%  | 6.84                        | 2.18 | 157     | 40.1%                       | 2.95                       | 2.08 |
| Emergency Medicine                                | 565                      | 35.6%  | 6.31                        | 2.09 | 561     | 42.1%                       | 3.20                       | 1.94 |
| Endocrinology, Diabetes and Metabolism            | 180                      | 33.9%  | 6.52                        | 1.91 | 182     | 33.0%                       | 2.79                       | 1.91 |
| Family Medicine                                   | 788                      | 34.8%  | 6.26                        | 2.15 | 783     | 42.3%                       | 3.18                       | 2.03 |
| Gastroenterology                                  | 242                      | 36.0%  | 6.22                        | 2.13 | 237     | 38.8%                       | 3.06                       | 2.05 |
| Geriatric Medicine - All Specialties              | 169                      | 43.8%  | 6.70                        | 2.05 | 167     | 35.3%                       | 2.76                       | 1.91 |
| Hematology/Oncology                               | 574                      | 43.9%  | 6.83                        | 2.02 | 576     | 41.7%                       | 3.14                       | 1.90 |
| Hospice and Palliative Medicine - All Specialties | 150                      | 49.3%  | 7.15                        | 2.00 | 149     | 36.2%                       | 2.95                       | 1.88 |
| Hospital Medicine                                 | 114                      | 39.5%  | 6.48                        | 2.01 | 114     | 41.2%                       | 3.04                       | 2.09 |
| Infectious Disease                                | 221                      | 44.3%  | 6.67                        | 2.09 | 218     | 37.2%                       | 2.92                       | 1.73 |
| Internal Medicine                                 | 1893                     | 35.8%  | 6.31                        | 2.21 | 1890    | 40.2%                       | 3.06                       | 2.05 |
| Maternal – Fetal Medicine                         | 97                       | 43.3%  | 6.84                        | 1.85 | 98      | 39.8%                       | 2.90                       | 1.65 |
| Medical Genetics and Genomics                     | 58                       | 41.4%  | 6.51                        | 1.94 | 57      | 42.1%                       | 3.07                       | 1.68 |
| Missing   | 2827                     | 37.1%  | 6.32                        | 2.17 | 2566    | 40.0%                       | 3.01                       | 1.99 |
| Neonatal - Perinatal Medicine                     | 282                      | 46.1%  | 6.91                        | 1.84 | 279     | 26.5%                       | 2.49                       | 1.73 |
| Nephrology  | 157                      | 43.3%  | 6.65                        | 2.09 | 158     | 41.8%                       | 2.99                       | 1.93 |
| Neurological Surgery                              | 115                      | 47.8%  | 6.95                        | 2.36 | 116     | 29.3%                       | 2.46                       | 2.14 |
| Neurology   | 535                      | 37.9%  | 6.52                        | 2.05 | 531     | 39.2%                       | 2.96                       | 1.95 |
| Neuroradiology                                    | 129                      | 46.5%  | 6.69                        | 1.87 | 128     | 26.6%                       | 2.30                       | 1.76 |
| Nuclear Medicine                                  | 26                       | 42.3%  | 7.28                        | 1.33 | 25      | 24.0%                       | 2.14                       | 1.73 |
| Obstetrics and Gynecology                         | 529                      | 36.7%  | 6.43                        | 2.03 | 532     | 43.2%                       | 3.22                       | 1.95 |
| Ophthalmology                                     | 256                      | 46.5%  | 6.94                        | 1.98 | 255     | 32.9%                       | 2.62                       | 1.88 |
| Orthopaedic Surgery                               | 358                      | 48.0%  | 6.91                        | 2.11 | 353     | 31.4%                       | 2.62                       | 1.92 |



|                                      |      |       |      |      |      |       |      |      |
|--------------------------------------|------|-------|------|------|------|-------|------|------|
| Otolaryngology                       | 208  | 38.5% | 6.45 | 2.21 | 210  | 45.2% | 3.20 | 2.13 |
| Pain Medicine - All Specialties      | 121  | 37.2% | 6.38 | 2.31 | 122  | 27.9% | 2.53 | 1.78 |
| Pathology/Lab Medicine               | 574  | 44.1% | 6.77 | 2.13 | 544  | 28.9% | 2.45 | 1.87 |
| Pediatric Anesthesiology             | 204  | 39.2% | 6.49 | 2.16 | 206  | 38.3% | 3.21 | 2.08 |
| Pediatric Cardiology                 | 177  | 40.7% | 6.71 | 1.99 | 177  | 31.6% | 2.68 | 1.74 |
| Pediatric Critical Care Medicine     | 125  | 40.0% | 6.59 | 2.13 | 125  | 35.2% | 2.89 | 1.78 |
| Pediatric Emergency Medicine         | 207  | 34.8% | 6.44 | 1.80 | 208  | 31.7% | 2.80 | 1.73 |
| Pediatric Hematology - Oncology      | 224  | 42.0% | 6.76 | 1.85 | 222  | 36.9% | 2.74 | 1.75 |
| Pediatric Hospital Medicine          | 242  | 38.8% | 6.55 | 1.92 | 238  | 30.3% | 2.68 | 1.77 |
| Pediatrics                           | 1189 | 37.8% | 6.55 | 1.95 | 1183 | 36.6% | 2.90 | 1.81 |
| Pediatrics - Other Subspecialty      | 145  | 35.9% | 6.54 | 1.88 | 145  | 28.3% | 2.83 | 1.93 |
| Physical Medicine and Rehabilitation | 131  | 41.2% | 6.78 | 1.95 | 130  | 29.2% | 2.61 | 1.79 |
| Plastic Surgery                      | 100  | 48.0% | 6.96 | 1.94 | 99   | 34.3% | 2.86 | 2.07 |
| Psychiatry                           | 430  | 40.2% | 6.53 | 2.05 | 433  | 42.3% | 3.14 | 1.94 |
| Psychiatry - Other Subspecialty      | 110  | 42.7% | 6.80 | 2.06 | 111  | 32.4% | 2.65 | 1.83 |
| Pulmonary Disease                    | 230  | 34.3% | 6.22 | 2.17 | 221  | 45.2% | 3.17 | 1.95 |
| Radiation Oncology                   | 160  | 54.4% | 7.10 | 2.14 | 160  | 36.9% | 3.01 | 2.08 |
| Radiology                            | 315  | 33.7% | 6.15 | 2.26 | 314  | 38.9% | 3.03 | 1.86 |
| Radiology - Other Subspecialty       | 396  | 39.6% | 6.52 | 2.15 | 391  | 30.7% | 2.65 | 1.89 |
| Rheumatology                         | 107  | 32.7% | 6.34 | 2.25 | 106  | 39.6% | 2.85 | 1.90 |
| Surgery                              | 375  | 44.0% | 6.88 | 2.12 | 374  | 36.9% | 2.87 | 1.99 |
| Surgery - Other Subspecialty         | 170  | 51.8% | 6.92 | 1.98 | 168  | 35.1% | 2.73 | 2.09 |
| Thoracic Surgery                     | 109  | 44.0% | 6.76 | 2.25 | 109  | 38.5% | 2.75 | 2.09 |
| Urology                              | 186  | 45.7% | 6.73 | 2.36 | 181  | 42.0% | 3.03 | 2.15 |

**eFigure.** Consort Diagram

Response Criteria is met by answering  $\geq 75\%$  of items for one or more outcome measure (Professional Fulfillment, Burnout, or Intent to Leave)

