

# IMPACT: Evaluation of a Controlled Organizational Intervention Using Influential Peers to Promote Professional Fulfillment



Mickey T. Trockel, MD, PhD; Nikitha K. Menon, BA; Maryam S. Makowski, PhD; Louise Y. Wen, MD; Rachel Roberts, MD; Bryan D. Bohman, MD; and Tait D. Shanafelt, MD

## Abstract

**Objective:** To determine the effects of a popular opinion leader (POL)-led organizational intervention targeting all physicians and advanced practice providers (APPs) working within clinic groups on professional fulfillment (primary outcome), gratitude, burnout, self-valuation, and turnover intent.

**Patients and Methods:** All 20 Stanford University HealthCare Alliance clinics with  $\geq 5$  physicians-APPs were matched by size and baseline gratitude scores and randomly assigned to immediate or delayed intervention (control). Between July 10, 2018, and March 15, 2019, trained POLs and a physician-PhD study investigator facilitated 4 interactive breakfast or lunch workshops at intervention clinics, where colleagues were invited to discuss and experience one evidence-based practice (gratitude, mindfulness, cognitive, and behavioral strategies). Participants in both groups completed incentivized annual assessments of professional fulfillment, workplace gratitude, burnout, self-valuation, and intent to leave as part of ongoing organizational program evaluation.

**Results:** Eighty-four (75%) physicians-APPs at intervention clinics attended at least 1 workshop. Of all physicians-APPs, 236 of 251 (94%) completed assessments in 2018 and 254 of 263 (97%) in 2019. Of 264 physicians-APPs with 2018 or 2019 assessment data, 222 (84%) had completed 2017 assessments. Modal characteristics were 60% female, 46% White, 49% aged 40 to 59 years, 44% practicing family-internal medicine, 78% living with partners, and 53% with children. Change in professional fulfillment by 2019 relative to average 2017 to 2018 levels was more favorable (0.63 points; effect size = 0.35;  $P=.001$ ) as were changes in gratitude and intent to leave among clinicians practicing at intervention clinics.

**Conclusion:** Interventions led by respected physicians-APPs can achieve high participation rates and have potential to promote well-being among their colleagues.

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Occupational well-being, characterized by high professional fulfillment and low burnout, is a worthy goal that remains elusive for many physicians in the United States.<sup>1-6</sup> Favorable occupational well-being in physicians is associated with lower risk of mental and physical health morbidity,<sup>7-12</sup> fewer clinical errors,<sup>13,14</sup> and more favorable patient experience.<sup>15-17</sup> Benefits to patients of physician well-being include safer and more compassionate clinical care.<sup>16,18,19</sup> Reduced turnover, increased

productivity, and improved overall quality of care may render additional financial benefits of physician well-being to the organizations employing them.<sup>19-23</sup> Greater recognition of the importance of occupational well-being in medicine has spurred development of organizational interventions to cultivate it among their workforces.<sup>5,24,25</sup> Available evidence from 2011 to 2017 suggests a modest initial reversal in the worsening trend of burnout but with much opportunity for improvement.<sup>26</sup>



From the Stanford University School of Medicine, Palo Alto, California (M.T.T., N.K.M., M.S.M., R.R., B.D.B., T.D.S.) and Geisel School of Medicine at Dartmouth College, Hanover, New Hampshire (L.Y.W.)

Improving physician well-being at the individual level often involves active interventions (eg, mindfulness meditation programs, coaching) that are underused, with low physician participation rates.<sup>27,28</sup> For instance, an intervention offered to 871 physicians recruited 70 (8%) to participate.<sup>27</sup> On the other hand, system-level interventions targeting changes in practice environment workflow (eg, increased numbers of medical assistants per primary care provider) are desirable<sup>29,30</sup> but often expensive and challenging to sustain or replicate.<sup>31,32</sup> An engaging and cost-effective culture of wellness-based intervention to improve physician well-being is a complementary approach that may circumvent some of these barriers.

Interventions outside the field of physician well-being have established popular opinion leader-based health promotion—members of a specific social group identified by their peers as someone with social influence (ie, respected by the group both personally and professionally)—as an effective mechanism for population-level social norm and behavioral change.<sup>33-36</sup> To our knowledge, this is the first intervention among clinicians to deploy popular opinion leaders as group intervention promoters and cofacilitators.<sup>33,34</sup> In this study, the IMPACT (Influencing and Modeling Provider Action for Culture Transformation) intervention was designed to direct popular opinion leader (POL) peer influence to encourage evidence-based practices that promote gratitude at work and compassion for one another including specific gratitude, cognitive reframing, and mindfulness practices. Distinct from previous studies, the unit of intervention was the clinic, not the individual. The primary objective of this study was to determine the effects of the IMPACT intervention on professional fulfillment among all physicians working in clinics who were randomly assigned to immediate vs delayed participation. Secondary objectives were to assess the effects of the IMPACT intervention on burnout, gratitude, self-valuation, and intent to leave current place of employment.

## PARTICIPANTS AND METHODS

All 20 clinics with 5 or more physicians and advanced practice providers that are part of an adult outpatient health care system were paired by size and baseline gratitude scores (Supplemental Material, available online at <http://www.mayoclinicproceedings.org>). One clinic in each pair was randomly assigned to immediate (n=10) or delayed intervention, control groups (Figure 1). Intervention was not delivered to delayed intervention control clinics until postintervention survey evaluation data were collected (Figure 2). For brevity, the study population of physicians, combined with the small number of advanced practice providers, is collectively referred to as physicians in this report. The Stanford University Institutional Review Board approved the involvement of human subjects in this evaluation study. This intervention evaluation study was conducted between March 1, 2017, and April 3, 2019. The primary outcome was change in professional fulfillment by postintervention (2019) relative to preintervention (2017 and 2018).

### The IMPACT Program

We identified and trained POLs and asked them to encourage colleagues where they work to attend 60-minute skills-based learning sessions. The first 3 sessions' standardized curriculum (Table 1) were delivered at each clinic in the following order: First, gratitude practice; second, mindfulness meditation practice; and third, cognitive reframing to alleviate distressing emotions. POLs, with input from their colleagues, identified a new topic for the fourth session or elected to review a topic from the first 3 sessions. A trained doctoral-level instructor (PhD or MD) facilitated each session with POLs. Meals were provided at each session. POLs chose whether to schedule learning sessions before work or during lunchtime. All but 1 (who selected breakfast sessions) identified a lunch time on a workday as the time when their colleagues were most likely available to attend. Investigators provided POLs with template e-mail invitations and reminders, including a brief video featuring

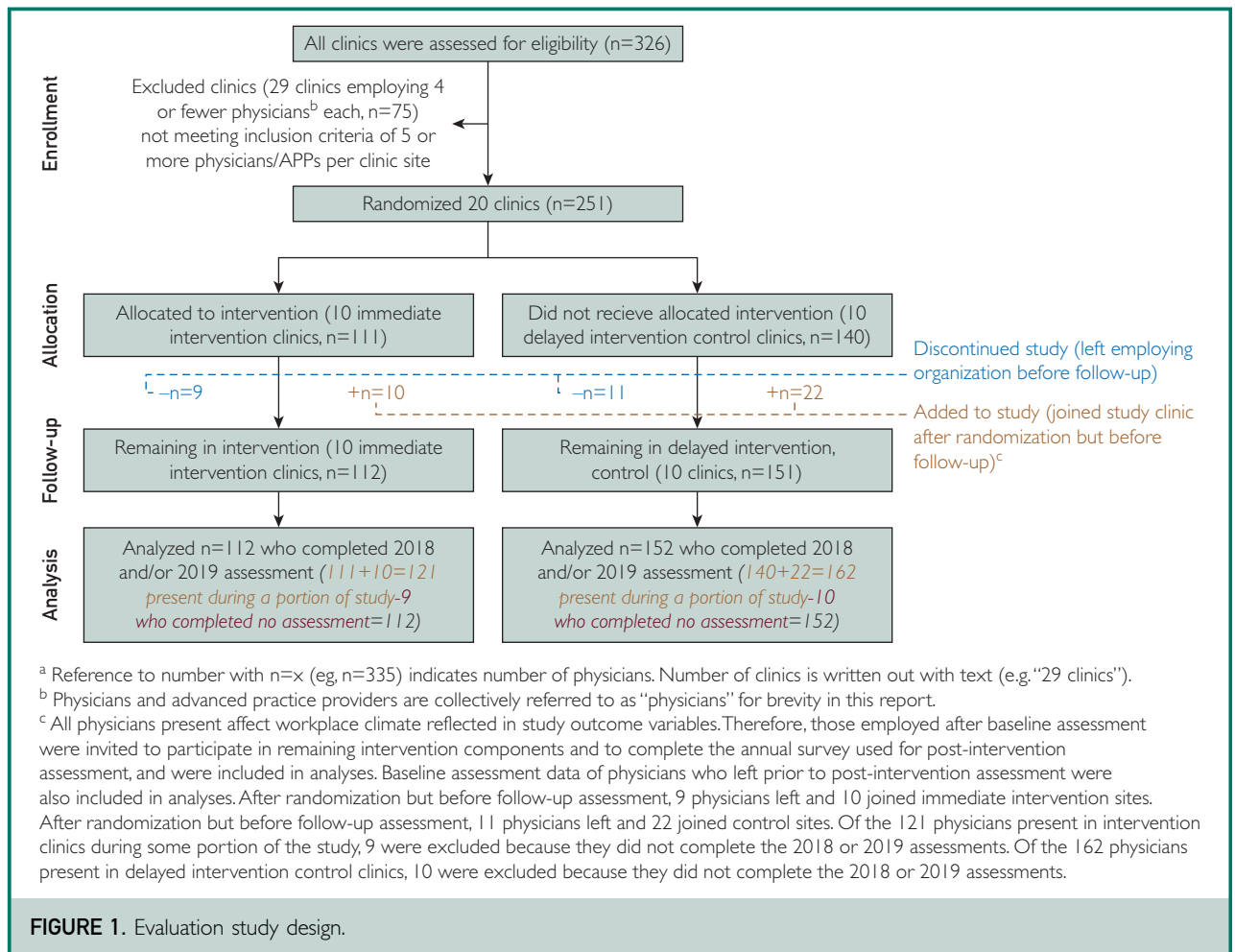


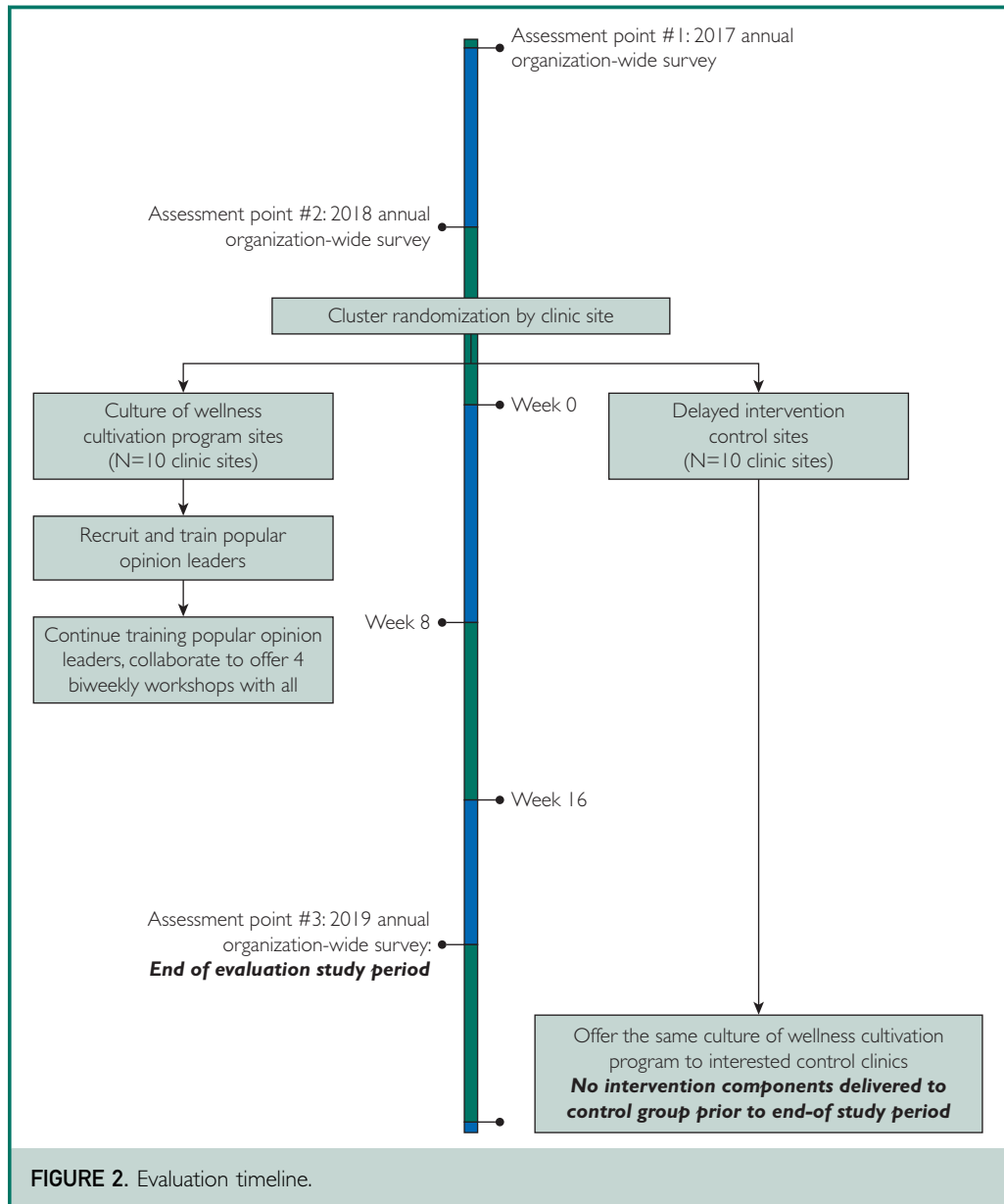
FIGURE 1. Evaluation study design.

a physician leader who introduced each workshop focus, along with a study demonstrating evidence for benefit of the practice in clinicians and encouragement to attend. POLs shared these materials with their colleagues. In groups with more than 1 POL, 1 took the lead in sending e-mail invitations encouraging their colleagues to attend sessions. All POLs, whether there was 1 or more than 1 present, were given time during each session to invite colleagues to practice the skills introduced during the session. All POLs were encouraged to teach any aspect of the curriculum they wished to teach. Few elected to teach 1 or more components of session content. After each session, POLs were given a postworkshop e-mail template to send to their colleagues that reviewed workshop content and skills and encouraged

practice during the subsequent 2 weeks. We also encouraged all POLs to use informal conversation opportunities at work to encourage their colleagues to practice the evidence-based health-promotion skills presented during lunch sessions.

### Selection and Training of Popular Opinion Leaders

Supplemental Table 1 (available online at <http://www.mayoclinicproceedings.org>) describes the adaptation of the Centers for Disease Control and Prevention (CDC) approach in designing this POL intervention to cultivate a culture of wellness among physicians. POLs were identified using an electronic survey, which asked all physicians at the 10 immediate intervention clinics to respond to the following single question: "Who in your clinic



group do you respect most both as an example of clinical competency and as an example of provider wellness? Please list your first, second, and third choice, in that order.” Responses were provided by 38 physicians (33.9% of the 112 practicing in immediate intervention clinics). Consistent with CDC recommendations,<sup>36</sup> the number of POLs selected per clinic was set to approximately 15% of each clinic population.<sup>33-35</sup>

Nominated physicians were invited by the medical director of provider wellness at

the organization to discuss their potential involvement in the program. Those willing to serve as POLs were then invited to a lunchtime training session that began with an overview of evidence-based intervention components of the program, followed by a first-hand experience of 1 upcoming gratitude workshop activity. A key message of this brief POL training session was that they had been identified by colleagues as respected peers and, as such, they had unique ability to promote activities and skills

TABLE 1. IMPACT Workshop Focuses

Gratitude workshop
<p>Introduction to the gratitude practice, to promote appreciation for self and others, began with distribution of the measures used to assess this construct (Supplemental Material, available online at <a href="http://www.mayoclinicproceedings.org">http://www.mayoclinicproceedings.org</a>), a graph illustrating its relationship with high professional fulfillment in their own organization's wellness data and research demonstrating its relationship with improved occupational well-being.<sup>37–39</sup> Participants engaged in a work-specific variation of the “Three Good Things” exercise,<sup>40</sup> in which they described things they were grateful for at work in the last day, including 1 thing a colleague did, 1 thing they did or accomplished, and 1 other thing they were grateful for. Participants were provided leather-bound journals (each included a pen and an attached laminated bookmark describing the exercise as a reminder) to record their responses to these 3 gratitude prompts and were given time to share their responses with a colleague seated near them. They evaluated their mood on a 0 to 10 scale before and after the exercise, which reliably demonstrated improved mood associated with this gratitude practice. In addition, they were provided a mechanism to share gratitude for a colleague online, through a mobile application, or using physical cards. Gratitude messages written in any of these formats (submitted anonymously if preferred) were delivered to an organizational leader, who then sent a letter that included the message of gratitude to the intended recipient, along with a note of recognition for their contributions to a culture of wellness. A poster encouraging gratitude served as a visual cue around each clinic, with a pouch stocked with thank-you cards, which also allowed physicians to thank those they work with directly. During the workshop, participants were encouraged by the instructor and popular opinion leader (POL) to practice the work-specific “Three Good Things” exercise daily, for 2 weeks, and to express gratitude for those with whom they work, using their preferred option(s).</p>
Cognitive reframing workshop
<p>Participants were provided copies of the self-valuation measure<sup>41</sup> and informed that self-valuation is associated with professional fulfillment and reduced burnout among physicians.<sup>41,42</sup> Cognitive reframing was introduced as a way to promote self-valuation during distressing circumstances, along with the evidence indicating this practice has demonstrated significant efficacy in reducing distress in various populations<sup>43–46</sup> and reduced suicidal ideation in physicians.<sup>47</sup> Participants collectively engaged in a cognitive reframing exercise in which they described an example of a distressing event at work and identified specific automatic negative thoughts and associated emotions related to the event. The instructor then taught participants how to use basic cognitive therapy methods to reframe automatic negative thoughts. These methods included using a list of common cognitive distortions and comparing negative self-talk with what might be said to a friend experiencing the same distressing event. The instructor and POL encouraged participants to replicate the exercise if they experienced a negative event at work during the next 2 weeks. A section of the IMPACT mobile application included all materials provided during the workshop, and a poster was hung in the clinic, with a pocket carrying instructional handouts.</p>
Mindfulness workshop
<p>This workshop began with a review of the robust evidence of the benefits of mindfulness meditation, including cognitive performance, sleep-quality, cardiovascular health, immune-system function, conflict response, empathy, and compassion.<sup>48–55</sup> The group engaged in a brief mindfulness practice, facilitated by the instructor. The group then discussed the experience. The instructor and POL requested that participating physicians commit to 12 minutes of meditation per day during the next 2 weeks and provided them with guided meditation audio online and within the IMPACT mobile application, as well as a poster onsite with a pocket carrying instructional handouts.</p>
“Participant Group Choice” workshop
<p>The final workshop topic was selected by the POL and colleagues, many of whom chose to repeat a workshop (often gratitude or cognitive reframing), and a few who requested other topics. For example, 1 requested a “meaning in medicine” workshop, in which colleagues reflected on professional fulfillment in the field. The workshop focus was typically followed by a motivational interview-based discussion to promote lasting behavioral change after the conclusion of the program.<sup>56</sup> This included a brief discussion in which physicians reflected on their experiences with the program over the previous 8 weeks as well as their plans moving forward. The workshop concluded with a decision on which specific practices they planned to continue engaging with after the program: individually and as a clinic (eg, beginning weekly meetings with a gratitude-focused agenda item).</p>

that contribute to well-being and a workplace culture of wellness. POLs were also invited to meet with the workshop facilitator shortly before the start of each workshop for a brief review of the agenda.

### Data Collection and Measures

Data were collected using electronic assessment surveys administered across the

organization in 2017, 2018, and 2019, to all clinicians in the organization. Surveys were incentivized by linking bonus funds equal to 1% of the respondents' annual salaries to completion and achieved >90% response rate each year. A third-party administrator assigned each physician a unique identifier, performed linkage of annual survey data across time, and

deidentified and provided the dataset to investigators.

Surveys included the Professional Fulfillment Index<sup>57</sup> measure of professional fulfillment and burnout, the Self-Valuation Scale,<sup>41</sup> and a single item assessing intent to leave the organization.<sup>58</sup> Assessment in 2018 and 2019 also included the Gratitude at Work Inventory, which assesses overall perceived gratitude, expressed gratitude (frequency of my expressions of gratitude for others' contributions at work), and received gratitude (frequency of others expressing gratitude for my contributions at work). Additional information on this previously unpublished measure of Gratitude at Work and results from principal components and internal consistency analyses are included in [Supplemental Material](#). We normalized all scale scores to a score range of 0 to 10, apart from intent to leave within 2 years, which was used as a dichotomous measure with response options of “moderate,” “likely,” or “definitely” defined as “moderate to greater intent to leave” (vs “none” or “slight,” defined as “low intent to leave”).

### Statistical Analyses

Demographic data were not available in the completely deidentified dataset. Therefore, aggregate demographic descriptive statistics were obtained from the third-party survey administrator. All control group participants and intervention group participants—regardless of whether they participated in the intervention or not—were included in data analyses. We used 3 level mixed-effects models in assessment of the intervention effects on professional fulfillment, burnout, self-valuation, and intent to leave to account for the nested data structure of assessment time points nested within individual participants and individual participants nested within clinic sites. We specified level 1 fixed effect to contrast post-intervention (2019) scores against combined 2017 and 2018 scores by immediate intervention vs delayed-intervention clinic. We specified fixed cross-level interaction effects for post-test (level 1) by intervention assignment (level 3) to assess intervention effects

on change in the outcome variable. We used 2 preintervention scores (2017 and 2018) rather than using only the most recent assessment for 2 reasons: Two assessments at different times is likely to be a more accurate representation of cultural climate than 1, and statistical power is likely to improve by using 2 baseline-assessment points. We used a logistic regression (logit link) model to assess the effects of intervention on the dichotomous outcome of moderate or greater intent to leave. For all level 3 models we specified a random level 2 intercept and a random level 3 intercept. We used a less complex 2-level mixed-effects model (participants nested within clinics) to assess intervention effects on gratitude, which was only assessed in 2018 and 2019. [Supplemental Table 2](#), available online at [www.mayoclinicproceedings.org](http://www.mayoclinicproceedings.org), includes the equations of specified mixed effects models and the associated results. We calculated standardized effect sizes (ES) by dividing estimated fixed effects of the intervention group for each outcome variable by the standard deviation of the same variable in baseline (2018) data. We analyzed data using IBM SPSS Statistics for Windows, version 27.0 (IBM Corp) and HLM 8.1 software (Scientific Software International). Reported *P* values are 2-tailed, with statistical significance set at *P*<.05.

### RESULTS

Across 20 sites enrolled in this evaluation study, 264 of 283 physicians (93%) who were present during at least some portion of the study period completed the wellness survey in 2018, 2019, or both ([Figure 1](#)). All 264 physicians were randomized (by clinic), to immediate intervention (n=112) or delayed intervention control (n=152) during the study period. Of 264 physicians-APPs with 2018 and 2019 assessment data, 222 (84%) completed 2017 assessments.

[Table 2](#) describes the characteristics of the 264 physicians who participated in the 2018 or 2019 UHA wellness survey and were therefore practicing in clinics randomized to immediate intervention (n=112) or delayed intervention control (n=152)

TABLE 2. Participant Characteristics (Clinicians Practicing in 2018 or 2019 [or Both Years])

Demographic (no. (%))	Immediate intervention (n=112)	Delayed intervention control (n=152)	Total study population (n=264)
Gender			
Female	68 (61)	91 (60)	159 (60)
Male	42 (38)	54 (36)	96 (36)
Missing gender	2 (2)	7 (5)	9 (3)
Race			
White (European, Middle Eastern, other)	47 (42)	74 (49)	121 (46)
Black or African American	0 (0)	3 (2)	3 (1)
Asian	45 (40)	44 (29)	89 (34)
American Indian or Alaska Native	0 (0)	0 (0)	0 (0)
Native Hawaiian or Pacific Islander	0 (0)	1 (1)	1 (0)
Missing race	20 (18)	30 (20)	50 (19)
Ethnicity			
Hispanic or Latinx	0 (0)	2 (1)	2 (1)
Not Hispanic or Latinx	102 (91)	126 (83)	228 (86)
Missing ethnicity	10 (9)	24 (16)	34 (13)
Age			
Below 30 years	0 (0)	2 (1)	2 (1)
30 to 39 years	21 (19)	26 (17)	47 (18)
40 to 49 years	38 (34)	38 (25)	76 (29)
50 to 59 years	24 (21)	29 (19)	53 (20)
60 years or older	20 (18)	30 (20)	50 (19)
Missing age	9 (8)	27 (18)	36 (14)
Relationship status			
Not living with a significant other	11 (10)	16 (11)	27 (10)
Living with a significant other	93 (83)	114 (75)	207 (78)
Who does not work outside the home	20 (18)	24 (16)	44 (17)
Who works part-time outside the home	18 (16)	19 (13)	37 (14)
Who works full-time outside the home	54 (48)	71 (47)	125 (47)
Whose occupation is missing	20 (18)	38 (25)	58 (22)
Missing relationship status	8 (7)	22 (15)	30 (11)
Dependent children			
Living with no dependent children	38 (34)	54 (36)	92 (35)
Living with 1 or more dependent children	65 (58)	76 (50)	141 (53)
Missing dependent children	9 (8)	22 (15)	31 (12)
Occupation			
Physician	102 (91)	122 (80)	224 (85)
Physician assistant	2 (2)	23 (15)	25 (9)
Nurse practitioner	8 (7)	5 (3)	13 (5)
Other clinician (RD, AuD, OD)	0 (0)	2 (1)	2 (1)
Specialty			
Allergy/immunology	0 (0)	3 (2)	3 (1)
Cardiology	0 (0)	38 (25)	38 (14)
Dermatology	3 (3)	0 (0)	3 (1)
Endocrinology/metabolism	6 (5)	2 (1)	8 (3)
Family medicine	24 (21)	48 (32)	72 (27)
Gastroenterology	6 (5)	0 (0)	6 (2)
Hematology/oncology	0 (0)	0 (0)	0 (0)
Internal medicine	24 (21)	20 (13)	44 (17)
Obstetrics/gynecology	26 (23)	15 (10)	41 (16)

Continued on next page



TABLE 2. Continued

Demographic (no. (%))	Immediate intervention (n=112)	Delayed intervention control (n=152)	Total study population (n=264)
Specialty, continued			
Ophthalmology	0 (0)	1 (1)	1 (0)
Otorhinolaryngology	5 (4)	0 (0)	5 (2)
Pediatrics	5 (4)	15 (10)	20 (8)
Pulmonary medicine	5 (4)	0 (0)	5 (2)
Radiology	0 (0)	2 (1)	2 (1)
Rheumatology	0 (0)	2 (1)	2 (1)
Surgery	3 (3)	3 (2)	6 (2)
Other	3 (3)	3 (2)	6 (2)

during the study period. [Figure 1](#) illustrates the number who joined the employer after the baseline survey and left before the study follow-up survey (ie, the number of 2018 physicians who were not surveyed by 2019 and 2019 physicians who were not previously surveyed in 2018). Modal category demographic characteristics of the overall population were female (60%), White (46%), non-Hispanic (86%), aged 40 to 59 years (49%), family-medicine specialists (27%), living with a significant others (78%), and with dependent children (53%). A minority (40 of 264 [15%]) were advanced practice providers (nurse practitioners or physician assistants).

Of the 112 practicing in intervention clinics, 84 (75%) attended 1 or more workshops: 41 (36.6%) attended all 4 workshops, 17 (15.2%) attended 3 workshops, 3 (2.7%) attended 2, 23 (20.5%) attended 1, and 28 (25%) did not attend any workshops. Attendance was highest at the first (Gratitude) session, with 71 (63.3%) of the immediate intervention group population participating. Attendance at the second (Cognitive Reframing), third (Mindfulness), and fourth (Group-Choice) workshops were 57 (50.9%), 55 (49.1%), and 51 (45.5%), respectively.

#### Effect on Professional Fulfillment and Gratitude

[Table 3](#) demonstrates trends across time by intervention assignment for professional fulfillment, gratitude, burnout, and self-valuation. The primary outcome for evaluation of intervention efficacy (professional

fulfillment at the 2019 assessment relative to the average of 2017 and 2018 assessments) demonstrated a statistically significant effect in favor of intervention. Specifically, the hierarchical linear modeling estimated effect of practicing at an immediate intervention clinic site relative to delayed intervention clinic on change in professional fulfillment was 0.63 points (ES=0.35;  $P=.001$ ). Change in gratitude (not assessed in 2017) from 2018 to 2019 was also more favorable by 0.45 points (ES=0.22;  $P=.035$ ) among physicians practicing at clinics assigned to immediate intervention. Pearson correlations between gratitude and professional fulfillment in 2018 and 2019 were 0.59 and 0.58 ( $P<.001$ ), respectively. See [Supplemental Table 3](#), available online at [www.mayoclinicproceedings.org](http://www.mayoclinicproceedings.org), for additional information on mixed-effects model results.

#### Effects on Burnout and Self-Valuation

By chance, physicians at delayed intervention sites averaged  $-0.71$  points lower burnout at baseline (2017 and 2018) relative to clinicians at immediate intervention sites before intervention ( $P<.018$ ). Change in burnout by 2019 did not differ significantly by intervention group (ES=0.13;  $P=.180$ ). Self-valuation changes between baseline (2017 and 2018) and 2019 did not differ significantly by intervention group (ES =  $-0.06$ ;  $P=.552$ ).

#### Effects on Intent to Leave

[Table 3](#) shows the portion of clinicians with moderate or greater intent to leave at



**TABLE 3. Descriptive Data and Mixed-Effects Model Estimated Impact of Intervention on Professional Fulfillment, Gratitude, Occupational Burnout, Self-Valuation, and Intent to Leave**

	Intervention		Control		MEM estimated difference	
	Mean (SD)	Number	Mean (SD)	Number	Coef <sup>a</sup> (SE)	P
Professional fulfillment, 2017	7.23 (1.98)	96	7.09 (1.77)	126	–	–
Professional fulfillment, 2018	7.52 (1.79)	105	6.86 (1.77)	131	–	–
Professional fulfillment, 2019	7.40 (2.01)	111	6.34 (2.06)	143	0.63 (0.19)	.001
Gratitude at work, 2018	6.60 (2.10)	105	6.29 (1.99)	128	–	–
Gratitude at work, 2019	6.52 (1.92)	112	5.82 (2.01)	144	.045 (0.20)	.035
Occupational burnout, 2017	1.79 (1.46)	96	2.49 (1.70)	126	–	–
Occupational burnout, 2018	1.97 (1.48)	105	2.60 (1.60)	131	–	–
Occupational burnout, 2019	2.05 (1.59)	112	2.98 (1.87)	144	–0.20 (0.15)	.180
Self-valuation, 2017	3.51 (1.80)	91	3.14 (1.79)	118	–	–
Self-valuation, 2018	5.72 (2.17)	105	5.32 (2.07)	131	–	–
Self-valuation, 2019	5.72 (2.19)	112	5.42 (1.99)	144	–0.14 (0.28)	.628
	%		%		OR (95% CI)	P
Intent to leave, 2017	20%	97	13%	123	–	–
Intent to leave, 2018	13%	105	21%	129	–	–
Intent to leave, 2019	15%	112	31%	143	0.40 (0.19-0.86)	.020

<sup>a</sup>MEM estimated differences in outcome variables by intervention group are based on post-test assessment relative to average 2017 and 2018 preintervention assessments, except for analysis of “gratitude at work,” which used only 2018 preintervention assessment scores because gratitude at work was not assessed in 2017.

CI, confidence interval; Coef, coefficient; MEM, mixed-effects model; OR, odds ratio; SD, standard deviation; SE, standard error.

baseline (average of 2017 and 2018) and at the 2019 postintervention assessment. Immediate intervention was associated with a 60% reduction in odds of reporting moderate or greater intent to leave at 2019 assessment (odds ratio [OR], 0.40; 95% confidence interval [CI], 0.19 to 0.86;  $P=.020$ ).

## DISCUSSION

Our observations indicate the IMPACT intervention using a POL approach achieved high levels of engagement, with 3 of 4 physicians participating in 1 or more intervention sessions. At the clinic level, IMPACT was associated with a favorable impact on professional fulfillment, gratitude at work, and intent to leave the organization. An overall decline in well-being metrics across the study population during the intervention period meant that the benefits of IMPACT were detected primarily in an attenuation of this decline in well-being at intervention clinics. Annual assessments with response rates  $\geq 90\%$  facilitated population-level

comparison over time in these clinics. Incentives equal to 1% of annual compensation tied to completing the survey likely drove high response rates.

Discussion groups for medical professionals that are led and facilitated by physicians have previously been associated with retention,<sup>59</sup> improved engagement at work,<sup>60–62</sup> increased self-compassion,<sup>59–62</sup> reduced burnout,<sup>59–61</sup> and reduced cortisol levels.<sup>59</sup> The distinct intent of this study was to determine the effects of a low-intensity, unit-based intervention on professional fulfillment and other wellness domains among all physicians practicing at clinics in which the intervention was delivered, regardless of whether they personally participated. Professional fulfillment and gratitude at the clinic level (averaged across all physicians independent of participation) improved, suggesting that the IMPACT intervention had a positive effect on the culture of wellness. In addition, the favorable results on intent to leave suggest a

compelling potential cost-to-benefit ratio for this POL intervention. If the estimated 60% reduction in odds of intent to leave attributed to intervention could have been achieved in the control group with intervention, we estimate that 17.8% (rather than the observed 30.8%) would have reported moderate or greater intent to leave at postintervention follow-up assessment in 2019. By multiplying this difference (30.8% – 17.8% = 13.0%) by the estimated portion of physicians reporting moderate or greater intent to leave who actually do leave within 2 years (22.6%),<sup>21</sup> we estimate that over the subsequent 2 years, 2.94% or 1 in 34.0 control group physicians may have been prevented from leaving the organization (ie, 4 to 5 physicians). Using a conservative approximation of \$250,000 cost to replace each departing physician,<sup>20,21</sup> we estimate the reduced physician turnover cost to the organization achievable over 2 subsequent years by offering the intervention to the entire population of 152 physicians in the control group could be more than \$1,000,000. The cost of delivering the IMPACT program to immediate intervention clinics was approximately \$117,268.82 (Supplemental Table 4, available online at [www.mayoclinicproceedings.org](http://www.mayoclinicproceedings.org)).

It is also noteworthy that a large proportion of participants attended at least 1 intervention workshop, as physicians face unique barriers to engagement in—and thus often underutilize—wellness interventions.<sup>1-4</sup> Invitations from clinic-site POLs and scheduling lunch workshops at clinic sites to accommodate their schedules probably increased participation. Of every 3 intervention-group clinic physicians, 2 attended the gratitude workshop. Robust attendance level at this session, the intervention effect on gratitude, and the high correlation between gratitude and professional fulfillment, suggest the gratitude component of the IMPACT program may be an important contributor to the program's effects on professional fulfillment. We did not observe IMPACT intervention effects on self-valuation or burnout, even though cognitive

reframing and mindfulness meditation were intended to improve both outcomes.

### Limitations

Limitations of this study include use of only annual assessments, which may be a blunt instrument for detecting immediate change associated with participation in intervention; therefore, a subsequent study with more frequent assessments of the primary outcome variable may be particularly clarifying. In addition, despite use of stratification factors for randomization, group burnout level differed by intervention assignment at baseline. This complicates the interpretation of intervention effects on burnout. Another limitation of this study is that we tested a packaged intervention involving multiple components, including the role of POLs and a standardized curriculum emphasizing 3 evidence-based practices. Although some observations suggest IMPACT program components that promote gratitude at work may have contributed substantively to program benefit, this study was not designed to assess efficacy of specific intervention components. Therefore, these observations should be considered hypothesis generating. Future research focused on a POL-led approach to increase gratitude at work specifically may be a helpful next step in the development of interventions to improve culture of wellness. A study designed to assess the efficacy of an intervention with and without POLs may be a useful step toward clarifying the effect of POL influence, specifically.

### CONCLUSION

A clinic-level wellness intervention led by respected colleagues achieved high rates of participation and was associated with more favorable changes in professional fulfillment, gratitude at work, and intent to leave at the group level. These findings, observed in assessments of all physicians at clinic sites, suggest POL-based wellness interventions may be a cost-effective way to engage physicians in practices that improve occupational well-being.

## POTENTIAL COMPETING INTERESTS

Dr. Trockel frequently gives grand rounds/key note lecture presentations. He receives honoraria for some of these activities. Dr Shanafelt is co-inventor of the Well-being Index instruments and the Participatory Management Leadership Index. Mayo Clinic holds the copyright for these instruments and has licensed them for use outside of Mayo Clinic. Mayo Clinic pays Dr. Shanafelt receives a portion of any royalties received. As an expert on the well-being of healthcare professionals, Dr. Shanafelt frequently gives grand rounds/key note lecture presentations and provides advising for healthcare organizations. He receives honoraria for some of these activities. Dr Tait D. Shanafelt, section editor of the journal, had no role in the editorial review or decision to publish this article.

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## SUPPLEMENTAL ONLINE MATERIAL

Supplemental material can be found online at <http://www.mayoclinicproceedings.org>. Supplemental material attached to journal articles has not been edited, and the authors take responsibility for the accuracy of all data.

**Abbreviations and Acronyms:** CDC, Centers for Disease Control and Prevention; CI, confidence interval; IMPACT, Improving and Modeling Physician Action for Culture Transformation; OR, odds ratio; PFI, Professional Fulfillment Index; POL, popular opinion leader; UHA, Stanford University HealthCare Alliance

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**Correspondence:** Address to Mickey T. Trockel, MD, PhD, 401 Quarry Road, Stanford CA, 94305 ([trockel@stanford.edu](mailto:trockel@stanford.edu)).

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