Intensive Care Med
https://doi.org/10.1007/s00134-025-08134-2

ORIGINAL

Positive communication for decreasing burnout in intensive-care-unit staff: a cluster-randomized trial

Élie Azoulay[1,20*], Sheila N. Myatra[2], Gabriel Heras La Calle[3,22], Samir Jaber[4,21], Carole Boulanger[5], Oktay Demirkýran[6], Maria Theodorakopoulou[7], José-Artur Paiva[8,23], Yaseen M. Arabi[9], Gaston Burghi[10], Peter Vernon van Heerden[11], Abdulrahman Al Fares[12,24], Nancy Kentish-Barnes[1,20], Maria-Cruz Martin-Delgado[13,25], Giovanni Mistraletti[14], Guy Francois[15], Anita Barth[15], Jan De Waele[16,26], Tait D. Shanafelt[17], Michael Darmon[1,20] and Maurizio Cecconi[18,19] on behalf of European Society of Intensive Care Medicine

© 2025 Springer-Verlag GmbH Germany, part of Springer Nature

Abstract

Purpose: Occupational burnout is common among intensive-care-unit (ICU) staff and adversely affects staff well-being and patient care. We hypothesized that a multicomponent intervention based on organizational support and workplace climate improvement would reduce burnout.

Methods: The 1:1 cluster-randomized Hello trial involved 370 ICUs from sixty countries allocated to either the intervention or usual care. The four-week intervention designed to promote a positive workplace culture and within-team support used posters, email nudges, greetings during morning meetings, role modeling, and positive messages in boxes and on noticeboards. The primary endpoint was burnout prevalence, measured using the Maslach Burnout Inventory. Secondary outcomes included MBI subscale scores, well-being, job satisfaction, ethical climate, intention to leave, work safety, and professional conflicts.

Results: Before the intervention, burnout prevalence was 59.4% (95% CI, 58.6–60.5), with no difference between arms. After the intervention, 4966 intervention-arm and 4602 control-arm healthcare professionals completed the MBI. Burnout prevalence was significantly lower in the intervention arm relative to controls (52.2% vs. 63.3%; adjusted odds ratio, 0.56; 95%CI 0.46–0.68; $P < 0.001$). Among MBI sub-scales scores, emotional exhaustion and depersonalization were lower, and personal accomplishment was higher in the intervention arm. Staff in the intervention arm reported better job satisfaction, workplace safety, ethical climate, and patient- and family-centered care; they were less often considering a job change.

*Correspondence: elie.azoulay@aphp.fr
[1] Medical Intensive Care Unit Department, AP-HP, Saint-Louis University Hospital, Paris-Cité University, Paris, France
Full author information is available at the end of the article

The Collaborators are listed in the electronic supplementary material 2.
This study was performed on behalf of the European Society of Intensive Care Medicine.

Springer

Conclusions: The Hello intervention reduced burnout and improved workplace culture among ICU staff. Given the pragmatic design, the intervention tested may have broad applicability.

Trial registration: The trial was registered on ClinicalTrials.gov on June 18, 2024 (NCT06453616).

Keywords: Mental health, Emotional exhaustion, Depersonalization, Conflicts, International, Shortage

Introduction

Occupational burnout is pervasive among healthcare professionals (HCPs) [1]. The main manifestations are emotional exhaustion, depersonalization or cynicism, and a low sense of personal achievement and self-esteem [2, 3]. The prevalence of burnout is higher in women and younger professionals [4, 5]. Studies suggest HCPs who work in intensive-care-unit (ICUs) have burnout prevalences of up to 60% [6]. Contributors to ICU staff burnout are the high patient morbidity and mortality [7], the complexity of decisions and work organization [8], and the frequency of ethical dilemmas with ensuing interprofessional conflicts [9]. Observational studies suggest that better communication among physicians and nurses decreases burnout [4, 5].

Burnout adversely affects patients, HCPs, and healthcare systems. HCPs with burnout are less able to provide optimal care and to avoid medical errors [10]. It can also contribute to depression, substance abuse, suicidal ideation, and disruptions in career and family life [4, 5, 11]. Healthcare institutions with high levels of HCP burnout experience increased staff turnover, reduced productivity, and higher costs [1, 12].

Several calls for action targeting burnout have been issued [13–15]. Most interventions designed to reduce burnout targeted individuals, for instance via mindfulness-based strategies, professional coaching, creative arts therapy, or exercise and yoga programs. These approaches require considerable personal effort and time. Moreover, long-term effects have been limited [16–20]. System-levels can be targeted by interventions focused on workload, leadership, communication, and organizational culture [21]. Although system-level strategies show significant potential for reducing burnout, they are less frequently utilized [16, 22].

In the setting of the post-COVID-19 pandemic with increased emotional exhaustion [23], we sought to develop a pragmatic intervention that was built upon established models of organizational support and workplace climate improvement in healthcare settings. The objective of the Hello trial was to test a simple, multifaceted program that addresses both individual and system-level factors and designed to reduce occupational burnout among ICU staffs.

Take-home message

In a cluster-randomized trial, 370 ICUs from sixty countries, a multicomponent intervention focused on organizational support and workplace climate, effectively reduced burnout prevalence (from 63.3% to 52.2%) among ICU staff.

Methods

Trial design and oversight

The multicenter, cluster-randomized controlled Hello trial evaluated a multicomponent intervention designed to enhance positive communication, and teamwork among ICU staffs (Supplemental Fig. 1). Participating ICUs were allocated either to the intervention or to usual care. We performed cluster randomization at the unit level rather than randomization of individual staff members because the intervention was designed to be implemented among all staff working in a given ICU.

The Hello protocol has been published elsewhere [24]. ICUs affiliated with the European Society of Intensive Care Medicine were invited to participate. Participating ICUs applied for institutional review board (IRB) approval according to legislation in the relevant country. All HCPs working in participating ICUs were eligible to participate in the study on a voluntary basis. No data on patients or families were recorded. The trial was registered on ClinicalTrials.gov on June 18, 2024 (NCT06453616).

Randomization

Cluster randomization of the participating ICUs in a 1:1 ratio was performed in a centralized manner using the cvcrand package in the R program (http://www.r-project.org/). Randomization was stratified on ICU size, country, and mortality in 2023. The ICUs were enrolled by the three main investigators (EA, GF, and AB) and the national coordinators. ICU names were replaced by random numbers for the randomization process to ensure concealment.

Intervention

The protocol and Supplemental Fig. 1 detail the intervention [24]. The six components of the intervention were drawn from social, organizational, positive-psychology, and healthcare-communication research [20, 25, 26].

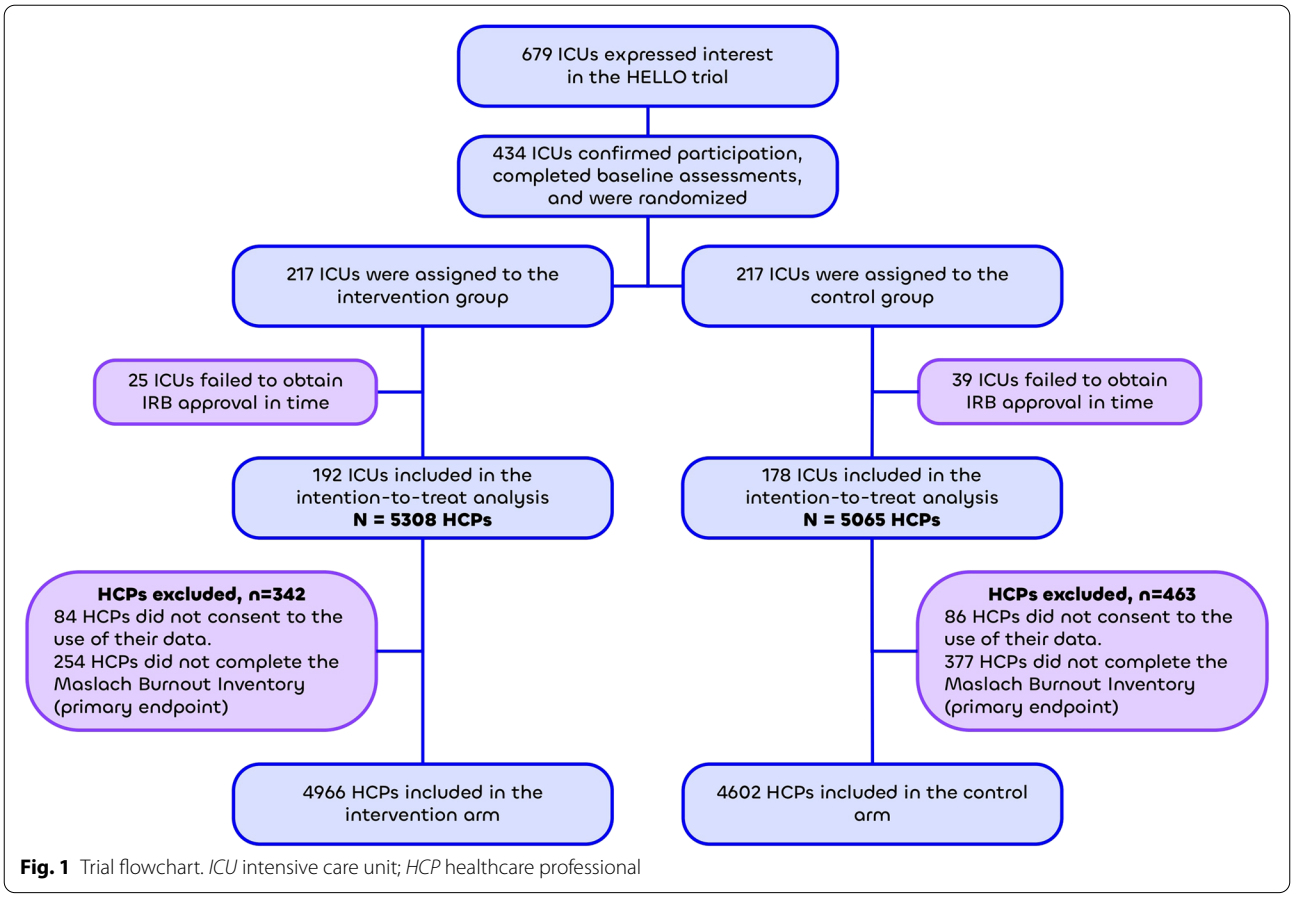


Fig. 1 Trial flowchart. *ICU* intensive care unit; *HCP* healthcare professional

Collectively, the components addressed both individual-level factors, such as well-being, motivation, and job satisfaction, and system-level factors, such as communication, team cohesion, group dynamics, and conflicts. The six components consisted of posters, including the word Hello in all country languages, displayed in 20 places in each ICU and designed to encourage saying Hello; weekly e-mail reminders about the importance of teamwork [27]; greetings during morning huddles to set a positive tone and enhance teamwork [28]; a box in which staff placed positive messages for their colleagues, to be read by any staff members who wished to [29]; role modeling by leaders to promote positive communication [30]; and two noticeboards per ICU for posting positive messages, drawings, or photos directed to all ICU HCPs [31].

Overall, the study cost was 105 K€, including 47 K€ for preparing printing and shipping the materials to the centers. Regarding the "lead by example" component, no formal training sessions were mandated, but site leaders were provided with concise implementation guides.

Intervention and control ICUs

A video detailing the intervention to be shared with the staff was provided to the ICUs in the intervention arm (https://vimeo.com/988364914/e2c89b435b). Participating HCPs from the intervention group were asked to view the video and to communicate any questions they might have to the local investigators. The three investigators (EA, GF, and AB) subsequently held several question-and-answer sessions with the local investigators. The intervention-arm ICUs implemented the intervention for four weeks, between October 14 and November 10, 2024. Time-limited cognitive and behavioral therapy provides incentives for both subjects and providers to work efficiently. In the HELLO intervention, the four-week period of active treatment, followed by a later booster session when, is designed to maximize impact while maintaining efficiency [32].

ICUs randomized in the control arm were informed that they would receive the intervention in early 2025. Intervention centers were encouraged to submit pictures illustrating how the Hello intervention was implemented at their sites, which are available for viewing online: (https://www.dropbox.com/scl/fo/qt8z4w3zk1ako7x

uganx4/AED_EQk6vuwrxGSp3eMLmvM?rlkey=ispyrsenwlwlpv5xkkr5r8ewh&e=1&st=7ak60m04&dl=0).

Outcomes

The study's primary outcome was the prevalence of burnout as assessed using the 22-item Maslach Burnout Inventory (MBI, Human Services version, https://www.mindgarden.com/315-mbi-human-services-survey-medical-personnel) after the intervention or corresponding period in the control group. Validated versions of the MBI in 19 different languages were used [33]. The MBI has three subscales, for emotional exhaustion (nine items), depersonalization (five items), and personal accomplishment (eight items), respectively [3]. Each item is scored from 0 (never) to 6 (every day). Respondents with high emotional exhaustion (≥27) and/or high depersonalization (≥10) scores were classified as having burnout [34].

Secondary outcomes included the scores on each of the three MBI sub-scales, handled as continuous data; the scores on six visual analog scales (VAS, where 0 was worst and 10 best) assessing work satisfaction, patient-centeredness of care, family-centeredness of care, ethical climate, and intention to leave the ICU, respectively; the feeling of work safety, and the number of other HCPs each respondent felt in conflict with [9]. Finally, we evaluated the MBI score differences from the first assessment at baseline to the second assessment.

Data collection

Individual HCP information was de-identified. Each HCP connected to an online data-collection system via a link or QR code to complete a five-minute survey that included their age, sex, role in the ICU, number of working hours/week, duration of ICU experience, MBI and six VAS, and to report the number of conflicts. These data were collected twice, before the intervention (September 1 to October 10, 2024) and after the intervention (between November 15 and December 15, 2024). No personal identifiers were provided in the online data. Accordingly, data from individual HCP could not be paired across timepoints.

Local investigators completed a scale designed for this trial to assess compliance with the intervention [24]. Adherence to each of the six Hello program components was rated from 0 to 4, and an additional point could be assigned for extraordinary efforts.

Statistical analysis

The statistical analysis plan is available in the published protocol [24]. The ICU was the randomization unit. All primary and secondary analyses were performed at the HCP level with adjustment for clustering. Since one-point differences in EE and DP scores have been shown to correlate with medical errors, intent to leave, and reductions in clinical work hours at the population level, one-point changes in emotional exhaustion and depersonalization were considered meaningful [12, 35–37]. Effect size changes in standard deviation (SD) were also assessed [38].

The study was designed to demonstrate a 9% difference in burnout prevalence between intervention and control arms (from 39 to 30%) [39, 40]. Assuming an intra-class coefficient of 0.15, at least 72 ICUs per arm that would include 50 HCPs each were required. Given the heterogeneity of the ICUs and possibility that fewer than 50 HCPs might respond in some ICUs, we enrolled all eligible ICUs who wished to participate. The sample size was calculated using method proposed by Hooper R et al. [41] and using the derived shiny app calculator (https://clusterrcts.shinyapps.io/rshinyapp/, last accessed July 8th 2025).

Data were described as mean (SD) or number (percentage). Categorical variables were compared using Fisher's exact test and continuous variables using parametric tests.

A mixed-effects logistic regression was used for the primary analysis, with clusters entered as a random effect on the intercept. The intention-to-treat approach was followed, with a binary exposure variable indicating whether the HCP was in an intervention or control ICU.

The secondary outcomes were assessed using linear mixed-effects regression, with clusters entered as a random effect on the intercept. Difference in difference was approximated using mixed-effect linear regression, with clusters entered as a random effect on the intercept, and using interaction between intervention and time as a reflection of the difference in difference.

MBI responses were considered only if they had no more than one missing value per sub-scale. When one value was missing, it was imputed using the mean score for all answered items in the same domain. We did not impute any other variables.

Finally, two predefined subgroup analyses were performed. First, center and country effects were assessed using mixed-effect models with center and country as random effects on the intercept. The approximated median odds ratios (ORs) with their 95% confidence intervals (95%CIs) were computed using permutation tests [42, 43]. Second, we looked for interactions of protocol adherence, country, region, and HCP job category with the effect of the intervention on burnout prevalence.

Statistical analyses were performed with the R program, version 3.4.3 (http://www.r-project.org/), with the 'lme4', and 'lmerTest' packages. All tests were two-sided and P values < 0.05 were considered significant.

Results

Participating intensive care units and healthcare professionals

Figure 1 is the flowchart. The 370 randomized ICUs had 9210 beds; 281 (76%) were medical-surgical ICUs (Tables S1). Table S2 reports the geographic distribution of the ICUs. Table 1 reports the characteristics of the 9568 HCPs, from both randomization groups, who completed the MBI after the intervention. Approximately 60% of participants were part of the nursing staff and 30% part of the medical staff.

Respondents' demographic characteristics did not differ significantly between the pre- and post-intervention groups. Table S3 shows a burnout prevalence of 59.4% among the 15,891 HCPs who completed the MBI before the intervention (58.6% in the intervention group and 60.5% in the control group). Following the intervention, 9,568 HCPs completed the MBI, corresponding to an overall response rate of 59% (9,183/15,527). Specifically, 51% of nursing staff responded (5773/11,410) compared to 83% of medical staff (3410/4117).

Table 1 Main features of the 9568 healthcare professionals who completed the Maslach Burnout data after the intervention

Features	Intervention ICUs (*N* = 4966)	Control ICUs (*N* = 4602)
Age, years, median [IQR]	34 [28–43]	36 [30–45]
Female, *n* (%)	3375 (68)	3200 (69)
ICU experience, months, median [IQR]	36 [11–100]	30 [9–95]
Work time/week, hours, median [IQR]	42 [36–50]	45 [36–55]
Role in the ICU, n (%)		
Nurse or nursing assistant	2961 (60)	2812 (61)
Physician	1501 (30)	1281 (28)
Resident	346 (7)	282 (6)
Physiotherapist/Respiratory therapist	96 (2)	201 (4)
Pharmacist	39 (0.5)	17 (0.5)
Psychologist	22 (0.5)	9 (0.5)
University hospital, *n* (%)	3310 (67)	3139 (68)
Number of ICU beds, median [IQR]	19 [12–28]	23 [13–40]
ICU mortality in 2023, median [IQR]	17 [10–27]	19 [13–34]
Patients per nurse, median [IQR]	2 [2, 3]	2 [2, 3]
Patients per physician, median [IQR]	5 [4–7]	5 [4–8]
Visiting hours per day, median [IQR]	4 [2–10]	3 [1–9]
Type of ICU, n (%)		
Medical-surgical	3634 (73)	3676 (73)
Medical	726 (15)	475 (15)
Surgical	273 (5)	254 (5)
Specialized	332 (7)	197 (7)
Geographic region, n (%)		
Africa	332 (7)	253 (5)
Asia	930 (20)	805 (16)
Eastern Europe	301 (6)	260 (6)
Middle East	90 (2)	437 (10)
North America	108 (2)	108 (2)
Northern Europe	340 (7)	422 (9)
South and Central America	473 (10)	121 (3)
Southern Europe	1657 (33)	1384 (30)
Western Europe	859 (17)	687 (15)

ICU intensive care unit, *MBI* Maslach Burnout inventory

Outcomes

After the intervention or corresponding period for the control arm, the prevalence of burnout was 52.2% in the intervention arm and 63.3% in the control arm (adjusted OR, 0.56; 95%CI, 0.46–0.68; $P < 0.001$, Table 2). The emotional-exhaustion, depersonalization and personal accomplishment scores were better with vs. without the intervention (Fig. 2).

All six VAS scores determined at the end of the intervention period were better with vs. without the intervention (Table 2; Fig. 3). The number of colleagues HCPs felt in conflict with was not different between the two groups. Moreover, change in prevalence of burnout between study initiation and completion was in favor of the intervention (approximated adjusted difference in difference −7% (95%CI −4 to −10%; $P = < 0.001$)). Full models for primary and secondary analyses are reported as supplementary tables (Tables S4–S14).

Protocol deviation and adherence

No deviations were reported. HCPs in three ICUs were unable to complete the baseline MBI due to late IRB approval but completed the second MBI.

Intervention compliance, measured by adherence scores, was completed in week 1 by all 192 (100%) intervention-arm ICUs, and in weeks 2, 3, and 4 by 138 (72%), 144 (75%), and 126 (66%) ICUs, respectively (Supplemental Table S15).

Other analyses

Risk of Burnout was significantly associated with centers and countries (respective median odds ratio after adjustment for intervention of, respectively, 2.00 (95%CI 1.92–2.08) and 1.84 (95%CI 1.70–2.02, Figures S2–S3). An interaction between country and region with regard to intervention efficacy was observed ($P < 0.001$ for each, Figure S4). No significant interactions regarding intervention efficacy were observed by job category ($P = 0.32$) (Figure S5). Adherence to the intervention interacted

Table 2 Outcomes in the two trial arms

Outcomes Median [IQR] or *N* (%)	HCPs in intervention ICUs (*N* = 4966)	HCPs in control ICUs (*N* = 4602)	Adjusted Odds-Ratio or adjusted Estimates (95% Confidence Interval)	*P* value
Burnout[a]	2592 (52.2%; 95% CI 50.8–53.6)	2888 (63.3%; 95% CI 61.9–64.7)	OR 0.56 (0.46–0.68)	< 0.0001
MBI sub-scores				
Emotional exhaustion	22.8 ± 12.95 (vs. baseline 24.6 ± 12.8)	25.5 ± 12.88 (vs. baseline 25.1 ± 12.8)	Estimate − 3.54 (− 4.88 to − 2.19)	< 0.0001
Depersonalization	9.28 ± 6.94 (vs. baseline 9.8 ± 7.1)	10.88 ± 7.26 (vs. baseline 10.0 ± 7.15)	Estimate − 1.79 (− 2.43 to − 1.14)	< 0.0001
Personal accomplishment	34.93 ± 7.50 (vs. baseline 35.8 ± 7.6)	34.32 ± 7.50 (vs. baseline 35.8 ± 7.6)	Estimate + 1.15 (0.44–1.86)	0.002
Difference in burnout prevalence between baseline (B) vs. post intervention (I)	B: 58.6% [95% CI 57.5–59.6] vs. I: 52.2% [95%CI 50.8–53.6]	B: 60.5% [95% CI 59.3–61.6] vs. I: 63.3% [95%CI 61.9–64.7]	Estimate—7.3% (95% CI − 4.8% to − 0.9.8)	< 0.0001
VAS scores[b]				
Satisfaction at work	7.12 ± 2.21	6.84 ± 2.31	Estimate + 0.47 (0.26–0.67)	< 0.0001
Patient-centeredness of care	8.83 ± 1.56	8.62 ± 1.73	Estimate + 0.23 (0.08–0.37)	< 0.0001
Family-centeredness of care	7.93 ± 2.00	7.75 ± 2.13	Estimate + 0.29 (0.12–0.47)	< 0.0001
Ethical climate	7.06 ± 2.36	6.92 ± 2.35	Estimate + 0.32 (0.09–0.55)	0.004
Intention to leave the ICU	4 ± 3.42	4.51 ± 3.40	Estimate − 0.53 (− 0.80 to − 0.27)	< 0.0001
Feeling of safety at work*	7.4 ± 2.4	7.2 ± 2.4	Estimate + 0.33 (0.1–0.5)	0.0003
Number of colleagues HCPs felt they were in conflict with	2.28 [0–2]	2.42 [0–3]	Estimate − 0.34 (− 0.86 to 0.17)	0.32

MBI Maslach Burnout Inventory, *HCP* healthcare professional, *VAS* visual analog scale

[a] Burnout was assessed using the Maslach Burnout Inventory and was defined as an emotional exhaustion sub-score ≥ 27 and/or a depersonalization score ≥ 10

[b] Visual analog scales (0–10) were used to assess unidimensional measures; 0 indicated the lowest intensity possible and 10 the highest intensity possible

*Post-hoc analysis

with the effect of the intervention ($P = 0.04$), with no dose–effect (Figure S6).

Discussion

This large cluster-randomized trial demonstrated that a simple and inexpensive unit-based intervention designed to foster positive interactions among HCPs significantly decreased the prevalence of occupational burnout. This effect was observed within the first month after the implementation of the four-week intervention. The program was also associated with HCPs having more favorable perception of work satisfaction, centering of care on patients and families, ethical climate, and safety at work. The large number of participating ICUs from 60 countries around the world supports the general applicability of our findings.

Occupational burnout is a multi-faceted, WHO-defined work phenomena that is distinct from, but associated with, anxiety and depression [44]. Its incidence has increased in the aftermath of the COVID-19 pandemic [23]. Occupational burnout among HCP is associated both with adverse outcomes for the individual HCP as well as decreased quality of care, lower patient experience, higher cost of care, decreased work hours, and higher turnover [10].

Many studies have assessed interventions designed to prevent or alleviate burnout [16, 20]. Nonetheless, the prevalence of burnout in ICU professionals remains high [4, 5, 45, 46]. Several features of the Hello intervention deserve emphasis. First, the Hello intervention seamlessly integrates into ICU daily routines, fostering spontaneous adoption among staff. It includes gratitude, social connection, and positive communication that can apply to burnout treatment and prevention [26, 47]. It is simple, inexpensive, and modifies the overall ICU climate, without requiring time-consuming actions on the part of HCPs [48]. Second, the intervention was unit-based and appeared to benefit all HCP on the unit by changing the work climate. This aspect is notable since HCP enrollment in individual interventions to reduce burnout is often low. Third, although the intervention lasted only four weeks, a rapid effect was discernable within the month following the intervention. Since recovery from burnout can take several months, it is possible that prolonging the intervention might have further decreased the prevalence of burnout. Although it is assumed the changes to work unit climate and team interaction persist

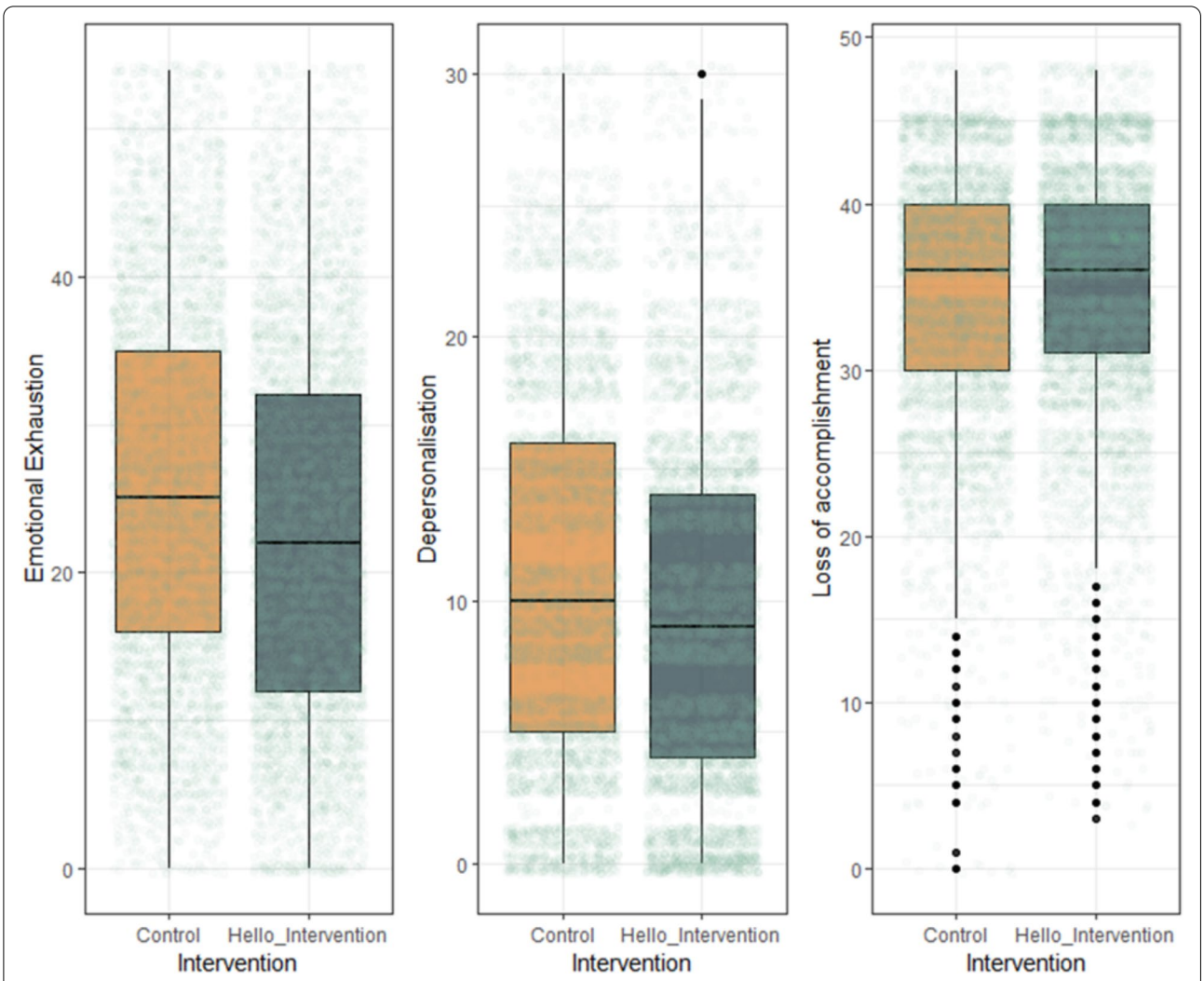


Fig. 2 Distribution of the three Maslach Burnout Inventory (MBI) sub-scale scores for healthcare professionals in the intervention group (blue boxes) and control group (red boxes). Burnout was measured using the three MBI sub-scales. The emotional exhaustion (EE) sub-scale has nine items scored from 0 (never) to 6 (every day) and the score can range from 0 (best) to 54 (worst); the minimal clinically important difference is 1 point. The depersonalization sub-scale has five items scored from 0 (never) to 6 (every day) and the score can range from 0 (best) to 30 (worst); the minimal clinically important difference is 1 point. The personal accomplishment sub-scale has eight items scored from 0 (never) to 6 (every day) and the score can range from 0 (worst) to 48 (best); the minimal clinically important difference is a fifth of a point. Sample sizes were 4966 healthcare professionals for the intervention group and 4602 for the control group. For each box, the solid horizontal lines indicate the median, the vertical height of the box reflects the interquartile range, and the whiskers extend to the farthest outliers (≤ 1.5 times the interquartile range)

after the intervention interval, additional studies are needed to evaluate whether a longer duration of intervention times or repeating the intervention at defined intervals enhances efficacy.

We are not aware of similar programs to which Hello could be compared. Most other interventions have had a narrower scope. For instance, three 2-h sessions of therapeutic communication significantly only decreased depersonalization scores [49]. Holding virtual discussions about patients having died in the ICU was tested in a randomized trial in 10 ICUs [50]. No significant effect on burnout was demonstrated, but the target enrollment was not achieved and the attrition rate was 46%. In another study, weekly small-group discussions of problems with a psychologist were followed by a modest reduction in HCP's burnout [48]. An intervention for physicians and nurse practitioners in ambulatory clinics that involved a series of four, 1 h workshops resulted in improved professional fulfillment and gratitude scores but did not improve burnout [51].

The current shortage of HCPs is a major global concern [52, 53]. Extensive evidence indicates that burnout

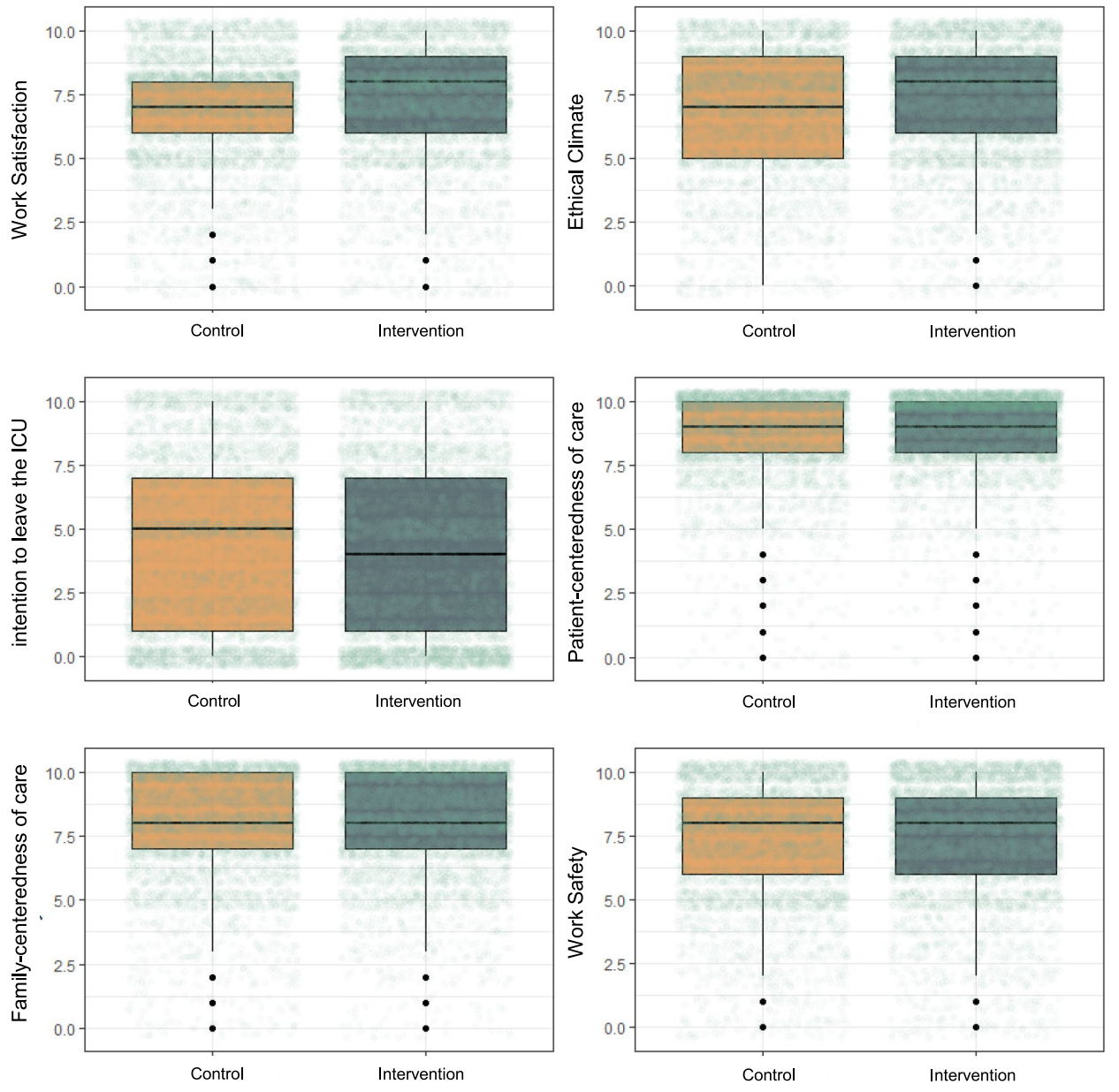


Fig. 3 Self-assessments by the healthcare professionals (HCPs) of six unidimensional measures using visual analog scales on which 0 indicated the worst possible level and 10 the best possible level. The six assessments were done within the first month after the intervention in the intervention arm and during the corresponding time period in the control arm. First five figures are preplanned secondary endpoints. Safety at work was a post-hoc analysis

contributes to reductions in clinical work hours and high job-leaving rates [12, 54, 55]. In our trial, the proportion of HCPs who were considering a job change was lower in the intervention arm. The Hello program addresses many of the points identified as crucial to ICU staff retention, including recognition and respect, effective leadership, strong communication within the team, and humanization of the workplace [56]. Studies evaluating the long-term effects of the Hello program on HCP retention in ICUs would be of interest.

The Hello program does not address some system factors known to play a major role in causing burnout (e.g., excessive workload, contractual conditions, or staffing shortages). Techniques aimed at decreasing individual

vulnerability to burnout, such as mindfulness, meditation, yoga, and acupuncture may have benefits [17]. However, these techniques are time-consuming and have not been extensively studied in ICUs. At the organizational level, workload is a major factor [57]. System-focused strategies may prove more effective in reducing burnout than those aimed at individuals [16, 20]. Moreover, organizational changes such as staffing adjustments and workflow optimization remain essential.

One limitation of our trial is that we assessed burnout using the MBI, a tool extensively validated over decades [58], but with limitations [59]. Although the optimal thresholds and approach to categorize "burnout" remain controversial [34, 60], scores on the emotional exhaustion and the depersonalization subscales have consistently been shown to correlate with clinically consequential outcomes. Notably, scores for these independent domains were more favorable among HCP at intervention ICUs relative to control ICUs in the Hello trial. The favorable scores for the six unidimensional markers of well-being assessed by VAS further support a beneficial effect of the intervention. Second, while the benefits of the Hello program were statistically significant, the score differences were modest (three points for emotional exhaustion and one point for depersonalization). Nonetheless, numerous studies have demonstrated strong associations between one-point changes and clinically important outcomes at the population level such that a 3-point change in the mean EE for the HCP across hundreds of ICUs would be expected to have potentially profound consequences [12, 35–37]. Third, the intervention was delivered for only one month. Repeated or longer deliveries might be more effective. Fourth, the HCPs were evaluated only once after the intervention, within a few weeks. The duration of the effect should be assessed by follow-up assessments. Finally, we did not ask the HCPs about their perceptions of the intervention. Conceivably, some components of the Hello program may be viewed as more helpful and others as more difficult to implement. Knowledge of HCP perceptions might help to improve the program.

In this cluster-randomized trial of 370 ICUs across 60 countries, a simple, inexpensive intervention targeting interdisciplinary teams improved work climate, communication, and reduced burnout. Further studies are needed to explore other approaches to deliver the Hello intervention, effect duration, and the impacts on HCP retention and perceptions.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1007/s00134-025-08134-2.

Author details

[1] Medical Intensive Care Unit Department, AP-HP, Saint-Louis University Hospital, Paris-Cité University, Paris, France. [2] Department of Anaesthesiology, Critical Care and Pain, Tata Memorial Hospital, Homi Bhabha National Institute Mumbai, Mumbai, India. [3] Intensive Care Unit, Hospital Universitario de Jaén, Jaén, Spain. [4] Department of Anesthesia and Intensive Care Unit, Montpellier Regional University Hospital, St-Eloi Hospital, Montpellier University, Montpellier, France. [5] Royal Devon University NHS Foundation Trust, Barrack Road, Exeter, UK. [6] Department of Anesthesiology and Intensive Care, Cerrahpaşa School of Medicine, Istanbul University-Cerrahpaşa, Istanbul, Turkey. [7] First Department of Critical Care and Pulmonary Diseases, Athens Evangelismos General Hospital, National and Kapodistrian University of Athens, Athens, Greece. [8] Intensive Care Department, Centro Hospitalar Universitario S. Joao, School of Medicine, Porto University, Porto, Portugal. [9] Intensive Care Department, King Abdullah International Medical Research Center, King Abdulaziz Medical City, Ministry of National Guard Health – Affairs; College of Medicine, King Saud Bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia. [10] Intensive Care Unit, Maciel Hospital, ASSE, Montevideo, Uruguay. [11] Department of General Intensive Care, Division of Anesthesiology, Critical Care and Pain Medicine, School of Medicine, Hadassah Medical Center, Hebrew University of Jerusalem, Jerusalem, Israel. [12] Department of Anesthesia, Critical Care Medicine and Pain Medicine, Al-Amiri Hospital, Ministry of Health, Kuwait, Kuwait. [13] Department of Intensive Care Medicine, 12 de Octubre Hospital, Madrid, Spain. [14] Dipartimento di Fisiopatologia, Medico-Chirurgica e dei Trapianti. A.S.S.T. Ovest Milanese, Università degli Studi di Milano, Ospedale Civile di Legnano, Legnano, MI, Italy. [15] European Society of Intensive Care Medicine, Brussels, Belgium. [16] Department of Intensive Care Medicine, Ghent University Hospital, Ghent, Belgium. [17] Division of Hematology, Department of Medicine, Stanford University, Palo Alto, CA, USA. [18] Department of Biomedical Sciences, Humanitas University, Via Levi Montalcini, Pieve Emanuele, MI, Italy. [19] IRCCS Humanitas Research Hospital, Via Manzoni 56, 20089 Rozzano, Milan, Italy. [20] European Society of Intensive Care Medicine, INSERM UMR1342 Institut de Recherche Saint-Louis, Paris, France. [21] PhyMedExp, Montpellier University, INSERM U1046, CNRS UMR, 9214 Montpellier, France. [22] Humanizing Healthcare Foundation, International Research Project for the Humanization of Intensive Care Units, Proyecto HU-CI, Madrid, Spain. [23] Grupo Infecao E Sepsis, Porto, Portugal. [24] Kuwait Extracorporeal Life Support Program, Al-Amiri Center for Respiratory and Cardiac Failure, Ministry of Health, Kuwait, Kuwait. [25] Research Institute Hospital 12 de Octubre (imas12), Universidad Complutense de Madrid, Madrid, Spain. [26] Department of Internal Medicine and Pediatrics, School of Medicine and Health Sciences, Ghent University, Ghent, Belgium.

Author contributions

Elie Azoulay designed the study. Elie Azoulay and Maurizio Cecconi obtained the ESICM funding. Anita Barth, Guy-Marie François, and Elie Azoulay launched the invitations and checked that all the participating ICUs had obtained all the authorizations. Elie Azoulay, Maurizio Cecconi, Sheila Myatra, Gabriel Heras La Calle, Samir Jaber, Carole Boulanger, Oktay Demirkýran, Maria Theodorakopoulou, José-Artur Paiva, Yaseen M. Arabi, Gaston Burghi, Peter Vernon van Heerden, Abdulrahman Al Fares, Nancy Kentish Barnes, Maria-Cruz Martin Delgado, Giovanni Mistraletti were part of the steering committee and helped to design the project and to select all the metrics and mental health outcomes. Michael Darmon is the statistician (from the study design and grant preparation to the data analyses). Tait D Shanafelt took part in discussing the survey instrument, guided study completion and interpretation. All authors took part in analyzing the data, raising hypotheses, and guiding the analysis. All authors revised the text for important intellectual content and approved the submission of the final version.

Funding

This study was funded and performed on behalf of the European Society of Intensive Care Medicine.

Access to data and data analysis

Mr Guy François, Dr Azoulay and Dr Darmon had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Dr Darmon from the Saint-Louis hospital Paris, France, conducted and is responsible for the data analysis.

Data sharing statement
Data will not be shared.

Declarations

Conflicts of interest
MD, MC and MCMD are a Section Editors for Intensive Care Medicine. They have not taken part in the review or selection process of this article. Other authors have nothing to disclose in relation with this trial.

Ethical statement
Every participating ICU applied for institutional review board (IRB) approval according to legislation in the relevant country. All HCPs working in participating ICUs were eligible to participate in the study on a voluntary basis. HCPs were asked to consent to participate to the study and to have their anonymous data used for the study analysis before they started completing the questionnaires.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.

Received: 6 August 2025 Accepted: 18 September 2025
Published online: 30 October 2025

References

1. Guille C, Sen S (2024) Burnout, depression, and diminished well-being among physicians. N Engl J Med 391:1519–1527. https://doi.org/10.1056/NEJMra2302878
2. Freudenberger HJ (1974) Staff burn-out. J Soc Issues 30(1):159–165
3. Maslach C (1979) Burned-out. Can J Psychiatr Nurs 20:5–9
4. Poncet M, Toullic P, Papazian L et al (2007) Burnout syndrome in critical care nursing staff. Am J Respir Crit Care Med 175:698–704. https://doi.org/10.1164/rccm.200606-806OC
5. Embriaco N, Azoulay E, Barrau K et al (2007) High level of burnout in intensivists: prevalence and associated factors. Am J Respir Crit Care Med 175:686–692. https://doi.org/10.1164/rccm.200608-1184OC
6. Papazian L, Hraiech S, Loundou A et al (2023) High-level burnout in physicians and nurses working in adult ICUs: a systematic review and meta-analysis. Intensive Care Med. https://doi.org/10.1007/s00134-023-07025-8
7. Mealer M, Hodapp R, Conrad D et al (2017) Designing a resilience program for critical care nurses. AACN Adv Crit Care 28:359–365. https://doi.org/10.4037/aacnacc2017252
8. Donchin Y, Seagull FJ (2002) The hostile environment of the intensive care unit. Curr Opin Crit Care 8:316–320. https://doi.org/10.1097/00075198-200208000-00008
9. Azoulay E, Timsit J-F, Sprung CL et al (2009) Prevalence and factors of intensive care unit conflicts: the conflicus study. Am J Respir Crit Care Med 180:853–860. https://doi.org/10.1164/rccm.200810-1614OC
10. Tawfik DS, Scheid A, Profit J et al (2019) Evidence relating health care provider burnout and quality of care: a systematic review and meta-analysis. Ann Intern Med 171:555–567. https://doi.org/10.7326/M19-1152
11. Dres M, Copin M-C, Cariou A et al (2023) Job strain, burnout, and suicidal ideation in tenured university hospital faculty staff in France in 2021. JAMA Netw Open 6:e233652. https://doi.org/10.1001/jamanetworkopen.2023.3652
12. Shanafelt TD, Mungo M, Schmitgen J et al (2016) Longitudinal study evaluating the association between physician burnout and changes in professional work effort. Mayo Clin Proc 91:422–431. https://doi.org/10.1016/j.mayocp.2016.02.001
13. Moss M, Good VS, Gozal D et al (2016) An official critical care societies collaborative statement: burnout syndrome in critical care health care professionals: a call for action. Am J Crit Care Off Publ Am Assoc Crit-Care Nurses 25:368–376. https://doi.org/10.4037/ajcc2016133
14. Rinne ST, Shah T, Anderson E et al (2021) Professional societies' role in addressing member burnout and promoting well-being. Ann Am Thorac Soc 18:1482–1489. https://doi.org/10.1513/AnnalsATS.202012-1506OC
15. National Academies of Sciences, Engineering, and Medicine; National Academy of Medicine; Committee on Systems Approaches to Improve Patient Care by Supporting Clinician Well-Being (2019) Taking Action Against Clinician Burnout: A Systems Approach to Professional Well-Being. National Academies Press (US), Washington (DC)
16. West CP, Dyrbye LN, Erwin PJ, Shanafelt TD (2016) Interventions to prevent and reduce physician burnout: a systematic review and meta-analysis. Lancet Lond Engl 388:2272–2281. https://doi.org/10.1016/S0140-6736(16)31279-X
17. Cohen C, Pignata S, Bezak E et al (2023) Workplace interventions to improve well-being and reduce burnout for nurses, physicians and allied healthcare professionals: a systematic review. BMJ Open 13:e071203. https://doi.org/10.1136/bmjopen-2022-071203
18. Kuyken W, Warren FC, Taylor RS et al (2016) Efficacy of mindfulness-based cognitive therapy in prevention of depressive relapse: an individual patient data meta-analysis from Randomized Trials. JAMA Psychiat 73:565–574. https://doi.org/10.1001/jamapsychiatry.2016.0076
19. Avallone Mantelli R, Forster J, Reed K et al (2024) Creative arts therapy reduces psychological distress in non-patient-facing healthcare workers. Am J Med S0002–9343(24):00801–00805. https://doi.org/10.1016/j.amjmed.2024.12.002
20. Panagioti M, Panagopoulou E, Bower P et al (2017) Controlled interventions to reduce burnout in physicians: a systematic review and meta-analysis. JAMA Intern Med 177:195–205. https://doi.org/10.1001/jamainternmed.2016.7674
21. Shanafelt TD (2021) Physician well-being 2.0: where are we and where are we going? Mayo Clin Proc 96:2682–2693. https://doi.org/10.1016/j.mayocp.2021.06.005
22. Linzer M, Poplau S, Prasad K et al (2019) Characteristics of health care organizations associated with clinician trust: results from the healthy work place study. JAMA Netw Open 2:e196201. https://doi.org/10.1001/jamanetworkopen.2019.6201
23. Sexton JB, Adair KC, Proulx J et al (2022) Emotional exhaustion among US health care workers before and during the COVID-19 Pandemic, 2019–2021. JAMA Netw Open 5:e2232748. https://doi.org/10.1001/jamanetworkopen.2022.32748
24. Azoulay E, Barnes NK, Nainan-Myatra S et al (2024) HELLO: a protocol for a cluster randomized controlled trial to enhance interpersonal relationships and team cohesion among ICU healthcare professionals. Intensive Care Med Exp 12:90. https://doi.org/10.1186/s40635-024-00677-w
25. Schultz PW, Nolan JM, Cialdini RB et al (2007) The constructive, destructive, and reconstructive power of social norms. Psychol Sci 18:429–434. https://doi.org/10.1111/j.1467-9280.2007.01917.x
26. Sexton JB, Adair KC (2024) Well-being outcomes of health care workers after a 5-hour continuing education intervention: The WELL-B Randomized Clinical Trial. JAMA Netw Open 7:e2434362. https://doi.org/10.1001/jamanetworkopen.2024.34362
27. Weinmann M, Schneider C, vom Brocke J (2016) Digital nudging. Bus Inf Syst Eng 58:433–436. https://doi.org/10.1007/s12599-016-0453-1
28. Reader TW, Flin R, Mearns K, Cuthbertson BH (2009) Developing a team performance framework for the intensive care unit. Crit Care Med 37:1787–1793. https://doi.org/10.1097/CCM.0b013e31819f0451
29. Lindström B, Golkar A, Jangard S et al (2019) Social threat learning transfers to decision making in humans. Proc Natl Acad Sci USA 116:4732–4737. https://doi.org/10.1073/pnas.1810180116
30. McPherson K, Barnard JG, Tenney M et al (2022) Burnout and the role of authentic leadership in academic medicine. BMC Health Serv Res 22:627. https://doi.org/10.1186/s12913-022-08034-x
31. Oerlemans WGM, Bakker AB (2014) Burnout and daily recovery: a day reconstruction study. J Occup Health Psychol 19:303–314. https://doi.org/10.1037/a0036904
32. Hofmann SG, Smits JAJ (2008) Cognitive-behavioral therapy for adult anxiety disorders: a meta-analysis of randomized placebo-controlled trials. J Clin Psychiatry 69:621–632. https://doi.org/10.4088/jcp.v69n0415

33. Leiter MP, Maslach C (2016) Latent burnout profiles: a new approach to understanding the burnout experience. Burn Res 3:89–100. https://doi.org/10.1016/j.burn.2016.09.001
34. Shanafelt TD, Hasan O, Dyrbye LN et al (2015) Changes in burnout and satisfaction with work-life balance in physicians and the general US working population between 2011 and 2014. Mayo Clin Proc 90:1600–1613. https://doi.org/10.1016/j.mayocp.2015.08.023
35. West CP, Huschka MM, Novotny PJ et al (2006) Association of perceived medical errors with resident distress and empathy: a prospective longitudinal study. JAMA 296:1071–1078. https://doi.org/10.1001/jama.296.9.1071
36. Shanafelt TD, Balch CM, Bechamps G et al (2010) Burnout and medical errors among American surgeons. Ann Surg 251:995–1000. https://doi.org/10.1097/SLA.0b013e3181bfdab3
37. Shanafelt TD, Dyrbye LN, West CP et al (2023) Career plans of US physicians after the first 2 years of the COVID-19 pandemic. Mayo Clin Proc 98:1629–1640. https://doi.org/10.1016/j.mayocp.2023.07.006
38. Norman GR, Sloan JA, Wyrwich KW (2004) The truly remarkable universality of half a standard deviation: confirmation through another look. Expert Rev Pharmacoecon Outcomes Res 4:581–585. https://doi.org/10.1586/14737167.4.5.581
39. West CP, Dyrbye LN, Rabatin JT et al (2014) Intervention to promote physician well-being, job satisfaction, and professionalism: a randomized clinical trial. JAMA Intern Med 174:527–533. https://doi.org/10.1001/jamainternmed.2013.14387
40. Ali NA, Hammersley J, Hoffmann SP et al (2011) Continuity of care in intensive care units: a cluster-randomized trial of intensivist staffing. Am J Respir Crit Care Med 184:803–808. https://doi.org/10.1164/rccm.201103-0555OC
41. Hooper R, Teerenstra S, de Hoop E, Eldridge S (2016) Sample size calculation for stepped wedge and other longitudinal cluster randomised trials. Stat Med 35:4718–4728. https://doi.org/10.1002/sim.7028
42. Biard L, Darmon M, Lemiale V et al (2019) Center effects in hospital mortality of critically ill patients with hematologic malignancies. Crit Care Med 47:809–816. https://doi.org/10.1097/CCM.0000000000003717
43. Dumas G, Demoule A, Mokart D et al (2019) Center effect in intubation risk in critically ill immunocompromised patients with acute hypoxemic respiratory failure. Crit Care 23:306. https://doi.org/10.1186/s13054-019-2590-7
44. Atroszko PA, Demetrovics Z, Griffiths MD (2020) Work addiction, obsessive-compulsive personality disorder, burn-out, and global burden of disease: implications from the ICD-11. Int J Environ Res Public Health 17:660. https://doi.org/10.3390/ijerph17020660
45. Mehta AB, Lockhart S, Reed K et al (2022) Drivers of burnout among critical care providers: a multicenter mixed-methods study. Chest 161:1263–1274. https://doi.org/10.1016/j.chest.2021.11.034
46. Burghi G, Lambert J, Chaize M et al (2014) Prevalence, risk factors and consequences of severe burnout syndrome in ICU. Intensive Care Med 40:1785–1786. https://doi.org/10.1007/s00134-014-3454-x
47. Fredrickson BL (2001) The role of positive emotions in positive psychology. The broaden-and-build theory of positive emotions. Am Psychol 56:218–226. https://doi.org/10.1037/0003-066X.56.3.218
48. Ricou B, Gigon F, Durand-Steiner E et al (2020) Initiative for burnout of icu caregivers: feasibility and preliminary results of a psychological support. J Intensive Care Med 35:562–569. https://doi.org/10.1177/0885066618768223
49. Pilon C, Fusco N, Nourry E et al (2023) Burnout among ICU caregivers: a positive impact of therapeutic communication ? Intensive Care Med 49:708–709. https://doi.org/10.1007/s00134-023-07075-y
50. Bateman ME, Chung CH, Mascarenhas E et al (2024) STOPTHEBURN: a randomized controlled trial of death cafés for burnout prevention in intensive care unit employees. Ann Am Thorac Soc 21:1572–1582. https://doi.org/10.1513/AnnalsATS.202312-1024OC
51. Trockel MT, Menon NK, Makowski MS et al (2023) IMPACT: evaluation of a controlled organizational intervention using influential peers to promote professional fulfillment. Mayo Clin Proc 98:75–87. https://doi.org/10.1016/j.mayocp.2022.06.035
52. Dean W, Morris D, Llorca P-M et al (2024) Moral injury and the global health workforce crisis - insights from an international partnership. N Engl J Med 391:782–785. https://doi.org/10.1056/NEJMp2402833
53. Abbasi J (2022) Pushed to their limits, 1 in 5 physicians intends to leave practice. JAMA 327:1435–1437. https://doi.org/10.1001/jama.2022.5074
54. Aiken LH, Clarke SP, Sloane DM et al (2002) Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. JAMA 288:1987–1993. https://doi.org/10.1001/jama.288.16.1987
55. Dyrbye LN, West CP, Sinsky CA et al (2022) Physicians' experiences with mistreatment and discrimination by patients, families, and visitors and association with burnout. JAMA Netw Open 5:e2213080. https://doi.org/10.1001/jamanetworkopen.2022.13080
56. Vincent J, Boulanger C, van Mol M et al (2022) Ten areas for ICU clinicians to be aware of to help retain nurses in the ICU. Crit Care 26:310. https://doi.org/10.1186/s13054-022-04182-y
57. Lilly CM, Cucchi E, Marshall N, Katz A (2019) Battling intensivist burnout: a role for workload management. Chest 156:1001–1007. https://doi.org/10.1016/j.chest.2019.04.103
58. Maslach C, Leiter MP (2016) Understanding the burnout experience: recent research and its implications for psychiatry. World Psychiatry Off J World Psychiatr Assoc WPA 15:103–111. https://doi.org/10.1002/wps.20311
59. Shoman Y, Marca SC, Bianchi R et al (2021) Psychometric properties of burnout measures: a systematic review. Epidemiol Psychiatr Sci 30:e8. https://doi.org/10.1017/S2045796020001134
60. Worley JA, Vassar M, Wheeler DL, Barnes LLB (2008) Factor structure of scores from the maslach burnout inventory: a review and meta-analysis of 45 exploratory and confirmatory factor-analytic studies. Educ Psychol Meas 68:797–823. https://doi.org/10.1177/0013164408315268