


ORIGINAL



# Ethical climate and intention to leave among critical care clinicians: an observational study in 68 intensive care units across Europe and the United States

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## Abstract

**Purpose:** Apart from organizational issues, quality of inter-professional collaboration during ethical decision-making may affect the intention to leave one's job. To determine whether ethical climate is associated with the intention to leave after adjustment for country, ICU and clinicians characteristics.

**Methods:** Perceptions of the ethical climate among clinicians working in 68 adult ICUs in 12 European countries and the US were measured using a self-assessment questionnaire, together with job characteristics and intent to leave as a sub-analysis of the Dispropricus study. The validated ethical decision-making climate questionnaire included seven factors: not avoiding decision-making at end-of-life (EOL), mutual respect within the interdisciplinary team, open interdisciplinary reflection, ethical awareness, self-reflective physician leadership, active decision-making at end-of-life by physicians, and involvement of nurses in EOL. Hierarchical mixed effect models were used to assess associations between these factors, and the intent to leave in clinicians within ICUs, within the different countries.

**Results:** Of 3610 nurses and 1137 physicians providing ICU bedside care, 63.1% and 62.9% participated, respectively. Of 2992 participating clinicians, 782 (26.1%) had intent to leave, of which 27% nurses, 24% junior and 22.7% senior physicians. After adjustment for country, ICU and clinicians characteristics, mutual respect OR 0.77 (95% CI 0.66–0.90), open interdisciplinary reflection (OR 0.73 [95% CI 0.62–0.86]) and not avoiding EOL decisions (OR 0.87 [95% CI 0.77–0.98]) were all associated with a lower intent to leave.

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**Conclusion:** This is the first large multicenter study showing an independent association between clinicians' intent to leave and the quality of the ethical climate in the ICU. Interventions to reduce intent to leave may be most effective when they focus on improving mutual respect, interdisciplinary reflection and active decision-making at EOL.

**Keywords:** Intent to leave, Ethical climate, Interdisciplinary reflection, Decision-making, Respect

## Introduction

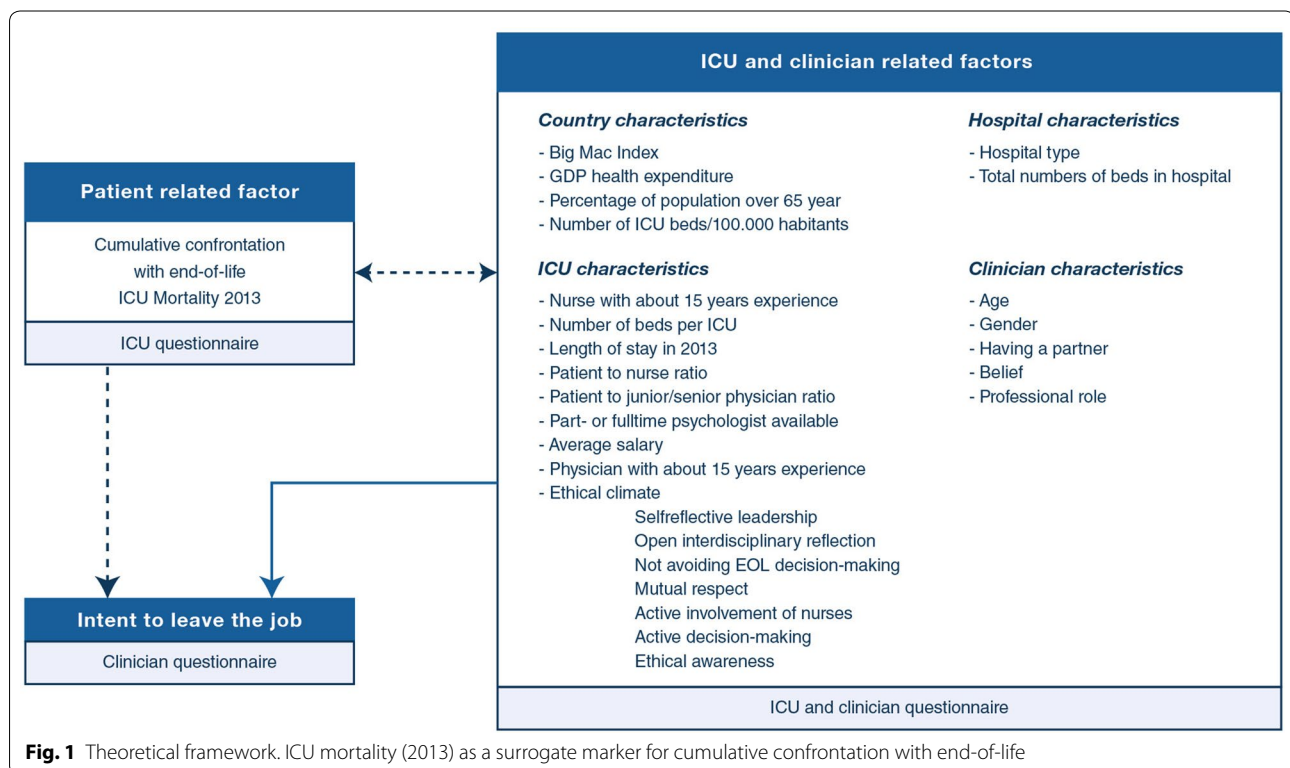
It becomes more and more challenging for hospital managers worldwide to retain clinicians in intensive care units (ICU) [1–5]. Currently, about 18–23% of ICU clinicians express an intention to leave their job in the United States and Europe [6, 7]. Besides irregular working hours and night/weekend shifts in an often chaotic and noisy environment, clinicians are increasingly confronted with morally distressing situations often related to decision-making at end-of-life (EOL) [7–13]. The combination of technical innovation, which often prevents patient's natural death, and the increasing number of potentially inappropriate admissions [7, 8, 14] render EOL decisions stressful, with postponed decision-making or even decision-paralysis as a consequence [7, 8, 14]. Whereas acute moral distress related to decision-paralysis may induce overt conflicts in the team [10, 15], more chronic forms of unexpressed moral distress such as frustration, guilt, maladaptive behavior, can ultimately cause job turnover [14–21]. As one of the strongest and most important predictors of actual

## Take-home message

Interventions aiming to reduce or prevent intent to leave among the ICU workforce should focus on improving their ethical climate.

turnover in health care, besides job satisfaction, has been found to be turnover intention [1–6]. Past efforts to reduce burnout and job leave have mainly focused on empowering individuals' resilience skills [5, 7, 9]. However, timely sharing knowledge, experience and values between different professions within an open climate may further help in reducing moral distress and subsequently intention to leave [7–15, 20]. To our knowledge, the relationship between the intent to leave and the quality of inter-professional collaboration with regards to ethical decision-making in the ICU has never been assessed.

The main objective of this study, as shown in Fig. 1, was to assess the relationship between the quality of the ethical climate in the ICU and intent to leave after taking country, ICU, and clinician factors into account. We



**Fig. 1** Theoretical framework. ICU mortality (2013) as a surrogate marker for cumulative confrontation with end-of-life

hypothesized that the better the quality of ethical climate in the ICU, the lower the intent to leave among clinicians.

## Methodology

### Ethics

This study was approved by the ethics committees of all participating centers and the Danish National Health Authority. Informed consent was required in all countries. The questionnaires are available in the electronic supplementary material (ESM 1).

### Data collection and ethical climate instruments

This study is part of the DISPROPRICUS study, which aimed to assess whether the quality of the ethical climate in ICU is associated with the predictive value of perceptions of excessive care, in regards to patients' 1-year outcomes, as well as to the time until written treatment limitation decisions during ICU stay and death [14, 20].

ICU characteristics were collected by the local investigators between March and May 2014. Country-specific health variables were retrieved from a prior publication [14]. As proxy of the average wage at country level, we used countries' Big Mac index (i.e. the cost of a Big Mac in 120 different countries) as retrieved from the world bank website. This index is a global, well-known and simple economic standard reflecting countries' purchase power parity [21]. Clinicians of 68 adult ICUs in 12 European countries (Belgium, Czech Republic, Denmark, France, Germany, Greece, Hungary, Italy, Portugal, United Kingdom, Sweden, the Netherlands) and the US completed questionnaires on personal characteristics, working conditions and the ethical climate prevailing in their units using the ethical decision-making questionnaire (EDMCQ) [20]. This self-assessment questionnaire consists of 32 items with 4- or 5-point Likert scale options; 11 items are on end-of-life care practices [11]; 11 on interdisciplinary reflection, collaboration, and communication [22] and 11 on leadership skills of senior doctors [23, 24]. The theoretical framework of this instrument can be found in a previous publication [20]. The EDMCQ was first validated and determined via exploratory and confirmatory factor analysis, which identified seven important factors: F1 culture of not avoiding EOL decisions; F2 culture of mutual respect within the interdisciplinary team; F3 practice and culture of open interdisciplinary reflection; F4 self-reflective and empowering leadership by physician; F5 practice and culture of ethical awareness; F6 active decision-making by physicians; F7 active involvement of nurses in EOL care and decision-making [20]. Cluster analysis was subsequently used to determine categorically which kind of ethical decision climate characterized each of the ICUs [20, 25]. This analysis yielded four mutually exclusive climates:

good, average with<sup>(+)</sup> and average without<sup>(-)</sup> involvement of nurses at end-of-life, and poor. The risk of death and of receiving a written treatment-limitation decision in patients perceived by clinicians as receiving excessive care was higher in ICUs with a good climate than in those with a poor one. The differences in these endpoints between the average and the poor climates were less obvious, but still in favor of the former compared to the latter, thus objectively validating the EDMCQ instrument [14, 20].

Next to the measured demographical characteristics, clinicians were also asked to report whether they actively considered leaving their current job [20, 14]. Although intention to leave is not always followed by action, the reverse relationship always exists, and intent can manifest itself some time before (from months to years) actually leaving the job [6]. For this reason, the intent to leave is presently regarded as "the most direct and immediate antecedent of overt turnover behavior" [26].

### Data analysis

The primary endpoint of this study is intent to leave categorized as a binary (yes or no) outcome.

### Univariate analysis

Fisher's exact tests and Pearson Chi-square tests were used for comparing categorical variables and Mann-Whitney *U* tests (or *t* test where appropriate) for comparing continuous variables. Results are presented as numbers (%) and medians (25th–75th percentiles). Two-sided *p* values were calculated and compared with 5% to identify potential variables for inclusion in a subsequent multivariate analysis.

### Multivariate analysis

We performed two hierarchical logistic mixed effect models to assess the multivariate associations between the characteristics reported in Table 1 and intention to leave, with independent random effects at the level of ICU and countries to account for correlation between measurements obtained in the same ICU, hospital and country [25]. The first model, including the four EDMCQ clusters, provides insight into the association between the overall quality of the ethical climate in a unit and intent to leave. The second model, including the seven EDMCQ factors, provides more detailed information on the association between each of the EDMCQ factors and clinicians' intent to leave their job in a unit.

The models were built using a backward elimination method. In particular, we started with a full model, including all characteristics that were identified as significantly associated with intent to leave at the 5% significance level in the univariate analysis and proceeded by removing characteristics with the highest *p* value,

**Table 1 Intent to leave: univariate analysis\***

Variables	Overall	Intent to job leave		p value
		Yes	No	
Overall respondent	n = 2992	n = 782 (26.1%)	n = 2210 (73.9%)	
Country level				
General economic factors (25th–75th percentile)				
Percentage of inhabitants > 65 year	18.0 (18.0–20.0)	18.0 (18.0–20.0)	18.0 (18.0–20.0)	0.823
Number of ICU beds/100,000 inhabitants	6.7 (6.4–15.9)	6.7 (6.0–12.5)	6.7 (6.4–15.9)	0.016
GDP** per inhabitant (dollar) (× 1000)	41.8 (30.8–48.1)	41.8 (30.8–51.8)	41.8 (30.7–48.1)	0.159
GDP health expenditure (%)	10.6 (9.7–11.7)	9.8 (9.7–11.3)	11.2 (9.7–12.9)	<0.001
GDP health expenditure per capita (x 1000)	5.1 (3.2–6.1)	5.1 (3.2–6.1)	5.1 (3.2–6.1)	0.498
Big Mac index***	4.3 (4.0–4.8)	4.4 (4.0–4.9)	4.3 (4.0–4.8)	<0.001
Geographical region (%)				
Northern Europe	674 (22.5%)	228 (33.8%)	446 (66.7%)	<0.001
Western Europe/VS	1468 (49.1%)	337 (22.9%)	1131 (77.1%)	
Central Europe	513 (17.1%)	123 (23.9%)	390 (76.1%)	
Southern Europe	337 (11.3%)	94 (27.9%)	243 (72.1%)	
Hospital level (%)				
Hospital type				
University	1787 (59.7%)	458 (25.6%)	1329 (74.4%)	0.671
University affiliated	364 (12.2%)	104 (28.6%)	260 (71.4%)	
Hospital	749 (25.0%)	201 (26.8%)	548 (73.2%)	
Private	92 (3.1%)	19 (20.7%)	73 (79.3%)	
Total beds in hospital				
< 250	147 (4.9%)	40 (27.2%)	107 (72.8%)	<0.001
250–499	689 (23.0%)	207 (30.0%)	482 (70.0%)	
500–749	581 (19.4%)	168 (28.9%)	413 (71.1%)	
> 750	1575 (52.6%)	367 (23.3%)	1208 (76.7%)	
ICU level (25th–75th percentile)				
General				
Number of beds per ICU	13.0 (9.0–22.0)	12.0 (9.0–16.0)	13.0 (9.0–24.0)	<0.001
Severity of illness				
ICU mortality in 2013 (in %)	13.0 (8.0–18.0)	14.0 (8.0–18.0)	13.0 (8.0–18.0)	<0.001
Length of stay in 2013 (in days)	4.0 (3.1–6.0)	4.6 (3.1–6.0)	4.0 (3.0–6.0)	0.057
Organizational factors				
Staffing				
Patient to nurse ratio	1.7 (1.0–2.0)	1.5 (1.0–2.0)	2.0 (1.0–2.0)	0.311
Patient to junior physician ratio	4.0 (2.0–6.0)	4.0 (2.0–5.8)	4.0 (2.0–6.0)	0.073
Patient to senior physician ratio	6.0 (3.0–8.0)	6.0 (3.0–8.0)	7.0 (3.0–8.0)	0.109
Part- of fulltime psychologist available	1760 (58.8%)	479 (61.3%)	1281 (57.9%)	0.118
Physician salary (Euro x 1000) (15 years of working experience)	5.0 (3.2–7.3)	4.9 (3.2–6.3)	5.0 (3.2–7.3)	0.005
Nurse salary (Euro x 1000) (15 years of working experience)	2.5 (1.9–2.8)	2.6 (1.9–2.9)	2.5 (1.9–2.8)	0.013
Ethical decision-making climate (%)				
Good	535 (17.9%)	162 (30.3%)	373 (69.7%)	0.607
Average with nurse involvement at EOL	1253 (41.9%)	332 (26.5%)	921 (73.5%)	
Average without nurse involvement at EOL	302 (10.1%)	65 (21.5%)	237 (78.5%)	
Poor	902 (30.1%)	223 (24.7%)	679 (75.3%)	
Clinicians level (%)				
Age (25th–75th percentile)	38.0 (30.0–47.0)	37.0 (30.0–45.0)	39.0 (30.0–48.0)	0.002
Male gender	858 (28.7%)	224 (26.1%)	634 (73.9%)	0.99
Having a partner	2300 (76.9%)	561 (24.4%)	1739 (75.6%)	<0.001

**Table 1 (continued)**

Variables	Overall	Intent to job leave		<i>p</i> value
		Yes	No	
Having children	1754 (58.6%)	431 (24.6%)	1323 (75.4%)	0.023
Religion				
Non-religious	1190 (39.8%)	299 (25.1%)	891 (74.9%)	0.587
Roman catholic	687 (22.9%)	184 (26.8%)	503 (73.2%)	
Protestant	534 (17.8%)	150 (28.1%)	384 (71.9%)	
Greek-orthodox	179 (5.9%)	36 (20.1%)	143 (79.9%)	
Muslim	30 (1.0%)	11 (36.6%)	19 (63.4%)	
Jewish	9 (0.3%)	4 (44.4%)	5 (65.6%)	
Budhist	10 (0.3%)	3 (33.3%)	7 (66.6%)	
Other	162 (5.4%)	51 (31.5%)	111 (68.5%)	
I do not wish to answer	191 (6.4%)	44 (5.6%)	147 (6.7%)	
Belief important to very important in attitude towards EOL	453 (15.1%)	132 (23.0%)	321 (77.0%)	0.128
Role				
Nurses	2275 (76.0%)	615 (27.0%)	1660 (73.0%)	0.043
Junior physicians	308 (10.3%)	74 (24.0%)	234 (76.0%)	
Senior physicians	409 (13.7%)	93 (22.7%)	316 (77.3%)	
Years of experience in the ICU (25th–75th percentile)	8.0 (3.0–16.0)	7.0 (3.0–13.8)	8.0 (3.0–18.0)	0.001
Working conditions (25th–75th percentile)				
Hours working in a week	38.0 (32.0–40.0)	38.0 (35.0–40.0)	38.0 (32.0–40.0)	0.048
Night shifts per month	5.0 (3.0–7.0)	5.0 (3.0–7.0)	5.0 (3.0–7.0)	0.256
Day shifts during weekend per month	3.0 (2.0–4.0)	4.0 (2.0–5.0)	3.0 (2.0–4.0)	<0.001
Involved in research or ICU working group	1084 (36.2%)	285 (26.3%)	799 (73.7%)	0.919
Ever been involved in medico-legal claim	258 (8.6%)	75 (29.1%)	183 (70.9%)	0.295

\*Results are expressed by Chi square test as numbers (%) percentages out of the total number of participants (2992), and by Kruskal test as median (25th–75th percentile), \*\*GDP: measure of a country's economic output, gross domestics product; \*\*\*Big Mac index: the cost of a Big Mac in 120 different countries) as retrieved from the world bank website

one by one recursively, until the *p* values for all characteristics were below 0.1. We checked for the presence of significant interaction effects. The sole interaction effect ( $p=0.02$ ) that was significant at the 5% level, namely between role and hours, was included in the final models. Results of the association between ethical climate clusters and factors were expressed in (adjusted) odds ratios (OR) together with 95% confidence intervals. To aid interpretation, the results from the fitted models were standardized to adjusted percentages for the entire population, using direct standardization [25]. In the standardization process, random effects were repeatedly drawn randomly from normal distributions centred at zero with variance given by its residual maximum likelihood estimate [27]. Approximate normal-based 95% confidence intervals for these adjusted percentages were calculated; in these, the sampling variance was obtained as the sampling variance of the standardized percentages upon ignoring the imprecision in the estimated regression coefficients, plus the variability in these percentages as the regression coefficients are repeatedly drawn from their (multivariate)

sampling distributions centred at the maximum likelihood estimates. The analysis was performed in RStudio, version 1.0.15.

Since intention to leave is analyzed in a multi-level analysis approach, we also assessed which parts of the variance of intention to leave are on the country, ICU and the individual clinician level (Statistical Appendix).

## Results

Country-, ICU- and clinician variables are reported in Table 1. Of 3610 nurses and 1137 physicians providing ICU bedside care, 2275 (63.1%) and 717 (62.9%), of which junior physicians 308 (61.5%) and 409 (63%) senior physicians working in 68 ICUs participated, respectively.

Respectively, 17.9%, 41.9%, 10.1% and 30.1% of clinicians worked in an ICU with a good, average<sup>(+)</sup>, average<sup>(-)</sup> and poor climate. Overall, 782 clinicians (26.14%) had the intention to leave their job, of which 615 (27.0%) were nurses, 74 (24.0%) junior physicians, and 93 (22.7%) senior physicians.

**Table 2 Multivariate analyses on intent to leave (adjusted odds ratio [95% confidence interval])**

	Model including EDMCQ clusters	Model including EDMCQ factors
Country		
Big mac index	1.65 [1.05,2.60] <sup>b</sup>	1.86 [1.14,2.88] <sup>b</sup>
Healthcare expenditure per capita (divided by 100)	NS	NS
Percentage over 65 years	NS	NS
Hospital		
Number of beds	NS	NS
ICU		
Patient to nurse ratio	NS	0.76 [0.61,0.95] <sup>b</sup>
Patient to junior physician ratio	NS	NS
Psychologist available	NS	NS
Total number of beds ICU	NS	NS
ICU mortality in 2013	1.03 [1.003,1.05] <sup>b</sup>	1.03 [1.005,1.05] <sup>b</sup>
Ethical climate		
Good	0.58 [0.35,0.96] <sup>b</sup>	–
Average <sup>+</sup>	0.68(0.46–0.99) <sup>b</sup>	–
Average <sup>–</sup>	0.62 [0.40,0.98] <sup>b</sup>	–
Poor	1	–
Factors EDM climate		
Not avoiding EOL decisions	–	0.87 [0.77,0.98] <sup>b</sup>
Mutual respect	–	0.77 [0.66,0.90] <sup>c</sup>
Open interdisciplinary reflection	–	0.73 [0.62,0.86] <sup>d</sup>
Self-reflective leadership	–	NS
Ethical awareness	–	NS
Active decision making	–	0.87 [0.75,1.006] <sup>a</sup>
Active involvement of nurses	–	NS
Clinician		
Medicolegal claim	NS	NS
Age	0.98 [0.97,0.99] <sup>d</sup>	0.98 [0.97,0.99] <sup>d</sup>
Gender	NS	NS
Hours worked per week	NS	NS
Belief		
(Very) important	NS	NS
Not religious	NS	NS
Not (very) important	NS	NS
Professional role		
Nurse	0.27 [0.09,0.82] <sup>b</sup>	0.18 [0.06,0.55] <sup>b</sup>
Junior doctor	0.27 [0.06,1.12] <sup>a</sup>	0.22 [0.05,1.01] <sup>a</sup>
Senior doctor (Ref)	1	1
Interaction between professional role and hours worked per week*		
Nurse	1.03 [1.01–1.06] <sup>b</sup>	1.03 [1.01–1.06] <sup>c</sup>
Junior doctor	1.02 [0.99–1.05] <sup>a</sup>	NS
Senior doctor (Ref)	1	1
Intercept of model	0.12 [0.01,1.11] <sup>a</sup>	0.11 [0.01,1.21] <sup>a</sup>

Data used of resp. 2992. Results of the association between ethical climate clusters and factors were expressed in (adjusted) odds ratios (OR) together with 95% confidence intervals

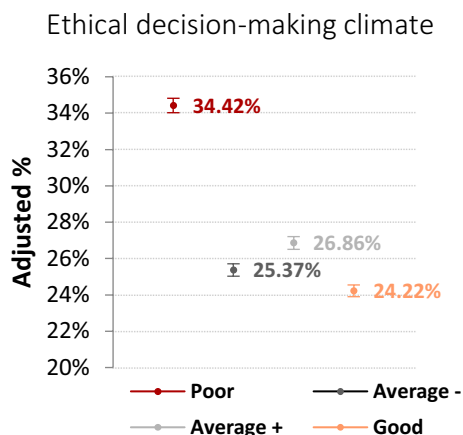
\*Interaction effect between professional role and hours worked per week as shown in Fig. 3

<sup>a</sup>  $p < 0.10$

<sup>b</sup>  $p < 0.05$

<sup>c</sup>  $p < 0.01$

<sup>d</sup>  $p < 0.001$



**Fig. 2** Adjusted probabilities to leave one's job in the respective climates (all  $p < 0.05$  in comparison to the poor climate). Adjusted risk of intent to job leave, expressing the percentage of health care professionals who would have intentions to leave their job if they all worked in a good, average<sup>+</sup>, average<sup>-</sup> or poor ethical climate, respectively, along with 95% confidence intervals. (Poor: 0.3442 [0.3402, 0.3481], average<sup>+</sup>: 0.2686 [0.2651, 0.2720], average<sup>-</sup>: 0.2537 [0.2503, 0.2570], good: 0.24 [0.2389, 0.2455])

Differences between clinicians with and without intent to leave are provided in Table 1. After adjusting for clinicians' characteristics within an ICU and country, the risk of intent to leave was lower in clinicians working in ICUs in a good (OR 0.58, 95% CI 0.35–0.96), average<sup>(+)</sup> (OR 0.68, 95% CI 0.46–0.99) and average<sup>(-)</sup> (OR 0.62, 95% CI 0.40–0.98) climate compared to clinicians working in ICUs with a poor climate. Results are provided in Table 2. The adjusted probabilities to leave one's job in the respective climates are shown in Fig. 2 (all  $p < 0.05$  in comparison to the poor climate). The most important independent ethical climate factors associated with intent to leave were mutual respect within the interdisciplinary team (OR 0.77 95% CI 0.66–0.90), open interdisciplinary reflection (OR 0.73 95% CI 0.62–0.86) and not avoiding EOL decisions by physicians (OR 0.87 95% CI 0.77–0.98) (Table 2). Interestingly, younger age, clinicians working in countries with a higher Big Mac index and clinicians working in ICUs with a higher mortality, were independent factors, significantly associated with a higher intent to job leave in both models (with a  $p < 0.05$ ). Figure 3 shows a significant interaction effect between professional role and average hours per week of clinicians as associated with intent to leave. Clinicians who worked more hours per week had a higher intent to leave, especially if they were in a nursing role ( $p = 0.004$ ).

## Discussion

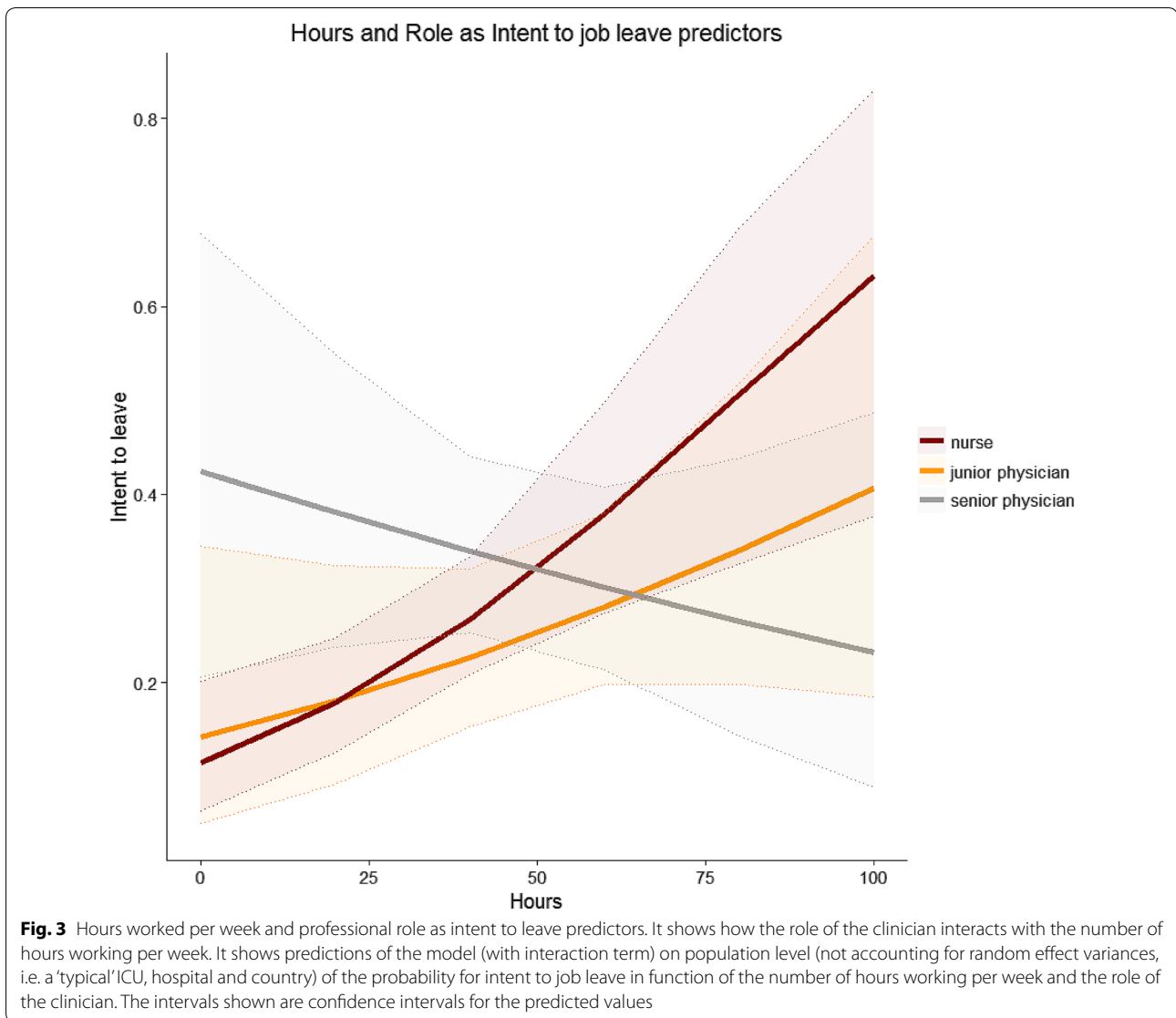
This is the first large multicenter study showing that the quality of the ethical climate in ICU is associated with the intention to leave one's job, even after accounting for the impact of country, ICU and clinician characteristics. Measuring ethical climate by means of the EDMCQ [20] helped to identify several modifiable factors, which could be targeted to reduce intent to leave in the ICU.

Moreover, our study reveals that job mobility is more substantial in countries with a higher purchasing power [2, 6, 21, 28], and confirms that younger ICU clinicians tend to be less afraid to leave their current workplace [28, 29]. These results suggest that less modifiable external/environmental factors (e.g., labor market, perceived employment opportunities, job alternatives, economic concerns,...) and clinician characteristics (e.g. age) might play an important role in ICU clinicians' intention or willingness to enter, leave or remain in the current job, profession and/or the organization as well [16, 29, 30].

Although pay and financial benefits may substantially help in reducing the intent to leave an ICU job [6, 28, 30], creating favorable working conditions for clinicians by ensuring a right work–family balance and lowering the work pressure [1, 2, 28, 30] may be at least as important. Limiting the number of working hours per week is one of the measures to achieve this goal and has already been identified as an important factor in several previous studies [2, 5, 6, 30]. We found that this was specifically more important in nurses (Fig. 3).

Extending previous research on the detrimental effect of high mortality in the ICU on workload, moral distress and burnout [7, 8, 11, 31], our study highlights its positive association with intent to leave. This suggests that intent to leave could be further reduced by improving triage and advanced care planning before ICU admission [32]. Moreover, our study showed a protective association between the quality of the ethical climate and intent to leave in the ICU which is in line with contemporary studies where lack of collaboration, disrespectful communication and distrust among team members are recognized as direct factors of increased job dissatisfaction and moral distress among ICU clinicians [7, 19, 33–36].

Moral distress occurs when an individual's moral integrity is seriously compromised, either because one feels unable to act in accordance with core values or obligations, or attempted actions fail to achieve the desired outcome [37]. Therefore, moving from pure knowledge-based discussions to more knowledge and value-based reflections may be of utmost importance to reduce clinicians' moral distress [14, 15, 20] and quality of care [7, 8, 14, 32]. Mutual respect which allows interdisciplinary reflection [33, 36, 39], together with the non-avoidance



of EOL decisions in the ICU, were the two most important ethical climate factors associated with a lower intent to leave the job in our study. The key position of senior physicians in the EDM process [7, 8, 12, 14] and the fact that senior doctors tend to overrate their leadership- and decision-making capacities at EOL [11, 12] naturally points them for future interventions, especially in ICUs with a poor ethical climate [14]. Restoring meaning and a sense of wellbeing in physicians may not only improve intention to leave but might also make the ICU a highly respected and desirable place to work [7, 8, 12, 15, 37]. Every clinician needs to feel confident to promote change within the team for the benefit of the patient and their families [15, 32, 36–39]. To develop the practice of mutual respect within a team, senior physicians should

act as role models [14, 20, 36–39]. This includes giving respectful feedback, empowering staff to voice perceptions and emotions, facilitating an ethical climate, where difficult decisions are not postponed but made in a timely fashion following open discussions [7, 8, 12, 14, 20, 36]. Our EDMCQ scale is a valuable addition and update to existing ethical climate scales focusing on physicians and nurses, as well as different factors within ICU units, e.g. unit physician leadership, which all have profound effects on the ethical climate [12, 14, 15, 20].

Strengths of the study include the large number and multi-national inclusion of participants, the use of a validated questionnaire to assess the ethical climate in the ICU, the high response rate of 63% and the use of logistic mixed effect models to account for correlation within ICUs and



countries, as well as standardization to aid interpretation. Our study also has some limitations. First, the ICUs were not selected at random, which may have affected the external validity of our results. Second, all variables were measured with self-reported questions, so a common method bias may exist [40]. To increase the validity of the outcomes, assessment of actual turnover behavior ought to be included in future research. Within our cross-sectional approach, we could not enable causal interpretations [25, 27]. Future studies should longitudinally examine how ethical climate in the ICU and its outcomes develop over time, or evaluate the effect of specific interventions on the ethical climate. Finally, we did not explore meanings associated with ethical decision-making and the intent to leave, using qualitative research (e.g. focus groups). Nevertheless, the EDMCQ instrument enables ICUs to take a ‘snapshot’ of the EDM, as perceived by their team members. The findings of our study suggest that multidimensional interventions are necessary to address ethical climates at ICU- and individual level. Further research should focus on interview perceptions of staff members within their ICUs to create tailored and sustainable interventions to improve mutual respect, interdisciplinary reflections and active decision-making at end of life.

## Conclusion

This is the first large multicenter study showing an independent association between clinicians’ intention to leave their job and the quality of the ethical climate in ICU. Interventions aiming to reduce or prevent intent to leave among the ICU workforce, may be more effective when they focus on improving their ethical climate through encouraging mutual respect, open interdisciplinary reflection and active decision-making by making (senior) physicians aware of their unique position in facilitating discussions about EOL decisions.

## Electronic supplementary material

The online version of this article (<https://doi.org/10.1007/s00134-019-05829-1>) contains supplementary material, which is available to authorized users.

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#### Author contributions

All authors had their substantial contributions to the conception or design of the work, or the acquisition, analysis or interpretation of data, drafting the work or revising it critically for important intellectual content and their final approval of the version published. Every author gave his/her agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Study concept and design: BB, DB, RP. Design of the questionnaire: DB, HIJ, JM, SV, EJOK, JD, BB, EA, RP. Coordination of the translation of the questionnaire: HIJ, JM, VM, AKR, MD, KR, DT, AM, LC, LZ, PM, AM. Acquisition of data: BB, HIJ, JM, VM, AKR, MD, KR, DT, AM, LC, LZ, PM, AM, Gadeyne. Analysis and interpretation of data: BB, DB, SV, JR, SV, RP. Drafting of the manuscript: BB, DB, VM, SV, BB, SV, PV, RP. Critical revision of the manuscript for important intellectual content: BB, DB, HIJ, JM, VM, AKR, MD, KR, DT, AM, LC, LZ, PM, AM, SV, EJOK, JD, JR, SV, JR, EA, RP. Statistical expertise: JR, SV. Obtained funding: DB, JD. Administrative, technical, or material support: DB, JD. Steering committee: DB, SV, EJOK, JD, SV, Gadeyne, BB, EA, RP.

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#### Compliance with ethical standards

#### Conflicts of interest

The authors declare that they have no conflict of interests.

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