Organizational Climate, Stress, and Error in Primary Care: The MEMO Study*

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Abstract

Background: The impact of organizational climate on physicians and their patients is not well understood. The Minimizing Error, Maximizing Outcome (MEMO) Study investigates this question through a conceptual model that relates office working conditions to quality of care, as mediated by physician reactions. **Methods:** MEMO is a longitudinal study of physicians and patients in New York, Chicago, and the state of Wisconsin, including Milwaukee and Madison. Physician surveys assessed office environment and organizational climate (OC). Stress was measured using a 4-item scale, past errors were self reported, and the likelihood of future errors was self-assessed using the OSPRE (Occupational Stress and PReventable Error) measure. Factor analysis revealed new domains of OC. Regression analyses assessed predictors of stress, past errors, and future errors. **Results:** Among 420 physician respondents, predominantly from general medicine and family medicine practices, 38 percent described their office environment as busy, tending toward chaotic, while another 10 percent described their office environment as hectic or chaotic. Sixty-one percent agreed their work was stressful; 27 percent noted burnout symptoms; and 31 percent of respondents said they were at least moderately likely to leave their jobs within 2 years. The domains of OC (with related Cronbach's alpha values) were: leadership/governance (.86), quality emphasis (.86), belonging/trust (.79), information/communication (.68), and cohesiveness (.66). Chaotic office atmosphere was strongly associated with physician stress (P = .001), while a lack of quality emphasis was associated with past errors (P < .005), and a lack of emphasis on information and communication was associated with a higher likelihood of future errors (P < .02). Less trust in the organization was associated with an intent to leave (P = .001). Other variables associated with physician outcomes included age, gender, ethnicity, work hours, work control, inadequate resources, and a lesser emphasis on diversity. **Conclusions:** Physician stress is prevalent in primary care; stress and the likelihood of making errors are associated with organizational climate and office environment. Primary care offices could be made safer by emphasizing information systems, promoting a culture of quality, and improving the hectic environment.

Introduction

While much research has focused on stress among health care workers,[1–3] only a handful of studies have investigated the impact of stress on patient outcomes. Those works suggest that dissatisfaction, stress, and burnout are associated with patient dissatisfaction,[4–6] diminished adherence to medical treatments,[7,8] and poorer prescribing behaviors.[9–11] Poor worker well-being is, in turn, driven by organizational context, including both climate and culture. For example, Nystrom[12] found that clinics that had strong task norms and valued pragmatism had higher levels of satisfaction and commitment among their staffs. Similarly, Williams, et al.[13] found that physicians experienced higher stress levels when they lacked control over their workplace and administrative issues. Driven by the Institute of Medicine report, the MEMO (Minimizing Error, Maximizing Outcome) Study conceptually links and empirically examines the interrelationships between working conditions in physicians' offices, their impact on physician reactions such as satisfaction, stress, burnout and turnover, and the ultimate impact of working conditions on the quality of care provided by these physicians. This paper provides early data from the MEMO Study linking organizational structure and climate with physician reactions.

Figure 1. MEMO Conceptual Model
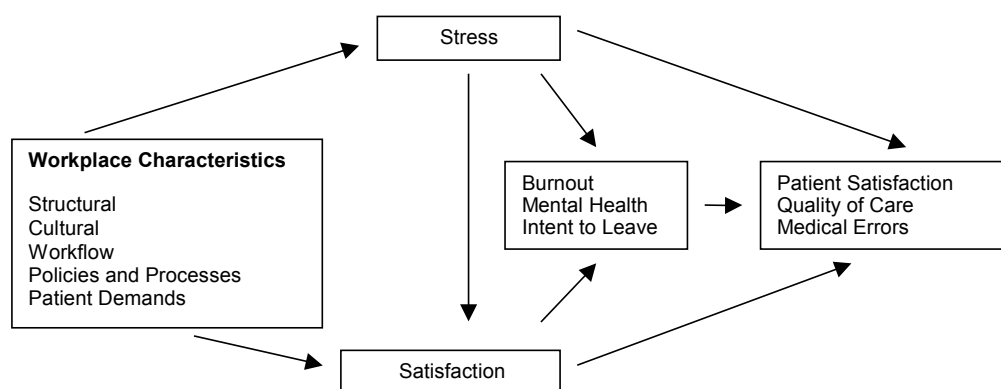
The conceptual model for our work (Figure 1) ties workplace characteristics to physician stress, satisfaction, burnout, and mental health. These factors may, in turn, have a direct impact on patient outcomes including satisfaction, quality, and errors. This model was derived from our earlier work, the Physician Worklife Study[14,15] as well as the pioneering work of Lazarus and Folkman,[16] and Ivancevich and Matteson.[17] Organizational climate in health care (i.e., the perception of culture by those within it) has been described by several authors, including Shortell,[18] Wakefield,[19] and Kralewski.[20] We chose to modify scales from Kralewski's work for use in new analyses designed to define domains of organizational climate within the offices of ambulatory care physicians. We further sought to determine the impact of office environment pace on physician stress. Finally, we asked physicians to assess their past error histories and the

likelihood that they would commit mistakes in the future; we then attempted to discern links between these safety variables and the domains of organizational climate.

Methods

MEMO was developed in response to a Request for Application (RFA) from the Agency for Healthcare Research and Quality's Patient Safety Initiative, a large series of national projects investigating factors aimed at making the health system safer. Within the larger group of studies is a smaller group of projects (n=21) including MEMO that are intended to assess the impact of working conditions on patient safety and the quality of care. Key MEMO personnel have worked in collaboration with other working condition grantees to develop models based on data obtained from numerous health care settings.[†]

Now 2 years into the 3-year project horizon, the study aims of MEMO are to: (1) investigate the effect of workplace characteristics on patient outcomes, (2) assess the role of physicians as mediators of this effect, and (3) determine if the best outcomes occur in practices with low physician stress and burnout. MEMO further seeks to identify specific gender, ethnicity, and location (rural and urban) issues pertinent to physicians and their patients. The research settings include academically affiliated outpatient practices, managed care practices, and small group practices (including many rural groups) throughout Wisconsin. The target sample also includes urban practices from the Chicago, New York, and Milwaukee areas with a high proportion of vulnerable patients.

The first phase of MEMO included focus groups involving clinicians, office staff, and patients. The analysis revealed several important findings, including the high and rising level of "busyness" in a typical ambulatory care practice, and the discovery that patients are remarkably perceptive with regard to the quality of care they received and the stresses endured by their physicians. In the second phase, we utilized this information to develop a physician survey, an organizational assessment instrument for practice managers, and a checklist for on-site assessments of participating offices by research assistants. Specifically, our finding from the focus groups that hectic office environments may potentially contribute to adverse patient outcomes resulted in an on-site assessment instrument and the inclusion of a single question that asked about office pace across the physician, organizational assessment, on-site assessment, and patient surveys. Moreover, a theme emerged from the physician focus groups regarding the organization of clinical practices, which led to a series of organizational assessment questions about bottlenecks, communications practices, and use of information technology. In the third and final phase of MEMO, a patient survey and medical record review are being used to gather quality and safety data. The data presented in the current paper come from the second (cross-sectional) phase of the project.

[†] Also see the paper, *Organizational Climate of Staff Working Conditions and Safety—An Integrative Model*, by Dr. Patricia Stone and colleagues, in Volume 2 of this publication.

The clinician survey was derived in part from our Physician Worklife Study instrument,[14, 15] and included our five-item global job satisfaction measure and a newly implemented four-item job stress measure.[21] Organizational climate was measured using a scale adapted from Kralewski's instrument,[20] which was developed for use in physician offices. We asked physicians about burnout (using a single-item measure from Freeborn[22]) and whether they intended to leave the practice. The survey included single-item measures of practice emphasis with respect to issues such as work–home balance, professionalism, and diversity in office staff, as well as single items concerning access to resources, interpreters, and referrals. Control of the work environment was measured with a 13-item scale employed for the Physician Worklife Study; this scale had clusters of items that correlated strongly with overall life stress.[23] Survey scores were normalized to a scale ranging from 0 to 100.

We assessed the physicians' self-reported likelihood of future errors with a novel nine-item scale that addressed errors committed in the management of common chronic medical conditions. Entitled the "Occupational Stress and PReventable Error" measure (OSPRE), this scale includes such questions as: "How likely is it over the next month that you will overlook a diagnosis of hypertension in a patient with 2 to 3 elevated blood pressures?" (scored from "very unlikely" to "very likely"). In addition, physicians assessed their frequency of errors or shortcomings over the past year in five areas: incomplete discussion of treatment, medication errors, lack of attention to illness impact, minimal reaction to a patient's death, and guilt about lack of humanitarian perspective (scored from "never" to "weekly"). Pace of the office environment was determined with a single item measure derived from the physician focus groups. This measure utilized a 5-point scale ranging from "calm" to "hectic or chaotic." Mental health was determined using the 12-item General Health Questionnaire (GHQ-12).[24] In this scale, physicians were asked about such issues as sadness, self-esteem, ability to concentrate, worry, and strain. A score of 4 or higher was considered a positive screen for mental health issues.

Every attempt was made to recover surveys from all ambulatory general internal medicine and family medicine physicians at each clinical site, using multiple mailings and e-mail or telephone reminders. Once it was determined that we had received the maximum number of surveys that were likely to be returned, data were entered into an isolated computer (not connected to a network) with rigorous attention to confidentiality. Analyses included: (1) split sample exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) of the 31 items related to organizational climate, (2) simple correlation analyses linking organizational structural and climate characteristics to physician reactions, and (3) stepwise linear regression analyses of factors associated with physician stress, satisfaction, mental health, intent to leave the practice, and the chance of committing or having committed errors. Internal consistency of the stress, satisfaction, and OSPRE scales were assessed with Cronbach's alpha, a measure of how reliably or consistently a set of items measures a single construct.

Results

The physician sample of 420 is 84 percent of the original target sample of 500. Sixty-one percent of the contacted physicians agreed to participate. Table 1 illustrates the sociodemographic characteristics of the sample. While the age range was wide, the average age was 43. Close to half (44 percent) were female, and 23 percent were non-white. Respondents were evenly split between general internal medicine and family medicine, and were a relatively stable group, averaging over 8 years in their current practices. Open access scheduling was present in just under half of the practices, for an average of 16 months. The average workweek—excluding night call—was close to 50 hours. Sixteen percent of the sample worked part time, defined as less than 40 hours per week.

The typical practice (as estimated by physician respondents) was comprised predominantly of female patients (Table 2), with meaningful numbers of patients who spoke little English (13%), suffered from chronic pain (17%), had alcohol or other substance abuse problems (12%), or were generally frustrating to deal with (12%). Over one-third of patients have complex or numerous psychosocial problems, and a similar number were considered to visit regularly while ignoring medical advice. These findings denote a complex medical practice for these geographically disparate primary care physicians.

In their assessment of the work environment, the physicians described a modest to moderate amount of work control (50, on a normalized scale from 0 to 100), with a wide overall range from 7 to 93. The pace of the office was described as busy by 46 percent, busy tending toward chaotic by 38 percent, and hectic or chaotic by 10 percent of those surveyed. For the single item measures of organizational climate, physicians agreed most with the statements (on a scale from 1 to 4, where 1 = not at all and 4 = to a great extent) that "quality of care is goal one" (3.0), "there is widespread agreement about most moral/ethical issues" (3.0), and "candid and open communication exists between physicians and nurses" (2.9). The least agreement was seen with the statements, "There is broad involvement of physicians in most financial decisions" (1.8), "there is open discussion of clinical failures" (1.9), and "our administrators obtain and provide us with information that helps us improve the cost-effectiveness of our patients' care" (2.0).

Factor analysis of the 31 organizational climate items resulted in the identification of five domains (Table 3): (1) alignment between leadership and physician values (8 items, alpha = .86), (2) practice emphasis on quality (11 items, alpha = 0.86), (3) sense of trust or belonging (5 items, alpha = .79), (4) practice emphasis on information and communication (4 items, alpha = .68), and (5) cohesiveness (3 items, alpha = .66). The latter three scales (trust, information, and cohesiveness) were endorsed most often, implying that physicians found these cultural aspects of the practice to be the most prevalent. The leadership values scale, used to indicate the alignment in values between physicians and leadership, is a new scale and was not part of Kralewski's 1996 study.[4]

Table 1. Characteristics of MEMO study physician participants (n=420)

Age in years, mean (SD)	43 (10), range: 29-89
Gender (% female)	44
Ethnicity	(%)
Hispanic	4
White	77
Black	6
Asian	12
Native American	1
Specialty	(%)
Family Medicine	47
General Internal Medicine	50
Other	3
Years in current practice, mean (SD)	8.4 (8.0)
Open access appointment system (%)	44
Practice owner (%)	13
Income, median	$125,000–$150,000
Full time (%)	84%
Workload	(hours/week)
Seeing patients in office	26
Seeing patients in hospital	5
Patient activities (phone, paperwork)	8
Teaching/research	5
Other work activities (e.g. admin.)	5
Total (not including on-call)	49
On-call days per month (mean)	5

Table 2. Patient mix as estimated by 420 physician participants in MEMO

Patient type	Percent
Female	62
Elderly	36
Non-English Speaking	13
Chronic Pain	17
Numerous Medical Problems	45
Numerous Psychosocial Problems	35
Frustrating to Deal With	12
Alcohol or Substance Abuse	12

Table 3. Organizational climate domains from the MEMO study

Leadership/Governance alignment scale	mean (sd) alpha
	2.2* (0.7) .86
c. Our physician compensation formula is well aligned with our organization's goals.	2.4 (0.9)
e. There is broad involvement of physicians in most financial decisions.	1.8 (0.9)
f. Our administrators obtain and provide us with information that helps us improve the cost effectiveness of our patient care.	2.0 (0.9)
g. Our compensation plan rewards those who work hard for our group.	2.3 (1.1)
k. Our physician compensation formula is well understood by our physicians.	2.1 (1.0)
l. Our administrative decision-making process is described as consensus building.	2.1 (0.9)
o. The business office and administration are considered to be a very important part of our group practice.	2.4 (1.0)
r. There is rapid change in clinical practice among our physicians when studies indicate that we can improve quality/reduce costs.	2.3 (0.7)

Quality emphasis scale:	mean (sd) alpha
	2.5* (0.6) .86
b. Physicians who develop inappropriate patient care practices will be "talked to."	2.6 (1.0)
i. We emphasize patient satisfaction.	2.9 (0.9)
j. The quality of each physician's work is closely monitored.	2.1 (0.8)
m. There is an identifiable practice style that we all try to adhere to.	2.3 (0.8)
u. There is a high level of commitment to measuring clinical outcomes.	2.4 (0.8)
v. Quality of care is goal one.	3.0 (0.8)
bb. We have developed a common standard of care.	2.5 (0.8)
cc. Our clinical leadership is concerned with quality of care issues.	2.9 (0.8)
dd. Adequate training is provided in dealing with quality of care issues.	2.4 (0.8)
ee. Making changes to reduce the possibility of substandard care is difficult.	2.7 (0.8)
aa. There is a general agreement on treatment methods.	2.8 (0.7)

Physician reactions included job satisfaction, stress, burnout, intention to leave the current practice, physical health, and mental health. An analysis of the 5-item job satisfaction scale resulted in a Cronbach's alpha of 0.86. Similar analyses of the 4-item stress scale and the OSPRE resulted in alphas of 0.83 and 0.87 respectively.

Table 3. Organizational climate domains from the MEMO study, cont.

Organizational trust/Belonging scale	mean (sd) alpha
	2.6* (0.7) .79
q. There is a strong sense of belonging to the group.	2.7 (0.9)
s. There is a great deal of organizational loyalty.	2.5 (0.8)
t. There is a strong sense of responsibility to help one of our physicians if he/she has a personal problem.	2.9 (0.9)
y. We encourage the internal reporting of all adverse patient care events.	2.5 (0.9)
z. There is a high degree of organizational trust.	2.2 (0.9)

Information/Communication scale	mean (sd) alpha
	2.6* (0.7) .68
n. We have very good methods to assure that our physicians change their practices to include new technologies and research findings.	2.1 (0.8)
p. We rely heavily on electronic information systems to provide cost effective care.	2.4 (1.0)
w. We rely heavily on computer-based information when seeing a patient.	2.5 (1.0)
x. Candid and open communications exist between physicians and nurses.	2.9 (0.8)

Cohesiveness scale	mean (sd) alpha
	2.6* (0.6) .66
a. There is widespread agreement about most moral/ethical issues.	3.0 (0.8)
d. There is a great deal of sharing of clinical information.	2.8 (0.8)
h. There is an open discussion of clinical failures.	1.9 (0.8)

* In response to the question, "To what degree do the following statements reflect the conditions in your group practice?" on a scale from 1 to 4, where 1 = not at all, and 4 = to a great extent. The letter prior to each statement refers to item on the MEMO Clinician Survey. Adapted from: Kralewski JD, et al. Assessing the culture of medical group practices. *Medical Care* 1996 34:377-388.

While 79 percent of the physician sample indicated satisfaction with their jobs, 61 percent agreed that their work was stressful, 27 percent described burnout symptoms, and 31 percent reported at least a moderately high likelihood of leaving their practice within 2 years. Seventy-three percent of the respondents described their physical health as "very good" or "better," but 26 percent scored 4 or higher on the GHQ-12 exam, indicating clinically meaningful mental health concerns in more than one-quarter of the participating providers.

Correlation analyses indicated numerous associations between organizational climate and key physician outcomes of satisfaction and stress. Satisfaction was strongly associated with work control (r = .46, *P* < .001), a less hectic environment (r = .38, *P* < .001) and all five organizational climate scales

Table 4. Reactions by 420 primary care physician participants: regression analyses

Dependent variable	Predictors (*P*)
Satisfaction	control (.001)
	trust (.001)
	resources (.001)
	less chaos (.001)
Stress	less control (.001)
	younger (.001)
	white (.006)
	fewer resources (.018)
	more chaos (.001)
Poorer mental health	less resources (.001)
	less control (.006)
	more chaos (.001)
Intent to leave	less trust (.001)
	fewer resources (.001)
	older (.001)
Past errors	*fewer* work hours (.002)
	less emphasis on quality (.002)
	male (.024)
Future error (OSPRE*)	lack of emphasis on information and communication (.017)
	less emphasis on diversity among clinicians and staff (.001)

Independent variables in the regression analyses: work control, practice emphasis on select factors (e.g. work-home balance, diversity, teamwork, professionalism), office atmosphere (from calm to chaotic), and organizational culture domains. Most regressions also tested the impact of demographics.
* Occupational Stress and PReventable Error measure.

(r's ranging from .25 to .50, all *P* < .001). Stress was associated with lack of work control (r = .37, *P* < .001), a chaotic atmosphere (r = .48, *P* < .001), and all five organizational climate scales (r's ranging from .16 to .28, *P* < .001).

The regression analyses (Table 4) focused on the relationship of physician reactions to organizational climate. Satisfaction was associated with a sense of trust and belonging (*P* = .001) and a less chaotic office environment (*P* = .001), while stress related to the chaotic office (*P* = .001) and lack of work control (*P* = .001). The chaotic office also was associated with diminished mental health (*P* = .001), and a lack of trust in the organization was associated with an intent to leave (*P* = .001). Physicians were more likely to report errors during the past year in offices where quality was not emphasized (*P* = .002). Respondents predicted a higher likelihood of future errors in offices lacking an information and

communication emphasis ($P = .017$), or in practices lacking an emphasis on diversity among the clinicians and staff ($P = .001$). Some collinearity was present among organizational climate subscales, but this was not a major factor in the predominance of the chaos or work control variables in most of the reported stepwise regressions. In full multivariate linear regression models, collinearity did impact the model predicting the OSPRE, and two additional climate scales (trust and quality) were linked to the OSPRE scores, though only in combination due to collinearity.

Discussion

The preliminary results from the MEMO study reinforce and extend the findings from the Physician Worklife Study.[13, 23, 25, 26] Large numbers of primary care physicians work in stressful environments that they describe as busy, tending toward hectic or chaotic. More than a quarter report mental health difficulties and burnout symptoms, and close to one-third are moderately likely to leave their job in 2 years. The MEMO data also revealed five scales of organizational climate: leadership, quality, trust, information, and cohesiveness. These scales overlap, and further extend Kralewski's work on the structure and culture of medical group practices.[20] These five domains, along with the pace of the office, are associated with multiple physician reactions including satisfaction, stress, tendency to err, and intent to leave the practice. We have thus demonstrated a relationship between organizational climate and undesirable reactions by physicians. The final phase of MEMO will determine the impact of these variables on patient outcomes.

Occupational stress has received substantial attention in numerous industrial settings. Relatively little attention has been paid to stress in physicians, and few studies of stress in health care workers have addressed patient outcomes. The recent nursing shortage and the consequences of stress and burnout in nurses may foreshadow a similar phenomenon among physicians. Many factors create stress in health care workers: high work demands (including time pressure in office visits), low work control, and a difference in perceived values between physicians and health care leaders. Managed care places doctors in the uncomfortable position of controlling resource utilization, which, in turn, leads many patients to question the medical decisions made by their physicians—a trend that exposes physicians to an entirely new series of strains and stresses. Time pressure,[27] induced by the need to see high volumes of patients in already busy workdays, has increased pressure on primary care physicians. And as doctors move away from managing their own practices to increase their practice time, they find themselves with less control over their work environments and removed from some of the decisions and values of their office leaders. Future research must address the critical issues arising from this medical milieu, including the patient-related consequences of these busy offices and high stress levels, and the potential effectiveness of physician stress management programs.

Kralewski described nine domains of organizational culture in medical group practices, including collegiality, cohesiveness, organizational trust, quality emphasis, information emphasis, organizational identity, business emphasis, innovativeness, and autonomy.[20] We tested the six domains thought to be pertinent to the current study (the first six listed), and found four that remained in the new factor analyses (cohesiveness, trust, quality, and information), while a fifth (leadership values alignment) emerged. Two scales (collegiality and identity) were dropped, as some of their items shifted to the remaining domains. The five climate scales have internal consistency scores ranging from good to excellent, and correlate in regression analyses with a broad range of key variables, including physician satisfaction, intent to leave the practice, and past and future error assessments. All five scales were associated with stress in simple correlation analyses, and their lack of correlation with stress in the regressions may have been due to their correlation with the chaotic office environment that emerged as a strong and independent predictor of stress. The importance of the climate domains is found in their ability to provide critical information about sources of physician dissatisfaction and unsafe environments. Managers could use this information on practice climate to identify and target emerging issues before physicians consider leaving the practice or begin to make stress-related errors.

The chaotic office environment plays a prominent role in explaining adverse physician reactions such as stress, poor mental health, and job dissatisfaction. This is, to our knowledge, a new finding that will require further assessment. In particular, we need to know more about the remediable contributors to a chaotic environment, the relationship between the chaotic environment and adverse patient outcomes, and the amount of agreement between different observers (e.g., clinicians, managers, and research assistants) concerning this assessment. If these findings continue to pinpoint the busy or chaotic environment as a risk factor for stress and error, then physician offices rated as busy tending toward chaotic might be the immediate targets of safety improvement efforts.

Our study population is diverse, and many female, minority, rural, and inner city physicians are represented. Some of the findings in Table 4 highlight the potential importance of gender and diversity, such as the tendency for men to acknowledge a higher likelihood of past errors than women, for white physicians to acknowledge higher stress than minority physicians, and for future errors to be predicted more often in practices with less emphasis on diversity among clinicians and staff. These findings will be assessed in greater detail in future analyses of the MEMO data.

Our analyses have several limitations. Because the patient data are not yet available, we do not know the impact of these physician-related outcomes on quality of care or patient safety. Likewise, we do not as yet know the accuracy of the physician estimates of past errors or potential future errors. It is possible, as Firth-Cozens suggests,[1] that stressed physicians are more likely to presume they will make mistakes, when in reality they may not. While the response rate of 61 percent is less than optimal, it remains well within the range of reasonable response rates for physician surveys.[28] It is also possible that some of the results

have been inflated by common method variation. Lastly, our cross-sectional data cannot determine causality. Fortunately, some causality questions will be addressed in the third phase of our study.

Conclusions

Physician stress is prevalent in primary care, and stress and the tendency to err are associated with different aspects of organizational climate and the pace of the office environment. Key contributors to unfavorable physician reactions such as stress, dissatisfaction, and intent to leave the practice included insufficient resources, chaos in the office environment, diminished trust in the organization, and diminished control of the workplace. The tendency to make mistakes was associated with a lack of emphasis on quality, information, and communication. These findings suggest that primary care offices can be made safer by emphasizing information and communication, promoting a culture of quality rather than quantity of care, and targeting the hectic office environment for improvements.

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