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1 **Work environment differences between outpatient and inpatient surgery: a pilot study on the vascular**
2 **surgeons' perceptions**

3 short title: **Vascular surgeons' view of their work environment**

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31 **Abstract**

32 **Background:** In France, outpatient endovascular surgical procedures have been slowly implemented in
33 hospitals since 2015. Their development has been heterogeneous across France and is not yet the standard
34 of care despite their benefits concerning patients' outcomes and healthcare professionals' satisfaction.
35 However, since the COVID-19 pandemic, the demand for patient beds has been increasing, while human
36 resources have been decreasing. This encouraged the surgery service reorganization and accelerated the
37 shift from inpatient to outpatient surgery. Consequently, services had to adapt rapidly and this may have
38 caused some strain on the hospital medical workforce. The objectives of this pilot study were to document
39 and analyze the nursing staff (nurses and certified assistant nurses) well-being and workload as perceived by
40 the vascular surgeons working with them. It also wanted to assess the link between the nursing staff's
41 psychosocial stress and the surgeons' concentration and serenity in their workplace, based on the
42 assumption that the well-being of both parties is inextricably linked.

43 **Methods:** An observational study was conducted using an online questionnaire distributed to the senior
44 members of the French society of vascular and endovascular surgery (n=490) between October 10 and
45 October 18, 2022.

46 **Results:** In total, 125 surgeons completed the questionnaire (25% response rate). The main finding was that
47 according to 68% of vascular surgeons, the nursing staff's psychosocial stress significantly impaired their
48 serenity and concentration at work and this frequently affected the surgical procedure safety. The main
49 sources of psychosocial stress were the high work pace (64%), demand for flexibility (56%), lack of
50 anticipation of schedule changes (82%), and difficulties encountered in relaying these concerns to hospital
51 managers (44.6%).

52 **Conclusions:** This study demonstrated that concomitantly with the forced acceleration of outpatient activity
53 implementation, the vascular surgeons' perceptions of their working environment is deteriorating, especially
54 in conventional (inpatient) surgery wards where the workload is increasing and patients have more
55 comorbidities. The worsened psychosocial stress of surgeons and staff affects the care provided.

56 **Introduction**

57 In France, a country with an aging population, high tobacco consumption and modern lifestyle, the increasing
58 needs in vascular surgery specialists was foreseen by the French College of Vascular Surgery and healthcare
59 services should have been progressively adapted (1,2). In addition, recent technical progress in minimally
60 invasive surgery for the treatment of peripheral arterial diseases should have contributed to the
61 development of same-day discharge endovascular revascularization and help with the organization of
62 vascular care. However, in France, endovascular surgery procedures for peripheral artery diseases are mostly
63 performed in inpatient settings (i.e. conventional wards) (3). Inpatient surgery includes at least an overnight
64 stay. Conversely, in outpatient surgery, patients are hospitalized less than 12 hours, without overnight stay
65 (same-day discharge). Several studies demonstrated that outpatient surgery presents benefits in patient's
66 outcomes and work organization (4–8). However, outpatient endovascular surgery procedures have been
67 slowly implemented in French hospitals since 2015 (3), their development has been heterogeneous, and they
68 are not yet the standard of care despite their documented benefits (4). Concurrently, the COVID-19 crisis
69 overstretched healthcare services and imposed substantial adjustments in healthcare services (9,10). Notably
70 in vascular services, it encouraged the reorganization of surgery wards and the move from inpatient to
71 outpatient surgery (the so-called “ambulatory shift”) (11,12). Since the COVID-19 pandemic, the ambulatory
72 shift seems to have accelerated in France. However the COVID-19 crisis also accelerated the defection of
73 healthcare professionals, thus increasing the burden of care, particularly in conventional vascular surgery
74 wards where the demand for patient beds has been increasing. Therefore, the combine impact of the
75 ambulatory shift and post-COVID-19 health care professional ressources on vascular surgery wards needs to
76 be documented. A major effect concerns the human resource redistribution between conventional and day
77 surgery wards that threatens healthcare planning (13), especially in a context of healthcare workforce
78 shortage (14). In addition, several vascular surgeons raised concerns about the degradation of life at work
79 and more globally on the psychological stress of healthcare workforces, particularly in conventional wards.
80 Many studies demonstrated that the degradation of work life is associated with the degradation of the care
81 quality and safety (15–18). However, only few reports focused on the healthcare workforces' psychological

82 stress and its impact on care quality and safety in the context of the shift from inpatient to outpatient care
83 (19,20). Consequently, it becomes critical to better assess the quality of life at work in surgery wards in the
84 context of the workforce shortage and the increase of outpatient surgery procedures because it may affect
85 healthcare service organization and patient care.

86
87 The objective of this pilot study was to evaluate the impact of the ambulatory shift due to the COVID-19
88 pandemic on the vascular surgeons' quality of work, with a focus on conventional surgery wards, and their
89 perception of the healthcare staff's psychological stress. Specifically, we addressed the following questions:
90 (1) How do vascular surgeons perceive the healthcare staff's quality of work life? (2) How does the
91 healthcare staff's quality of work life affect the vascular surgeons' serenity and concentration? (3) How does
92 the healthcare staff's quality of work life affect the safety of the vascular surgeons' procedures?

93

94 **Methods**

95 Study design and participants

96 An observational study was conducted from the 10 to the 18 October 2022. It consisted of a voluntary online
97 survey sent to senior vascular surgeons, members of the French society of vascular and endovascular
98 surgery.

99 Questions and variables

100 The questions focused on the working environment with an emphasis on the nursing staff (i.e. nurses and
101 certified assistant nurses) working in vascular surgery wards. The survey consisted of 28 questions divided in
102 six main topics: characteristics of the hospital or the clinic, impact of the COVID-19 pandemic on surgical
103 activity, discrepancy between surgical activity and nursing resources, nursing staff's work conditions, impact
104 of the nursing staff's work conditions on the vascular surgeons' work environment, and interpersonal
105 relationships and communication between vascular surgeons and the human resources department. The

106 work environmental factors were described and analyzed in order to understand the vascular surgeons'
107 answer to the following questions: (1) "In your opinion, are nursing staff unhappy with their working
108 conditions (high levels of occupational stress, anxiety, dissatisfaction)?" [do not know/no, rarely/yes, most of
109 the time] (2) "Are your serenity and professional concentration affected by the nursing staff's quality of
110 work life (organization, skills, experiences)?" (3) "Is the safety of your surgical interventions affected by the
111 nursing staff's quality of work life?" [exceptionally/occasionally/frequently/difficult to assess]. The complete
112 questionnaire is available in Supplementary material.

113 Statistical analysis

114 Univariate statistical analyses were performed using Fisher's exact tests or Pearson's χ^2 tests. Variables with
115 a p-value <0.25 were included in the multivariate models. Multivariate logistic regression models were applied
116 using stepwise approaches to analyze the effect of each variable on the questions of interest, all other things
117 being equal. P-values < 0.05 were considered statistically significant. Data management and statistical
118 analyses were performed using the R statistical software (version 4.1.2)

119

120 Results

121 *Characteristics of the respondents*

122 In total, 125 vascular surgeons completed the survey (25.5% of the 490 senior members of the French society
123 of vascular and endovascular surgery). The sample was representative of distribution of the vascular
124 surgeons' in the different hospital sectors: 53% in private-sector hospitals and 41% in public-sector hospitals.
125 Most surgeons (86%) performed both arterial and venous surgical procedures. Although 40% of respondents
126 said that the COVID-19 health crisis led to an increase in their outpatient activities, the proportion of
127 outpatient arterial surgery procedures remained lower than 10% for 48% of respondents.

128 *Nursing staff resources*

129 Most surgical units operated with a 8-13 patients per nurse ratio, irrespective of the setting. Only 13% of
130 respondents who worked in day surgery wards and 18% of those who worked in conventional surgery wards
131 reported a patient-to-nurse ratio >13. It should be noted that 27% and 4% of respondents could not assess
132 this ratio for their day surgery ward and conventional surgery ward, respectively. Overall, nursing staff in day
133 surgery wards seemed to cover more medical and surgical specialties than in conventional wards (49% vs.
134 9.7%).

135 *Factors associated with the nursing staff's quality of work life*

136 According to 52% and 37% of respondents, overall, the nursing staff's workload has been increasing in
137 conventional and day surgery wards, respectively. Whatever the ward, nursing staff needed to be flexible;
138 however, 50% of responders highlighted a lack of information to anticipate changes. Most respondents (65%)
139 underlined that in conventional wards, the work pace was very sustained and 50% of respondents indicated
140 that from 15% to >30% of errors in nursing care were due to time constraints (23% in day surgery wards).
141 Conversely, 42% of respondents considered the work pace to be adapted or even low in day surgery wards.
142 However, it should be noted that 21% of respondents were unable to assess this point. Moreover, 57% of
143 respondents said that the supervision of nursing staff was deficient and 50% found that discussion with
144 hospital managers was difficult when psychological stress was observed in nursing staff members. Overall,
145 68% of respondents (n=85) reported frequent psychological stress in their nursing staff. Only two
146 respondents said that nursing staff did not show any stress and five could not assess it. These response
147 modalities were grouped with the "Sometimes" versus "Often" to maintain the statistical power in the
148 multivariate analyses. When analyzed independently, changes in the conventional surgery activity linked to
149 the COVID-19 pandemic, work pace, supervision, flexibility, anticipation of schedule changes, and
150 interactions with hospital managers were significantly associated with frequent work-related psychosocial
151 stress in nursing staff (Table I and II). In the multivariate analysis with all variables adjusted for each other,
152 demand for flexibility, sustained work pace in conventional surgery wards, and late notice of planning

153 changes contributed significantly to work-related psychosocial stress in the nursing staff (Table III), but not
154 perceived lack of supervision and patient-to-nurse ratio.

155 *Factors associated with the vascular surgeons' quality of work life*

156 Concerning the surgery procedure safety in conventional surgery wards, the vascular surgeons' perception of
157 the impact of the nursing staff's quality of work life was not clear-cut: 53% and 28% mentioned occasional
158 and negative effects, respectively (Table IV). The significant and independently contributing factors were the
159 frequent psychosocial stress of nursing staff, increased complexity of patients, and sustained work pace.
160 Compared with surgeons who reported that nursing staff's issues only rarely affected the safety of their
161 surgical practice, surgeons who said that such issues frequently perturbed their work safety also reported
162 significantly more nursing staff's psychosocial stress and more patients with multiple chronic conditions
163 (Table V). The odds ratio for the work pace suggested the possible negative effect of sustained pace of work
164 on patient safety, but overall, this was not significant.

165 The factors significantly and independently associated with the vascular surgeons' reduced serenity and
166 concentration were the patients' increased level of comorbidities, increased lack of nursing care due to time
167 constraints, frequent psychosocial stress of nursing staff, and difficulties in discussing the nursing staff's
168 working conditions with hospital managers (Table VI). Compared with responders who reported rare
169 perturbations, vascular surgeons who reported frequent impairment of their serenity and concentration also
170 reported 4 times more nursing staff's psychosocial stress and higher number of comorbidities in patients
171 (Table VII). The absence of mediation with hospital managers also was significantly correlated with
172 occasional and frequent perturbations compared with rare. A surgeon stated that "our serenity is no longer
173 affected, but we lose a lot of energy in arguing to maintain sufficient workforce levels" and another added
174 that "... we see more and more staff turnover, with loss of specific knowledge on vascular patients'
175 management". These qualitative statements completed the description of the deteriorating working
176 environment in hospitals.

177

178 **Discussion**

179 Our study was designed to assess (i) the vascular surgeons' perceptions on the work life quality of their
180 nursing staff, (ii) the impact of the nursing staff's quality of work life on their own serenity and concentration,
181 (iii) the impact of the nursing staff's quality of work life on the safety of their surgical procedures. Our main
182 observation is that according to 68% of vascular surgeons, their nursing staff experienced psychosocial stress
183 and that for many of them, this significantly affected their serenity and concentration at work with frequent
184 concerns about the surgical procedure safety. According to the surveyed vascular surgeons, the main sources
185 of stress for the nursing staff were the high work pace (64%), demands for flexibility (56%), lack of
186 anticipation of schedule changes (82%), and difficulties encountered with the hospital manager on these
187 matters (44.6%).

188 First, these results question the patient-to-nurse ratio adequacy that according to many studies, is critical for
189 the nurses' quality of care (21–24) and work life (11). However, in the present study, the patient-to-nurse
190 ratio was not associated with the nursing staff and vascular surgeons' quality of work life. This may be
191 explained by the broad question on this issue in the survey with a categorical answer: ratio <8, between 8
192 and 10, between 11 and 13, and >13. Unfortunately, as this information is sensitive and subject to frequent
193 changes, the exact ratio is not necessarily known by vascular surgeons. The French national hospital
194 performance support agency (ANAP) published guidelines in 2015 to recommend <13-16 patients per nurse
195 and the implication of certified assistant nurses for activities without technical procedures and without high
196 patient turnover. However, data on the fluctuations in activity and staff members (e.g. training, absenteeism,
197 burn-out), the organization of the different wards (day-to-night and week-to-weekend shift), the different
198 activity types per nurse, the hospital budgetary situation, and the populations served are missing, although
199 they represent critical information for the organizational equation (26,27). Many healthcare systems report
200 that healthcare services are currently experiencing healthcare workforce shortages (14), particularly in
201 nursing human resources (28). In our survey, some surgeons said that "although the medical and nursing
202 schools do not report a vocational crisis and have a high number of enrollments, they experience an alarming

203 number of dropouts during the training program because of discouragement when faced with the
204 unpredictable nature of the working conditions or workload, particularly in conventional wards". To address
205 this issue, the French senate recently voted in favor of a minimum patient-to-nurse ratio to improve the
206 nurses and care assistants' working conditions (<https://www.senat.fr/leg/tas22-047.html> in French). By
207 December 2024, the French healthcare authority (HAS) must determine in public hospitals, the minimum
208 patient-to-nurse ratio per number of open beds or per number of visits (for outpatient activities) for each
209 specialty and each activity type that will have to be implemented within 2 years.

210
211 Second, our results highlight the importance of the quality of the interactions between healthcare staff and
212 hospital managers. Good interpersonal relationships between physicians, nurses and managers are critical
213 for the patient safety and quality of care (29) because the medical staff's work is affected when working
214 conditions are not good (25). In France, except for few specific and standardized situations defined by
215 national rules, hospitals have a legal obligation to involve physicians in the review of their nursing workforce
216 number. Yet, 66.1% of the surveyed vascular surgeons said that they had not been involved by hospital
217 managers in these discussions. Moreover, healthcare professionals and managers often have antagonistic
218 constraints (15) and visions of hospital activities as highlighted by one respondent who stated that "*they do*
219 *not have the same definition of workload*". Additionally, the administrative rules for workforce allocation
220 depend on many criteria. For instance, the rules and health economic evaluation differ when a hospital is
221 adapting to the changes in care offers or when a hospital is planning the development of a new activity for
222 their strategy plan. However, whatever the activity, it has been demonstrated that investments in nursing
223 reap rewards (23,24) . Small additional costs for better nursing improve patient outcomes and consequently
224 lessen the burden and cost of post-operative care in primary care.

225 Third, although the vascular surgeons' serenity and concentration were somewhat affected by the nursing
226 staff psychosocial stress, the safety of their practice did not seem to be compromised. This observation is
227 consistent with a recent study on the vascular surgeons' capacity for resilience (31) due to their training and

228 their adherence to the Hippocratic oath. A more qualitative analysis with measured outcomes for patients,
229 such as length of stay and complication rate, is needed to confirm this interpretation.

230

231 The main limitation of this study is its voluntary framework that could have influenced the sample
232 representativeness. However, the French society of vascular and endovascular surgery includes almost 500
233 members who are representative of the French vascular surgeons in terms of age, specialty, and hospital
234 type (public- and private-sector) where they work. The 25% response-rate represented a reasonable sample
235 size for statistical analysis. Our sample was representative in terms of specialty, surgical practice seniority,
236 and type of hospital. A second limitation is that respondents were volunteers, therefore strong opinions on
237 their quality of work life may have been overestimated. However, the respondents were at first unaware that
238 the survey would concern their nursing staff's wellbeing and this may be in favor of an accurate assessment
239 of the nursing staff's psychosocial stress. A third limitation is that the survey did not address the seniority
240 and stability of the nursing team and this may explain the lack of significance of the patient-to-nurse ratio.
241 Indeed, compared with unexperienced nurses, experienced nurses should be able to manage more patients
242 in a shorter time frame, especially in an environment with a frequent turnover. Lastly, although the present
243 quantitative survey included open-text comments, our research would benefit from a qualitative approach
244 with semi-structured interviews to better describe the hospital healthcare professionals' working conditions
245 and experiences. In addition, besides the quantitative survey of vascular surgeons, a mixed-method approach
246 that included also the nursing staff would complete and enhance our research findings.

247

248 **Conclusions**

249 This pilot study demonstrated that concomitantly with the ambulatory shift accelerated by the COVID-19
250 pandemic, the vascular surgeons' perception of their working environment is deteriorating. Workload has
251 increased, especially in conventional surgery wards where healthcare workers encounter more patients with

252 many comorbidities. The work life quality for both surgeons and paramedical staff is worsening and this
253 affects the quality of care. Working conditions and emphasis on the patient-to-nurse ratio are critical issues.
254 When nursing staff resizing is needed, it is urgent to respect the legal frameworks that require a
255 multidisciplinary consultation of professional experts in the field and the involvement of the concerned
256 physicians to guarantee a safe and adequate workforce distribution. These qualitative statements complete
257 the description of what is becoming a critical public health issue.

258

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265

266 **Author contributions**

267 LD designed the study, collected the data, and reviewed and edited the manuscript; YY and SW completed
268 the literature review, and reviewed and edited the manuscript; NLM performed the statistical analysis,
269 interpreted the results, and wrote the original draft of the manuscript. All authors have read and agreed to
270 the published version of the manuscript.

271 **Competing interests**

272 The authors have no competing interests to declare.

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374 **Table I. Surgeon's perception of nursing staff's unhappiness and their work environment, in France in 2022**

Work environment	Nursing staff's unhappiness		p-value†
	Sometimes N = 40*	Often N = 85*	
Hospital status			0.048
<i>non-profit</i>	5 (12%)	2 (2.4%)	
<i>private</i>	22 (55%)	44 (52%)	
<i>public</i>	13 (32%)	39 (46%)	
Vascular procedure			0.3
<i>arterial only</i>	4 (10%)	14 (16%)	
<i>mixed</i>	36 (90%)	71 (84%)	
Proportion of outpatient surgery			0.5
0%	2 (5.1%)	2 (2.4%)	
<10%	18 (46%)	41 (48%)	
10-29%	9 (23%)	14 (16%)	
30-49%	2 (5.1%)	13 (15%)	
50-70%	4 (10%)	9 (11%)	
>70%	4 (10%)	6 (7.1%)	
Impact of COVID-19 on outpatient activity			>0.9
<i>decrease</i>	2 (5.0%)	7 (8.2%)	
<i>no impact</i>	15 (38%)	35 (41%)	
<i>increase</i>	18 (45%)	33 (39%)	
<i>do not know</i>	5 (12%)	10 (12%)	
Impact of COVID-19 on inpatient activity			0.045
<i>decrease</i>	9 (22%)	38 (45%)	
<i>no impact</i>	26 (65%)	39 (46%)	
<i>increase</i>	5 (12%)	8 (9.4%)	
Adequate supervision			0.002
<i>poor</i>	14 (35%)	57 (67%)	
<i>adequate</i>	20 (50%)	22 (26%)	
<i>do not know</i>	6 (15%)	6 (7.1%)	
Demand for flexibility	10 (25%)	60 (71%)	<0.001
Early notice of planning changes			<0.001
<i>yes</i>	14 (35%)	15 (18%)	
<i>no</i>	10 (25%)	53 (62%)	
<i>do not know</i>	16 (40%)	17 (20%)	
Discussion with hospital administration on nursing staff's unhappiness			0.058
<i>yes</i>	7 (18%)	13 (15%)	
<i>sometimes</i>	17 (42%)	22 (26%)	
<i>no</i>	14 (35%)	49 (58%)	
<i>do not know</i>	2 (5.0%)	1 (1.2%)	

*n (%) - †Fisher's exact test; Pearson's Chi-squared test

376 **Table II. Surgeon's perception of nursing staff's unhappiness by surgery setting, in France in 2022.**

	Outpatient			Inpatient		
	Sometimes, N = 33*	Often N = 85*	p-value†	Sometimes N = 33*	Often N = 85*	p-value†
Change in workload since ambulatory shift			0.6			0.073
<i>decrease</i>	2 (6.1%)	5 (5.9%)		9 (27%)	9 (11%)	
<i>no change</i>	3 (9.1%)	16 (19%)		8 (24%)	19 (22%)	
<i>increase</i>	20 (61%)	44 (52%)		8 (24%)	38 (45%)	
<i>do not know</i>	8 (24%)	20 (24%)		8 (24%)	19 (22%)	
Patient-to-nurse ratio			>0.9			0.2
<8	5 (21%)	17 (27%)		6 (19%)	6 (7.2%)	
8-13	13 (56%)	34 (56%)		19 (59%)	61 (73.5%)	
>13	5 (22%)	10 (16%)		7 (22%)	16 (19.3%)	
Number of specialties per nurse			0.8			0.2
1	1 (3.1%)	2 (2.4%)		11 (33%)	13 (15%)	
2-3	3 (9.4%)	6 (7.1%)		13 (39%)	44 (52%)	
4-5	11 (34%)	36 (43%)		6 (18%)	21 (25%)	
>5	17 (53%)	40 (48%)		3 (9.1%)	7 (8.2%)	
Work pace			0.006			<0.001
<i>low to adequate</i>	21 (64%)	27 (32%)		19 (58%)	15 (18%)	
<i>sustained</i>	7 (21%)	38 (45%)		13 (39%)	65 (76%)	
<i>do not know</i>	5 (15%)	20 (24%)		1 (3.0%)	5 (5.9%)	
Lack of nursing care due to time constraints			0.7			0.2
0-15%	17 (52%)	33 (39%)		13 (39%)	30 (35%)	
16-30%	5 (15%)	13 (15%)		10 (30%)	22 (26%)	
>30%	2 (6.1%)	8 (9.4%)		1 (3.0%)	15 (18%)	
<i>do not know</i>	9 (27%)	31 (36%)		9 (27%)	18 (21%)	

*n (%)

†Fisher's exact test; Pearson's Chi-squared test

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383 **Table III. Factors associated with nursing staff's unhappiness, in France in 2022.** Method: multivariate
 384 logistic regression with often vs. sometimes unhappy

Characteristics	OR*	95% CI†	p-value
Impact of COVID-19 on conventional activity			
<i>no impact</i>	—	—	
<i>decrease</i>	2.99	0.97, 10.2	0.065
<i>increase</i>	0.46	0.08, 2.66	0.4
Demand for flexibility			
<i>no</i>	—	—	
<i>yes</i>	5.03	1.74, 15.8	0.004
Work pace in conventional wards			
<i>low to adequate pace</i>	—	—	
<i>sustained pace</i>	4.71	1.66, 14.1	0.004
<i>do not know</i>	27	2.29, 801	0.02
Early notice of planning changes			
<i>yes</i>	—	—	
<i>no</i>	4.50	1.27, 16.9	0.021
<i>do not know</i>	1.23	0.33, 4.62	0.8

*OR = Odds Ratio

†CI = Confidence Interval

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394 **Table IV. Factors associated with vascular surgeons' perturbed work safety in conventional wards, in**
 395 **France in 2022.** Method: univariate analysis.

Characteristics	Rarely N = 21*	Occasionally N = 61*	Very frequently N = 33*	p-value†
Patient-to-nurse ratio				0.6
	<8	2 (9.5%)	8 (13%)	2 (6.1%)
	8-13	15 (71%)	44 (72%)	22 (67%)
	>13	4 (19%)	9 (15%)	9 (27%)
Number of specialties per nurse				0.9
	1	5 (24%)	9 (15%)	6 (18%)
	2-3	11 (52%)	33 (54%)	14 (42%)
	4-5	4 (19%)	13 (21%)	9 (27%)
	>5	1 (4.8%)	6 (9.8%)	4 (12%)
Work pace				0.015
	<i>low to adequate pace</i>	11 (52%)	17 (28%)	4 (12%)
	<i>sustained pace</i>	10 (48%)	42 (69%)	26 (79%)
	<i>do not know</i>	0 (0%)	2 (3.3%)	3 (9.1%)
Lack of nursing care due to time constraints				0.12
	0-15%	11 (52%)	23 (38%)	9 (27%)
	16-30%	4 (19%)	22 (36%)	7 (21%)
	>30%	1 (4.8%)	7 (11%)	8 (24%)
	<i>do not know</i>	5 (24%)	9 (15%)	9 (27%)
Inpatient increased comorbidities				0.028
		8 (38%)	42 (69%)	23 (70%)
Nursing staff's unhappiness				<0.001
	<i>sometimes</i>	12 (57%)	21 (34%)	2 (6.1%)
	<i>often</i>	9 (43%)	40 (66%)	31 (94%)

*n (%)

†Fisher's exact test; Pearson's Chi-squared test

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403 **Table V. Factors associated with vascular surgeons' perturbed work safety in conventional wards, in France**
 404 **in 2022.** Method: Multivariate multinomial analysis - Reference: Safety of care rarely perturbed.

Characteristics	Occasionally			Very frequently		
	OR*	95% CI†	p-value	OR*	95% CI†	p-value
Patient-to-nurse ratio						
<8	—	—		—	—	
8-13	2.5	0.38, 16.4	0.3	2.73	0.24, 30.6	0.4
>13	0.82	0.19, 3.50	0.8	1.88	0.38, 9.28	0.4
Work pace						
<i>low to adequate pace</i>	—	—		—	—	
<i>sustained pace</i>	1.82	0.55, 5.95	0.3	2.61	0.54, 12.5	0.2
Inpatient increased comorbidities						
<i>no</i>	—	—		—	—	
<i>yes</i>	3.92	1.27, 12.1	0.018	4.75	1.21, 18.6	0.026
Nursing staff's unhappiness						
<i>sometimes</i>	—	—		—	—	
<i>often</i>	2.5	0.77, 8.18	0.13	16.3	2.58, 102	0.003

*OR = Odds Ratio

†CI = Confidence Interval

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416 **Table VI. Factors associated with vascular surgeons' perturbed serenity and concentration in conventional**
 417 **wards, in France in 2022.** Method: univariate analysis.

Characteristics	Rarely N = 16*	Occasionally N = 49*	Very frequently N = 43*	p-value†
Inpatient increased comorbidities	7 (44%)	29 (59%)	33 (77%)	0.042
Patient-to-nurse ratio				0.1
<8	14 (88%)	33 (67%)	28 (65%)	
8-13	1 (6.2%)	8 (16%)	2 (4.7%)	
>13	1 (6.2%)	8 (16%)	13 (30%)	
Number of specialties per nurse				0.7
1	4 (25%)	10 (20%)	6 (14%)	
2-3	6 (38%)	26 (53%)	19 (44%)	
4-5	5 (31%)	9 (18%)	12 (28%)	
>5	1 (6.2%)	4 (8.2%)	6 (14%)	
Work pace				0.092
<i>low to adequate pace</i>	7 (44%)	17 (35%)	8 (19%)	
<i>sustained pace</i>	9 (56%)	32 (65%)	35 (81%)	
Lack of nursing care due to time constraints				0.028
0-15%	7 (44%)	22 (45%)	12 (28%)	
16-30%	1 (6.2%)	15 (31%)	14 (33%)	
>30%	1 (6.2%)	4 (8.2%)	10 (23%)	
<i>do not know</i>	7 (44%)	8 (16%)	7 (16%)	
Nursing staff's unhappiness				0.006
<i>sometimes</i>	7 (44%)	21 (43%)	6 (14%)	
<i>often</i>	9 (56%)	28 (57%)	37 (86%)	
Discussion with hospital administration on nursing staff's unhappiness				0.002
<i>no</i>	2 (12%)	24 (49%)	27 (63%)	
<i>yes</i>	8 (50%)	6 (12%)	4 (9.3%)	
<i>sometimes</i>	6 (38%)	18 (37%)	10 (23%)	
<i>do not know</i>	0 (0%)	1 (2.0%)	2 (4.7%)	

*n (%)

†Fisher's exact test; Pearson's Chi-squared test

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423 **Table VII. Factors associated with vascular surgeons' perturbed serenity and concentration in conventional**
 424 **wards, in France in 2022.** – Method : Multivariate multinomial logistic regression - Reference: serenity and
 425 concentration during care is rarely impaired -.

Characteristics	OR*	Occasionally			Very frequently		
		95% CI†	p-value	OR*	95% CI†	p-value	
Discussion with hospital administration on nursing staff's unhappiness							
<i>yes, or sometimes</i>	—	—		—	—		
<i>no</i>	6.78	1.33, 34.6	0.022	10.6	1.97, 57.0	0.006	
Inpatient increased comorbidities							
<i>no</i>	—	—		—	—		
<i>yes</i>	1.42	0.43, 4.77	0.6	4.64	1.17, 18.5	0.03	
Nursing staff's unhappiness							
<i>sometimes</i>	—	—		—	—		
<i>often</i>	0.86	0.25, 2.94	0.8	4.78	1.06, 21.6	0.042	

*OR = Odds Ratio,
 †CI = Confidence Interval

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432 **Supplementary material for Destrieux et al. Work environment differences between**
433 *outpatient and inpatient surgery: a pilot study on the vascular surgeons' perceptions.*

434

435 **Survey on the quality of work life for vascular surgeons**

436

437 **I – Hospital characteristics**

438

439 1- What is the legal status of your hospital?

440 Public-sector university hospital

441 Public-sector non-university hospital

442 Private-sector hospital

443 Non-profit sector hospital

444 Other

445

446 2- What vascular surgery procedures do you perform?

447 Arterial and venous

448 Arterial exclusively

449 Venous exclusively

450 Other

451

452 3- Today, what proportion of arterial surgery procedures do you carry out in the day surgery ward?

453 >90%

454 >70%

455 50-70%

456 30-49%

457 10-29%

458 <10%

459

460 4- How many different medical-surgical specialties does a nurse in a conventional surgery ward have to deal
461 with at the same time?

462 1

463 2 to 3

464 4 to 5

465 >5

466

467 5- How many different medical-surgical specialties does a nurse in a day surgery ward have to deal with at
468 the same time?

469 1

470 2 to 3

471 4 to 5

472 >5

473 6- What is the current patient-to-nurse ratio in your conventional surgery ward?

- 474 <8
- 475 8 to 10
- 476 11 to 13
- 477 >13
- 478 Do not know.
- 479 Other

480 7- What is the current patient-to-nurse ratio in your day surgery ward?

- 481 <8
- 482 8 to 10
- 483 11 to 13
- 484 >13
- 485 Do not know.
- 486 Other

487

488 **II – Impact of the COVID-19 crisis on the vascular surgery activity changes**

489

490 8- What impact did the COVID-19 crisis have on the activities of your vascular surgery wards?

- 491 Increase of outpatient surgery procedures AND no impact on inpatient surgery procedures.
- 492 No impact.
- 493 Increase of both outpatient AND inpatient surgery procedures.
- 494 Increase of outpatient surgery procedures AND decrease of inpatient surgery procedures.
- 495 No impact on outpatient surgery procedures AND decrease of inpatient surgery procedures.
- 496 Do not know.

497

498 9- In your opinion, what is the impact of the increase of outpatient surgical procedure on the disease burden
499 (comorbidities, complexity of surgical management) of patients hospitalized in conventional and day surgery
500 wards?

- 501 No impact on inpatient and outpatient burden
- 502 Increased burden of both inpatients and outpatients
- 503 Increased burden of inpatients only
- 504 Increased burden of outpatients only
- 505 Do not know.

506

507 10 – In the context of a recent opening of a day vascular surgery ward, what is the impact on the delivery of
508 follow-up and treatment information? (Multiple answers possible)

- 509 Development of new materials to inform patients.
- 510 Materials to inform patients are not optimal.
- 511 Already optimal materials to inform patients.
- 512 More compliant patients in day surgery wards than in conventional wards
- 513 Less compliant patients in day surgery wards than in conventional wards
- 514 No impact
- 515 Too soon to observe any impact

516

517 **III - Changes in surgical activities and adequacy of nursing resources (nurses and certified assistant nurses)**

518

519 11- In your opinion, what impact did the opening or increase of outpatient surgery activity have on the
520 nursing staff's workload in your vascular surgery wards?

- 521 No impact
522 Workload increase in both day AND conventional vascular surgery wards.
523 Workload increase in the day vascular surgery ward AND decrease in the conventional vascular
524 surgery ward.
525 Workload increase in the day vascular surgery ward AND no impact in the conventional vascular
526 surgery ward.
527 Workload decrease in both day AND conventional vascular surgery wards.
528 Workload decrease in the day vascular surgery ward AND no impact in the conventional vascular
529 surgery ward.
530 Workload decrease in the day vascular surgery ward AND increase in the conventional vascular
531 surgery ward.
532 No impact in the day vascular surgery ward AND increase in the conventional vascular surgery ward.
533 No impact in the day vascular surgery ward AND decrease in the conventional vascular surgery ward.
534 Do not know.

535

536 12- In your opinion, is the nursing staff' work pace currently adapted to manage your outpatients (including
537 technical care, listening time and information time)?

- 538 Slow
539 Adapted
540 Fast
541 Do not know.

542

543 13- In your opinion, is the nursing staff's work pace currently adapted to manage your inpatients (including
544 technical care, listening time and information time)?

- 545 Slow
546 Adapted
547 Fast
548 Do not know.

549

550 14- In your opinion, what percentage of your inpatients was affected at least once by lack of nursing care due
551 to the nurses' lack of time in 2022 (e.g. technical procedure not performed, prescribed treatment not
552 administered, information not provided)?

- 553 0-15%
554 16-30%
555 31-45%
556 46-60%
557 61-75%
558 76-90%
559 >90%
560 No impact

561

562 15- In your opinion, what percentage of your outpatients was affected at least once by lack of nursing care
563 due to nurses' lack of time in 2022 (e.g. technical procedure not performed, prescribed treatment not
564 administered, information not provided)?

- 565 0-15%
- 566 16-30%
- 567 31-45%
- 568 46-60%
- 569 61-75%
- 570 76-90%
- 571 >90%
- 572 No impact
- 573

574 **IV - Nursing staff's quality of work life**

575 16 - In your opinion, are nursing staff properly supervised in your vascular surgery wards?

- 576 No
- 577 Yes
- 578 Do not know
- 579

580 17- In your opinion, do nursing staff have to change tasks, positions, or functions at a moment's notice to
581 meet current constraints?

- 582 No, rarely
- 583 Yes, sometimes
- 584 Yes, often
- 585 Do not know
- 586

587 18 - In your opinion, are nursing staff informed sufficiently in advance about their working hours or about
588 changes to their work schedule?

- 589 No, rarely
- 590 Yes, most of the time
- 591 Do not know
- 592

593 19- In your opinion, are nursing staff unhappy with their working conditions (high levels of occupational
594 stress, anxiety, dissatisfaction)?

- 595 No, rarely
- 596 Yes, most of the time
- 597 Do not know
- 598

599

600

601

602

603 20- In your opinion, this unhappiness is most often related to:

- 604 Work overload
- 605 Lack of professional recognition
- 606 Physicians' unsuitable or oppressive attitude
- 607 Hospital managers' unsuitable or oppressive attitude
- 608 Poor care management organization
- 609 Relationship problems with other healthcare staff members
- 610 Inadequate pay
- 611 I do not perceive unhappiness in my team
- 612 I do not know

613

614 **V - Impact of the nursing staff's quality of work life on the vascular surgeons' working conditions**

615

616 21- As a surgeon, do you have the means to discuss with your administration in the event of unhappiness or
617 difficulties among nursing staff?

- 618 No
- 619 Sometimes
- 620 Yes
- 621 I do not know

622

623 22- How would you describe your healthcare human resources currently working in the conventional and day
624 surgery wards? Multiple answers possible

- 625 Very stable: little turnover
- 626 Long-term bed closures due to unreplaced departures
- 627 Frequent use of temporary staff to keep beds open
- 628 Constant turnover due to regular departures that are easily replaced without temporary staff
- 629 Fragilized by frequent unreplaced departures.
- 630 Other

631

632 23- Are your serenity and professional concentration affected by difficulties related to nursing staff
633 (organization, skills, experience)?

- 634 Rarely
- 635 Occasionally
- 636 Very frequently
- 637 Do not know
- 638 Other

639

640 24- Is the safety of your surgical procedures affected by problems with nursing staff?

- 641 Rarely
- 642 Occasionally
- 643 Very frequently
- 644 Do not know
- 645 Other

646

647 **VI - Opportunities given to surgeons to get involved in the hospital care organization.**

648 25- Can you or your medical representatives effectively express your opinions and proposals to the hospital
649 management team when the staff organization or workload appears to be detrimental to care?

- 650 Never
651 With difficulty
652 Occasionally
653 Often
654 Always
655 Do not know
656 Other
657

658 26- Have you or your medical representatives been asked by your hospital management team to participate
659 in the review of healthcare staffing requirements in your day surgery and conventional surgery wards?

- 660 Yes, optimal staffing levels are reviewed yearly with the management committee.
661 Yes, optimal staffing levels are part of every hospital project renewal.
662 Yes, this is done when there is a significant change in surgical activity or a new type of activity.
663 No, to my knowledge, the healthcare staffing review does not involve the physicians in my hospital.
664 Do not know
665 Other
666

667 27- In your opinion, are changes in the medical care organization anticipated, discussed, and clearly
668 explained to practitioners by the hospital management team?

- 669 Never
670 Occasionally
671 Often
672 Always
673 Do not know
674

675 28- What is the quality of your relations with your hospital management team?

- 676 Not existent
677 Poor
678 Unstable
679 Satisfactory
680 Excellent
681 Other
682