



Original Research Article

Identifying institutional factors in general surgery resident wellness and burnout

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ABSTRACT

Background: Effects of the institutional macrocosm on general surgery resident wellbeing have not been well studied. We sought to identify organizational factors that impact resident wellness and burnout.

Methods: Using a modified Delphi technique, an open-ended survey and two subsequent iterations were distributed to wellness stakeholders at two institutions to identify and stratify institutional factors in six burnout domains.

Results: Response rates for each survey round were 29/106 (27%), 30/46 (65%) and 21/30 (70%). Top factors identified in each domain were:

- Workload: hours (60% respondents), advanced practice providers (53%)
- Control: autonomy (77%), scheduling blocks/changes (43%)
- Rewards: compensation (93%), vacation (83%)
- Community: peer support (66%) and mentorship programs (59%)
- Fairness: budget allocation (48%), resident union (48%)
- Values: mentorship program (43%), institution type (40%)

Conclusion: A modified Delphi technique prioritized institutional wellness and burnout factors. Top factors identified were compensation, vacation time, and autonomy. These results can direct future scholarship of barriers/facilitators of resident wellbeing.

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1. Introduction

High rates of burnout have been demonstrated amongst physicians^{1,2} with burnout in surgery residents reaching heights of 70%.^{3,4} Burnout has implications on the physician workforce with higher rates of attrition^{5–7} and suicide.^{8,9} The social-ecological model describes various dimensions or constructs influencing an individual from intrinsic characteristics of the person to their community (i.e. residency program) to the organization and policies in which they work.¹⁰ Research on burnout needs to acknowledge each of these constructs. However, research to understand and address the burnout problem has largely focused on

the individual¹¹ and programmatic factors¹² that affect surgery residents. This ignores the greater institutional macrocosm where esoteric policies and systematic inefficiencies create escalating frustrations in an already stress-overburdened field. Furthermore, significant effects on patient care^{13–15} and the economic impacts of burnout⁵ demand that this problem be addressed by more than the residency program. It is incumbent upon a hospital system to address this growing epidemic and intervene.

Exploring the institutional factors in surgery resident wellness is thus important, but the substance of these factors is poorly understood. Furthermore, assessing their impact on wellness and burnout is challenging. For example, the utility of measuring organizational culture is frequently limited by single-site surveys that require intensive time and labor to execute and ultimately lack generalizability.^{16,17} Identifying metrics that can be definitively isolated or measured, such as those available via public domain,

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could be a solution. Organizational metrics such as financial health¹⁸ and trauma exposure¹⁹ have been explored; but these studies are limited in number, scope, and are not in the high-risk, vulnerable resident population. Accessible, public metrics have the utility of allowing for aggregation of data, increasing the power to detect impact on wellness. Additionally, this would allow for easy screening for at-risk programs. To our knowledge, no list of such factors has been identified.

To address this lack of data in the literature, our study seeks to identify and stratify institutional factors that could be implicated in general surgery resident wellness. This will guide future research towards understanding burnout within the organizational context. Ultimately, understanding the risk factors for resident burnout will allow for identification of those most at risk, support targeted interventions, and pave the way for a healthier and more fulfilled workforce.

2. Methods

2.1. Study design

A modified Delphi technique²⁰ was utilized to form a consensus amongst wellness stakeholders. Stakeholders were identified at two southeast Michigan hospitals/programs (one academic and one university-affiliated) by members of the surgery education department as physician faculty or hospital administrators that had demonstrated an interest in resident wellness through academic activities or excellence in education. All general surgery residents were also included. Surveys were distributed through Qualtrics (Provo, UT) with a maximum of 2 reminders. This study was reviewed and deemed exempt by the University of Michigan Institutional Review Board.

Survey 1

A list of factors was developed through an initial open-ended survey distributed electronically. This Survey #1 asked participants to identify factors at the institutional level they thought were implicated in general surgery resident wellness within 6 Areas of Worklife (AWS)^{16,21,22}: Workload, Control, Rewards, Community, Fairness, and Values (Appendix). While other frameworks have been developed for²³ and applied to²⁴ surgical resident wellness and burnout, we selected the AWS model given our focus on institutional determinants and its broad applicability to various fields. A definition of each domain was provided to participants in each question prompt.

Survey 2

The research team refined the list of provided factors from Survey #1 to those thought to be identifiable via public domain (e.g. websites, databases, etc.). We included all identified factors that met this criterion; we did not limit the number of factors. Additionally, factors identified via literature search as well as through oral surveys, utilizing the same AWS conceptual framework, with faculty and administrative stakeholders (performed by DF, a surgical resident/education research fellow during conceptualization of the project) were added to create a robust list of factors for the second iteration. Survey #2 was sent to all respondents who had started the previous survey asking them to select up to three factors from this list in each domain that they thought most affected surgery resident wellness.

Survey 3

Table 1
Wellness stakeholder respondent demographics.

Wellness Stakeholder	Survey #1	Survey #2	Survey #3
Residents (PGY1-5)	19/91	20/28	13/20
Surgical Faculty	3/5	2/3	1/2
Program Director	2/3	3/3	2/3
Wellness Representative	3/4	2/3	2/2
GME Administration	1/1	1/1	1/1
Hospital Administration	1/2	2/2	2/2
Total Responses	29	30	21
Response Rate	27% (29/106)	65% (30/46)	70% (21/30)

Factors selected by respondents in Survey #2 were ranked by percentage of respondents. The positive or negative effects on wellness and burnout were not queried. Similar to previously described ranking-type Delphi studies,²⁵ a cutoff of 25% or more of respondents designated a list of at least 3 top responses in each domain. A final Survey #3 was then sent to all participants that had completed the second survey asking them to agree with or provide additional input on the top factors identified. Any additional input from stakeholders was weighed by the research team and agreement on whether to add additional factors was made attaining the final consensus of factors. No factors were removed during this process.

3. Results

3.1. Demographics

Survey #1 was distributed to a total of 106 wellness stakeholders and 29 complete responses were obtained. Residents formed 66% of these responses and included input from all post graduate years. The stakeholder position and response rate for this and subsequent surveys are represented in [Table 1](#).

3.2. Institutional factors

Upon refinement of the factors following Survey #1 to those that were accessible via public domain, we identified 15 factors in the Workload domain, 12 in Control, 14 in Rewards, 13 in Community, 10 in Fairness, and 10 in Values. These factors are listed in [Table 2](#). Factors bolded received a response of 25% or more and were the factors proposed in Survey #3. Ultimately, a final consensus identified the top 3 factors in each of the six domains:

- **Workload**: workhours (60% of all respondents), advanced practice/mid-level providers (53%, e.g. presence of, ratio to residents), number of surgical consults (37%)
- **Control**[†]: autonomy (77%, e.g. patient care, operative), number of scheduling blocks/frequency of service changes (43%), childcare options (33%, e.g. within/offered by institution), presence of residency union (33%)
- **Rewards**: compensation/salary (93%), vacation time (83%), benefits (38%)
- **Community**: peer support (66%) and mentorship programs (59%), geographic region (31%)
- **Fairness**: budget allocation (48%), presence of residency union (48%), resident attrition (41%)

[†] Four factors were identified for Control given that the final factors had the same selection rate.

Table 2

All identified factors by domain.

Refined factors (obtainable via public domain) are organized within each Area of Worklife domain by rank based on percentage of responses (in parenthesis). Bold factors were identified by wellness stakeholders received response rates of 25% or greater and were included in Survey #3 to finalize the most important factors.

Workload	Control
<p>Workhours (60%) Advanced practice/mid-level providers (53%, e.g. presence of, ratio to residents) Number of surgical consults (37%) Average inpatient census (23%) Complexity of patient cases (23%)</p> <p>Type of electronic medical/health record (23%) Admission metrics (20%, e.g. patient to physician/surgeon/resident ratio) Morbidity/mortality (20%) Research expectations (20%) Surgical volume (20%) Number of hospitals covered by residents (3%) Bed utilization (0%) Number of emergency room visits (0%) Patient demographics (0%, e.g. socioeconomic status, percentage minority) Trauma metrics (0%, e.g. number of trauma admissions, trauma center designation)</p>	<p>Autonomy (77%, e.g. patient care, operative) Number of scheduling blocks/frequency of service change (43%) Childcare options (33%, e.g. within/offered by institution) Presence of residency union (33%) Turnover of surgery administration (27%, e.g. department chair, program director) Wellness/doctor/sick days (27%) Composition of hospital administration (17%, e.g. business v. nursing v. physicians) Turnover of hospital/institution administration (10%) Number of resident-covered hospitals (7%) Affiliations with private or county hospitals (3%) Moonlighting opportunities (3%) Presence of nursing union (3%)</p>
Rewards	Community
<p>Compensation/salary (93%) Vacation time (83%) Benefits (38%) Maternity/paternity leave (28%) Cost of living (21%) Childcare (21%) Profit status (7%) Financial health of institution (7%) NIH funding (3%) Revenue (3%) Institution endowment (0%) Insurance reimbursement (0%) Number of named professorships (0%) Percentage Medicare/Medicaid (0%)</p>	<p>Peer support program (66%) Mentorship program (59%) Geographic region (31%) Institution location (28%, metropolitan v. urban v. suburban v. rural) Affiliation with medical school (28%) Mental health resources (28%) Composition of hospital administration (17%, e.g. business v. nursing v. physicians) Administration/physician ratio (10%) ACGME wellness metrics (7%) Trauma exposure (7%) Local homicide/suicide rates (3%) Lawsuit rates (0%) Veterans Administration (VA) rotations (0%)</p>
Fairness	Values
<p>Budget allocation (48%) Presence of residency union (48%) Resident attrition (41%)</p> <p>Turnover of faculty (38%) Composition of hospital administration (34%, e.g. business v. nursing v. physicians) Turnover of nursing (21%) Executive bonus allocation (21%) Turnover of surgery administration (17%, e.g. department chair, program director) Presence of nursing union (3%) Turnover of hospital/institution administration (3%)</p>	<p>Mentorship program (43%) Type of institution (40%, e.g. academic v. community) Composition of hospital administration (37%, e.g. business v. nursing v. physicians) Percentage of female faculty (37%) Percentage of under-represented/minority faculty (37%)</p> <p>Mission statement (33%) Patient safety metrics (30%) Not-for-profit status (27%) Affiliation with medical school (20%) Religious affiliation (7%)</p>

- Values[‡]: mentorship program (43%), type of institution (40%, e.g. academic v. community), percentage of female faculty (37%), percentage of under-represented/minority faculty (37%), composition of hospital administration (37%)

The top ranked factor in each domain is represented in Fig. 1 with responses subdivided into percentage of resident and faculty/administration responses.

There were no significant differences in ranking of factors between residents and non-resident (e.g administration, faculty) respondents with the exception of number of surgery consults (50% of residents versus 10% of administration/faculty, p = 0.0321) and type of electronic medical record (5% of residents versus 60% of administration/faculty, p = 0.0008).

[‡] Five factors were identified for Values given that the final factors had the same selection rate.

4. Discussion

This study accomplished the objective of identifying and stratifying factors that are related to general surgery resident wellness and burnout. Our results fill a critical gap in the literature and create an essential, previously lacking framework in which to start understanding the effects of the greater institutional context on resident wellness.

As previously noted, the study of the effects of the institution in the literature has been limited. Previous investigators' examinations of institutional factors on wellness and burnout amongst healthcare populations has been restricted in scope, without evidence for a systematic framework, and not in a resident population. Adriaenssens et al. reviewed a wealth of studies on factors implicated in burnout, but among nurses. The studies explored the impact of traumatic exposure, staffing structures, communication, and financial reward on burnout.¹⁹ Amongst physicians, the effect of the organization's financial health correlated with faculty's work strain, depression, and anxiety.¹⁸ Our study is unique in both its

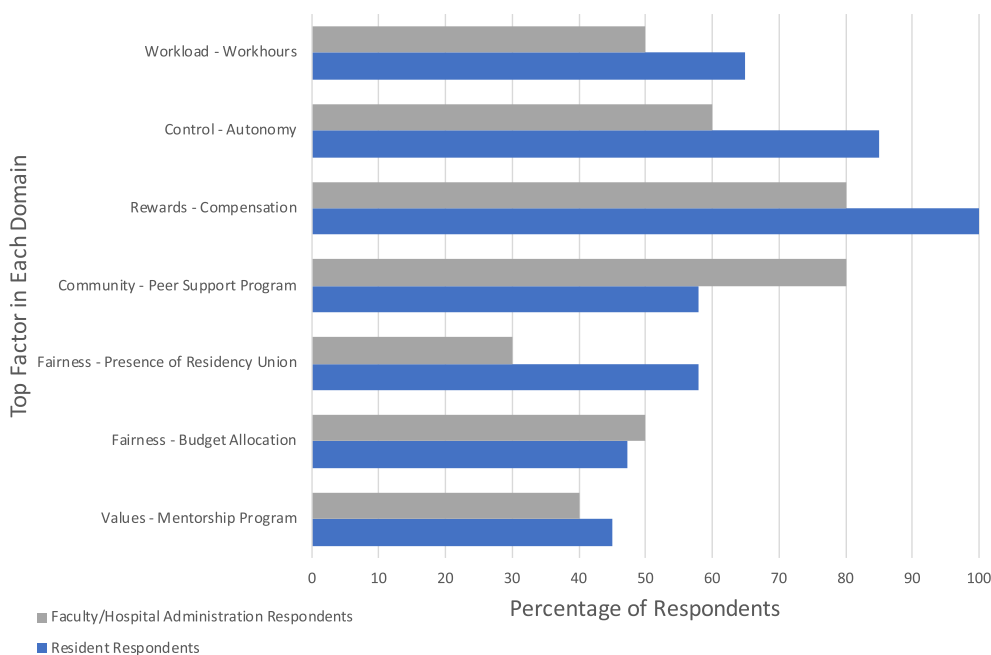


Fig. 1. Top Factor in Each Area of Worklife Domain by Resident and Faculty/Administration Responses
 The top factor(s) in each domain are presented by percentage of stakeholder respondents. Two factors are present for the Fairness domain as both had the same percentage of all respondents. There are no statistically significant differences between resident and faculty/administration responses.

development of a conceptual roadmap for future work and its focus on surgery residents. The aforementioned factors have not been well studied in the resident population, though some investigation has been started. Previous work by the FIRST trial²⁶ demonstrated that there was no effect of location by region, program type or size, and demographics of chair, program director, and faculty.²⁷ While some of these items are within our identified factors, we did not exclude them when asking our stakeholders to rank factors, as there are still dimensions that can be explored. For example, while geographic region (e.g. Northeast, Midwest, West, etc.) was explored, aspects of geography such as urbanization (e.g. metropolitan, suburban, rural), critical access or referral hospital designations, sociopolitical climates, etc. have not been investigated.

Our work compliments current ongoing work examining other influencers of resident burnout. While institutional interventions have been shown to be more effective than individual-focused interventions in other populations,²⁸ there is evidence for development of personal strategies among surgeons¹¹ and surgery residents.^{29,30} Meanwhile, ongoing work by the SECOND trial^{12,31} is exploring the resident learning environment and implementation of programmatic tools to promote wellness. Programmatic factors (many of which were identified by our stakeholders) such as autonomy, peer support systems, and mentorship programs may be easier and faster to implement than some institutional factors, such as compensation and vacation time, that require universal GME acceptance for all residency specialties. Ultimately, the goal of any study of wellness is to understand the influencers and develop interventions to improve wellness, decrease burnout and suicide, and provide mechanisms for creating a more fulfilled workforce. Institutional factors can be divided into intrinsic factors – such as location, patient population, local trauma and suicide rates – and mutable factors – such as support staff, benefits, and compensation. Identifying intrinsic contributors allows for identifying those at risk; interventions can prophylactically target the individual to promote resilience and create structural support. Mutable

characteristics will call for institutional or policy changes. Both are worthy of study though each has unique challenges in addressing the problem. Interestingly, the domain that had the greatest diversity of responses was that of ‘Values’. This suggests that our stakeholders, which include surgery residents, have disparate values. The divergent emphasis may create challenges to demonstrating a significant association between Value factors and wellness. Similarly, interventions targeted at this domain may be appreciated only by a subset of individuals and not be universally beneficial.

There are limitations to our study. First, our stakeholders came from two southeastern Michigan hospitals. Thus, locoregional culture may be influencing the answers of our respondents. Although the inclusion of two sites (one academic and one university-affiliated) with distinct institutional priorities and deficiencies likely added to the variability of input, generalizability cannot be assumed. Second, our first survey in particular suffered from a low response rate. We invited all residents at both institutions to participate (over the targeted approach of identifying faculty and administration interested in resident wellness). Lack of response from residents was the primary source of our low response rate. This may have resulted in losing the valuable perspective of residents who are experiencing burnout. Alternatively, residents experiencing the phenomena may have been more invested in the topic and thus responded. It is difficult to predict how this nonresponse would have affected our results. However, the majority of input did come from residents. This likely skewed ranking of factors towards the resident perspective. However, given that resident wellness was our primary outcome of interest we thought it reasonable for residents to have heaviest input. Additionally, when comparing responses of residents to the input of faculty and administration there were few differences (only number of surgical consults and type of EMR).

With this framework, we provide a map for studying the institutional contributors to burnout of general surgery residents.

Future work can be directed towards systematically examining these factors. For example, the impact of our top three identified factors – compensation, vacation time, and autonomy – is currently understudied in the literature. We found no studies on the effects of compensation on wellness among surgical residents although the burden of financial debt is well acknowledged³²; some work has been done in other surgical providers.³³ Possible aspects of compensation to consider are absolute salary, salary relative to cost of living, and other stipends provided by the institution (e.g. food, housing, etc.). Similarly, various aspects of vacation time can be studied: absolute time, holiday vacation structure, or options for scheduling flexibility. Finally, the impact of autonomy on burnout has been suggested by improved wellness metrics later in residency – years when autonomy is presumably greatest,³⁴ but aspects of perceived and measured autonomy have yet to be studied. Substantiating the effect of these factors provides a basis for motivating institutional change. While our study was targeted at the surgery resident population, similar studies could be performed to understand influencing factors of practicing physicians in other specialties. Also of interest would be understanding the stratification of factors by genders, race, or other characteristics to help bring clarity to interventions that may be most beneficial for specific populations.

5. Conclusions

In conclusion, our study creates a framework for studying surgery resident wellness that was previously lacking in the literature. Commonly identified factors could be the first areas of future investigation into wellness and burnout at the institutional level.

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Declaration of competing interest

The authors of no conflicts of interest to disclose.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amjsurg.2021.07.014>.

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