

AAIM Perspectives

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Time Allocation and Well-Being in Internal Medicine Residents: A Multi-Institutional Cross-Sectional Survey



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INTRODUCTION

Due to work hour limitations set forth in the Accreditation Council for Graduate Medical Education Common Program Requirements, residency programs invest considerable resources examining and managing the time residents spend at work.¹ Many proponents of the system assume that by reducing time spent on clinical work, residents may spend more time engaged in activities that mitigate fatigue, stress, and burnout and enhance education. However, reviews of well-being and education following duty hour reforms are inconclusive.²⁻⁴ Prior authors have challenged educators to shift emphasis from counting work hours to considering time engaged in other activities, such as those that are restorative or fulfill personal needs.⁵

Existing studies support a relationship between personal activities (and perceived time for them) with well-being, satisfaction, stress, burnout, and depression

in residents.^{6,7} Resident allocation of time away from work requires a trade-off between many worthy activities, such as those which maintain self-identity and those that combat fatigue.⁸ Time availability also arises as a common thread in reported barriers to self-directed learning, including competing clinical responsibilities, erratic schedules, and poor work-life balance.⁹⁻¹¹ Assessment of time allocation across all types of activities, especially outside of work, would enhance understanding of factors influencing resident well-being and provide evidence to inform interventions.

We sought to assess the distribution of time residents report spending engaged in various activities, including work, self-directed learning, and personal life activities. This was a multi-institutional, cross-sectional survey examining how internal medicine residents distribute their time in and out of the hospital. We examine how this distribution changed with more time-intensive rotations and searched for associations between the time spent on various activities with burnout, quality of life, and satisfaction with work-life balance.

METHODS

Study Design, Setting, and Participants

We conducted a cross-sectional survey of residents at 4 university-affiliated internal medicine residency programs in the United States. Programs distributed surveys

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electronically via email to all internal medicine residents in Spring 2017. Responses were anonymous and voluntary.

Respondents did not receive compensation. We obtained program demographics from a public database.¹² Institutional review boards from all participating institutions declared the study exempt.

Survey Composition

Our study team (leadership from programs and individuals experienced in survey design and medical education research) performed a literature review to inform survey development, piloted the survey with chief medical residents, and made modifications based on feedback. Surveys asked respondents to estimate during the most recent week (on both an inpatient service and during a non-inpatient service) the hours spent in clinical work, non-clinical work (eg, research or other projects, administrative tasks), commuting, errands and basic needs, sleeping, exercising, time with family, time with friends, personal entertainment and hobbies, or other activities. The survey defined inpatient rotations as “wards, intensive care unit, etc” and non-inpatient rotations as “consults, electives, ambulatory, etc.” The survey categorized response options as 0, 1-2, 3-5, 6-10, 11-20, 21-30, 31-40, 41-60, 61-80, and >80 hours per week. Surveys asked respondents to estimate total hours spent in self-directed learning during a typical week (on both an inpatient and during a non-inpatient rotations), similar to a previous study conducted by Kelleher et al. (other data, 2019). Respondents reported hours in self-directed learning as a free response, categorical variables.

Surveys assessed burnout using two validated single items asking participants to report on a 7-point Likert scale (1 = daily, 7 = never) how often they felt burned out from work or callous toward people.¹³⁻¹⁵ The surveys measured quality of life using a single-item linear analogue self-assessment and satisfaction with work-life balance using a single-item assessment, both of which are used in resident medical education and quality of life research.¹⁶⁻¹⁹

Data Analysis

For analyses of time spent engaged in the activities, we eliminated respondent data when the sum of all lower bounds of the chosen intervals exceeded 168 hours (the number of hours in 1 week) and when the upper bound was less than 80 hours (less than one-half of all hours

in 1 week); if reporting time spent more than one category removed from all other respondents; or when realistically implausible. We examined differences in time spent in the activities between inpatient and outpatient rotations with the Wilcoxon signed-rank test.

Quality of life responses were dichotomized as bad (if responses included “Somewhat bad” and “As bad as it can be,”) or other, and work-life balance responses as dissatisfied (if responses included “somewhat dissatisfied” or “very dissatisfied”) or not. The level of burnout was considered to be “high” if responses included “Once a week” or more frequently to either or both questions. Logistic regression models were performed to assess the association between quartiles of time in daily activities and quality of life, work life satisfaction, and burnout, with models adjusting for clustering within program. Analysis of the data was con-

ducted with Stata 13 (College Station, Tex).

RESULTS

Participants

The total response rate was 74% (283 out of 384 residents), with 263 (68%) responses providing some usable data and 202 (53%) remaining after removing outliers in daily activities. Combined program demographics were as follows: 89% United States medical doctors, 28.7% international medical graduates, 44.8% female, average Step 1 of the United States Medical Licensing Examination score greater than 221, and 3-year rolling average American Board of Internal Medicine pass rate of 95%.

Quality of Life and Prevalence of Burnout

Across respondents, 31 of 259 (12%) reported a bad quality of life, 72 of 258 (28%) reported dissatisfaction with work-life balance, and 109 of 261 (42%) reported high burnout.

Reported Time in Activities

The [Figure](#) shows the distribution of reported hours engaged in activities per week during inpatient and non-inpatient rotations. Residents reported more time engaged in clinical work and less time in non-clinical work, exercising, and spending time with friends and family on inpatient rotations. Comparing inpatient and non-inpatient rotations, we found no statistically

PERSPECTIVES VIEWPOINTS

- Duty hour limitations have an unclear association with well-being.
- This study found that reported time spent in specific personal activities was associated with well-being measures.
- The findings suggest that it may be the actual activities in which one engages and not the total hours in or out of work that is related to well-being.
- Educators should place more emphasis on time allocation across all types of activities to understand and foster well-being.

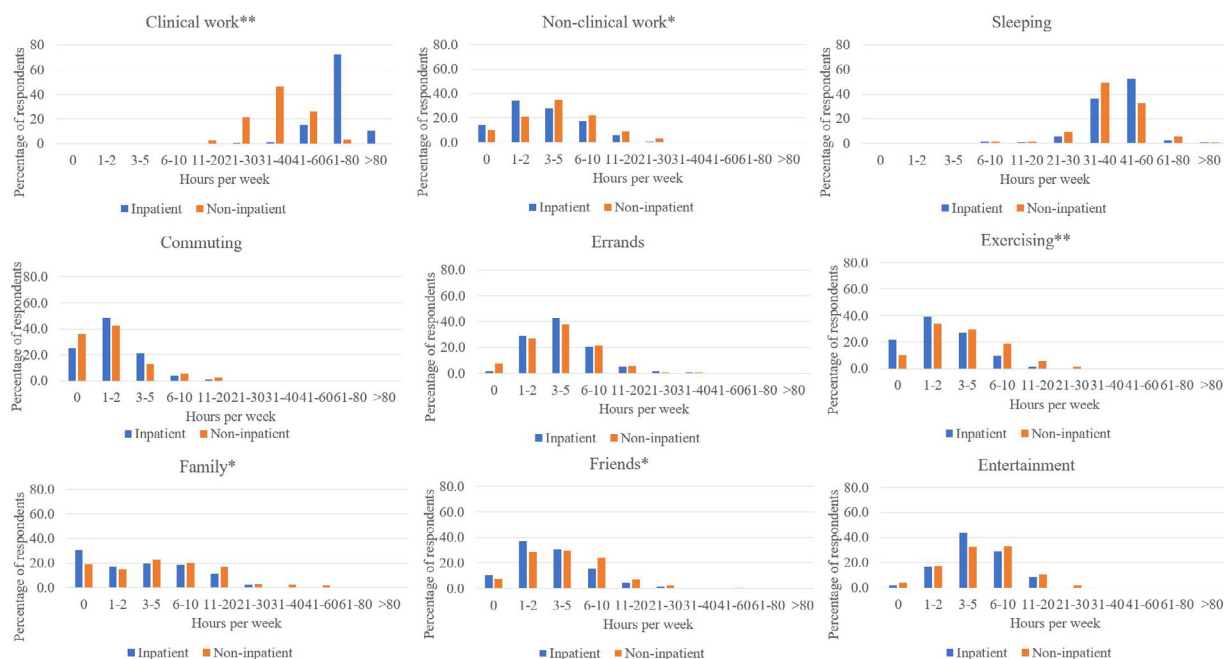


Figure Distribution of activities of inpatient and non-inpatient services. Blue indicates inpatient rotations, and green indicates non-inpatient rotations. Asterisks reflect significant differences between inpatient and non-inpatient rotations. * $P < .05$. ** $P < .01$.

significant differences in reported time spent running errands, commuting, engaging in personal entertainment, and sleeping.

Residents reported spending a median of 11 hours per week (interquartile range 8-17) engaged in self-directed learning during non-inpatient rotations and 7 hours per week (interquartile range 4-10) during inpatient rotations.

Time Allocation, Quality of Life, and Burnout

The Table shows the associations between the reported time spent on various activities and well-being measures (burnout, quality of life, and satisfaction with work-life balance). There was no association between clinical or non-clinical work with well-being measures. The strongest relationships were observed in time exercising and time with family. As residents reported more time exercising, they less frequently reported “bad” quality of life ($P < .001$), dissatisfaction with work-life balance ($P < .05$), and high burnout ($P < .001$). Similarly, residents reporting more time with family less frequently reported dissatisfaction with work-life balance ($P < .001$) and high burnout ($P < .001$). Other activities with significant associations with better well-being included time with friends, personal entertainment, and sleeping.

DISCUSSION

In this multi-institutional cross-sectional survey of internal medicine residents, we attempted to quantify

how residents spend their time on various activities and to explore the relationship between these activities and well-being. These data shed light on how residents spend their time and may inform future research and ongoing policy debates attempting to balance patient safety, physician wellness, and adequate training time.

Key Results

We observed no association between reported time in clinical or non-clinical work and well-being. Reported time spent engaged in exercise had the strongest association with well-being, consistent with existing studies on medical students and residents.²⁰⁻²² Reported time spent with family and friends was also associated with improved well-being. This finding emphasizes the previously reported positive impact of social support on well-being and the risk of social isolation with more time at work, particularly when not spent in direct patient care.²³⁻²⁵ On less intense rotations, residents reported increased participation in activities that are possibly protective of well-being, such as exercise and time with family, more frequently. Additionally, residents reported less time engaged in self-directed learning on more intense rotations, suggesting a positive impact of work hour limitations on education and differing from some existing studies.³

Despite knowledge that increased sleep correlates with improved well-being, participants in this sample did not report sleeping more on less intense rotations.^{25,26} This result supports earlier findings that changes to work hours and workload may not have the intended effect of

Table Associations Between Reported Time Spent Engaged in Various Activities and Well-Being

Average Hours per Week	Bad Quality of Life		Dissatisfied		High Burnout	
	Percent	<i>P</i>	Percent	<i>P</i>	Percent	<i>P</i>
All respondents*	11%		26%		40%	
Clinical work						
≤48	10%	.105	24%	.158	32%	.195
48 to 55	10%		25%		44%	
55 to 65	11%		26%		38%	
>65	25%		38%		56%	
Non-clinical work						
<2	13%	.578	32%	.750	45%	.752
2 to 4	7%		20%		33%	
4 to 6	13%		23%		50%	
>6	14%		29%		37%	
Commuting to and from work						
<1	7%	.169	22%	.207	37%	.718
1 to 3	17%		31%		45%	
>3	15%		30%		37%	
Errands and basic needs						
<3	14%	.232	26%	.381	46%	.215
3 to 4	10%		29%		46%	
4 to 6	9%		30%		38%	
>6	9%		16%		19%	
Sleeping						
<36	15%	.344	33%	.455	43%	.043
36 to 45	9%		21%		42%	
45 to 52	8%		16%		31%	
>52	14%		43%		36%	
Exercising, sports, or other physical activity						
<2	20%	<.001	39%	.028	51%	<.001
2 to 4	9%		23%		39%	
4 to 6	6%		17%		31%	
>6	0%		10%		28%	
Time with family						
<1	16%	.281	35%	<.001	52%	<.001
1 to 4	10%		26%		37%	
4 to 9	8%		24%		41%	
>9	8%		15%		27%	
Time with friends						
<2	24%	.006	38%	.001	54%	.007
2 to 4	11%		26%		36%	
4 to 6	5%		26%		40%	
>6	0%		8%		26%	
Personal entertainment						
<4	16%	.002	27%	.255	47%	.001
4 to 6	10%		27%		42%	
6 to 8	9%		22%		39%	
>8	6%		23%		22%	

*Respondents after removing outliers of time engaged in daily activities.

enhancing rest, but rather result in residents engaging in activities deemed more important in the short term for well-being.²⁻⁴

We found similar rates of high burnout in our population (42%) to those found in a 2017 survey of employed US physicians (40%).²⁷ In addition, responses reported for time spent engaged in activities that are necessary regardless of clinical duties, such as commuting and running errands, support the credibility of our findings.

Limitations

This cross-sectional survey is limited to associations. Measures are self-reported and subject to recall and social

desirability biases. In addition, we asked residents to report time in intervals (to decrease cognitive load), limiting precise estimates. To preserve confidentiality of sensitive data, we did not compare results across individual programs. Both prospective and longitudinal studies with more frequent assessment are warranted.

CONCLUSIONS

We found that reported time spent by internal medicine residents engaged in specific personal activities was associated with well-being measures. Our findings suggest that it may be the actual activities in which one engages and not the total hours in or out of work that is related to well-being. Future studies

should focus on the facilitation of activities that foster social connection and meaning either in or out of work.

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References

1. Accreditation Council for Graduate Medical Education. Common program requirements. Available at: <https://www.acgme.org/What-We-Do/Accreditation/Common-Program-Requirements>. Accessed February 20, 2019.
2. Fletcher KE, Underwood W 3rd, Davis SQ, Mangrulkar RS, McMahon LF Jr, Saint S. Effects of work hour reduction on residents' lives: a systematic review. *JAMA* 2005;294(9):1088–100.
3. Bolster L, Rourke L. The effect of restricting residents' duty hours on patient safety, resident well-being, and resident education: an updated systematic review. *J Grad Med Educ* 2015;7(3):349–63.
4. Desai SV, Feldman L, Brown L, et al. Effect of the 2011 vs 2003 duty hour regulation-compliant models on sleep duration, trainee education, and continuity of patient care among internal medicine house staff: a randomized trial. *JAMA Intern Med* 2013;173(8):649–55.
5. Boex JR, Leahy PJ. Understanding residents' work: moving beyond counting hours to assessing educational value. *Acad Med* 2003;78(9):939–44.
6. Lebensohn P, Dodds S, Benn R, et al. Resident wellness behaviors: relationship to stress, depression, and burnout. *Fam Med* 2013;45(8):541–9.
7. Cedfeldt AS, Bower EA, English C, Grady-Weliky TA, Girard DE, Choi D. Personal time off and residents' career satisfaction, attitudes and emotions. *Med Educ* 2010;44(10):977–84.
8. Taylor TS, Nisker J, Teunissen PW, Dornan T, Lingard L. Recovery of sleep or recovery of self? A grounded theory study of residents' decision making regarding how to spend their non-clinical postcall time. *Acad Med* 2016;91(3):395–400.
9. Li ST, Tancredi DJ, Co JPT, West DC. Factors associated with successful self-directed learning using individualized learning plans during pediatric residency. *Acad Pediatr* 2010;10(2):124–30.
10. Nothnagle M, Anandarajah G, Goldman RE, Reis S. Struggling to be self-directed: residents' paradoxical beliefs about learning. *Acad Med* 2011;86(12):1539–44.
11. Baldwin DC Jr, Daugherty SR. How residents say they learn: a national, multi-specialty survey of first- and second-year residents. *J Grad Med Educ* 2016;8(4):631–9.
12. American Medical Association. FREIDA. Available at: <https://www.ama-assn.org/residents-students/match/freida>. Accessed April 1, 2018.
13. Schaufeli WB, Leiter MP, Maslach C, Jackson SE. *The Maslach Burnout Inventory-Test Manual*. 3rd ed. Palo Alto, CA: Consulting Psychologists Press; 1996.
14. West CP, Dyrbye LN, Satele DV, Sloan JA, Shanafelt TD. Concurrent validity of single-item measures of emotional exhaustion and depersonalization in burnout assessment. *J Gen Intern Med* 2012;27(11):1445–52.
15. West CP, Dyrbye LN, Sloan JA, Shanafelt TD. Single item measures of emotional exhaustion and depersonalization are useful for assessing burnout in medical professionals. *J Gen Intern Med* 2009;24(12):1318–21.
16. West CP, Tan AD, Habermann TM, Sloan JA, Shanafelt TD. Association of resident fatigue and distress with perceived medical errors. *JAMA* 2009;302(12):1294–300.
17. Schipper H, Clinch J, McMurray A, Levitt M. Measuring the quality of life of cancer patients: the Functional Living Index-Cancer: development and validation. *J Clin Oncol* 1984;2(5):472–83.
18. Rummans TA, Clark MM, Sloan JA, et al. Impacting quality of life for patients with advanced cancer with a structured multidisciplinary intervention: a randomized controlled trial. *J Clin Oncol* 2006;24(4):635–42.
19. Gudex C, Dolan P, Kind P, Williams A. Health state valuations from the general public using the Visual Analogue Scale. *Qual Life Res*. 1996;5(6):521–31.
20. Ishak WW, Lederer S, Mandili C, et al. Burnout during residency training: a literature review. *J Grad Med Educ* 2009;1(2):236–42.
21. Dyrbye LN, Satele D, Shanafelt TD. Healthy exercise habits are associated with lower risk of burnout and higher quality of life among U.S. medical students. *Acad Med* 2017;92(7):1006–11.
22. Wolf MR, Rosenstock JB. Inadequate sleep and exercise associated with burnout and depression among medical students. *Acad Psychiatry* 2017;41(2):174–9.
23. Rogers E, Polonijo AN, Carpiano RM. Getting by with a little help from friends and colleagues: testing how residents' social support networks affect loneliness and burnout. *Can Fam Physician* 2016;62(11):e677–83.
24. Wenzel RP. RVU medicine, technology, and physician loneliness. *N Engl J Med* 2019;380(4):305–7.
25. Raj KS. Well-being in residency: a systematic review. *J Grad Med Educ* 2016;8(5):674–84.
26. Bordley J, Agustin AG, Ahmed MA, et al. Restoration of resident sleep and wellness with block scheduling. *Med Educ* 2017;51(12):1241–9.
27. Shanafelt TD, West CP, Sinsky C, et al. Changes in burnout and satisfaction with work-life integration in physicians and the general us working population between 2011 and 2017. *Mayo Clin Proc* 2019;94(9):1681–94.