# Stress and Work Hours During Residency

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**Lay Abstract**

Following medical school, most young doctors enter residencies for further training. Residency can be a difficult and stressful time. Numerous studies have attempted to evaluate the effects of sleep deprivation, frequent night calls, and abusive attending physicians on residents in training. Many of these studies cite long work hours as one of the major causes of stress and depression during residency. This study proposes to evaluate the relationship between number of work hours and level of stress. First-year residents in the Internal Medicine program at CPMC are surveyed daily to count their work hours; this tabulation is part of a departmental effort towards reducing work hours. Participants in this study will be asked to fill out a confidential questionnaire about their level of stress. Study subjects will be surveyed five or six times throughout the academic year.

All sixty-two first year residents will be asked to participate. Study subjects will be eligible for a $100 raffle at the end of the academic year.

There will be no specific procedures, apart from the questionnaire, required for this study. In addition, there are no identifiable practical or ethical problems.

**A. Study Purpose and Rationale**

Occupational stress has been defined as those job characteristics that pose a threat to the individual; strain is the deviation from the normal response that an individual experiences in a given situation.[1] Medical residency is often described as stressful, and few would argue with this assessment. Commonly cited causes of stress in residency include "long work hours, dealing with critical life and death decisions, and frustrations with health care delivery systems."[2] Other factors that may contribute to stress include debt, chronic sleep deprivation, educational demands, patient death, and fatigue.[3]

In May of 2002, Schneider and associates evaluated 44 residents in obstetrics and gynecology using the Occupational Stress Inventory, a validated research instrument to measure occupational stressors across different occupational levels and environments. The investigators of this study found that occupational stress was relatively common, but did not appear related to the year of training or season.[4]

Other studies have found a difference between training years, with the first year identified as the most stressful[5] and with the highest prevalence of depression[6]. Furthermore, a recent study at the University of Pennsylvania noted the emergence of depressive symptoms as the intern year progressed.[7]

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[1] Osipow SH, Spolane AR. Occupational stress inventory, manual research version. Odessa (FL): Psychological Assessment Resources, Inc;1992,1-25.

[2] Schneider KM, Monga M, Kerrigan AM. Stress in residency: Reality or myth? Am J Obstet Gynecol 2002;186:907-9.

[3] Daugherty SR. Learning, satisfaction, and mistreatment during medical internship. JAMA. 1998;186:907-9.

[4] Schneider KM, Monga M, Kerrigan AM. Stress in residency: Reality or myth? Am J Obstet Gynecol 2002;186:907-9.

[5] Alexander D, Monk JS, Jonas AP. Occupational stress, personal strain and coping among residents and faculty members. Med Educ. 1985;60:830-9.

[6] Reuben DB. Depressive symptoms in medical house officers: effect of level of training and work rotation. Arch Intern Med. 1985;145:286-8.

[7] Bellini LM, Baime M, Shea JA. Variation of mood and empathy during internship. JAMA. 2002;287:3143-6.

Investigations of stress among residents have focused largely on questionnaires in which residents self-identify stressors. A 1988 review of empiric studies of the stresses of residency by Butterfield, identifying inadequate sleep and fatigue as major stressors in residency, examined mostly self-report inventories and depression scales.[8] While "work hours" or "time pressures" are frequently listed as potential stressors, no study appears to objectively evaluate the relationship between work hours and stress levels.

This study will attempt to evaluate, in an empiric manner, stress levels among first-year residents at the Internal Medicine training program at Columbia-Presbyterian Hospital. As part of ongoing changes to the program, residents are interviewed daily to assess their work hours during "ward" rotations, i.e. General Medicine, Oncology, Cardiology, and AIDS/TB. This study proposes to evaluate levels of stress among interns, using the Occupational Stress Inventory, at the same time that their work hours are being sampled. The goal is to identify the relationship between work hours and stress levels among first-year residents.

The Oncology rotation is often identified as the most stressful for interns. Several factors may contribute to its difficulty, including the expected mortality of oncology patients and the frequent end-of-life discussions during this rotation. As Oncology is also one of the most time-consuming of the rotations, a particular analysis of this rotation is warranted.

**B. Study Design and Statistical Analysis**

The chief residents will interview all first-year residents on the ward rotations, i.e. General Medicine, Oncology, Cardiology, and AIDS/TB, during the third week of their rotation, to assess the number of work hours. During the same week, each intern will be asked to complete the Occupational Stress Inventory. Twenty interns each month will be evaluated in this way. At the end of one year, each intern will be expected to have 5 to 6 completed questionnaires and work hour surveys.

Linear regression will be performed for each subject, using the two continuous variables: work hours and results of the Occupational Stress Inventory. The results of this linear regression for each subject will then be combined, excluding the results of interns on the Oncology rotation. The slope of this linear regression model can be expected to be between 0 and 1, with a standard deviation of 0.5. The effect size sought is 0.4, a change that would indicate that a subject moved from a low level of stress to an elevated level. Based on these estimates, using the unpaired t test, the estimated number of subjects needed is 13.

An "Oncology Stress Effect" will then be sought, based on the expected level of stress for the number of hours worked during this rotation. Oncology work hours and stress levels will therefore be initially eliminated from the linear regression calculations .

**C. Study Procedure**

Each intern will be asked to complete the Occupational Stress Inventory five to six times over the course of his or her intern year. Participation will be entirely voluntary and no pain or discomfort is anticipated. Further, the Chief Residents interview interns to count their work hours during the third week of each month or rotation. This tabulation is already being conducted as part of an effort to reduce work hours. The entire study will last approximately one year.

**D. Study Drugs**

No drugs will be used during this study.

**E. Medical Device**

[8] Butterfield PS. The stress of residency: a review of the literature. Arch Intern Med. 1998;148:1428-35.

No medical devices will be used during this study.

**F. Study Questionnaires**

The Occupational Stress Inventory is a validated research instrument that measures three domains of occupational adjustment: occupational stress, psychologic strain, and coping resources. Occupational stress is measured by the occupational roles questionnaire, which consists of six scales: role overload, role insufficiency, role ambiguity, role boundary, responsibility, and physical environment. Psychologic strain is measured by the personal strain questionnaire, which consists of four scales: vocational strain, psychologic strain, interpersonal strain, and physical strain. The personal resources questionnaire measures coping resources and consists of four scales: recreation, self-care, social support, and rational/cognitive coping. Ten questions make up each scale and the survey takes approximately 20 to 40 minutes to complete.[2]

**G. Study Subjects**

Study subjects will be first year interns at the Internal Medicine Residency Program at Columbia-Presbyterian Medical Center.

**H. Recruitment of Subjects**

Subjects will be readily identifiable through well-known schedules of rotations. They will be contacted individually to complete the work hours assessments and questionnaires.

**I. Confidentiality of Study Data**

A unique code will be assigned to each intern. This code will identify their work hours data and questionnaires to ensure confidentiality. Data will be stored in a secure location, accessible only to study investigators.

The front page of each questionnaire will request the intern's name. This page will be torn off before scoring of the questionnaires and used to enter the intern in the raffle at the completion of the study.

**J. Potential Conflict of Interest**

There are no identifiable conflicts of interest.

**K. Location of Study**

The study will be conducted at CPMC, although participants may answer questionnaires at their convenience and discretion.

**L. Potential Risks**

There are no identifiable risks to the subjects.

**M. Potential Benefits**

[2] Schneider KM, Monga M, Kerrigan AM. Stress in residency: Reality or myth? Am J Obstet Gynecol 2002;186:907-9.

Interns may find that completing the questionnaire assists them in identifying personal stressors and coping mechanisms.

**N. Alternative Therapies**

There are no therapies involved in this study.

**O. Compensation to Subjects**

Interns completing the questionnaire will be eligible for a $100 raffle at the end of the study. The front page of each questionnaire will request the name of the intern for the drawing. As described, this front page will be torn off before scoring of the questionnaire to ensure confidentiality.

**P. Costs to Subjects**

No costs to the subjects are anticipated.

**Q. Minors as Research Subjects**

No minors will participate in the study.

**R. Radiation or Radioactive Substances**

No radiation or radioactive substances will be used in the study.

**Consent Form**

**Columbia Presbyterian Medical Center**
Consent to Participate in a Research Study

The purpose of this consent form is to provide you with the information you need to consider in deciding whether to participate in this research study.

Study title: Stress and Work Hours in Residency

**Study Purpose**

You are invited to participate in a research study of stress and work hours in residency. The study is designed to evaluate a relationship between work hours and level of stress. You qualify as a possible participant in this study because of your status as PGY-1 in the Department of Internal Medicine Residency Program at Columbia-Presbyterian.

**Study Procedures**

If you decide to participate, you will be asked to fill out a confidential questionnaire, five to six times over the upcoming year, to evaluate your level of stress. Each questionnaire will take between 20 to 40 minutes to complete. The questionnaire will be labeled with a unique number to match your results to your work hours tally. Your name will not be on the questionnaire, and individual results of the questionnaire will not be available to you or anyone else.

**Study Risks**

Apart from the time required to complete the questionnaire there are no identifiable risks to participating in this study.

**Study Benefits**

You may or may not benefit personally from this study. Benefits to you may include a reduction in your own stress or identification of your own, successful, coping mechanisms.

**Costs**

There are no costs to the participant, apart from the time required to complete the questionnaire.

**Compensation**

For your participation in this study you will be eligible for a $100 raffle at the end of the academic year.

**Confidentiality**

Any information obtained during this study and identified with you will remain confidential. Your questionnaire will be labeled with a unique number to ensure confidentiality, and the results of your individual study will not be available to you or anyone else, including the program director or chief residents. Survey results will be stored in a secure location.

**Participation is Voluntary**

Your participation in this study is completely voluntary. You can refuse to participate, or withdraw from the study at any time, and such a decision will not affect your residency at Columbia-Presbyterian Medical Center, now or in the future. Signing this form does not waive any of your legal rights. Should you decide to withdraw from the study there will be no adverse consequences.

**Questions**

If you have any questions, please ask, and we will do our best to answer them. If you have additional questions in the future, you can reach Dr. Smith at (212) 501-9604.

If you have any questions on your rights as a research subject, you can call the Institutional Review Board at (212) 305-5883 for any information.

**Statement of Consent**

I have discussed this study with Dr. Emily Smith to my satisfaction. I understand that my participation is voluntary and that I can withdraw from the study at any time without prejudice. I have read the above and agree to enter this research study. Signing this form does not waive any legal rights.

I have been informed that if I believe I have sustained injury as a result of participating in a research study I may contact the Principle Investigator, Dr. Emily Smith, at (212) 501-9604, or the Institutional Review Board at (212) 305-5883, so that I can review the matter and identify the medical resources which may be available to me.

I understand that:

(a) The Presbyterian Hospital will furnish that emergency medical care determined to be necessary by the medical staff of this hospital;
(b) I will be responsible for the cost of such care, either personally or through medical insurance or other form of medical coverage;
(c) No monetary compensation for wages lost as a result of injury will be paid to me by the Columbia-Presbyterian Medical Center, and;
(d) I will receive a copy of this consent form.

Signatures:

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Participant Date

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Investigator Eliciting Consent Date