

# An Observational Study of Hospital Paging Practices and Workflow Interruption Among On-call Junior Neurosurgery Residents

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## Introduction

Previous studies have suggested that non-urgent pages comprise a substantial portion of the pages received by resident physicians while on duty. Evaluating nurse-physician communication paging practices may be an important step in developing solutions that may enhance patient care and reduce unnecessary distractions that could lead to medical errors during busy call nights.

## Methods

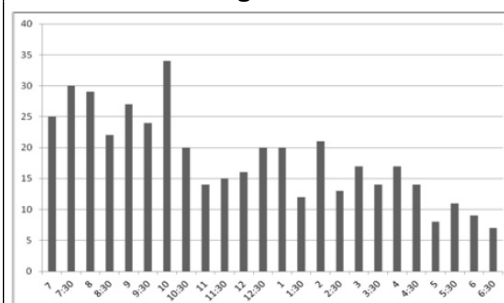
For eight 12-hour call sessions, a medical student shadowed the on-call junior neurosurgery resident at our institution and recorded all pages received as well as the time, paging number and location, priority of the page (non-urgent, urgent, or emergent), and the activity that was being performed when the page was received. Examples of priorities and activities are shown in Table 1.

**Table 1**

Factor	Examples
<b>Paging Priority</b>	
Non-urgent	Patient calls from home, low-priority medication changes, family asking to speak to physician, patient insomnia
Urgent	Most new consults, ventriculostomy malfunctioning, seizure
Emergency	Cardiac arrest, acute neurologic exam changes, acutely elevated intracranial pressure, new operative consults
<b>Resident Activity</b>	
Evaluating new patient	Seeing new Emergency Room or inpatient consultation, hospital-to-hospital transfers
Patient care activity	Rounding, speaking with patient families, assessing minor patient issues, assessing patients after falls, neurologic exam changes, or with elevated intracranial pressure, or while en-route to see such patients
Procedure	Performing lumbar puncture, ventriculostomy, shunt tap
Sleep or meal	Only with sleeping or sit-down meals
Other low urgency	Resident not actively engaged in patient care activities

Examples of page priorities and activities.

**Figure 1**



Total number of pages (Y-axis) per half-hour (X-axis) from 7pm to 7 am.

## Results

Over the eight 12-hour shifts, 439 communications were recorded (range 33-75, mean 54.9; Figure 1 and Tables 2 and 3). Communications occurred at a rate of 4.6 per hour (every 13 minutes), and ranged from as low as 1.75 per hour from 5-6 am (every 34 minutes) to as high as 6.9 per hour from 7-8pm (every 8.7 minutes). Paging remained frequent even during the hours when on-call residents are most likely to sleep (2 am to 5 am), with an average of 4 communications per hour (every 15 minutes). The time to return pages ranged from 15 to 174 seconds (mean 79.7 seconds). Most pages were non-urgent (68.3%) and occurred during patient care activities (65%). Residents spent a calculated 1.1 hours on the phone returning pages during each 12 hour shift.

**Table 2**

Location of Origin	Total		Priority					
	N	%	Emergency		Urgent		Non-Urgent	
ICU	193	44.4	13	6.7	42	21.8	138	71.5
Ward	106	24.4	3	2.8	13	12.3	90	84.9
ER	46	10.6	8	17.4	33	71.7	5	10.9
PACU	10	2.3	0	0.0	0	0.0	10	100.0
Pharmacy	7	1.6	0	0.0	2	28.6	5	71.4
Patient calls from home	6	1.4	0	0.0	0	0.0	6	100.0
Other	67	15.4	1	1.5	23	34.3	43	64.2
<b>All Locations</b>	<b>435</b>	<b>100.0</b>	<b>25</b>	<b>5.8</b>	<b>113</b>	<b>26.0</b>	<b>297</b>	<b>68.3</b>

Legend: ICU, intensive care unit; ER, emergency room; PACU, post-anesthesia care unit.

Page priorities and location of origin.

**Table 3**

Activity	Total		Priority					
	N	%	Emergency		Urgent		Non-Urgent	
Evaluation of new patient	86	19.8	5	5.8	27	31.4	54	62.8
Patient care activity	284	65.4	12	4.2	66	23.2	206	72.5
Procedure	28	6.5	5	17.9	9	32.1	14	50.0
Sleep or meal	7	1.6	3	42.9	1	14.3	3	42.9
Other low urgency	29	6.7	0	0.0	11	37.9	18	62.1
<b>All Activities</b>	<b>434</b>	<b>100.0</b>	<b>25</b>	<b>5.8</b>	<b>114</b>	<b>26.3</b>	<b>295</b>	<b>68.0</b>

Activities performed during pages.

## Conclusions

The majority of pages were non-urgent and most were received during important patient care activities. Pages remained frequent (every 15 minutes) during the period of time when residents are most likely to sleep. Improvements in paging practices, particularly during early morning hours when residents are most likely to be fatigued and distracted, may be a means of reducing resident medical errors from distraction during patient care activities.

## Learning Objectives

By the conclusion of this session, participants should be able to: 1) Identify relevant issues regarding nurse-physician communication at large teaching hospitals, 2) Describe the number and priority of pages received at our institution by on-call residents and their effect on patient care activities; 3) Identify potential solutions for optimizing nurse-resident physician communication.

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