**Frequency and Clinical Importance of Pages Sent to the Wrong Physician**

Effective communication between health care providers is essential to patient safety and quality of care.\(^1\)\(^-\)\(^6\) A retrospective study of 14,000 admissions found that communication failures were the most common cause of preventable disability or death and were nearly twice as common as those due to inadequate medical skill.\(^6\) A major type of communication failure is sending a page to the wrong physician. Prior studies have described paging problems such as paging the wrong physician, unanswered pages, and delayed responses but do not quantify the extent of the problem.\(^3\) Our primary aim was to quantify the frequency of pages sent to the wrong physician in 2 academic teaching hospitals and to examine the potential clinical importance of these errors.

**Methods.** Sunnybrook Health Sciences Centre (SHSC) and the Toronto General Hospital (TGH) are tertiary care academic teaching hospitals affiliated with the University of Toronto, Toronto, Ontario, Canada. There are 4 dedicated general internal medicine wards with more than 3000 total admissions at each site per year. Physicians and nurses can send numeric or text (SHSC only) pages at our hospitals and rely on paper monthly call schedules to determine which physician to page.

We reviewed all available paging records from our communications department for all residents (28 of 38 [74%]) rotating through each study site in January and February 2008. Our primary outcome measure was the percentage of pages that were sent to the wrong physician, defined as any page that was sent to a resident during a scheduled absence when the resident was known to be off duty and out of the hospital (postcall afternoon, academic half days, off-duty evenings and weekends, and vacations). Three investigators independently judged potential clinical importance by classifying text pages as an emergency if its content warranted immediate attention, urgent if its content warranted attention within the hour, and nonurgent if its content did not require a response within 1 hour.

We reported descriptive data as counts and percentages, with 95% confidence intervals (CIs), for categorical data, or mean and standard deviation for continuous data. A weighted \(\kappa\) analysis was carried out to assess rater agreement when judging critical pages. The research ethics boards at both institutions approved this study.

**Results.** During the 2-month study period, 1409 of 10,190 pages were sent to the wrong physician (14%; 95% CI, 13%-15%). These were typically sent during the postcall period (36%; 95% CI, 33%-39%), during evenings (22%; 95% CI, 19%-25%), and during scheduled academic half days (21%; 95% CI, 18%-24%). A review of the text pages sent to the wrong physician (213 of 1409 [15%]) revealed that 15% (95% CI, 10%-20%) of these pages were emergency pages that warranted immediate attention and 32% (95% CI, 25%-39%) were urgent pages that warranted a response within the hour (\(\kappa=0.70-0.73\)) (Table).

**Comment.** We found that 14% of all pages were sent to the wrong physician when he or she was not on duty and out of the hospital and that 47% of these were an emergency or urgent. This extrapolates to over 4300 pages per year at each hospital, including approximately 2000 pages requiring an emergency or urgent response. These incorrect pages create delays and inefficiencies in care that disrupt workflow and represent potential threats to patient safety. Our results were consistent across 2 teaching hospitals with different call schedule and paging systems. Limitations of our study include that our retrospective method for classifying pages was not designed to detect pages sent to the wrong physician during regular hours and may have misclassified pages. We were also unable to determine how the sender of the pages resolved the paging error, so it is difficult to say what impact these errors had on patient care.

### Table. Clinical Importance of Pages Sent to the Wrong Physician

<table>
<thead>
<tr>
<th>Level of Urgency</th>
<th>Frequency, % (95% CI)</th>
<th>Example</th>
<th>Type of Absence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency (warrants immediate response)</td>
<td>15 (10-20)</td>
<td>(1) Patient A: desaturation, (\text{SaO}_2) 60%-81%</td>
<td>(1) Vacation (8:42 AM, fifth day of vacation)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2) Patient B: potassium 6.2 mEq/L</td>
<td>(2) Academic half day (10:07 AM, 3 h before return to hospital)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3) Patient C: blood glucose, 448 mg/dL. Please call back.</td>
<td>(3) Weekend (11:39 AM, Saturday)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4) Call radiology—alert perforation</td>
<td>(4) Postcall (15:52 PM, 3.5 h into postcall period)</td>
</tr>
<tr>
<td>Urgent (warrants response within 1 h)</td>
<td>32 (25-39)</td>
<td>(1) Patient D: BP 96/59 mm Hg. Please reassess furosemide. Thanks.</td>
<td>(1) Academic half-day (9:32 AM, 5 h after shift change)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2) Patient E: INR 3.91</td>
<td>(2) Evening (21:34 PM, 4.5 h after shift change)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3) Patient F has abdominal pain.</td>
<td>(3) Postcall (15:46 PM, 4 h into postcall period)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4) Patient G: please reassess IV orders</td>
<td>(4) Vacation (15:28 PM, third day of vacation)</td>
</tr>
<tr>
<td>Nonurgent (does not warrant a response)</td>
<td>53 (46-60)</td>
<td>Patient H: bed offer (for long-term care) for Monday. Sent from social worker</td>
<td>Academic half day (15:01 PM, 3 h after start of academic half-day)</td>
</tr>
</tbody>
</table>

Abbreviations: BP, blood pressure; CI, confidence interval; INR, international normalized ratio; IV, intravenous; \(\text{SaO}_2\), arterial oxygen saturation.

SI conversion factors: To convert potassium to millimoles per liter, multiply by 1; to convert glucose to millimoles per liter, multiply by 0.0555.
Despite this, we believe that the frequency of pages sent to the wrong physician is too high and are taking steps to reduce the potential for these errors.

Brian M. Wong, MD  
Sherman Quan, BSc  
C. Mark Cheung, MD  
Dante Morra, MD, MBA  
Peter G. Rossos, MD, MBA  
Khalli Sivjee, MD  
Robert Wu, MD, MSc  
Edward E. Etchells, MD, MSc

Correspondence: Dr Wong, Sunnybrook Health Sciences Centre, 2075 Bayview Ave, Room D474, Toronto, ON M4N 3M5, Canada (BrianM.Wong@Sunnybrook.ca).

Author Contributions: All authors have made a substantial, direct, intellectual contribution to this study. All authors had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: Wong, Quan, Morra, Rossos, Wu, and Etchells. Acquisition of data: Wong and Quan. Analysis and interpretation of data: Wong, Quan, Cheung, Sivjee, Wu, and Etchells. Drafting of the manuscript: Wong and Etchells. Critical revision of the manuscript for important intellectual content: Quan, Cheung, Morra, Rossos, Sivjee, Wu, and Etchells. Administrative, technical, and material support: Wong, Quan, Cheung, Morra, Rossos, and Etchells. Study supervision: Morra and Etchells.

Financial Disclosure: None reported.

Funding/Support: This study was funded by the Chair of Medicine/Academic Hospitals Quality and Safety Partners Intramural Grant (Department of Medicine, University of Toronto, Toronto, Ontario, Canada).

Role of the Sponsors: The funding program had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; or preparation, review, or approval of the research letter.

Additional Contributions: Donald Redelmeier, MD, MSc, provided helpful comments on earlier drafts of this research letter and Alex Kiss, PhD, provided assistance with statistical analysis.


Rituximab and Thyroid Function

Report of a Case. In August 2006, a 39-year-old woman with rheumatoid arthritis (RA) was seen at the outpatient clinic for exacerbation of RA. In the previous few months, she had progressively swollen and painful joints, notably her wrists, knees, and feet. A review of her medi-