**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. 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. 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. 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 days, longitudinal clinic, 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 κ 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 (κ=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) (n=213)</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, SaO2 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 (15:22 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; SaO2, 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.

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Rituximab and Thyroid Function

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 medical history revealed that in addition to an erosive, rheumatoid factor anticitrullinated protein antibody–positive RA since 1995 she had autoimmune hypothyroidism and diabetes mellitus type 1 since 1986. For these conditions she used long-acting (24 U/d) and short-acting (50 U/d) insulin and L-thyroxine (262.5 µg/d). Findings from physical examination were unremarkable except for polyarthropathy (shoulders, elbows, wrists, knees, ankles, hands, and feet). Her RA disease activity score of 28 joints (DAS28) was 8.3 (low disease status, DAS28 < 3.2). Type 1 diabetes mellitus and hypothyroidism were in a well-controlled condition (hemoglobin A1c level of 6.8% [reference range, 4.0%-6.0%] [to convert to proportion, multiply by 0.01], thyrotropin (TSH) level of 1.18 mU/L [reference range, 0.35-4.70 mU/L], and free thyroxine [FT4] level of 20 pmol/L [to convert to nanograms per deciliter, divide by 12.871] [reference range, 10.23 pmol/L]). Because this patient was refractory to tumor necrosis factor–blocking agents (etanercept and infliximab) and disease-modifying antirheumatic drugs (sulfasalazine and methotrexate), B-lymphocyte depletion therapy (rituximab) was started in a 2-week cycle of 1000 mg intravenously, with the addition of 100 mg of methylprednisolone to prevent infusion-related adverse events.

Results. After 3 months of rituximab treatment, this patient was seen at the outpatient clinic of internal medicine for hypothyroidism and diabetes. At that time there were no complaints of palpitations or weight loss. Remarkably, blood test results showed decreased TSH levels (0.24 mU/L), with a FT4 level in the high-normal range. After 5 months of treatment there was only a slight improvement of her active RA status, but blood test results revealed clinical hyperthyroidism (TSH, 0.10 mU/L; FT4, 25 pmol/L, and total triiodothyronine [T3], 3.1 nmol/L [to convert to nanograms per liter, divide by 0.0154] [reference range, 1.2-2.8 nmol/L]) (Figure, A). Both T3 and FT4 levels were elevated, indicating that the conversion of thyroxine to T3 was proceeding accurately. Differential diagnostic considerations explaining the development of hyperthyroidism can be divided into