Will this emergency department patient be referred to internal medicine?

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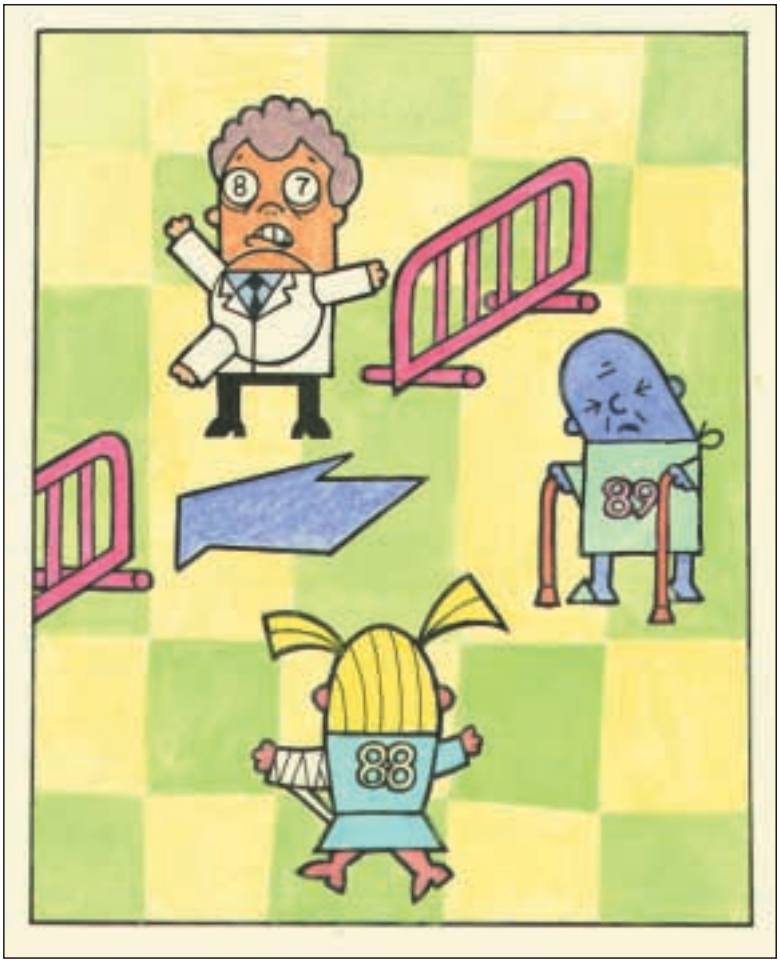
Internal medicine residency training in Canada is a 4-year program often involving long nights on call in hospital. Typically, the residents on call will be asked by emergency physicians to consult on patients to determine whether they should be admitted to the internal medicine service.

Unfortunately, this system often results in a substantial number of consultation requests, a large workload for the internal medicine team and little free time for the residents. Under the constant threat of consultations, residents are often unable to decide how best to organize their time on call. For example, deciding when to eat, read and perhaps even sleep can be very challenging. The ability to anticipate the next potential referral would be of great value. However, our search of the literature yielded nothing in the way of published data, nor could we find strict criteria or guidelines to help residents in this area.

We decided to conduct a prospective study in our emergency department to determine whether any patient characteristics would be useful predictors for referral to the internal medicine service.



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Methods

All consecutive patients who presented to the emergency department at our hospital over 5 days were automatically enrolled in the study. No approval was sought from the hospital's ethics review board as there was insufficient funding to convince its members of the study's merits. Before patients had a chance to be seen by an emergency physician (approximate waiting time 3 hours and 20 minutes), we reviewed their charts for characteristics that we thought might influence the emergency physician's decision to request a referral to internal medicine. Patients were followed closely (3 paces behind) to see if they would be referred.

We calculated likelihood ratios (LRs) for the characteristics identified from the patients' charts; the higher the LR, the greater the odds of referral to internal medicine. The LRs were ascertained by estimation; all other statistics were calculated by fixing the data to meet our preset objectives.

Although this was not a double-blind study, we had decreased vision from lack of sleep. Similarly, although this study was not randomized, we undertook numerous random trips for coffee.

Results

In total, 274 patients presented to the emergency department during the 5-day study period. Of these, 82 were

**The complete list of REFER members is unavailable because the other investigators had no energy left to submit their names for publication.*

Table 1: Likelihood of patient characteristics influencing emergency physicians' decisions to refer patients to the internal medicine service

Characteristic	Likelihood ratio
Old chart > 5 cm thick	1299.6
Age > 90 yr	567.5
Brought into emergency department on stretcher and wearing oxygen mask	75.7
Brought to emergency department from nursing home	34.9
Initially referred to general surgery	34.4
Relevant bloodwork not yet drawn	22.9
Recently discharged from hospital	15.8
Arrival to emergency department after midnight	12.3
Accompanied by > 3 family members	10.0
English speaking	0.01
Ambulatory	0.006
Had chest x-ray done properly	0.00002

excluded: some patients left before they had a chance to be referred to internal medicine, others were referred to psychiatry instead and we elected not to follow them there, and others, as far as we know, are still waiting to be seen. Of the remaining 192 patients, 132 were eventually referred to internal medicine; 8 of those patients were admitted to hospital.

Several characteristics were found to be predictors of referral to internal medicine (Table 1). The strongest predictor was the thickness of the patient's old chart; the weakest was having a properly done chest x-ray. The combination of age greater than 90 years, having been brought to the emergency department from a nursing home and arriving at the emergency department after midnight was associated with an LR equivalent to infinity; thus, the presence of this triad can effectively guarantee a referral to the internal medicine service.

Interpretation

We have identified several characteristics of patients who are likely to be referred from the emergency department to internal medicine. For example, an internal medicine resident can quickly glance at the thickness of a patient's old chart, note his or her age, the time of arrival in the emergency department and the patient's place of residence and decide what best to do with their time.

The main limitation of our study is that we falsified the data. Also, there may be other patient characteristics predictive of a referral (e.g., taking more than 8 different medications or being profoundly deaf) that have not yet been described. Ultimately, controlled, randomized, double-blind studies should be done to confirm our results. In the interim, we hope that internal medicine residents on call across Canada will benefit from our findings, if they can find the time between consultations to read them.

Drs. Silverman and Kohn are with the Department of Medicine, University of Toronto, Toronto, Ont.

Contributors: Both authors contributed equally to the conception of the study, the falsification and analysis of the data, and the writing of this paper.

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Competing interests: Neither of the authors owns stocks in a coffee company. Both authors would someday like to receive consultations from emergency physicians.

References

Available upon request.

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