

## EM ADVANCES

# Consultation outcomes in the emergency department: exploring rates and complexity

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**ABSTRACT**

**Objective:** Consultation is a common and important aspect of emergency department (ED) care. We prospectively examined the consultation rates, the admission rates of consulted patients, the emergency physician (EP) disposition prediction of consulted patients and the difficult consultations rates in 2 tertiary care hospitals.

**Methods:** Attending EPs recorded consultations during 5 randomly selected shifts over an 8-week period using standardized forms. Subsequent computer outcome data were extracted for each patient encounter, as well as demographic data from the ED during days in which there was a study shift.

**Results:** During 105 clinical shifts, 1930 patients were managed by 21 EPs (median 17 patients per shift; interquartile range 14–23). Overall, at least 1 consultation was requested in 38% of patients. More than one-half of the patients (54.3%) who received a consultation were admitted to the hospital. Consultation proportions were similar between males and females (51% v. 49%,  $p = 0.03$ ). Consultations occurred more frequently for patients who were older, had higher acuity presentations, arrived during daytime hours or arrived by ambulance. The proportion of agreement between the EP's and consultant's opinion on the need for admission was 89% ( $\kappa = 0.77$ , 95% confidence interval 0.72–0.83). Overall, 92% of patients received 1 consultation. Six percent of the consultations were perceived as "difficult" by the EPs (defined as the EP's subjective impression of difficulties with consultation times, accessibility and availability of consultants, and the interaction with consultants or disposition issues).

**Conclusion:** Consultation is a common process in the ED. It often results in admission and is predictable based on simple patient factors. Because of perceived difficulty with consultations, strategies to improve the EP consultation process in the ED seem warranted.

**Key words:** consultation, emergency medicine, disposition

**RÉSUMÉ**

**Objectif :** La consultation est un aspect courant et important des soins prodigués à l'urgence. Nous avons étudié prospectivement, dans deux centres de soins tertiaires, les taux de consultation, les taux d'admission des patients vus en consultation, les prédictions du médecin d'urgence quant à l'issue des patients vus en consultation ainsi que les taux de difficulté des consultations.

**Méthodes :** Les médecins d'urgence traitants ont consigné, sur des formulaires normalisés, les consultations réalisées pendant cinq quarts de travail choisis au hasard sur une période de huit semaines. Subséquemment, des données informatiques des résultats ont été extraites pour chaque

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rencontre avec un patient, de même que des données démographiques de la salle d'urgence pour les jours où un quart de travail faisait partie de l'étude.

**Résultats :** Au cours des 105 quarts de travail observés, 21 médecins d'urgence ont vu 1930 patients (médiane : 17 patients par période de travail; écart interquartile : 14 à 23). Dans l'ensemble, au moins une consultation a été demandée pour 38 % des patients. Plus de la moitié des patients (54,3 %) qui ont reçu une consultation ont été admis à l'hôpital. Les pourcentages de consultation étaient semblables chez les femmes et les hommes (51 % contre 49 %,  $p = 0,03$ ). La fréquence des consultations était plus élevée chez les patients plus âgés, chez ceux qui se présentaient à l'urgence avec un problème plus grave ainsi que chez ceux qui arrivaient de jour ou par ambulance. Le médecin d'urgence et le consultant étaient d'accord quant à l'admission du patient dans 89 % des cas ( $\kappa = 0,77$ ; intervalle de confiance à 95 %, 0,72 à 0,83). Dans l'ensemble, 92 % des patients ont reçu une consultation. De l'avis des médecins d'urgence, 6 % des consultations étaient jugées « difficiles » (terme défini comme l'impression subjective du médecin d'urgence d'avoir eu des difficultés quant au temps de consultation, à l'accessibilité et à la disponibilité des consultants, à l'interaction avec ces derniers ou à l'issue de la consultation).

**Conclusion :** La consultation est monnaie courante dans les salles d'urgence. Elle mène souvent à l'admission des patients et elle est prévisible d'après des facteurs élémentaires relatifs aux patients. Il ressort de cette étude que des stratégies d'amélioration du processus de consultation en salle d'urgence s'imposent, et ce, en raison des difficultés perçues relativement aux consultations.

## Introduction

Consultation is a common and important aspect of emergency medicine practice.<sup>1,2</sup> It is the process by which emergency physicians (EPs) request other specialists (consultants) to participate in the care of the emergency department (ED) patient. By the end of this process, the consultant should provide 1 of the following recommendations: admit, discharge with or without consultant follow-up, or consult another specialty.<sup>3</sup> Consultation ranges from “stat therapy” (e.g., emergency craniotomy) to arrangement of outpatient tests or follow-up (e.g., chest pain). Effective use of consultation has the potential to improve ED throughput and patient care.<sup>4,5</sup> Delays associated with consultation requests and decisions<sup>6</sup> are of growing concern for EDs as they further exacerbate the severe overcrowding crisis currently being experienced in EDs across Canada.<sup>7</sup> The Canadian Association of Emergency Physicians (CAEP) and the National Emergency Nurses Affiliation (NENA) have identified that establishing acceptable consultation time frames may play an important role in avoiding disposition and treatment delays that lead to overcrowding conditions in the ED.<sup>8</sup>

Little research has been conducted on this topic in emergency medicine. Past research has examined issues of preparedness and training in the art of consultation<sup>9-20</sup> and the timeliness of consultation in the ED.<sup>21,22</sup> There are very few studies targeting consultation outcomes relevant to current ED practice.<sup>23-26</sup> There are none studying the frequency of consultation and admission of consulted patients in Canadian EDs. Consultants and emergency physicians have different

perceptions as to the results of ED consultation. Moreover, the level of agreement among consultant and emergency practitioners regarding final patient dispositions in the ED is also unknown.

The primary objective of this study was to describe the frequency of consultation in 2 tertiary care academic hospital EDs. Secondary objectives were to determine the admission rate of consulted patients, assess the level of agreement among EPs and consulting physicians regarding patients' dispositions, and the frequency of difficult consultations as perceived by the EPs. Factors associated with the frequency of consultation and EP perceptions of the difficulty of consultations were further explored.

## Methods

### Study design

A prospective observational descriptive study was conducted from February to April 2006 at EDs located in 2 tertiary care teaching hospitals associated with the University of Alberta. Both hospitals are regional referral centres for trauma and a variety of other services, and both provide almost every type of specialist and subspecialist care available. Together, these 2 ED sites manage over 130 000 ED visits per year and are staffed by full-time attending EPs.

### Participants

All full-time EPs practising at the 2 EDs were invited to participate in the study (30 EPs at ED 1 and 45 EPs at ED 2). Twenty-one attending EPs consented to participate in the study (11 from ED 1 and 10 from ED 2). These

physicians were part of the normal schedule and were remunerated in their usual fashion for that specific site. A computer-generated random numbers list was used to generate a list of shifts for a total of 5 study shifts per EP, and a total of 105 study shifts. No stratifications were used by time of the day or ED site.

### **Data collection**

Attending EPs used standardized forms to collect data on characteristics of the shifts worked, number of patients seen, and patient encounters in terms of the number and characteristics of consultations during each of the 8-hour shifts (exclusive of “handover” cases) over an 8-week period. A consultation was defined as an event in which attending EPs contacted other specialists (consultants) who take responsibility for patient disposition within and occasionally outside the hospital. Consultations could be made for advice on management, or transfer of care out of the ED, because the patient’s medical problems were beyond the scope of practice of the EP. Consultants also included allied health professionals (e.g., social workers, nurse practitioners and mental health workers) outside of the ED. The patient’s primary physician was considered a consultant only when interaction was required for the purpose of gathering information necessary for the appropriate care of the patients during their ED visit. This did not include simple courtesy calls informing the physician that their patient was in the ED or outpatient consultations. Routine referral of simple fractures to the outpatient orthopedics clinic were not considered consultations because this process does not require specialist care or opinion at the time of the ED visit. Interactions with diagnostic imaging staff members were not considered consultations as this service does not take responsibility for patient disposition.

EPs rated their perception of “difficult” consultations (defined as the EP’s subjective impression of difficulties with consultation times, accessibility and availability of consultants, and the interaction with consultants or disposition issues) using a dichotomous choice scale (i.e., yes or no). EPs were asked to record their predicted disposition (admit or discharge) before consultations were requested. Final decisions on patient disposition were recorded. Data from the Emergency Department Information System (EDIS) were extracted for each patient seen by the EPs during the shifts as well as demographic data, including CTAS (Canadian Triage and Acuity Scale) scores.

### **Statistical analysis**

A sample of 5 study shifts per EP or a total of 105 study shifts would be required to obtain a 95% confidence interval

(CI) of plus or minus 5% around an estimate of a consultation rate of 30%. To allow for an expected 70% response rate to the questionnaire, a total of 105 study shifts were assessed. Assuming that approximately 30 patients are seen per shift per EP, then a total of 5 study shifts per EP and a grand total of 105 study shifts would be needed to complete data collection.

Data were analyzed descriptively. Proportions with 95% confidence intervals (95% CI) were reported for categorical data. Continuous data were reported as means with standard deviations (SD) or medians with interquartile ranges (IQR) in the presence of skewed data. The statistical package SAS version 6 (SAS Institute, Carey, North Carolina) was used for all the analyses. The level of agreement among EPs and consultants regarding disposition was evaluated using the  $\kappa$  statistic.<sup>27</sup> A  $\kappa$  score in the range from 0.0 to 0.40 was considered poor agreement, 0.41 to 0.60 moderate agreement, and 0.61 to 0.80 substantial agreement.<sup>28</sup>

Differences in continuous outcomes were analyzed using 2-tailed *t* tests (either *t* tests or Wilcoxon test as appropriate), while categorical measures were compared using chi-squared tests. All results were considered statistically significant at a 2-tailed *p* value < 0.05.

### **Ethical considerations**

The study was approved by the University of Alberta Research Ethics Board (Panel B). Physicians each signed a consent form informing them of the rationale for the study. This study did not impact patient care; therefore, consent was not obtained from patients.

## **Results**

### **Patient characteristics**

Characteristics of the ED patients who were seen in the EDs during the study observation period are described in Table 1. The median total number of patients seen per 24-hour shift was 194 (IQR 153–236) for a total of 1930 EP–patient encounters during the observation period. CTAS scores ranged from 3 to 5 for 87.3% (IQR 85.1–89.4) of the patients. Study shift distribution and physician characteristics with the actual shift distribution and physician characteristics at each study ED are provided in Table 2.

### **Consultation characteristics**

At least 1 consultation was requested in 38% of the patients (733 out of 1930, 95% CI 35–40), with a total of 793 consultations requested in those 733 patients. Seven percent had 2 consultations while 1% had more than 2

consultations requested. Factors associated with consultation were explored (Table 3). Consultation proportions were similar between males and females (51% v. 49%,  $\Delta = 2\%$ , 95% CI  $-2$  to 7). Consultations occurred more frequently for patients who

- were older (55 v. 42 years old);
- had higher acuity presentations (CTAS 1 or 2 [64% and 60% consultation rates, respectively] v. CTAS 5 [9%]);
- arrived during daytime hours (49% v. 42%,  $\Delta = 7\%$ , 95% CI 3–12;  $p < 0.001$ ); and
- arrived by ambulance (44% v. 20%,  $\Delta = 9\%$ , 95% CI 5–14;  $p < 0.001$ ).

Patients for whom consultations were requested were more likely to be admitted than patients who did not have a consult requested (53.3% v. 1.3%,  $\Delta = 52\%$ , 95% CI 48–55;  $p < 0.001$ ).

Overall, the rate of admission for the study sample was 21% (407 out of 1930, 95% CI 19–22). The majority of the patients were discharged (77.9%); whereas, a small number of patients were transferred to other institutions (0.7%) or died while in the ED (0.3%).

### Consultation outcomes

In 51.7% of the patient–EP encounters, the resident on the pertinent consultant service was paged to see the patient, since direct EP-consultant physician interactions are uncommon in these EDs. Consultants and EPs agreed on patient disposition 89% of the time (458 out of 513), with  $\kappa = 0.77$  (95% CI 0.72–0.83; Table 4).

Of the 733 patient consultations, 43 (6%, 95% CI 4–8) of them were perceived as difficult by the EPs, resulting in an average of at least 1 difficult consultation in 31% of their

**Table 1: Emergency department patient characteristics during the study observation period per 24-hour shift**

Characteristic per 24 h period	Median no. (and IQR) of patients	Median % (and IQR) of patients
Total no. of patients seen in ED	194 (153–236)	100.0
Total no. of patients who LWBS	14 (9–19)	7.5 (4.6–9.9)
Total no. of direct-to-consultant patients in ED*	10 (8–14)	5.8 (4.6–4.6)
Total no. of patients with CTAS score 1	1 (1–2)	0.6 (0.4–1.2)
Total no. of patients with CTAS score 2	17 (10–23)	12.0 (10.2–13.7)
Total no. of patients with CTAS score 3	170 (154–178)	87.3 (85.1–89.4)

IQR = interquartile range; ED = emergency department; LWBS = left without being seen; CTAS = Canadian Triage and Acuity Scale.  
\*Patients accepted for assessment or transfer by consultant services for which the ED physician was not responsible.

**Table 2. Comparison of study shift distribution and physician characteristics with the actual shift distribution and physician characteristics at each study ED**

Characteristic	ED 1; no. (and %) of physicians*		ED 2; no. (and %) of physicians*	
	Actual	Study sample	Actual	Study sample
<b>Shift characteristics</b>				
Acute shifts	4/7	33/55	6/8	38/50
Non-acute shifts	3/7	22/55	2/8	12/50
Day shifts	2/7	26/55	3/8	14/50
Evening shifts	2/7	22/55	3/8	24/50
Overnight shifts	1/7	7/55	2/8	12/50
<b>Physician characteristics</b>				
FRCPC-trained†	12/30	5/11	14/45	18/45
CFPC(EM)-trained‡	18/30	6/11	31/45	27/45
Years of practice, yr (and IQR)	NA	7 (3–18)	NA	7/45
No. of full-time EPs in clinical group	30	11	45	10

ED = emergency department; FRCPC = Fellow of the Royal College of Physicians and Surgeons of Canada; CFPC(EM) = College of Family Physicians of Canada (Emergency Medicine Certification); IQR = interquartile range; NA = no data available; EP = emergency physician.

\*Unless otherwise indicated.

†FRCPC designation is achieved after 5 yr of training.

‡CFPC(EM) training is achieved after 3 yr of training.

shifts. An EP was more likely to report at least 1 difficult consultation per shift during higher daily patient volumes (median 199 v. 190,  $p = 0.04$ ) and higher direct-to-consultant cases in the ED (mean 14 v. 10,  $p = 0.002$ ). ED 1 was associated with difficult consultations (9.8% v. 2.5%,  $p < 0.001$ ). Age, sex and acuity at presentation were not associated with difficult consultations.

## Discussion

To our knowledge, this is the first study that has reported the frequency of consultation, admission rate of consulted patients and factors associated with consultations in Canadian EDs. Physicians requested consultation in more than one-third of the ED patients, with more than one-half of the consulted patients being admitted. The literature on consultations in the ED is sparse; however, our data are comparable to those described by others. For ex-

ample, Cortazzo and colleagues<sup>29</sup> reported that the frequency of consultation was approximately 40% at a US Army base hospital ED with 60 000 annual visits.

The consultation proportion may seem high to some readers. As tertiary care academic centres, both EDs see a high proportion of complex patients with high acuity. The admission rate is > 15% for both institutions. Conversely, the difficult consultation proportion may seem low to other readers. However, both of these hospitals have developed admission policies to address the problem of patients with multiple consultations. It is likely that the multiple consultation patients of this study consumed extensive amounts of consultant time and contributed to ED overcrowding in the 2 hospitals. It is equally likely that other forms of “difficult consultations” created additional backlogs. Further studies should be conducted to assess specifically what impact multiple consultations have on length of stay and, ultimately, ED overcrowding.

**Table 3. Factors associated with consultation in 1930 patient encounters in 2 Canadian emergency departments**

Factor	No. (and %)* of patients with consultations ( <i>n</i> = 733)	No. (and %)* of patients without consultations ( <i>n</i> = 1197)	<i>p</i> value
Mean age (and SD), yr	54.6 (21.4)	42.1 (21.2)	< 0.001
Male sex	377 (51.4)	643 (53.7)	0.33
EMS arrival	322 (43.9)	236 (19.7)	< 0.001
Time of day			0.002
0801–1600	360 (49.1)	497 (41.5)	
1601–2400	273 (37.2)	481 (40.2)	
0001–0800	100 (13.6)	219 (18.3)	
CTAS score			< 0.001
1	14 (1.9)	8 (0.7)	
2	161 (22.0)	108 (9.0)	
3	394 (53.8)	559 (46.7)	
4	156 (21.3)	440 (36.8)	
5	8 (1.1)	82 (6.9)	
Admitted to hospital	391 (53.3)	16 (1.3)	< 0.001

SD = standard deviation; EMS = emergency medical services; CTAS = Canadian Triage and Acuity Scale.

\*Unless otherwise indicated.

**Table 4. Level of agreement among emergency physician and consultant regarding patient disposition**

	Emergency physician	
	Admit	Discharge
Consultant	Admit	270
	Discharge	39
Total		513*

\*Missing data for 220 encounters.

Although only 6% of all the consultations reported in this study were perceived as difficult by the EPs, there was an association between high daily patient volumes and the EPs' perceptions of what constitutes a difficult consultation. To some degree, this may reflect the stresses physicians feel when working with overtaxed resources in the health care system. EPs feel the need to maintain throughput in the department. Consultants feel they should provide comprehensive care for all of the patients for whom they are consulted, even when alternatives may exist in other locations. Current health care resources put these 2 goals in direct conflict, which may lead to difficulties in the consultation process.

Many physicians believe that admitted inpatients (i.e., access block) are the leading cause of ED overcrowding.<sup>7,30,31</sup> We found that about 20% of EP-patient encounters resulted in a decision of admission. The inability of EDs to move admitted patients to their appropriate ward destinations reflects system-wide pressures related to active care bed shortages, inefficiencies within the inpatient setting and inconsistencies in ED decision-making among physicians. The issue of admissions has become so important in the United Kingdom that a commission was recently established to reduce admissions on 20 sentinel diagnoses,<sup>32</sup> many of which were part of the group of diseases presenting to these Canadian EDs.

Some studies have reported that when compared with physicians from inpatient services (i.e., family medicine or internal medicine), EPs would admit more and discharge fewer patients from the ED.<sup>33</sup> We found, however, that the proportion of agreement between the EPs and consultants regarding patient disposition was substantial ( $\kappa = 0.77$ ). Although EPs do not have admitting privileges to inpatient services, our study found that they often agreed with inpatient consultants regarding the optimal patient disposition. This is an important finding, since EPs are often required to obtain the consent of consultants, or other physicians from inpatient services to admit a patient to the hospital. Further studies should assess the rates of ED return for patients who are discharged in which the EP and consultant opinions on the need for admission were discordant.

## Limitations

While this study collected data prospectively and the selection of ED shifts was randomized, there are some limitations to this study. Despite frequent reminders, some study physicians failed to record their decisions regarding patient disposition (220 encounters, 30% missing data). Participating physicians may not be broadly representative because of a possible volunteer bias; the group of EPs that agreed

to participate in the study may have different consultation practices and perceptions of difficult consultations than EPs who did not volunteer to take part in the study. Adding more physicians and/or additional sites would have increased the generalizability of these results. It can be argued that omitting diagnostic imaging and outpatient orthopedic referrals may have eliminated important consultation data. Expanded radiology services (invasive diagnosis and treatment) constitute an increasingly important service to EDs. Future studies should explore these expanded roles of radiology in more detail.

Study EPs may have had an unfair advantage in predicting disposition. It is possible that they either found out about the disposition of the patient while discussing the case with the consultant before filling out the study form, or they may have been delayed in filling out the forms during the shift and the disposition of the patient may have become known to them. To avoid this, we requested they base the decision on their perception at the time of the consult request. However, we realize this may not have always occurred.

Difficult consultation was problematic in this project, because there were a variety of ways a consultation could be "difficult." A priori, we believed we had a reasonable idea of what "difficult consultation" meant; however, when we attempted to examine the high frequency of this event in further detail, we were impressed at the variety of ways a consultation could be classified as difficult. For example, delays in ED assessment, the need for multiple consultations on the same patient, conflicts with accepting physicians, patients who were "too sick for the floor, not sick enough for ICU" (the "tweener") and other problems plagued this group of patients. Finally, consultation is a bidirectional process and data on opinions of the process were only obtained from the ED physicians' point of view. In future studies, consultants should be involved to hear their opinions on consultation processes.

## Conclusion

Consultation and referral are important components of ED patient care. Consultations are common and often lead to hospital admission in academic tertiary EDs. The vast majority of communication with regard to consultation occurs between attending EPs and residents on consultant services. Education of EPs and residents on ways to improve consultation requests may reduce the number of "difficult" consultations as perceived by EPs. Moreover, given the frequency with which patients have consultation as a part of their care in the ED, interventions to streamline the

consultation process and rules regarding consultation times appear warranted, especially given the current status of overcrowding in many urban hospitals.

**Competing interests:** None declared.

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