

General Internists Versus Specialists as Attendings for General Internal Medicine Inpatients at a Canadian Hospital: a Cohort Study

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INTRODUCTION

Both general internists and specialists serve as attending physicians on general internal medicine (GIM) wards in hospitals.^{1, 2} As attending physicians on GIM wards, specialists often care for patients with conditions outside their domain of expertise, which may lead to differences in efficiency and quality of care compared to general internists.³ This study's objective was to examine the relationship between receipt of care from general internists versus specialists as attending physicians and outcomes including hospital length of stay (LOS), readmissions, and inpatient mortality.

METHODS

We conducted a retrospective cohort study at Kingston General Hospital, a large Canadian tertiary care hospital. Consecutive adult patients admitted to GIM wards from January 1, 2015, to January 1, 2016, were included. Patient data were obtained from patient electronic medical records and the discharge abstract database.

Attending physician was the main responsible physician for the GIM inpatient at time of discharge or death. A general internist was defined as a faculty member of the GIM division with a practicing license listed as GIM or internal medicine without subspecialty whose main responsibilities included GIM ward service and GIM outpatient clinics. A specialist was defined as a faculty member of an internal medicine subspecialty division with a practicing license listed as subspecialty whose main responsibilities included subspecialty inpatient consult service and subspecialty outpatient clinics.

Patient outcomes included hospital LOS, readmission, and all-cause in-hospital mortality. LOS was compared using the Wilcoxon signed-rank test. Readmission and mortality rates were compared using Fisher's exact test.

As a secondary analysis, propensity score matching based on patient baseline characteristics was used to improve

comparability between patients under general internists and those under specialists. The two propensity-matched groups were compared in terms of LOS, readmission, and in-hospital mortality as described above.

RESULTS

Attending Physicians

From January 1, 2015, to January 1, 2016, 34 staff physicians attended on the 4 GIM teams, including 9 (26%) general internists and 25 (74%) specialists (Table 1).

Patient Outcomes

Of the 3782 consecutive GIM inpatients, 1747 (46%) and 2035 (54%) received care from general internists and specialists respectively (Table 2).

The median LOS was 4.89 (IQR 2.62–9.52) days for patients under general internists and 5.25 (IQR 2.75–10.28) days for those under specialists ($p = 0.049$). Of the 3516 discharges, 667 (19%) patients were readmitted within 30 days: 326/1634 (20%) discharged by general internists and 341/1882 (18%) discharged by specialists ($p = 0.17$). During their hospital stay, 266 (7%) patients died: 113/1747 (6%) patients under general internists and 153/2035 (8%) under specialists ($p = 0.23$).

Secondary Analysis

Using propensity scores, 1339 patients under general internists were matched to 1339 patients under specialists (Table 2). There was excellent balance on a large number of baseline characteristics (standardized differences for these characteristics were all < 10%).

The median LOS was 4.98 (IQR 2.63–9.71) days for patients under general internists and 5.41 (IQR 2.85–10.77) days for those under specialists ($p = 0.04$). Of the discharges, 259/1250 (21%) patients discharged by general internists and 236/1241 (19%) patients discharged by specialists were readmitted to the hospital within 30 days ($p = 0.29$). During their hospital stay, 89/1339 (7%) patients under general internists and 98/1339 (7%) under specialists died ($p = 0.54$).

Table 1 Characteristics and Outcomes of General Internist and Specialist Attending Physicians

	General internists (N=9)	Specialists (N= 25)	P-value
Male, N (%)	4 (44%)	17 (68%)	0.25
Years post graduation, N (%)			0.06
0–10 years	6 (67%)	5 (20%)	
11–20 years	1 (11%)	9 (36%)	
> 20 years	2 (22%)	11 (44%)	
Specialty, N (%)	GIM, 9 (100%)	Pulmonary, 6 (24%) Nephrology, 4 (16%) Intensive care, 3 (12%) Cardiology, 3 (12%) Endocrinology, 3 (12%) Rheumatology, 3 (12%) Gastroenterology, 2 (8%) Allergy, 1 (4%)	
Weeks on GIM ward in study year, median (IQR)	11 (7–13)	4 (2–6)	< 0.001
Deaths in hospital			
Rate of deaths/100 patient days	0.96	0.98	
Unadjusted IRR (95% CI)	0.98 (0.76–1.25)	Reference	0.87
Adjusted IRR (95% CI)*	0.87 (0.60–1.24)	Reference	0.44
Discharges from hospital			
Rate of discharges/100 patient days	14.22	12.42	
Unadjusted IRR (95% CI)	1.14 (1.07–1.22)	Reference	< 0.001
Adjusted IRR (95% CI)*	1.11 (1.01–1.22)	Reference	0.03

GIM, general internal medicine; IRR, incidence rate ratio

*Adjusted incidence rate ratio is estimated using a multivariable Poisson regression model that includes physician specialty (general internist versus specialist) along with other physician characteristics including sex, years post graduation, and number of weeks on GIM ward

DISCUSSION

In this study, GIM inpatients under the care of general internists had a modestly shorter LOS relative to those under the care of specialists without significant differences in readmissions or mortality. These results complement and extend findings of an earlier study that showed shorter LOS for GIM inpatients receiving care from general internists as compared to endocrinologists and rheumatologists.²

Study limitations include possible residual confounding from not adjusting for disease severity. As well, our study used data from a single academic acute care hospital, which may limit the generalizability of the results.

General internists may provide more efficient care because of their greater familiarity with inpatient GIM wards and related hospital processes. Note that general internists made up only 26% of the physicians in this study but provided care to 46% of GIM ward patients. Their experience may help expedite work-up, procedures, consultations with other specialty services, and collaboration with the interdisciplinary team for discharge planning, resulting in shorter LOS.

In conclusion, our study findings endorse the value of general internists for hospital GIM, which may not be replaceable by other internal medicine specialists.

Table 2 Baseline Characteristics of Patients Under General Internists and Specialists

	All patients			Patients matched by propensity score		
	General internists (N= 1747)	Specialists (N= 2035)	Std. diff	General internists (N= 1339)	Specialists (N= 1339)	Std. diff
Male	878 (50%)	1050 (52%)	0.03	687 (51%)	682 (51%)	0.007
Age, median (IQR)	71 (58–82)	71 (57–81)	0.04	71 (59–82)	71 (57–81)	0.05
Admission on weekend	438 (25%)	544 (27%)	0.04	329 (25%)	344 (26%)	0.03
Charlson Comorbidity Index						
0	480 (27%)	585 (29%)	0.03	374 (28%)	404 (30%)	0.05
1	406 (23%)	440 (22%)	0.04	312 (23%)	271 (20%)	0.07
≥ 2	861 (49%)	1010 (50%)	0.007	653 (49%)	664 (50%)	0.02
Top 7 admitting diagnoses						
COPD	176 (10%)	190 (9%)	0.02	134 (10%)	126 (9%)	0.02
Viral/undefined pneumonia	97 (6%)	133 (7%)	0.04	71 (5%)	77 (6%)	0.02
Lower urinary tract infection	79 (5%)	91 (4%)	0.002	64 (5%)	57 (4%)	0.03
Heart failure without cardiac catheter	68 (4%)	75 (4%)	0.01	51 (4%)	55 (4%)	0.02
Renal failure	58 (3%)	60 (3%)	0.02	43 (3%)	49 (4%)	0.02
Gastrointestinal hemorrhage	51 (3%)	59 (3%)	0.001	38 (3%)	39 (3%)	0.004
Diabetes	59 (3%)	46 (2%)	0.07	39 (3%)	34 (3%)	0.02

COPD, chronic obstructive pulmonary disease; Std. diff, standardized difference

The propensity score matched groups were also matched on admission months, general internal medicine teams, individual Charlson comorbidity score items, and the top 52 most common admitting diagnoses. These variables are not shown in the table

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Compliance with Ethical Standards:

Conflict of Interest: AD Bai: None to declare.

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