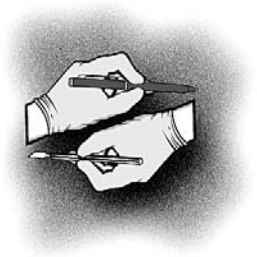

Response of rural physicians in a non–fee-for-service environment to acute increases in demand due to physician shortages

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Introduction: The Weeneebayko Health Ahtuskaywin (WHA) is an Aboriginal regional health authority serving a large remote region on the west coast of James Bay. The physicians are all paid on a non–fee-for-service basis. There are periods of acute shortage, periods of relative stability and periods when much of the care is provided by locum physicians. As a closed system, it is ideal for the investigation of physician response to periods of acute increases in demand for service.
Purpose: This study investigated the relationships between staffing levels and service provision to describe the response of physicians to increased demand due to an acute shortage of physicians. It also looked at whether payment options affected these relationships.
Methods: Using an existing administrative database from WHA for the period 1999 to 2002, relationships between staffing levels and service provision were investigated. We looked at the relationship between total physician levels and the number of patients seen per family medicine clinic. We also studied the relationships between total physician staffing levels and the number of patients seen in clinic, in the emergency department (ED), and per ED shift. We also looked at some proxy measures for the level of intensity of the work, including the number of hospital inpatients, the number of medevacs per ED shift and the number of ED shifts per physician. Exploratory graphical analysis was conducted and was followed by linear regression for associations of interest.
Results and Conclusion: During periods of decreased staffing, physicians saw more patients per clinic and ED shift, despite the lack of financial incentives. The study also clearly demonstrates the increased intensity of the workloads carried by rural physicians in times of staffing shortages as noted by increased numbers of ED shifts, increased numbers of medevacs per ED shift and the lack of a decline in inpatient numbers. This highlights the need for ongoing recruitment and retention efforts in rural and remote locations to ensure adequate physician staffing levels, if burnout is to be avoided.

Introduction : La Weeneebayko Health Ahtuskaywin (WHA) est une régie régionale de santé autochtone qui dessert une vaste région éloignée sur la côte ouest de la baie James. Tous les médecins y sont rémunérés autrement qu'à l'acte. Il y a des périodes de pénurie aiguë, des périodes de stabilité relative, et d'autres pendant lesquelles des suppléant fournissent la majorité des soins. Comme système fermé, il est idéal pour étudier la réponse des médecins aux périodes de pointe de la demande de services.
Objet : Cette étude a porté sur les liens entre les effectifs et la prestation des services afin de décrire la réponse des médecins à une augmentation de la demande attribuable à une pénurie aiguë de médecins. Les chercheurs ont aussi essayé de déterminer si les modes de rémunération avaient un effet sur ces liens.
Méthodes : En nous fondant sur une base de données administratives existante de la WHA portant sur la période de 1999 à 2002, nous avons étudié les liens entre les effectifs et la prestation des services. Nous avons analysé le lien entre les effectifs médicaux

totaux et le nombre de patients accueillis par clinique de médecine familiale. Nous avons aussi étudié les liens entre les effectifs médicaux totaux et le nombre de patients accueillis à la clinique, au service d'urgence et par quart de travail à l'urgence. Nous avons aussi analysé des variables substitutives de l'intensité du travail, y compris le nombre de patients hospitalisés, le nombre d'évacuations sanitaires par quart de travail à l'urgence et le nombre de quarts de travail à l'urgence par médecin. Nous avons procédé à une analyse graphique exploratoire suivie d'une analyse de régression linéaire portant sur les liens d'intérêt.

Résultats et conclusion : En période de réduction des effectifs, les médecins ont accueilli plus de patients par clinique et par quart à l'urgence, en dépit de l'absence d'incitations financières. L'étude démontre aussi clairement l'intensité accrue de la charge de travail des médecins ruraux en période de pénurie d'effectifs, comme l'indiquent le nombre accru de quarts à l'urgence, le nombre accru d'évacuations sanitaires par quart à l'urgence, et la non-diminution du nombre de patients hospitalisés. Ces résultats démontrent que des efforts continus de recrutement et de rétention s'imposent dans les régions rurales et éloignées afin d'y assurer suffisamment d'effectifs médicaux pour éviter l'épuisement.

Introduction

The role that physician payment systems play in physician behaviour has been the subject of debate for many years.[1] Some theorize that in the absence of economic incentives, the number of patients seen and the level of productivity decline.[2–4] Others suggest that moving away from fee-for-service (FFS) payments enhances quality of care.[3,5] On the whole, most studies have concluded that there are only small differences in physician behaviour that can be attributed to changes in payment systems.[1,3,6–9]

Alternative (non–fee-for-service) payment plans have become increasingly popular in rural and remote areas of Canada over the past decade. They have been seen as tools to attract physicians to underserviced areas where patient volumes may make FFS practice less financially attractive.[7,10,11] Some international literature has looked at this issue and suggested that non-FFS payment systems are the best option for some rural or remote settings.[12]

In Canada, there is a limited amount of published literature on the impact of such alternative payment plans on physician practice patterns.[11,13–15] One major study of an academic health sciences centre showed that payment systems had no impact on the number and variety of surgical procedures provided to patients.[13] The only published study from a rural or remote location was from the Northwest Territories and it found that, following the recruitment of salaried physicians into the area, FFS physicians increased their service intensity, billing intensity and propensity to recall patients. This may represent an effort to provide more preventive care, maintain incomes or redistribute clinical responsibilities.[16] There were no published studies in the Canadian or international literature on the response of non-FFS physicians to acute increases in demand. This study investigated the relationships between staffing levels and service provision to determine what changes occur when there are acute shortages of physicians and whether payment method affects these relationships.

Methods

Setting

The Weeneebayko Health Ahtuskaywin (WHA) is an Aboriginal regional health authority that administers a regional hospital and all physician services in a large remote region on the west coast of James Bay. As in many remote communities, recruitment and retention of medical staff is an ongoing process. As a result, there are periods of acute shortage, periods of relative stability and periods when much of the care is provided by locum physicians. At the time of the study they had a designated complement of 10 full-time-equivalent (FTE) family physicians. The physicians were all paid on a non-FFS basis. In this alternate payment plan a block monthly fee was provided for a fixed set of clinical services. These included two 12-hour emergency department (ED) shifts and up to 6 family medicine or urgent care clinics per week (which could be either at the family medicine clinic located in the local hospital or in a number of outlying communities), inpatient care,

obstetrics, participation in hospital administration and teaching of residents and medical students. Each half-day clinic would include approximately 3 hours of direct patient bookings and the associated time to complete paperwork.

The hospital board set priorities for staffing of the hospital such that maintaining services for inpatients and coverage of the ED took precedence over all other services when there were staffing shortages. Daytime ED shifts were counted as "clinics" for scheduling purposes, and physicians who had worked the previous 12-hour ED night shift were restricted from working in clinic or the ED the following day (but could work the next night). These limitations meant that the actual number of clinics (outside of acute care) provided per physician per week varied with staffing levels. Additional ED shifts were remunerated at an hourly sessional rate, and additional clinics were remunerated at a fixed dollar sessional rate per half day worked.

Patient population

The patient population served is predominantly Aboriginal and includes a significant proportion of patients whose first language is Cree. Many suffer from diabetes and its related complications, and are medically complex. Clinic bookings reflect the needs of the patient population; many patients require appointments of 30 minutes or longer. There were neither incentives for increased patient volumes nor disincentives for low patient volumes in any setting (clinic/ED/inpatients/obstetrics) in the service agreements assigned by physicians entering the alternate payment plan.

Data collection

The medical activity report database for the calendar period Jan. 1, 1999, to Dec. 31, 2002, was used to investigate relationships between staffing levels and service provision. The primary goal was to determine if, in the absence of financial incentives, there is an increase in activity when there is an acute increase in demand due to a shortage of physicians. As additional worked clinics/shifts are compensated, the unit of analysis will be patients seen per clinic scheduled. We also looked at the relationships between total physician staffing levels and the total number of patients seen in clinic, in the ED, and as hospital inpatients, the number of patients seen per ED shift, and the number of call shifts per physician over the 4-year period.

Data analysis

Data were transferred from the existing Excel format spreadsheet into Stata Version 8 statistical software using Stat-Transfer version 7. An exploratory graphical analysis of the data set was conducted first. Relationships of interest following this preliminary analysis were examined by means of linear regression models. Only summary data were used in the analysis. No data specific to an individual doctor were provided or reviewed.

This project was reviewed and approved by the research ethics boards of Queen's University, Kingston, Ont., and the WHA. In keeping with Ownership, Control, Access and Possession (OCAP) principles,[17] data ownership remains with the WHA and all files will be transferred back to them for secure storage following the completion of the study and publication of results. Preliminary results and a draft copy of this publication were shared with the WHA for review and comment before submission.

Results

Figure 1 and Figure 2 describe the relationships between staffing levels and the number of patients seen in the family medicine clinic. As staffing levels fall, the number of patients seen per half-day family medicine clinic rises ($r^2 = 0.63$, $p = 0.0003$) and the total number of patients seen falls ($r^2 = 0.39$, $p = 0.01$). Figure 3 and Figure 4 describe activity levels in the ED. The ED patient data are an amalgamation of ED and urgent care clinics. Regardless of staffing levels, the number of emergency shifts remains constant (2 per day) but urgent care clinics are cancelled if staffing is not available. The total number of patients seen in the ED does not vary with staffing level ($r^2 = 0.02$, $p = 0.5$), but the number of patients seen per ED shift increases somewhat ($r^2 = 0.33$, $p = 0.02$) as physician numbers drop. This is because the urgent care clinic patients are now seen by the physician covering the ED. As expected, the number of call shifts per physician must increase as physician numbers fall (Fig. 5, $r^2 = 0.97$, $p = 0.00001$). During the study period, the number of inpatients at WHA did not show any relationship to physician staffing levels (Fig. 6, $r^2 = 0.05$, $p = 0.43$). Figure 7 shows the relationship between the number of medevacs in and out of WHA per ED shift and the total FTE physicians. It can be seen that total medevacs in and out of WHA per ED shift increased slightly with a decrease in physician staffing levels ($r^2 = 0.2848$, $p = 0.03$).

Discussion

This study describes physician response to acute increases in demand for service in the absence of financial incentives. The measures described previously can be grouped into 2 broad categories.

1. Measures for which there are financial incentives for additional work. That is to say, extra ED shifts/extra clinics are remunerated: the base agreement dictates that a certain number of ED shifts be done. Since ED shifts count as "clinics" and there is additional pay for additional ED shifts, there is, in effect, a "double payment" since there is no clawback for cancelled clinics replaced by ED shifts.
2. Measures for which there are no financial incentives, which can further be divided into measures of patient volume (patients per clinic/ED shift) and acuity (inpatient numbers, numbers of medevacs).

Although financial incentives were available to physicians for working additional clinics, as described above, this was generally not logistically possible when there were staffing shortages due to the scheduling protocols (board priorities, rules on working after a night shift) so this was rarely done, leaving the number of ED shifts worked as the primary measure for which incentives existed. This measure was the most tightly associated with staffing levels. This may not, however, be purely related to the fact that it is remunerated, but also due to the reality that ED coverage was considered essential and was always provided *24/7* regardless of staffing level.

For all of the measures of increased workload for which there were not financial incentives, increased

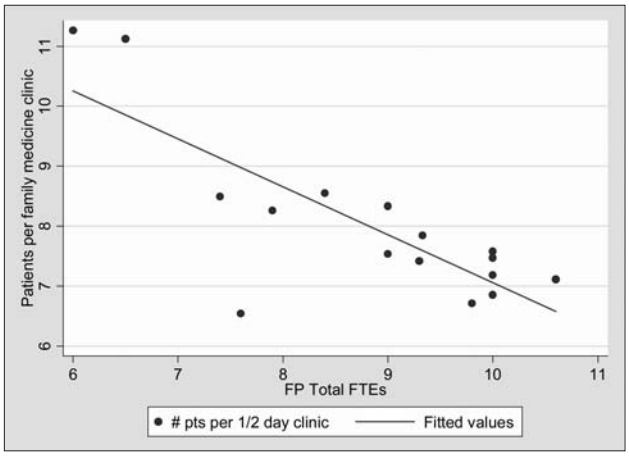

Fig. 1. No. of patients (pts) seen per half-day family medicine clinic compared with the total number of full-time-equivalent (FTE) family physicians (FPs) (r^2 = 0.63, b = –0.8, p = 0.0003).

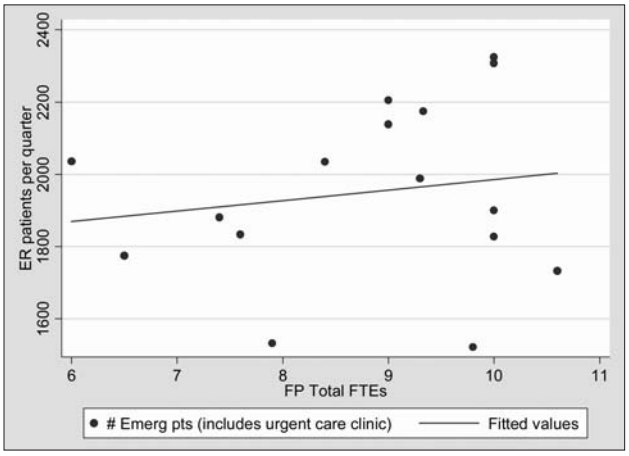

Fig. 3. Total no. of emergency patients (pts) per quarter, including both ER pts and urgent care clinic pts, compared with the no. of full-time-equivalent (FTE) family physicians (FPs) (r^2 = 0.0263, b = 29.16, p = 0.55). ER = emergency department.

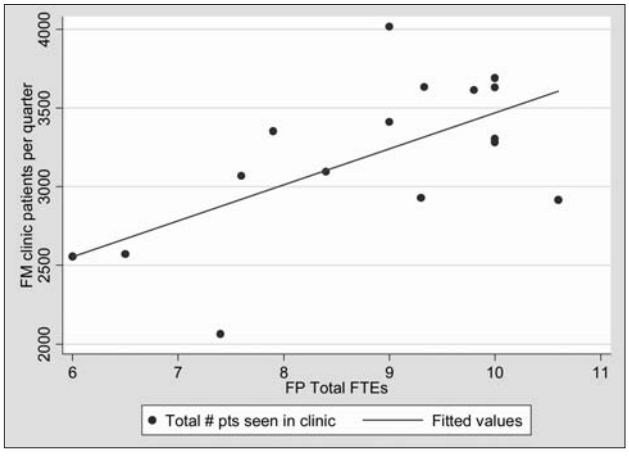

Fig. 2. Total of patients (pts) per quarter seen in family medicine (FM) clinics compared with the total no. of full-time-equivalent (FTE) family physicians (FPs) (r^2 = 0.3860, b = 229.1282, p = 0.01).

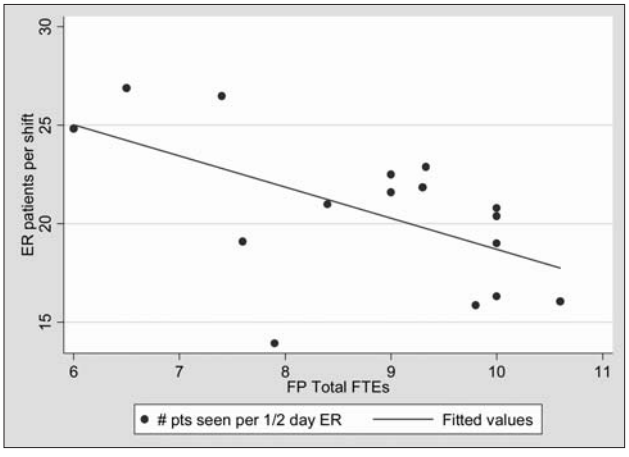

Fig. 4. No. of patients (pts) seen per half-day ER and urgent care shift compared with no. of full-time-equivalent (FTE) family physicians (FPs) (r^2 = 0.3283, b = –1.58, p = 0.02). ER = emergency department

outputs per physician were noted when staffing levels were decreased. The degree to which they increased varied, and the associations were not as strong as for the number of ED shifts worked, but nonetheless were statistically significant. The increase in the number of medevacs per ED shift noted when staffing levels were decreased is likely attributable to the reduced access to physician clinics in the outlying communities served by the physicians based in Moose Factory, Ont.

This study also raises the issue of physician burn-out in rural and remote locations. The physicians increased their workload to meet the needs of the community by increasing patient volumes per unit time in both the clinic and the ED. The average level of intensity of work in their practice also increased, as they maintained care levels for hospital inpatients (which meant that each individual physician carried a larger inpatient load), worked more ED shifts and dealt with larger numbers of acutely ill patients requiring medevacs. If this becomes too much strain, it does not appear that decreasing patient load is a realistic option; the only options available are for the physician to leave the community or for the community to recruit more doctors. This further emphasizes the importance of ongoing efforts to recruit and retain physicians in these communities.

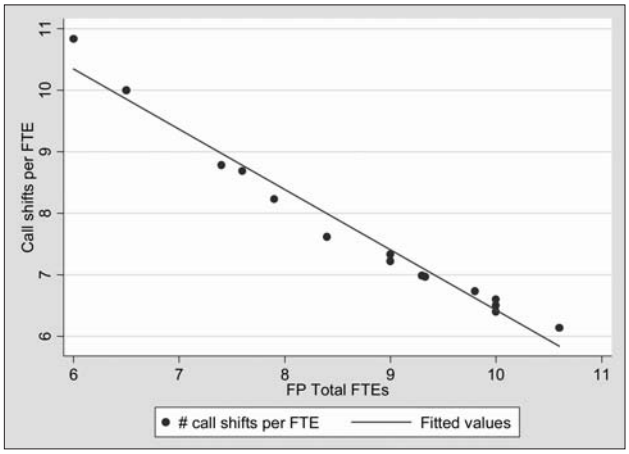

Fig. 5. No. of call shifts per physician as compared with the number of full-time-equivalent (FTE) family physicians (FPs) (r^2 = 0.9732, b = –0.98, p = 0.00001).

Limitations

The limitations of this study need to be acknowledged. First, WHA is an isolated community; the results of this study would apply only to a closed system where no neighbouring communities are available to provide service to patients. Second, it seems possible that over a short period of time physicians would be able to adapt and increase their workload. However, this could lead to burnout and decreased productivity over the long-term. Third, the personality traits of the physicians attracted to practising medicine in a remote location such as WHA may contribute to the altruism demonstrated by increasing workloads in the absence of financial incentives. This may not be a universal response of all personalities or specialties, but mirrors the experiences described anecdotally by other physicians working in similar settings.

Conclusion

During periods of acute increases in demand, physicians feel an obligation to increase patient load, both in terms of numbers and level of intensity, even in the absence of financial incentives. This is contrary

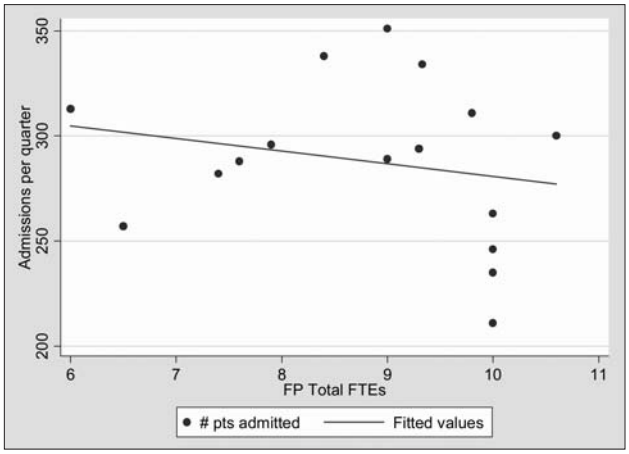

Fig. 6. Total no. of inpatients (pts) per quarter at Weeneebayko Health Ahtuskaywin compared with the no. of full-time-equivalent (FTE) family physicians (FPs) (r^2 = 0.046, b = –6.016, p = 0.43).

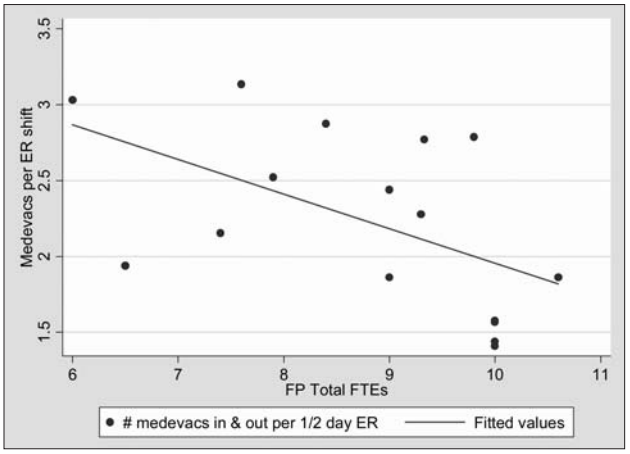

Fig. 7. No. of medevacs in and out of Weeneebayko Health Ahtuskaywin per half-day ER shift compared with no. of full-time-equivalent (FTE) family physicians (FPs) (r^2 = 0.28, b = –0.23, p = 0.03). ER = emergency department

to the criticism of non-FFS funding plans stating that financial incentives are essential if physicians are to respond to increases in demand for services. Our evidence suggests that this concern does not apply to short-term variations in demand due to variations in staffing levels, and should therefore not be considered an impediment to the implementation of non-FFS funding plans for rural and remote communities. This also highlights the need for ongoing recruitment and retention activities if burnout of existing physician staff is to be prevented.

Potential conflict of interest: The principal investigator was the Chief of Staff of the Weeneebayko General Hospital and an ex-officio member of the Weeneebayko Health Ahtuskaywin (WHA) Board from 1999 to 2003. He was also one of the permanent full-time physicians included in the study. He is currently a paid consultant for First Nations and Inuit Health Branch, Ontario Region, one of the funders of the WHA.

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