# Impact of a province-wide nurses' strike on medical care in a regional referral centre

CHRISTOPHER STABLER, MD, FRCP[C]
LAWRENCE SCHNURR, MD, FRCP[C]
GREGORY POWELL, MD, CCFP
BRIAN STEWART, MD, CCFP
CLARENCE A. GUENTER, MD, FRCP[C]

**A 4-week, province-wide nurses' strike in Alberta in 1982 caused the closure of 57% of the acute care beds, including 47% of the intensive care beds, in Calgary. The effects of the strike on patient care at Foothills Provincial General Hospital, where nurses did not strike, were assessed. The number of emergency admissions, severity of illness and rate of death in the intensive care unit increased. On the other hand, the rate of death, length of stay and number of unexpected deaths on the medical wards were similar to those in the control periods before and after the strike. A subjective perception by hospital personnel of deteriorating patient care caused much anxiety; however, the results of analysis of measurable aspects of care suggested that the patients admitted to hospital received care during the strike that was comparable to care given before or after the strike. The inconvenience and potential harm to the patients not admitted because they had less severe illness were not measured.**

**Une grève infirmière d'une durée de 4 semaines survenue à travers l'Alberta en 1982 a entraîné à Calgary la fermeture de 57% des lits pour maladies aiguës, y compris 47% des lits de soins intensifs. Le but de ce travail est d'évaluer l'incidence de cette grève sur les soins aux malades au Foothills Provincial General Hospital, où elle n'a pas été observée. Si le nombre d'entrées d'urgence, la gravité moyenne des maladies et le taux de mortalité dans le service des soins intensifs ont augmenté, on n'a noté dans les salles de médecine aucune différence dans le taux de mortalité, le nombre de décès inopinés et la durée moyenne de séjour par rapport aux périodes témoins ayant précédé et suivi le temps de la grève. Le personnel hospitalier s'est montré inquiet, vu l'impression subjective d'une détérioration de la qualité des soins. Mais au fait, l'analyse des indicateurs chiffrés de cette qualité fait penser que les malades hospitalisés pendant la grève ont été aussi bien traités que ceux qui l'ont été avant et après. On n'a pas chercher à quantifier les ennuis et les torts éventuels subis par les malades qui, en raison de la moindre gravité de leurs cas, n'avaient pas été hospitalisés.**

From the departments of medicine and family medicine, University of Calgary and Foothills Provincial General Hospital, Calgary, Alta.

Reprint requests to: Dr. Clarence A. Guenter, Department of medicine, Faculty of medicine, Foothills Provincial General Hospital, 1403 29th St. NW, Calgary, Alta. T2N 2T9

Acute shortages of health care workers due to strikes have caused great concern and inconvenience in recent years. Many institutions have reported their experience with such crises, emphasizing terms for and methods of negotiation,[1-5] ethical issues,[5,6] cost[7-9] and alternatives to withdrawal of services.[4,6,10-12]

A recent strike by the United Nurses of Alberta involved all acute and chronic care hospital facilities except those owned and operated by the province. Consequently, two metropolitan tertiary care and teaching hospitals, the Foothills Provincial General Hospital in Calgary and the University of Alberta Hospital in Edmonton, assumed most of the responsibility for acute care of adult patients in their regions. Each of these hospitals provided tertiary care to a population of about 1.2 million people. In this paper we report and interpret selected data on the effects of the nurses' strike on patient care in the Foothills Provincial General Hospital.

## Measures taken by the hospitals

The strike took place between Feb. 13 and Mar. 12, 1982. The hospitals in Calgary have 2627 acute care beds, of which 97 are for intensive care. During the strike the number of beds was reduced to 1130, with 51 intensive care beds (Figs. 1 and 2). The change in the number of beds available in surrounding community

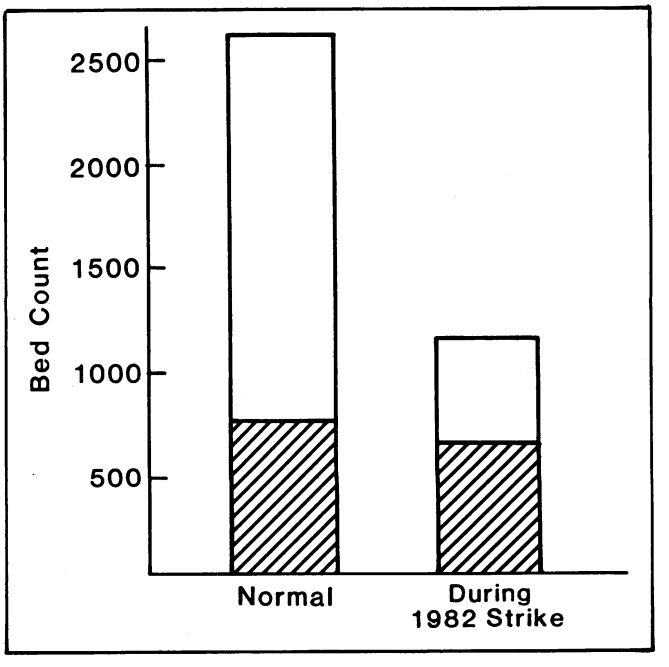


**Fig. 1—Availability of hospital beds in Calgary under normal circumstances and during 1982 nurses' strike. All categories of acute care beds are included. Hatched areas represent beds in Foothills Provincial General Hospital, white areas those in other hospitals in Calgary.**

hospitals is not known, since the strike was complete in some areas and partial in others; however, we assumed that most patients with serious acute illnesses in the southern half of the province were referred to our hospital.

As a result of two brief nurses' strikes in the preceding 5 years, we had drawn up a comprehensive contingency plan to deal with the increased demand for patient care that would be imposed by a strike in other hospitals in our region. When contract negotiations between the nurses and the Alberta Hospital Association broke down, an office was set up to coordinate the Calgary hospitals' response to the strike. An assistant executive director of the Foothills Provincial General Hospital chaired a committee of appropriate hospital department heads and was designated as coordinating officer for the response to the strike. Since we expected a rapid influx of severely ill patients, the following measures were instituted:

- All elective surgery was cancelled.
- All elective and prescheduled admissions were reviewed, and only emergency admissions were permitted.
- The departments of medicine and surgery appointed a member of the medical staff to serve as admitting officer to review the appropriateness of every admission and to assist, if necessary, with placement of the patient.
- A communication centre was set up in the emergency department to communicate with all other hospitals, the ambulance service and the admitting officers.
- Nursing staff and coverage by staff physicians in the emergency department were increased by 50%.
- House staff coverage in the emergency department, on the medical wards and in the intensive care unit was doubled by reassignment from other hospitals and elective services.
- Nursing staff in the intensive care unit was increased by 30% through recruitment of nurses currently not employed or from other provinces.
- During the strike six additional beds for intensive care were opened and staffed 24 hours per day by medical and nursing staff reassigned from nonemergency departments or recruited from outside the hospital.

## Assessment of changes in patient profile, hospital utilization and mortality

### *Methods*

We reviewed the hospital records for a control period before the strike, the 4 weeks of the strike and a control period after the strike. We paid particular attention to the emergency department, the medical wards and the multidisciplinary intensive care unit (examining the coronary care unit and the multiorgan failure unit separately) since these three areas experienced the most use. Standard data, including number, age and sex of patients, length of hospital stay and number of deaths, were recorded. For the medical wards and the intensive care unit we tabulated the number of unexpected deaths (i.e., deaths of patients who were not recognized to be terminally or critically ill). For the intensive care unit we recorded the following data:

- Transfer time (time from arrival in hospital until admission to the unit).
- Length of stay in the unit.
- Total length of stay in hospital.
- Number of readmissions to the unit.
- Number of "invasive" lines (i.e., chest tubes, arterial lines, Foley catheters and Swan–Ganz catheters, but excluding simple peripheral intravenous lines).
- Number of medications given by continuous intravenous infusion (i.e., heparin, insulin and dopamine, but excluding dextrose and saline).

In order to assess the severity of illness and complexity of care, all cases were assessed by the Therapeutic Intervention Scoring System (TISS).[13] These assessments were made at the time of admission, each day the patient stayed in the unit and at the time of discharge from the unit. Complications of invasive procedures performed in the unit, including pneumothorax development during central vein puncture and misplacement of endotracheal tubes, were evaluated.

Statistical evaluation comparing activities during the strike with those in the periods before and after was by chi-square analysis or one-way analysis of variance; when the F value was positive, Tukey's W test was used to identify differences.[14]

### *Results*

*Emergency department:* The daily number of patient visits, admissions to hospital and admissions to the intensive care unit all increased during the strike (Table I). The proportion of patients visiting the emergency department who required hospital admission appeared to increase (from a mean of 11.7% to 15.1%); however, the numbers varied from day to day, and the changes were not significant. The proportion of admissions to the intensive care unit out of all the hospital admissions from the emergency department was unchanged during the strike.

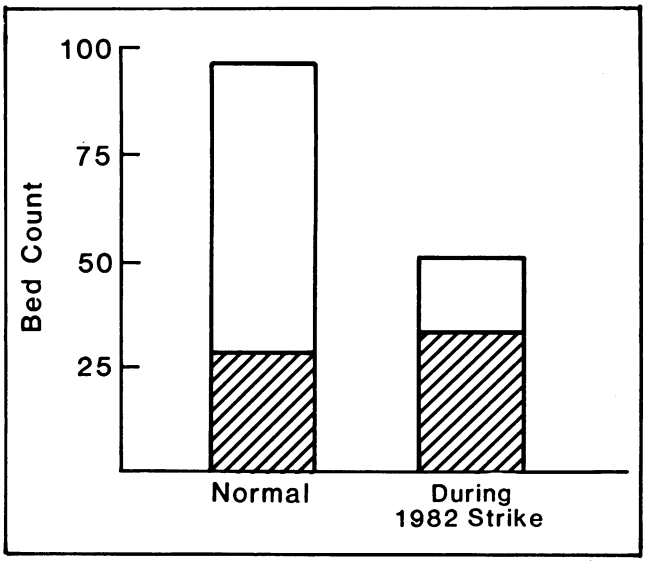


**Fig. 2—Distribution of intensive care beds in Calgary under normal circumstances and during the strike. Hatched areas represent beds in Foothills Provincial General Hospital, white areas those in other hospitals in Calgary.**

*Medical wards:* The number of patients admitted to the medical wards per week during the strike did not increase significantly (Table II). The mean age of the patients was significantly higher, but the male:female ratio was unchanged. The length of stay on the medical wards did not change, and both the number of deaths and the proportion of deaths among the admissions did not change significantly. There were no more unexpected deaths during the strike period than during the control period.

*Coronary care unit:* The number of patients admitted per week to the unit did not change significantly during the strike (Table III). The mean age of the patients did not change, but the male:female ratio increased from 1:1 to 2:1. The transfer time decreased significantly during the strike. The mean length of stay in the unit rose from 3.7 to 4.2 days during the strike, but this was not a significant change. The length of hospital stay did not change during the strike, nor did the proportion of patients readmitted to the unit before discharge from the hospital. Severity of illness, measured by the complexity of care, may have increased (Table IV). For

**Table I—Visits to the emergency department**

| Variable | Period studied*: Two weeks before strike | Four weeks of strike | Two weeks after strike | p value† |
|---|---|---|---|---|
| Visits, mean no./24 h | 240 | 265 | 231 | < 0.05‡ |
| Admissions to hospital | | | | |
| Mean no./24 h | 28 | 40 | 25 | < 0.05§ |
| % of all visits | 11.7 | 15.1 | 10.8 | > 0.05§ |
| Admissions to intensive care unit | | | | |
| Mean no./24 h | 3.7 | 4.9 | 3.3 | < 0.05§ |
| % of all admissions from emergency department | 13.2 | 12.4 | 12.8 | > 0.05§ |

*The 2-week control periods were in the month preceding and the month following the strike.
†Statistical significance determined by ‡Tukey's W test or §the chi-square test.

**Table II—Admissions to the medical wards**

| Variable | Period studied*: Two weeks before strike | Four weeks of strike | Two weeks after strike | p value† |
|---|---|---|---|---|
| Admissions, mean no./wk | 78 | 84 | 115 | > 0.05‡ |
| Patients' mean age (yr) | 52 | 57 | 53 | < 0.05§ |
| Patients' sex ratio (M:F) | 1.1:1 | 1.3:1 | 1.1:1 | > 0.05‖ |
| Length of stay (d), mean | 10.4 | 11.6 | 13.3 | > 0.05‡ |
| Deaths | | | | |
| Mean no./wk | 6 | 8 | 7 | > 0.05‡ |
| % of all admissions | 7.6 | 9.5 | 6.1 | > 0.05‡ |
| Mean no. unexpected/wk | 1 | 1 | 0.5 | > 0.05‡ |

*Control periods as in Table I.
†Statistical significance determined by ‡one-way analysis of variance, §Tukey's W test or ‖the chi-square test.

**Table III—Admissions to the coronary care unit**

| Variable | Period studied*: Four weeks before strike | Four weeks of strike | Four weeks after strike | p value† |
|---|---|---|---|---|
| Admissions, mean no./wk | 28 | 31 | 25 | > 0.05‡ |
| Patients' mean age (yr) | 61 | 60 | 61 | > 0.05‡ |
| Patients' sex ratio (M:F) | 1:1 | 2:1 | 1.6:1 | < 0.05§ |
| Transfer time (min), mean | 227 | 202 | 217 | < 0.05‖ |
| Length of stay (d), mean | | | | |
| In unit | 3.7 | 4.2 | 3.4 | > 0.05‡ |
| In hospital | 13.5 | 13.5 | 13.0 | > 0.05‡ |
| Readmissions, % of all admissions | 13 (11) | 13 (10) | 9 (9) | > 0.05§ |

*The first 4-week control period ended 1 week before the strike; the second began 1 week after the strike.
†Statistical significance determined by ‡one-way analysis of variance, §the chi-square test or ‖Tukey's W test.

**Table IV—Indicators of severity of illness among the patients in the coronary care unit**

| Indicator | Period studied*: Four weeks before strike | Four weeks of strike | Four weeks after strike | p value† |
|---|---|---|---|---|
| Invasive lines | | | | |
| Total no. | 55 | 120 | 64 | > 0.05‡ |
| Mean no./patient | 0.48 | 0.96 | 0.54 | > 0.05‡ |
| Medications given by continuous intravenous infusion | | | | |
| Total no. | 73 | 102 | 54 | > 0.05‡ |
| Mean no./patient | 0.64 | 0.82 | 0.54 | > 0.05‡ |
| Deaths | | | | |
| % of admissions | 6 | 10 | 6 | < 0.05§ |
| Total no. unexpected | 3 | 0 | 0 | > 0.05‡ |

*Control periods as in Table III.
†Statistical significance determined by ‡one-way analysis of variance or §the chi-square test.

example, the number of invasive lines used per patient doubled during the strike period, and the number of medications per patient given by continuous intravenous infusion increased by a third. These differences were not statistically significant owing to the great variations in the complexity of care among the patients. The number of deaths and the proportion of deaths among the admissions also increased. The number of unexpected deaths actually fell during the strike.

*Multiorgan failure unit:* The mean age of the patients admitted to the unit did not change during the strike, but the male:female ratio increased markedly (Table V). The transfer time, length of stay in the unit and readmission rate showed no significant changes. During the strike the proportion of patients admitted to this unit directly from the emergency department was greatly increased, whereas the proportion admitted from the operating rooms was much reduced (Fig. 3).

During the strike the complexity of care received in the unit, as assessed by the TISS, was increased from the time of admission to the time of discharge; however, the patient-to-patient variance was large, and the differences were not significant (Table VI). The higher values during the strike probably reflected increased severity of illness, since more patients died during this period. There was no significant increase in the rate of procedural complications.

## Discussion

During the province-wide nurses' strike that we described here, there was an unpredictable disruption of health care services to more than 2 million people, which created widespread inconvenience, stress in labour–management relations, angry public debate and morale problems for health care workers. Patients, their families and health care workers were extremely concerned about safe care for the sick. Physicians were quick to adopt the role of patient advocate, emphasizing the possibly disastrous effects on patient care if usual hospital procedures were disrupted and usual standards and criteria for care were changed. Since the law

**Table V—Admissions to the multiorgan failure unit**

| Variable | Period studied*: Four weeks before strike | Four weeks of strike | Four weeks after strike | p value† |
|---|---|---|---|---|
| Admissions, mean no./wk | 9.3 | 13.0 | 11.7 | > 0.05‡ |
| Patients' mean age (yr) | 52 | 51 | 50 | > 0.05‡ |
| Patients' sex ratio (M:F) | 1.7:1 | 3.4:1 | 1.3:1 | > 0.05§ |
| Transfer time (min), mean | 240 | 163 | 150 | > 0.05‡ |
| Length of stay in unit (d), mean | 4.4 | 5.9 | 4.1 | > 0.05‡ |
| Readmissions, % of all admissions | 15 | 11 | 30 | > 0.05§ |

*Control periods as in Table III.
†Statistical significance determined by ‡one-way analysis of variance or §the chi-square test.

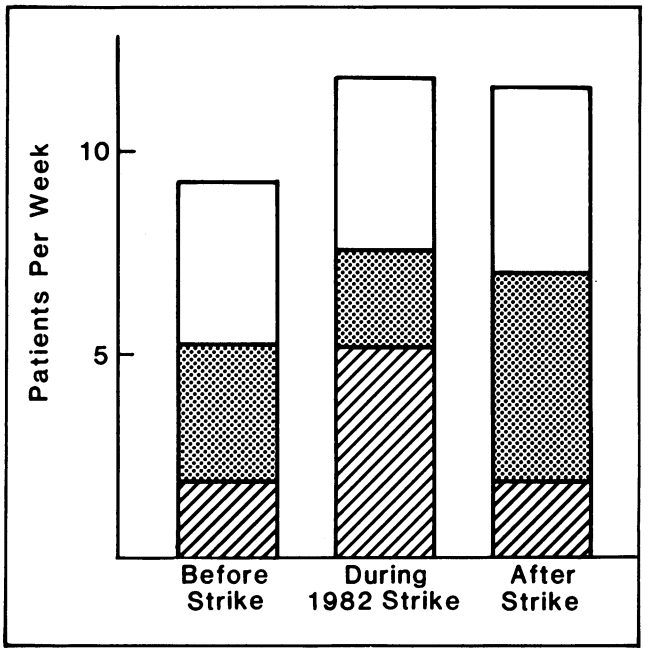


**Fig. 3—Origin (operating rooms [dotted areas], emergency department [hatched areas] or other [white areas]) and mean numbers of admissions per week to multiorgan failure unit of intensive care unit at Foothills Provincial General Hospital before, during and after strike.**

**Table VI—Indicators of severity of illness among patients in the multiorgan failure unit**

| Indicator | Period studied*: Four weeks before strike | Four weeks of strike | Four weeks after strike | p value† |
|---|---|---|---|---|
| Mean TISS‡ score | | | | |
| Per patient | | | | |
| At time of admission | 24 | 30 | 23 | > 0.05§ |
| At time of discharge | 16.2 | 21.8 | 17.2 | > 0.05§ |
| Total | 100 | 180 | 89 | > 0.05§ |
| Per patient-day | 20 | 27 | Not available | < 0.01‖ |
| Unit total/d | 140 | 300 | 162 | > 0.05§ |
| Complications, mean no./patient | 0.68 | 1.00 | 0.48 | > 0.05§ |
| Deaths, % of admissions | 37 | 43 | Not available | > 0.05¶ |
| While in unit | 22 | 33 | 17 | < 0.05¶ |
| Before discharge from hospital | 15 | 10 | Not available | > 0.05¶ |

*Control periods as in Table III.
†Statistical significance determined by ‡one-way analysis of variance, ‖Tukey's W test or ¶the chi-square test.
‡TISS = Therapeutic Intervention Scoring System.[13]

required that certain institutions be spared, we at the Foothills Provincial General Hospital in Calgary were in a position to assess the effects of this strike, which involved an entire referral area receiving care at a centre where nurses did not strike.

Many factors influenced hospital utilization during the strike. An active media program was conducted to encourage patients to seek care at hospitals only when absolutely necessary. Many patients doubted the reliability of the health care system during the strike. Private, nonhospital-based emergency clinics in Calgary announced improved staffing and faster service. Surgical procedures were performed only when they were considered emergencies; consequently, there were fewer postoperative complications requiring intensive medical care (Fig. 3).

Because of these factors the number of patients who visited the emergency department was only slightly increased during the strike. We had predicted far greater use of our emergency department than normal on the basis of the usual use of the emergency departments that were closed by the strike. The reduction in the total number of patients admitted to hospital in Calgary during the strike probably reflected more rigorous screening. The percentage of all patients admitted to hospital who were taken to the intensive care unit did not change; this probably reflects an irreducible minimum number determined by the established admission criteria and a maximum number determined by the availability of beds. The coroner said that there were no unexpected deaths reported during the strike among patients discharged from the emergency department or the medical wards, which suggests that the evaluations for severity of illness were accurate.

During the strike the average age of the patients admitted to the medical wards rose significantly, but the length of stay and the death rate did not change significantly. There was concern that some patients who needed intensive care were not admitted to the intensive care unit because of a lack of available beds. To assess this possibility we reviewed the case of every patient who had died to determine the number of patients who died unexpectedly and the number of patients who died while on a medical ward but for whom intensive care might have been judged preferable. The number of unexpected deaths relative to the number of admissions did not change during the strike. Several patients with severe, advanced disease were denied intensive care although they would normally have received it. Two of these patients died, but it was not clear whether more aggressive care would have improved their chances for survival.

There were common perceptions among nurses and physicians that during the strike patients were waiting for unusually long periods in the emergency department while beds were reallocated to accommodate new admissions, that patients receiving intensive care were discharged earlier than usual because of the need for beds for new patients and that the readmission rate was high because of premature discharge or incomplete care during the initial hospital stay. The data revealed, however, that the time from arrival at the emergency department to admission to the coronary care unit actually decreased during the strike, that the average stay in the intensive care unit was actually somewhat longer during the strike and that the readmission rate was not increased during the strike.

The severity of illness is difficult to quantify; in most studies it is measured by the type and number of medical interventions used, which we have described as the complexity of care. The increased complexity of care required in the intensive care unit during the strike was determined by the increased numbers of invasive lines and medications given by continuous intravenous infusion to patients in the coronary care unit and by the greater TISS scores for the patients in the multiorgan failure unit. Since well established criteria for these diagnostic and therapeutic interventions have been used for several years, and since the same physicians supervised these patients' care, it is likely that these indices reflected more severe illness. Further evidence of the increased severity of illness during the strike was the increased death rate in the intensive care unit. In spite of the increased workload and severity of illness, the rate of procedural complications did not increase, and none of the patients admitted to the intensive care unit died unexpectedly during the strike. These findings are a reassuring indication that adequate quality of care was maintained.

We were unable to identify statistical parameters that described the increased workload and tension within the hospital during the strike. Several specific areas of concern are worth mentioning, however. Medical staff who were expected during the strike to apply admission criteria that differed from usual practice and therefore did not admit patients who would not obviously and clearly benefit from a hospital stay felt great strain. Nurses were clearly under stress partly because of their wish to support their striking colleagues and partly because of a sense that patient care was incomplete, unsafe or inadequate. Administration, maintenance, laundry, dietary and laboratory staff all worked longer hours and more shifts in order to deal with the increased number of severely ill patients and, perhaps most importantly, to maintain a level of readiness for the unknown demand that might be placed on the hospital. There was a poststrike recovery period that was perceived by hospital personnel to be characterized by psychosocial instability, which also could not be quantified.

The ideal control periods for patient comparisons is debatable. In view of well documented seasonal effects on hospital use, we chose periods that bracketed the strike. It is likely that the periods before the strike are representative of normal hospital use. The poststrike periods may represent some continued effect of the strike.

Reallocation of resources, recruitment of additional personnel from the community, increased monitoring and supervision within programs, and voluntary reduction of hospital use by the public together provided what appears to have been at least equivalent care for the patients admitted to our hospital during the strike. However, many questions not addressed in this study remain unanswered. Most patients who were slated for elective biopsy of possibly malignant tumours waited 4

to 8 weeks longer for these procedures. Patients waiting for elective surgery, such as implantation of orthopedic prostheses, herniorrhaphy and cholecystectomy, and some patients awaiting resectional surgery for treatment of cancer also experienced delays. The pain or inconvenience experienced by such patients was not addressed in this study.

## References


1. ANTHONY MF: Early planning helps hospitals run efficiently during strike. *Hospitals* 1978; 52: 105, 108, 110–112
2. BARTMAN TI: Be prepared for future strikes. *Health Care* 1980; 22: 31–35
3. BARRETTI ML, DOMAINGUE RA: Detailed planning key to ongoing hospital function during a strike. *Hospitals* 1981; 55: 73–76
4. ROACH DL, BOYLE R, JONES DW et al: Hospitals stand firm, ensure care in lengthy area wide nurses' strike. *Hospitals* 1977; 51: 49–51
5. WOLF S: Strikes by hospital workers — a look at the concept, ethics and impacts. *Am J Public Health* 1979; 69: 431–433
6. CONNELLY CE, EVANS LK, DAHLEN RM et al: To strike or not to strike. *Superv Nurse* 1979; 10: 52–59
7. BRODY PE, LONDON J: How costly is a strike? *Hospitals* 1975; 49: 53–56
8. BRODY PE, STAMM JB: Coping with hospital strikes. *Mt Sinai J Med (NY)* 1978; 45: 773–781
9. Idem: Strike two: hospitals down but not out. *HCM Rev* 1978; 3: 53–61
10. Idem: Statistics tell a tale of two strikes. *Hospitals* 1978; 52: 57–61
11. HUBER GA, FORSYTHE RJ: Strategic strike management helps hospitals to carry on. *Hospitals* 1979; 53: 91–97
12. SHAFFER FA: A 70-day strike by professional nurses. *Superv Nurse* 1980; 11: 50–53
13. CULLEN DJ: Results and costs of intensive care. *Anesthesiology* 1977; 47: 203–216
14. OTT L: *An Introduction to Statistical Methods and Data Analysis*, Duxbury Pr, North Scituate, Mass, 1977: 389–392


## *ANNOUNCEMENT OF MEETINGS*

*continued from page 191*

Oct. 11–12, 1984

Canadian Association of Quality Assurance Professionals
Inn on the Park Hotel, Toronto
Miss J. Craighead, Treasurer, Canadian Association of Quality Assurance Professionals, Wellesley Hospital, 160 Wellesley St., Toronto, Ont. M4Y 1J3; (416) 966-6743

Oct. 18–20, 1984

Insight in Sight, Fifth Canadian Interdisciplinary Conference on the Visually Impaired Child
Four Seasons Hotel, Vancouver
Canadian National Institute for the Blind; (604) 321-2311

Oct. 19–20, 1984

The Sixth Post-Graduate Dermatology Seminar
Inn on the Park Hotel, Toronto
Dr. R.S. Lester, 2075 Bayview Ave., Toronto, Ont. M4N 3M5


# PAGING DOCTORS

**Messages from a medical journalist**

*By David Woods*

**180 pp. hardcover**
**Foreword by**
**D. Laurence Wilson, MD**
**Dean of Medicine**
**Queen's University**

**A collection of more than 50 articles, editorials and reviews by the Canadian Medical Association's Director of Publications . . . and culled from CMAJ, Canadian Family Physician, Maclean's, Quest, The Toronto Star, etcetera . . . including Medicine and the English language, The medical profession's image, Doctors and the press, Fitter than Thou, Words to give up . . . and interviews with William F. Buckley, Jr., Edwin Newman and Norman Cousins.**

*". . . a witty, scholarly look at the world, mostly at the world of medicine and its practitioners" — Morris Gibson, MD, author of One Man's Medicine.*

*". . . Paging Doctors is a treasure of fun, erudition, wit, good sense and delicious English" — Andrew Malleson, MD, author of Medical Runaround.*

*". . . doctors don't have time to return to school for a course in communication. But they do have the time to read this delightful, truthful book" — W. Gifford-Jones, MD, syndicated columnist and author of The Doctor Game.*

**To: Epigram Publishing, PO Box 6044, Station J, Ottawa, Ontario, Canada K2A 1T1**

**Please send me _____ copy(ies) of Paging Doctors at $20.00 each.**

**Name: (block letters)** _____

**Address:** _____

_____

_____