



problem that included better education about services that protect abused women, the need for physicians to ask their patients about abuse, the provision of services for abusers and the need to find ways for the long-term prevention or reduction of the frequency of abuse in pregnancy. Newberger and colleagues¹⁰ emphasized the need for housing advocacy, legal and medical referrals, court accompaniment and access to counselling support groups. They advocated for “networks of support in the community.”

A crucial question that needs to be asked now is “What can we do to prevent physical abuse in pregnancy?” Without population-based studies and rigorous evaluation of interventions aimed at reducing the problem, this question will be difficult to answer. Clearly the study by Muhajarine and D’Arcy, as well as the earlier work of Stewart and colleagues,⁸ indicates that the burden of suffering associated with this problem demands that we make this area a research priority in Canada. Determining the prevalence and risk factors of physical abuse in pregnancy at the national level, over the long-term, is an important element of developing preventive interventions. Without rigorous evaluation of prevention programs we will not know whether such programs are doing more good than harm. I hope that one day soon a commentary will be published that tells us “What we have learned about the prevention of physical abuse in pregnancy.”

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Can the health care system buy better antibiotic prescribing behaviour?

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Antibiotics costing more than \$485 million are prescribed annually in Canada (source: IMS Health Canada database, 1997). Concerns have been raised that some of this amount represents an inefficient use of limited health care resources, through either the unnecessary use of antibiotics for viral infections or the excessive use of expensive broad-spectrum drugs. In addition to questions about cost, the immoderate use of antibiotics has also been associated with the development of antibiotic resistance in the community.

Excessive antibiotic use is likely multifactorial.¹ Physicians have a strong desire to treat all infections aggressively

to avert therapeutic failure. Pressure from patients may also contribute to this problem, and physicians may fear that their patients will leave the practice to find more willing prescribers. A third issue is time: it takes less time to write a prescription than to explain to a patient why an antibiotic is unnecessary.

In this issue James Hutchinson and Robert Foley² identify an association between the rate of antibiotic prescription and the method of physician payment (fee-for-service or salary) (page 1013). In their study of Newfoundland GPs, they found that fee-for-service physicians gave antibiotic prescriptions to more patients than did salaried physi-



cians; they also found that as the number of patients receiving antibiotics increased, the mean number of prescriptions per patient also increased.

Is the fee-for-service payment method responsible for a significant component of antibiotic overuse? The answer to this question is difficult to determine from the design and analysis of this study. In the calculation of antibiotic rates, the denominator is the number of unique patients who received an antibiotic during the 1-year period of the study. We do not know the percentage of all patients seen in the practice who received antibiotics, nor the percentage of patient visits that resulted in such prescriptions. For example, we might draw different conclusions if we knew that the mean number of *patient visits* for the fee-for-service physicians was 3 times the number for the salaried physicians, given that the mean number of *unique patients receiving an antibiotic* was just under twice as many (212 v. 117).

Did the practices of the fee-for-service physicians include a greater number of patients receiving social assistance? If so, this would account for the difference in the mean number of unique patients receiving an antibiotic, since the data used in the analysis were obtained from the provincial government's drug benefit program, which pays for antibiotics for those receiving social assistance and needy elderly people. Practice location differed between the 2 physician payment categories, with 41.3% of the fee-for-service physicians and only 12.3% of the salaried physicians practising in St. John's. One might expect an urban practice to have more patients receiving social assistance.

The study indicates that of the patients who received at least one antibiotic prescription, those in the fee-for-service practices were more likely to have received more antibiotic prescriptions during the year of the study. But were they sicker? Although no data are provided on comorbidity, patient age and practice location were not different between the low and high prescribing physicians, which suggests that perhaps their 2 patient populations were not all that different.

If we are to accept the findings of this cohort study at face value, we should consider other possible explanations in addition to the authors' hypothesis that antibiotic prescription behaviour is more indiscriminate among fee-for-service physicians. For example, patients in high-volume, fee-for-service practices may have more prescription renewals per year for chronic disorders, may have more multiple antibiotic prescriptions to treat infections or may have more antibiotic failures, in which case a second antibiotic would be required. The last of these possibilities would represent an interesting scenario, in that it could imply a greater use of first-line antibiotic therapy for most patients in fee-for-service practices, rather than immediate use of second-line agents. Given these alternative hypotheses, it is difficult to draw from Hutchinson and Foley's results any specific inferences about the appropriateness of physicians' prescribing behaviour.

Evidence in the literature also contradicts the findings

obtained in this study. Hueston and colleagues³ showed that doctors in health maintenance organizations prescribed antibiotics for upper respiratory tract infections to a greater extent than their fee-for-service counterparts. In another study⁵ overuse of antibiotics was widespread among physicians in all payment systems. The proportion of salaried primary care physicians in Newfoundland is much larger than in other Canadian provinces, which may indicate that there is something unique about this region that could account for the discordance in results between this and other studies.

Hutchinson and Foley have demonstrated only an association, not causality, between physician payment method and rate of antibiotic prescription. Any belief that changing the remuneration system from fee-for-service to salary would help remedy the problem of excessive antibiotic use is premature. It may well be that physicians with tendencies for higher antibiotic prescription migrate to fee-for-service practices, and the "causal association" may be in the opposite direction.

So where should we go from here? Hutchinson and Foley's study is important for generating hypotheses, but the results need to be validated with data obtained using different methods. We need to know the frequency of antibiotic use per patient encounter for patients who present with signs and symptoms of infection. This type of data can be obtained only from patient records, not administrative databases. In addition, we need to know if the rate of antibiotic prescribing declines among physicians who have moved from fee-for-service to salaried payment programs. Although this information would not constitute high-quality evidence, it would be helpful in evaluating the role of payment method in determining prescribing behaviour. Until we have this additional information, it is important to educate physicians and patients about the problems of excessive antibiotic use and to develop and test programs that can have a positive influence on antibiotic prescribing behaviours.

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