Private costs of patients hospitalized with community-acquired pneumonia

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BACKGROUND: Community-acquired pneumonia (CAP) is a condition which frequently requires hospitalization and consequently, can result in high costs. Little is known of the additional personal resources that are used by patients hospitalized for CAP.

OBJECTIVE: To measure the private costs for persons who were hospitalized with CAP for the 30 days after being admitted to hospital using a systematic method of measurement.

METHODS: Potential personal cost items were identified by nurses familiar with the treatment of CAP and categorized. Using telephone interviews in conjunction with the cost-identification framework, 60 patients from the Edmonton, Alberta area were surveyed for their private costs associated with CAP for 30 days after admission to hospital.

RESULTS: Of the 60 patients surveyed, 49 were older than 65 years of age. The mean private cost was $505, which amounted to 5.6% of the total societal costs of $8,970. The distribution was skewed with a small number of patients that had high costs.

CONCLUSIONS: This method allows the determination of the societal costs for patients hospitalized with pneumonia, and the costs were not much greater than those to the health care system.

Key Words: Cost; Hospitalization; Pneumonia

PATIENTS AND METHODS

Ethics approval

The protocol for the project was approved by the University of Alberta Health Research Ethics Board in Edmonton, Alberta. Patients, while in hospital, gave informed, written consent to be interviewed. Their informed consent was asked for a second time when they were interviewed over the phone approximately one month after giving first consent.

Patient selection

Sixty consecutive patients were interviewed, and were drawn from four hospitals within the Capital Health Region of Edmonton. The study nurses were requested to interview all patients with pneumonia on their wards.

Time frame

The costs that were incurred during the 30 days after the initial hospitalization were determined. The time period of onset of pneumonia before hospitalization was difficult to calculate, particularly with patients who might have had associated illnesses. With appropriate intervention, most patients should have the major
signs of pneumonia disappear within a week; therefore, 30 days was judged as being of a sufficient duration to allow for the recuperation of the vast majority of patients.

Measurement
To measure private costs, data were collected in two stages. In the first stage, a list of potential private costs were generated. The list was compiled by 'pneumonia nurses' who were familiar with the treatment of CAP, using prior lists as a reference (6). This resulted in an initial list of 34 items which formed the basis of a telephone questionnaire (Table 1). In the second stage, telephone interviews of the selected patients were performed by one of two interviewers. Sixty patients or their caregivers were interviewed 30 to 35 days after the patients had been admitted to hospital. To determine the reliability of the interview results, 20 of the interviews were repeated by the second interviewer within one week of the first interview.

### Attributable costs
In accounting for attributable costs, decisions had to be made as to which costs were to be allowed. Guidelines were developed to allow for acceptable cost items. Pneumonia-related costs that would pose an extra personal burden on the patient or their caregivers were focused on. The following variables were considered in arriving at the private out-of-pocket costs for each patient.

**Private costs:** A private cost was defined as one where there was an actual "out-of-pocket expenditure" or a loss of income that was borne by the patient or their caregiver, and was always related to resources. The cost of pain and suffering, loss of quality of life or some other situation in which there was no financial loss, and costs that were borne by the health care system, governments or insurance were not included. An ongoing cost that existed before the onset of CAP was excluded because it could not solely be attributed to CAP.

**Caregiver costs:** Costs generated by the primary caregiver (or the equivalent, if more than one person shared care) were included. These costs included travel expenses for the caregiver for hospital visits and for any time lost from work.

**Standard unit costs:** To ensure that the results reflected differences among patients in actual resources used (rather than the prices paid for them), where available, a standard list of costs was used to evaluate the dollar value of the resources used. The list of standard costs and data sources are shown in Table 2.

### Initial cost list and structured interview
The initial list of potential cost items was divided into four categories and formed the basis of the structured telephone interviews. Several types of cost items (eg, ground ambulance and prescription drugs) were frequently, but not always, covered by the government or private insurance. These items were placed into a separate group, and the costs were analyzed with and without this group. In addition to the cost items, patients were asked for basic demographic information. Patients or their caregivers were asked to add any additional costs that were not listed. Where patients incurred a cost, they were asked to report or estimate its cost. They were also asked if the cost was covered by a third party and if they had to pay a portion of the cost. In cases where standardized costs were used, they were not asked for the actual cost.

### Results
Basic sample characteristics are shown in Table 3. A total of 60 patients or their caregivers were interviewed. Thirty-eight patients and 22 caregivers (as patient proxies) were interviewed. Two additional patients who were telephoned were reported to be deceased and are not included in the summary statistics. Eight patients who had given informed consent to participate could not be reached after five attempts. The average age of the patients was approximately 70 years (range 39 to 95 years); 49 of the 60 patients were older than 65 years of age. The average stay in hospital was 11.63 days, with six of the 60 patients remaining in hospital longer than 30 days.

Because the majority of the patients were older than 65 years of age, in Alberta, they would automatically have Blue Cross drug coverage, which would also cover the majority of their added personal medical expenses. Some of the patients younger than 65 years of age had additional coverage or supplemental coverage to the basic Blue Cross plan. Only one of the 60 patients was without insurance. The patients had an average copayment of 19.3% on their health insurance,
excluding the cost of ambulance service, which is fully covered in Alberta. Because most of the patients were older than 65 years of age, they were no longer employed and, hence, did not lose wages due to illness. Typically, their caregiver was their marriage partner who was also elderly and not employed, and also did not lose salary.

A summary of the private costs, including and excluding items that could potentially be subject to insurance coverage is shown in Table 4. Without ground ambulance and other medical expenses, the mean cost per person was $505±983. The median was $138. The relation between mean and median indicates that the distribution of private costs was skewed towards the right, with the highest value being $4,474.

The items that most frequently appeared on the service list were taxi rides, parking, meals and long distance telephone calls. Most subjects incurred private transportation costs; the most frequently appearing was private automobile costs.

Ground ambulance costs were the most frequent costs in the other health groups. Of the 33 patients who arrived at hospital by ground ambulance, eight also required a second ambulance trip either because of a second admission or transfer to an auxiliary hospital. Approximately one-half of the patients incurred at least one ambulance ride, but all were covered by insurance.

**DISCUSSION AND CONCLUSIONS**

In the present paper, we developed a method to identify and categorize private costs for patients who had been hospitalized with CAP. Using this framework, we conducted personal interviews to measure their private costs for the 30 days following admission to hospital. Our results indicate that the average person incurred private costs of $505 and that these were largely related to transport. The majority of the costs were for lost income (for those who were in the labour force) and for automobile travel.

To our knowledge, there have been no other studies that have examined the private costs of CAP. Several Canadian papers (6-8) have reported the measures of private costs for other conditions, but they did not develop the measures using focus groups and systematic design methods; without these methods, one cannot be sure that the items for which the costs are obtained are complete.

The cost can be related to estimated medical costs for an episode of pneumonia, which includes an emergency room visit (9), along with a physician component (10) ($294) and hospital stay of 11 days at $659 per day (9) along with physician visits ($451) (10) totalling $7,994. To obtain total societal costs, we must add the private costs ($505) and the other insured health care costs, such as drugs and ambulance ($471); the total societal costs for hospitalized CAP cases were $8,970. Thus, private costs amounted to 5.6% of the total. In large part, the low costs are due to the fact that most patients did not work.

Any definition of 'private costs' is dependent on the social environment in which the patient is treated. Social programs, medical care coverage and caregiver support will all have an influence on out-of-pocket costs. We separated drugs and ground ambulance because in Alberta they were covered for virtually all of the patients in our study, although in other provinces or jurisdictions this may not be the case. We also excluded air ambulance services because domestic air ambulance costs are publicly covered in the Canadian health care system. However, the degree of coverage depends on the circumstances.
Three additional ambulance trips for patients in our sample involved transportation by air. All were covered by insurance.

We have included only time lost from work, not from leisure or other activities, as private costs. Time lost from leisure does have an opportunity cost, but this was both hard to identify and measure, and therefore, it was left out of the analysis.

Several shortcomings in the study method should be noted. First, although the nurses were asked to collect data for all persons who were hospitalized with pneumonia, it is likely that a number may have been missed. However, we could not discern which patients these were, and so we do not know if our sample was unbiased. Second, because of the difficulties in recruiting outpatients, we did not study the costs for patients with CAP who were not admitted. Obviously, such data would be of interest to policy makers because it would allow for the comparison of costs on a societal level of inpatients versus outpatients.

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### REFERENCES
