

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*

Community-acquired pneumonia (CAP) has an incidence of 12 cases per 1000 per year, and is the most common cause of death from infectious disease in the United States (1,2). It is ranked as the eighth most cited reason for receiving hospital care within the Edmonton, Alberta Capital Health Region. While most patients can be treated on an out-patient basis, those who are admitted to hospital account for a large proportion of the costs to the formal hospital system. These patients are the focus of the present study.

Palmer et al (3) reported that a proportion of the outpatient data on home care and lost productivity for these high-cost cases were missing. While there was some attempt to collect private cost data (4), the authors did not use a systematic methodology to identify and classify these costs (5) and thus, may have missed some cost items. Jacobs et al (4) studied private costs for chronically ill patients with AIDS by developing a systematic identification and classification methodology, and showed that the private costs reported in previous studies were highly skewed. The purpose of the present study was to assess the private, out-of-pocket and indirect costs to patients hospitalized with CAP and their caregivers using a similar approach.

Coûts privés supportés par les patients hospitalisés pour une pneumonie extrahospitalière

CONTEXTE : Les pneumonies extrahospitalières (PEH) nécessitent souvent un traitement en milieu hospitalier et, par conséquent, peuvent entraîner des coûts élevés. Toutefois, l'on dispose de peu de données sur les ressources personnelles supplémentaires utilisées par les patients hospitalisés pour une PEH.

OBJECTIF : Mesurer les coûts privés supportés par les patients hospitalisés pour une PEH durant les 30 jours suivant leur admission à l'hôpital, et ce, à l'aide d'une méthode systématique de mesure.

MÉTHODE : Une liste d'activités personnelles, susceptibles d'entraîner des coûts a été dressée par des infirmières bien au fait du traitement de la PEH, puis divisée en catégories. Des entrevues téléphoniques ont ensuite été menées à l'aide de la grille de coûts auprès de 60 patients de la région d'Edmonton sur les coûts privés associés à la PEH durant les 30 jours suivant leur admission à l'hôpital.

RÉSULTATS : Sur les 60 patients interrogés, 49 étaient âgés de plus de 65 ans. Le coût privé moyen a atteint 505 \$, ce qui représente 5,6 % du coût total de 8970 \$, supporté par la société. La répartition a été faussée par un petit nombre de patients qui ont déclaré des coûts élevés.

CONCLUSION : La méthode a permis de déterminer les coûts supportés par la société chez les patients hospitalisés pour une PEH, et ces coûts n'étaient pas beaucoup plus élevés que ceux attribués au système de santé.

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

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TABLE 1
Potential service list for persons with pneumonia

Travel and communications
Special transportation (Disabled Adults Transit Services)
Driver
Air ambulance
Automobile (parking)
Taxi fares
Travel accommodation
Automobile expenses
Airplane tickets
Travel meals
Ambulance
Long distance telephone calls
Financial losses/expenses
Time off work
Lost working time for caregivers
Time off work for helpers
Financial support from others
Loss of salary to visit doctor
Personnel costs
Cooking assistance
Shopping assistance
Additional residential help
Child care
Housekeeping assistance
Fees for physician documentation
Yard maintenance
Supplies
Catheters
Masks
Rubber gloves
Tubes
Bowel supplies
Dressings
Oxygen
Medications (over the counter)
Prescription drugs
Nutritional supplements
Tissue

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,

TABLE 2
Standard units used in the cost calculations

Cost item	Unit cost (\$)	Source of data
Travel and communications		
Ground ambulance (per trip)	700.00	Edmonton emergency medical services
Taxi (per two-way trip)	20.00	Edmonton taxi services
Accommodations (per night)	60.00	Capital Health Authority cost for visitors
Parking (per session)	4.00	
Meal (at hospital)	4.50	
Telephone, long distance (per minute)	0.15	Telus (Alberta), long distance rate per minute.
Automobile expenses per km	0.40	Alberta Treasury guidelines (11)
Automobile expenses per city trip	8.00	Assumed 10 km each way
Financial		
Loss of work (per day)	125.00	Statistics Canada (12), average daily wage per person over 50 years of age
Personnel costs		
Physician documentation fee	25.00	Fee per office visit, Alberta Health and Wellness (9)
Other medical services		
Medications (prescription)	5.00	Nominal cost per prescription

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 indicate 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.

TABLE 3
Subject characteristics (n=60)

Sex (n)	
Male	31
Female	29
Age (years)	
Mean ± SD	69.78±14.08
Range	39 to 95
Number hospitalized	60
Average days in hospital (±SD)	11.63±8.55
Car trips	
Hospital trips by car	57
Average number of trips (±SD)	11.23±8.77
Ambulance trips	
Number of patients who made trips	33
Average number of trips (±SD)	1.21±0.42

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.

TABLE 4
Private costs by category

Costs not commonly covered by provincial health plans	Number of persons who incurred costs	Average \pm SD costs for persons who incurred any costs (\$)	Average cost for all persons (\$)
Travel and communications			
Parking	54	42.00 \pm 32.00	38.00
Automobile travel	57	72.00 \pm 56.00	68.00
Taxi	1	280.00	5.00
Out-of-town bus fares	1	152.00	3.00
Accommodations	1	60.00	1.00
Hospital meals	27	35.00 \pm 36.00	16.00
Long distance telephone calls	24	0.90.00 \pm 0.95.00	0.35
Financial losses/expenses			
Days off work	12	1,619.00 \pm 1,244.00	297.00
Caregivers loss of work	4	625.00 \pm 318.00	41.00
Salary loss to visiting doctor	1	125.00	2.00
Personnel costs			
Child care	1	240.00	4.00
Physician documentation fee	1	25.00	0.00
Supplies			
Oxygen	2	220.00	3.00
Tissue	55	1.00	1.00
Total \pm SD, excluding drugs and ground ambulance			505.00\pm983.00
Costs sometimes covered by provincial health plans			
Ground ambulance	33	848.00 \pm 290.00	466.00
Prescription drugs	60	5.00	5.00
Total \pmSD, including drugs and ground ambulance			982.00\pm1,156.00

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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