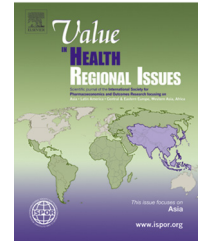




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Economic Burden of Community-Acquired Pneumonia among Adults in the Philippines: Its Equity and Policy Implications in the Case Rate Payments of the Philippine Health Insurance Corporation

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ABSTRACT

Objectives: To determine 1) the cost of hospitalization, the 1-week postdischarge cost, the total cost, and the economic burden of community-acquired pneumonia among patients aged 19 years or older in the Philippines and 2) the difference between the estimated costs and the Philippine Health Insurance Corporation (PhilHealth) pneumonia case rate payments. **Methods:** The study involved two tertiary private hospitals in the Philippines. Using the societal perspective, both health care and non-health care costs were determined. A base-case analysis and sensitivity analyses were performed, and the economic burden of pneumonia was determined using PhilHealth claims. **Results:** The estimated cost of hospitalization for community-acquired pneumonia-moderate risk (CAP-MR) ranged from Philippine peso (PHP) 36,153 to 113,633 (US \$852–2678) and its 1-week postdischarge cost ranged from PHP1450 to 8800 (US \$34–207). The cost of hospitalization for community-acquired pneumonia-high risk (CAP-HR) ranged from PHP104,544 to 249,695 (US \$2464–5885) and PHP101,248 to 243,495 (US \$2386–5739) using invasive and

noninvasive ventilation, respectively. The postdischarge cost for CAP-HR ranged from PHP1716 to 10,529 (US \$40–248). If only health care cost was considered, the cost ranged from PHP24,403 to 89,433 for CAP-MR and PHP92,848 to 213,395 for CAP-HR. The present PhilHealth case rate payments are PHP15,000 (US \$354) and PHP32,000 (US \$754) for CAP-MR and CAP-HR, respectively. Based on the number of PhilHealth claims for 2012 and the estimated health care cost, the economic burden of pneumonia in 2012 was PHP8.48 billion for CAP-MR and PHP643.76 million for CAP-HR. **Conclusions:** The estimated health care cost of hospitalization is markedly higher than the PhilHealth case rate payments. As per the study results, the economic burden of pneumonia is, thus, significantly higher than PhilHealth estimates.

Keywords: case rate payments, economic burden, PhilHealth, Philippines, pneumonia.

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Introduction

In 2009, pneumonia was the fourth leading cause of mortality in the Philippines, occurring in about 46 for every 100,000 Filipinos [1]. Moreover, together with acute lower respiratory tract infections, it was the second highest cause of morbidity, with a rate of about 613 per 100,000 Filipinos in the same year [2].

For the year 2010, the Philippine National Health Insurance (PhilHealth) reported pneumonia (age not specified) as the number one illness on the basis of the number of claims (295,390 claims), which amounted to Philippine peso (PHP) 2,042,400,000 [3]. This amount was also the highest among the top 20 illnesses

reimbursed by PhilHealth in that time period [3]. Likewise, for the first three quarters of 2011, it ranked first among the top 20 illnesses reimbursed by PhilHealth on the basis of the amount of claims (PHP1,851,900,000), although it ranked only second for the same period of time on the basis of the number of claims (262,320) [4].

In view of the above prevalence of pneumonia in a country with scarce resources, it is imperative to determine its economic burden. PhilHealth reimburses hospitals for hospitalized pneumonia cases on the basis of its mandated case rate payments since September 1, 2011 [5]. How this case rate payment approximates the real cost of hospitalization for pneumonia is a very

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important matter that merits consideration not only by patients but also by other stakeholders especially the policymakers. Hence, this study had the following objectives.

Objectives

General objective

To determine the economic burden of community-acquired pneumonia among adults (aged ≥ 19 years) using the societal perspective.

Specific objectives

1. To determine the cost of treating pneumonia as follows:
 - a. Cost of hospitalization
 - b. Total cost (hospitalization cost + 1-week postdischarge cost)
2. To estimate the difference between the above cost of hospitalization and that of the PhilHealth pneumonia package
3. To estimate the economic burden of community-acquired pneumonia in the country.

Methods

Setting

The above objectives were determined using the setting of an urban area and a suburban area in the country. The study sites were two tertiary private hospitals, the first one located in Manila, an urban area and the capital of the Philippines, while the other was located in a suburban area approximately 30 km south of Manila.

Inclusion Criteria

The study included patients aged 19 years and older who were admitted with a diagnosis of pneumonia on the basis of clinical signs and symptoms, radiologic test, and microbiology from January to December 2012 in the above tertiary hospitals. The medical records of the patients who satisfied the inclusion criteria were reviewed, after which the corresponding data were recorded.

Design: Cost Analysis Using the Societal Perspective

In any costing study, the steps involved are identification, measurement, and valuation of costs. These were done for both hospitalization and postdischarge costs. Drummond's classification of costs was used, which are 1) cost of health care resources consumed, 2) cost of patient/patient's family resources or out-of-pocket expenses, (3) productivity or production losses, and 4) cost due to the consumption of other resources/sectors [6].

The reference time used for the final cost was that for the year 2012 to coincide with the time period of hospitalization of the included patients.

Moreover, 2012 was also the reference year for the other types of costs (productivity losses and the cost for the consumption of other resources). Adjustment of the cost to 2012 was done through the use of consumer price indices.

All the above categories of costs were used for the determination of the economic burden of pneumonia except for the first one because this category refers to the cost of establishing and maintaining a health care program or service and the costs of treating the possible adverse effects of the said program. Under this category are fixed and variable costs (rent or capital cost and supplies). This type of cost was excluded because there was no need to establish a new facility or health care program. The study

settings are already equipped with provisions for the diagnosis and treatment of pneumonia.

Hospitalization Costs

The cost of hospitalization refers to the costs incurred for hospital confinement for pneumonia, that is, in-patient hospitalization. In estimating the hospitalization costs, the following identified cost centers were measured and valued:

1. Out-of-pocket expenses, which included the following:
 - a. Emergency room fees: cost of care delivered at the emergency room.
 - b. Cost of diagnostic examinations: cost of laboratory examinations, x-rays, and so forth.
 - c. Treatment cost: cost of medications, intravenous fluids, and other related expenses such as nebulizations and oxygenation.
 - d. Room and board (accommodations).
 - e. Supplies.
 - f. Professional fees.

2. Production/productivity losses

Production losses have been defined as "wealth lost to society due to disease" [7], while the United States Panel on Cost Effectiveness in Health and Medicine uses the term "productivity losses" to refer to "the costs associated with lost or impaired ability to work or to engage in leisure activities due to morbidity and lost economic productivity due to death" [6]. These costs were used to refer to the loss of income incurred by the patient or patient's relative or companion while in the hospital on the assumption that either is gainfully employed. Variations exist with regard to the valuation of productivity costs. For this article, "labor productivity," defined by the Organization for Economic Cooperation and Development as "the ratio of a volume measure of output to a volume measure of input," was used [8]. Thus, labor productivity was computed by dividing the gross domestic product (GDP), the output, by the number of employed persons, the input. "GDP refers to the value of all goods and services produced domestically; the sum of gross value added of all resident institutional units engaged in production" [8].

The Philippines 2012 GDP was divided by the number of employed persons in the same year to come up with the productivity losses for 2012. The labor force survey was used as the source for the number of employed persons for the same year [9].

3. Cost due to the consumption of other resources

The last category of cost refers to the cost due to the consumption of other resources or other sectors. This includes the cost of volunteer work or costs incurred by the patient's relative while attending to the needs of the patient. The cost of production losses incurred by the relative who took care of the patient may be considered under this cost, but to prevent double counting this cost was covered under production losses (mentioned earlier). However, other costs such as costs of transportation and meals incurred by the patient's relative during the course of hospitalization were included under this last type of cost.

The average cost of three meals per day and snacks (from the respective hospital canteens) and a conservative estimate of transportation cost of about PHP100/d (using public transportation) multiplied by the duration of hospitalization (average number of hospitalization days as mentioned in the earlier section of the study) were used.

The out-of-pocket expenses constituted the health care cost, whereas the sum of the productivity losses and the cost of

consumption of other resources constituted the non-health care costs for hospitalization.

Postdischarge and Follow-Up Costs

Follow-up costs entailed identification of the three types of costs that were mentioned earlier. In this time period, out-of-pocket expenses covered the costs of medications after discharge.

No additional laboratory examinations were identified during the follow-up period (1 week postdischarge).

Moreover, it was assumed that a relative or another person accompanied the patient during the follow-up visit and hence he or she had to absent himself or herself from work. It was estimated that the actual loss of productivity was about 4 hours or half a day of regular working time (inclusive of the time to go to and from the doctor's clinic and the waiting time before the actual consultation and the actual consultation time). Many relatives or the accompanying person, however, do not report for work anymore after bringing the patient home; hence, the actual productivity loss was computed for one whole day.

The cost of consumption of other resources covered the transportation expenses and snacks for the follow-up visit of both the patient and his or her companion.

Base-Case Analysis and Sensitivity Analyses

The most recent local clinical practice guidelines [10] and usual/standard practice patterns were used as reference for the costing of the diagnostic procedures and therapeutic interventions.

It should be recognized that differences exist between the terms "cost" and "charges/prices"; however, in this study they were used synonymously because no standard cost exists in the items identified for costing. In addition, these charges/prices were the ones paid through out-of-pocket.

The hospital charges for diagnostic procedures, room and board, ventilation use, and other relative charges of the included study sites were used.

However, to decrease variability in the cost of medications brought about by differences in hospital prices of such, the cost of medications was based on the prices obtained from the biggest drugstore chain in the country. Prices from this drugstore chain approximate the real out-of-pocket expenses better than do international prices or wholesale acquisition costs recommended by other studies [11,12]. Moreover, this drugstore chain has a nationwide presence and controls about 80% of the retail pharmaceutical market [8].

A base-case analysis whereby the scenario of having lowest costs of the range of values of the identified cost centers was used. In terms of the cost of medicines, this meant that the cost of the generic counterpart (marketed under the generic name with the name of the company or another brand given by the manufacturer to distinguish it from other generic medications) rather than the innovator brand of the recommended medicine was used. Also, lowest charges for diagnostic examinations, room accommodation, and other identified cost centers were used for the base-case analysis. Last, the average duration of hospitalization was used in the base-case analysis.

However, because of variability in costs, several scenarios were considered for sensitivity analyses on the basis of differences in the following factors:

1. Antibiotics used: For community-acquired pneumonia-moderate risk (CAP-MR), the cost of the combination of macrolide with Co-Amoxiclav, cefuroxime, or ceftriaxone was analyzed. For community-acquired pneumonia-moderate risk (CAP-HR), the cost of piperacillin/tazobactam plus azithromycin and meropenem plus levofloxacin was computed. These antibiotic regimens were the ones included in the cost analysis because

they were the treatment recommendations given by the local clinical practice guidelines for pneumonia [10]. The costs of these antibiotics were determined using the most expensive brand (the innovator brand) for sensitivity analyses in contrast with the lower or lowest priced brand or generic counterparts used for the base-case analysis.

2. Type of accommodations: either ward or private room.
3. Duration of hospital days: average duration plus 1 SD.
4. Location of the hospital where the patient was confined: either hospital A or B.
5. Variations in the professional fees.
6. Type of ventilation used (for CAP-HR).

Economic Burden of Pneumonia

The economic burden of pneumonia requiring hospitalization, that is, those classified by PhilHealth as CAP-MR and CAP-HR, was estimated using the health care cost of hospitalization as computed in the preceding sections multiplied by the corresponding number of PhilHealth claims/reimbursements for CAP-MR and CAP-HR in 2012. This was compared with PhilHealth case rate payments, also multiplied by the corresponding number of PhilHealth claims for CAP-MR and CAP-HR in 2012.

Results

Using the societal perspective, the cost of hospitalization for CAP-MR and CAP-HR was obtained. Although many patients had concomitant conditions such as hypertension and diabetes, the analysis dealt only with the cost for pneumonia.

For CAP-MR, the costs (obtained during the data collection period, i.e., fourth quarter of 2013 to the first quarter of 2014) for the above scenarios exclusive of the professional fees are summarized in Table 1.

The professional fee mandated by PhilHealth for CAP-MR is PHP4500, which corresponds to 30% of the case rate payment of PHP15,000 for CAP-MR [5]. In contrast, in the "real-world scenario," professional fees vary considerably because of several factors, for example, the type of accommodation, length of hospital stay, and difficulties encountered in the management (especially in the presence of comorbid conditions). For this study, the PhilHealth case rate payment was used for the base-case scenario (lowest professional fees) and the private room rate multiplied by the longer duration of days (average plus 1 SD) was used as the professional fee in sensitivity analyses. The 20% discount rate for senior citizens (those 60 years and older) was deducted from the higher professional fee rate because the mean age of the patients included in the study was 65 years.

However, because the total costs given in Table 1 were based on nominal prices during the last quarter of 2013 to the first quarter of 2014, these were adjusted to real prices with 2012 as the base year as explained in the Methods section.

For the year 2012, the GDP of the country was US \$250.27 billion [13], with 37.6 million Filipinos employed during that time [9]. Based on these data and the number of estimated working days in 2012, the production losses were estimated to be US \$22.50/d or about PHP950.00/d (based on the conversion rate of US \$1.00 to PHP42.43 at that time) [14]. In the local setting, at least one person (usually a relative) is always present in the patient's room to attend to the patient's other needs while he or she is confined in the hospital. If both the patient and his or her companion/relative are economically productive, the production loss per day was multiplied by 2 to account for the patient's and his or her companion's productivity loss. For the base-case scenario (lowest production losses), the patient was assumed to be not economically productive and only his or her companion was assumed to be economically productive.

Table 1 – Out-of-pocket expenses (health care cost) (PHP) for CAP-MR.

Subtotals (without PF)	Hospital A: Duration of hospitalization = 4.5 d (average)	Hospital A: Duration of hospitalization = 8 d (average + 1 SD)	Hospital B: Duration of hospitalization = 6 d (average)	Hospital B: Duration of hospitalization = 10 d (average + 1 SD)
Co-Amoxiclav + azithromycin regimen				
Ward: lower cost; expensive brand	31,021; 31,341	33,781; 34,101	20,951; 21,271	27,839; 28,159
Private room; lower cost; expensive brand	44,450; 44,771	55,650; 55,971	32,189; 32,509	39,189; 39,509
Cefuroxime + clarithromycin regimen				
Ward: lower; expensive brand	32,099; 47,110	34,859; 49,870	22,028; 37,040	28,917; 43,928
Private room: lower; expensive brand	45,528; 60,540	56,728; 71,740	33,267; 48,278	40,267; 55,278
Ceftriaxone + azithromycin regimen				
Ward: low; expensive brand	32,991; 41,059	35,751; 43,819	22,921; 30,989	29,809; 37,877
Private room: low; expensive brand	46,421; 54,489	35,751; 43,819	34,159; 42,227	41,159; 49,227

CAP-MR, community-acquired pneumonia-moderate risk; PF, professional Fees; PHP, Philippine peso.

In sensitivity analyses for the higher cost, both the patient and his or her companion were assumed to be economically productive.

The last category of cost can also be considered as out-of-pocket expenses; however, this was placed in another category to distinguish it from other expenses included in the section on out-of-pocket expenses. As mentioned in the Methods section, this refers to expenses attributed to meals and transportation of the patient’s companion during the patient’s hospitalization. Table 2 presents all the costs under each category and the total hospitalization costs (real cost as of December 2012) for CAP-MR. The range represents the lowest (base-case analysis) to the higher (sensitivity analyses) costs.

For CAP-HR, the cost of the antibiotic regimen piperacillin/tazobactam plus a macrolide (azithromycin) and imipenem (meropenem) plus a fluoroquinolone (levofloxacin) ranged from PHP34,307 to 36,316 and PHP56,897 to 92,694, respectively. The lower cost corresponds to the cost of the generic counterpart, whereas the higher cost corresponds to the cost of the innovator brand.

The cost of ventilation took into consideration the type of ventilation used, that is, either invasive or noninvasive ventilation. With the assumption that the patient stayed in the intensive care unit for 4 days, the cost of ventilation ranged from PHP20,021 to 30,136 and PHP16,551 to 29,986 for invasive and noninvasive ventilation, respectively.

Similar to the computation for CAP-MR, the table on out-of-pocket expenses (Table 3) did not include professional fees. The total cost of hospitalization for CAP-HR using either of the two antibiotic regimens and whether invasive or noninvasive ventilation was used is given in Table 4. To simplify the models, the included scenarios were those of the patient’s transfer from the intensive care unit to a private room.

Fig 1A,B shows the costs of hospitalization for CAP-MR and CAP-HR, using the societal perspective, whether inclusive or exclusive of non-health care costs. PhilHealth case rate payments (PHP15,000 for CAP-MR and PHP32,000 for CAP-HR) were contrasted with values exclusive of non-health care costs because PhilHealth is concerned only with health care costs.

The postdischarge costs are given in Table 5. These included out-of-pocket expenses, production losses, and the cost of consumption of other resources. The out-of-pocket expenses referred

to the outpatient consultation charge, the lowest of which corresponded to the private health insurance or health maintenance organization outpatient rate.

The postdischarge cost for CAP-HR was almost similar to the postdischarge cost for CAP-MR, except for the additional cost of step-down antibiotics (oral form), which were recommended to be given for an additional 7 days after the completion of the intravenous (IV) antibiotics course. Three recommended oral antibiotic regimens were priced (for both the more expensive and the cheaper available generic counterparts) and added to out-of-pocket expenses. These were levofloxacin 750 mg once a day, ciprofloxacin 500 mg twice a day, and cefixime 400 mg once a day, which were all given for 7 days.

The cost was PHP280 (PHP266 if adjusted to 2012 real prices) for the 1-week course of the generic ciprofloxacin and PHP1820 for the 1-week course of the generic levofloxacin (P1729, real cost as of 2012). For some patients who stayed in the hospital for more than 7 days, these step-down antibiotics were already started; hence, their cost should be included in their hospitalization cost. However, to segregate the cost of IV antibiotics from the cost of oral antibiotics, they were all included in the postdischarge cost.

Review of charts of patients admitted in the study setting for the year 2012 showed that the cost of hospitalization was paid out of pocket in 69% of the cases while a quarter had a private health insurance (see Table 6). Although in 6% of the cases, payments were made through the company where the patient or

Table 2 – Cost of hospitalization (PHP) for CAP-MR.*

Cost	Hospital A	Hospital B
Out-of-pocket expenses		
Subtotal exclusive of PF	29,470–68,153	19,903–52,514
PF	4,500–21,280	4,500–12,160
Production losses	11,400–19,000	9,500–15,200
Cost of consumption of other resources	3,120–5,200	2,250–3,600
Total cost	48,490–113,633	36,153–83,474

CAP-MR, community-acquired pneumonia-moderate risk; PHP, Philippine peso.

* Real prices, base year = 2012.

Table 3 – Out-of-pocket expenses (health care cost) (PHP) for CAP-HR.

Subtotals	Hospital A: HD = 7.5 d	Hospital A: HD = 14.5 d	Hospital B: HD = 5.5 d	Hospital B: HD = 11 d
A. Invasive ventilation				
Piperacillin/tazobactam plus azithromycin	111,280–113,289	130,880–132,889	91,099–93,108	99,099–101,108
Meropenem plus levofloxacin	133,870–169,667	153,470–189,267	113,689–149,486	121,689–157,486
B. Noninvasive ventilation				
Piperacillin/tazobactam plus azithromycin	104,753–106,762	124,353–126,362	87,629–89,638	95,629–97,638
Meropenem plus levofloxacin	127,343–163,140	146,943–182,740	110,219–146,016	118,219–154,016

CAP-HR, community-acquired pneumonia-high risk; HD, Hospitalization Days; PHP, Philippine peso.

his or her immediate family member was employed, a portion of the hospital cost will be paid later by the employee through salary deduction (except for a few instances in which the company shoulders the entire hospitalization cost).

PhilHealth coverage was availed by patients classified under any of the above type of payments, most especially those with private health insurance or patients who are employed or dependents of employed family members. As of December 31, 2012, PhilHealth estimated that its registered members and dependents were approximately 84% of the country's projected population [15].

Economic Burden of CAP-MR and CAP-HR

As per PhilHealth statistics, in 2012, there were 347,653 PhilHealth claims for CAP-MR amounting to PHP5.21 billion (PHP5, 214,795,000 under the case rate payment for CAP-MR). For CAP-HR, there were 7153 claims amounting to PHP228.9 million [15]. Even if the study estimates on the lowest health care costs were used, the economic burden for CAP-MR would be PHP8.48 billion and that for CAP-HR would be PHP643.76 million.

Discussion

The study has shown the huge economic burden of community-acquired pneumonia, specifically those that were classified as

Table 4 – Cost of hospitalization (PHP) for CAP-HR.*

Cost	Hospital A	Hospital B
Out-of-pocket expenses		
A. Invasive ventilation		
Subtotal exclusive of PF	105,716–179,803	86,544–149,612
PF	9,600–33,592	9,600–19,152
B. Noninvasive ventilation		
Subtotal exclusive of PF	99,516–173,603	83,248–146,315
PF	9,600–33,592	9,600–19,152
Production losses	7,600–28,500	5,700–20,900
Cost of consumption of other resources	4,160–7,800	2,700–4,950
Total cost: Invasive ventilation	127,076–249,695	104,544–194,614
Total cost: Noninvasive ventilation	111,276–243,495	101,248–191,317

CAP-HR, community-acquired pneumonia-high risk; PF, professional fee; PHP, Philippine peso.
* Real prices, base year = 2012.

CAP-MR and CAP-HR. It estimated the health care cost for CAP-MR to be in the range of about PHP25,000 to about PHP90,000, whereas for CAP-HR, the estimates ranged from about PHP93,000 to a little less than PHP214,000. The wide range of monetary values reflects variations in parameters that were considered in the analysis, with the lowest value assuming the lowest cost among the cost centers and the highest assuming the most expensive. In the real-world scenario, the most sensitive may be nearest the lowest value, considering that those in the higher socioeconomic status (classes A–C) are just about 4% to 10% of the population, while 64% to 70% are in class D and 22% to 28% in class E [16]. In view of these, the patients or their families will try to use the lowest possible diagnostic or treatment options available to them.

Even if the estimated health care costs are those of the lowest cost, this is still in striking contrast to case rate payments mandated by PhilHealth for pneumonia. As demonstrated by the results, the cost of IV antibiotics, especially for CAP-HR, was tremendous such that PhilHealth's case rate payment will not be able to cover even 50% of the antibiotic cost alone. In addition, the cost of ventilation, whether the invasive type or the non-invasive type, was also relatively high, such that this cost alone may have already consumed almost 100% of the case rate payment for CAP-HR. Hence, for patients with CAP-MR, the case rate payment may cover only about 15% of the total cost of CAP-HR. This means that the patient or his or her family needs to shoulder a huge co-payment unless he or is fortunate to have a private insurance (health maintenance organization) or is employed in a company that provides for the health care cost of its employees.

Some may argue that the huge cost obtained in this study could be due to the private nature of the hospitals included in the study. As demonstrated in the costing results, however, the cost of hospitalization was largely driven by the cost of antibiotics, which were not influenced by the study setting. As mentioned earlier, the cost for the medicines was obtained from the biggest drugstore chain, the prices of which are usually used as the benchmark of other drugstores or hospital pharmacies in the country. In addition, in a previous study carried out to calculate the cost of acute coronary syndrome, the increment in the hospital charges of one of the hospitals included in the study was about 5.4% to 7.8% compared with that of a tertiary government hospital located in Manila for patients admitted in either ward or private room [8].

However, the cost reported in this study may even be underestimated because many of the patients have concomitant conditions, necessitating additional diagnostic procedures and treatment. In addition, other miscellaneous charges may not have been added to the computation of the cost, further underestimating the cost. Last, the total economic burden of CAP-MR and CAP-HR reported in this study entailed only those with PhilHealth coverage. Considering that as of the end of 2012, PhilHealth

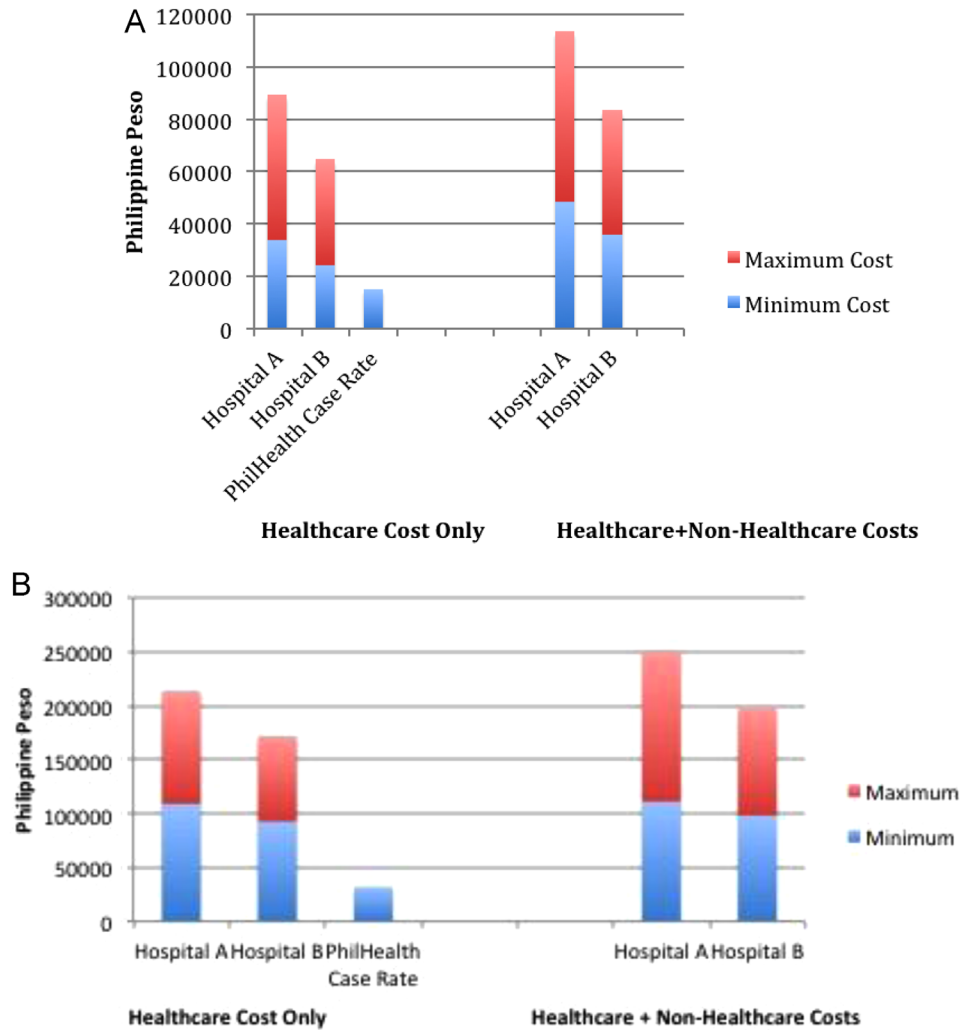


Fig. 1 – Hospitalization cost for (A) CAP-MR and (B) CAP-HR.

coverage is about 84% of the country’s population [15], it was very likely that some patients who were confined for CAP-MR and CAP-HR did not have PhilHealth coverage, resulting in the underestimation of the economic burden of pneumonia. Ironically, for 2013, PhilHealth’s estimated coverage went down to 79% of the projected population. In contrast, the prevalence of CAP-MR and CAP-HR as reflected in the number of claims went up by almost 43% for CAP-MR (495,745 claims from 347,653 claims) and more than 100% for CAP-HR (15,254 from 7153 claims) [15,17].

Equity and Policy Implications in PhilHealth’s Case Rate Payments

The article has shown that PhilHealth case rate payments for CAP-MR covered approximately 17% to 61% of the estimated total hospitalization cost (these percentages corresponded to the highest to the lowest estimated cost). For CAP-HR, the coverage was approximately 15% to 35% of the hospitalization cost. However, only about 31% of the study population had private health insurance or health benefits provided by their employer. This meant that the large percentage of the hospitalization cost that was not covered by PhilHealth needed to be shouldered by the patient or his or her family. This is more apparent for cases of CAP-HR whereby the PhilHealth pneumonia case rate will not be

sufficient to even cover the cost of ventilatory support or the full course of the IV antibiotics.

Table 5 – Postdischarge cost (PHP).*

Cost	Hospital A	Hospital B
CAP-MR		
Out-of-pocket expenses	300–600	300–500
Production losses	950–7,600	950–7,600
Cost of consumption of other resources	300–600	200–500
Total cost for CAP-MR	1,550–8,800	1,450–8,600
CAP-HR		
Out-of-pocket expenses	566–2,329	566–2,229
Production losses	950–7,600	950–7,600
Cost of consumption of other resources	300–600	200–500
Total cost for CAP-HR	1,816–10,529	1,716–10,329

CAP-HR = community-acquired pneumonia-high risk; CAP-MR, community-acquired pneumonia-moderate Risk; PHP, Philippine peso.

* Real prices, base year = 2012.

Table 6 – Type of payment.

Study Site	Self-pay	HMO	Company	Total number of patients
Hospital A	171 (35.4)	71 (14.7)	30 (6.2)	272 (56.3)
Hospital B	162 (33.5)	49 (10.1)	0 (0)	211 (43.7)
Total (%)	333 (68.9)	120 (24.9)	30 (6.2)	483 (100)

Note. Values are n (%).
HMO, health maintenance organization.

Equity considerations are evident in the above scenarios, considering that the average annual family income in 2012 was only PHP235,000 [18]. Those in higher socioeconomic conditions can afford to shoulder the costs not covered by PhilHealth; however, this is not the case for those in lower socioeconomic conditions where the needed personal funds are not available. Some families would opt to discontinue medical care and just bring the patient home even if the patient faced fatal consequences. However, those in the middle class may afford to cover the additional costs by availing loans or using funds intended for other purposes, for example, funds for their children's education.

In a move to support the medical needs of “marginalized” Filipinos, the government recently implemented a policy known as “no balance billing.” This means that PhilHealth members who are enrolled under the sponsored program (this program covers indigents belonging to the lowest 25% of the population and represents 31% of PhilHealth members) will not incur out-of-pocket expenses if hospitalized for some specific diseases (which include pneumonia) in government hospitals [17,19,20]. PhilHealth, in turn, will pay the specific case rates to the government hospital where the patient was confined. This means that the large difference in the actual cost of hospitalization (especially for CAP-HR) compared with PhilHealth case rates would have to be written off as losses by the hospitals, or else have to be sourced elsewhere (e.g., charitable institutions). In addition, there is an assumption that the government hospital always has the capacity to provide the needed antibiotics and machines for ventilatory support at all times, but this in reality may not be possible.

The above estimates of hospitalization cost can be used by stakeholders to negotiate for a bigger case rate payment from PhilHealth for pneumonia. A positive response from PhilHealth will, in turn, result in a bigger budget allocation for pneumonia. Moreover, other stakeholders for other diseases may also want to negotiate for higher coverage citing the same reason, that is, the significant disparity in PhilHealth's coverage and the estimated hospitalization cost. Increases in coverage rates, however, can be met only by an increase in PhilHealth's budget, which, in turn, will necessitate the collection of higher premiums from its members.

Conclusions

The article reported the hospitalization and follow-up costs of CAP-MR and CAP-HR based on the societal perspective. It showed significant disparity from the current PhilHealth case rate payments. The 2012 Philippine economic burden for CAP-MR and CAP-HR was estimated at PHP8.48 billion and PHP643.76 million, respectively, which may be an underestimation.

Limitations

The prevalence of CAP-MR and CAP-HR depended on the number of PhilHealth claims, which may not reflect their true prevalence

because of the less than 100% PhilHealth coverage of the country's population.

Also, the available data from the Department of Health are for the year 2009 [2]. Moreover, the data do not contain information on the age group and the type of pneumonia and combine pneumonia cases with other acute lower respiratory tract infections.

The sensitivity analysis performed in the study was also limited by the fact that it cannot cover all the possible scenarios or models. An example is the assumption regarding the loss of a day's wage when someone accompanies the patient for his or her follow-up visit after being discharged from the hospital. It may happen that the accompanying person may still be able to report for half a day, resulting in a decrease in the follow-up cost.

Last, modeling in health economic evaluations uses probabilistic sensitivity analysis “to reflect the uncertainty in the input parameters of the decision model and describe what this means for uncertainty over the outputs of interest: measures of cost, effect and cost-effectiveness” [21]. This study, however, did not use probabilistic sensitivity analysis. This cost analysis study only considered the assumptions of possible lowest to the highest range of the identified cost centers.

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REFERENCES

- [1] Republic of the Philippines Department of Health. Leading causes of mortality. Available from: <http://www.doh.gov.ph/node/198.html>. [Accessed May 26, 2014].
- [2] Republic of the Philippines Department of Health. Leading causes of morbidity. Available from: <http://www.doh.gov.ph/kp/statistics/morbidity.html>. [Accessed May 26, 2014].
- [3] Philippine Health Insurance Corporation. 2010 stats & charts. Available from: http://www.philhealth.gov.ph/about_us/statsncharts/. [Accessed April 20, 2012].
- [4] PhilHealth. Stats & charts 3rd quarter 2011. Available from: http://www.philhealth.gov.ph/about_us/statsncharts. [Accessed April 20, 2012].
- [5] PhilHealth special benefit packages case rates. Available from: http://www.philhealth.gov.ph/members/special_package/case_rates.htm. [Accessed May 29, 2014].
- [6] Drummond MF, Sculpher MJ, Torrance GW, et al. *Methods for the Economic Evaluation of Health Care Programmes* (3rd ed.). Oxford: Oxford University Press, 2005.
- [7] Koopmanschap MA, Rutten FFH, Martin van Ineveld BM, van Roijen L. The friction cost method for measuring indirect costs of disease. *J Health Econ* 1995;14:171–89.
- [8] Tumanan-Mendoza BA, Mendoza VL, Morales DD. Cost analysis for the management of acute coronary syndrome using different quality of care indicators. *Acta Medica Philippina* 2009;43:15–22.

- [9] Philippine Statistics Authority National Statistics Office. 2012 annual labor and employment statistics (annual estimates for 2012): 2012 labor force surveys. Available from: <http://www.census.gov.ph/content/2012-annual-labor-and-employment>. [Accessed May 20, 2014].
- [10] Philippine Society for Microbiology and Infectious Diseases, Philippine College of Chest Physicians, Philippine Academy of Family Physicians, Philippine College of Radiology Task Force on Community Acquired Pneumonia. Philippine Clinical Practice Guidelines on the Diagnosis, Empiric Management, and Prevention of Community-Acquired Pneumonia (CAP) in Immunocompetent Adults, 2010. Available from: <https://dl.dropboxusercontent.com/u/38069167/CPGs/PHILIPPINES%20CAP%20CPCGuidelines%202010.pdf>. [Accessed May 29, 2014].
- [11] Tan Torres-Edejer T, Baltussen R, Adam T, et al. Making Choices in Health: WHO Guide to Cost-Effectiveness analysis. World Health Organization, Geneva, 2003.
- [12] Miller P, Smith D, Jones P. Cost effectiveness of rosuvastatin in treating patients to low-density lipoprotein cholesterol goals compared with atorvastatin, pravastatin, and simvastatin (a US analysis of the STELLAR trial). *Am J Cardiol* 2005;95:1314–9.
- [13] Philippines GDP. Available from: <http://www.tradingeconomics.com/philippines/gdp>. [Accessed May 20, 2014].
- [14] Peso-US Dollar watch. Available from: <http://www.nscb.gov.ph/stats/pesodollar.asp>. [Accessed May 20, 2014].
- [15] PhilHealth. 2012 stats & charts. Available from: http://www.philhealth.gov.ph/about_us/statsncharts/snc2012.pdf. [Accessed April 4, 2014].
- [16] Africa T. Family income distribution in the Philippines, 1985–2009: essentially the same. Available from: http://www.sws.org.ph/pr20110321%20-%20Family%20Income%20Distribution%20by%20Mr%20Tomas%20Africa_FINAL.pdf. [Accessed March 8, 2015].
- [17] PhilHealth. Stats & charts 2013. Available from: http://www.philhealth.gov.ph/about_us/statsncharts/snc2013.pdf. [Accessed April 4, 2014].
- [18] Philippine Statistics Authority National Statistics Office. Philippines in figures. Available from: <http://web0.psa.gov.ph/>. [Accessed March 8, 2015].
- [19] DOH Department Order/PhilHealth Office Order No. 2013-0031. Available from: http://www.philhealth.gov.ph/joint_issuances/2013/jo2013_0031.pdf. [Accessed September 13, 2014].
- [20] PhilHealth implements 'no balance billing' scheme. Available from: <http://www.doh.gov.ph/sites/default/files/011912-3.pdf>. [Accessed September 13, 2014].
- [21] Briggs A, Claxton K, Sculpher M. *Decision Modelling for Health Economic Evaluation*. Oxford: Oxford University Press, 2006.