Inequality-related economic burden of communicable diseases in Canada

Diener A[1]*, Dugas J[1]

Affiliation

[1]Health Security and Infrastructure Branch, Public Health Agency of Canada, Ottawa, ON

***Correspondence:** alan.diener@phac-aspc.gc.ca

Abstract

Background: Communicable diseases cause a significant burden on society in terms of health care expenditures and their health impact on individuals. Cost-of-illness studies estimate the total economic burden of illness and injury.

Objective: To identify the economic burden of illness for communicable diseases in Canada, and to derive the costs associated with inequalities based on income and hospital expenditures.

Methods: Data were derived from the Economic Burden of Illness in Canada (EBIC) database, for the year 2008. Data for communicable diseases were extracted and compared to the overall results. Data on income level was available for hospital expenditures, and was analyzed by income quintile.

Results: The total costs attributable to communicable diseases in Canada were $8.3 billion, which represented 9% of the total costs that could be attributed to a specific disease or diagnostic category. Indirect costs accounted for 44% of total communicable disease costs and represented a more significant proportion of the economic burden related to communicable diseases compared to non-communicable diseases. When hospital costs by income quintile were analyzed, a clear inverse relationship was found between income and hospital expenditures. The costs associated with this inequality in 2008 were $308 million. The current estimates are likely to be an underestimate due to the conservative assumptions made in the analysis.

Conclusion: The cost of communicable disease in Canada is sizable and there is a clear correlation between lower income and higher hospital costs. Further research is needed to better account for co-morbid conditions and to better estimate the value of lost productivity related to disability arising from communicable diseases.

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Introduction

Communicable diseases cause a significant burden on society in terms of health care expenditures and their health impact on individuals. According to the most recent Global Burden of Disease project estimates, communicable diseases account for approximately 6% of the total burden of disease in all developed countries and 5% of the burden in Canada, in terms of disability-adjusted life years (DALYs) (1). In Canada, communicable diseases account for about 729 lost health-adjusted life years (HALYs) each year. The United Nations recently highlighted the importance of communicable diseases when the organization noted the need to "…accelerate the pace of progress made in fighting malaria, HIV/AIDS, tuberculosis, hepatitis, Ebola and other communicable diseases and epidemics, including by addressing growing antimicrobial resistance…" in its Sustainable Development Goals (2).

Health burden measured by utility-adjusted life-year measures, such as quality-adjusted life years (QALYs) and DALYs, only tell us part of the story. To understand the full economic burden of such diseases it is necessary to include information on the medical care costs as well as the effects of illness on the economy through decreases in productivity due to disability and premature mortality. Correctly understanding the full economic burden is necessary in order to properly evaluate public and population health programs and policies, including vaccine and immunization strategies, from a societal perspective. This is particularly important given recent concerns related to pandemics and outbreak planning.

Cost-of-illness studies estimate the total economic burden of illness and injury, and can provide valuable information for policy-makers by clarifying the most expensive cost components of treating specific diseases. In addition, estimating the indirect costs associated with illness and injury allows for a better understanding of the effects of preventive measures in terms of societal impacts. This important piece of information can be

used in economic evaluations and the allocation of public health resources.

The overall costs of illness can be defined as the sum of the opportunity costs, or the foregone opportunities in terms of resources, associated with being ill plus the associated psychosocial costs. The opportunity costs can be broken down into direct and indirect costs, while the psychosocial costs are often referred to as intangible costs as they are more difficult to estimate.

The *direct costs* refer to the direct expenditures associated with the treatment of diseases, for example, hospital care, physician care (primary care) and pharmaceutical consumption. In other words, they refer to those services for which some sort of payment is made. The *indirect costs* refer to other economic consequences attributable to illness or injury that result in lost resources but do not involve direct payment related to the disease. This includes labour supply effects such as the value of lost production due to morbidity (i.e. disability) or premature mortality, both of which are included in this analysis. Other indirect costs may include the value associated with caregiving (both formal and informal) or any other costs indirectly related to the health issue of concern.

The *intangible costs* refer to the reduced well-being, emotional distress, pain and other forms of suffering as well as premature mortality attributable to illness and injury that are more difficult to derive. This reduction in health status must be measured and then valued using utility-based methods, or in dollar terms. Utility-based measures combine quantity and quality of life into health-adjusted life measures such as QALYs, HALYs or DALYs. Methods such as the willingness-to-pay approach or the well-being approach can be used to derive monetary valuations of these changes in life status.

While international focus on the costs associated with non-communicable diseases has been increasing recently (e.g. The World Economic Forum report) (3), there is little literature on the overall economic burden of communicable diseases as a whole.

As noted, the Global Burden of Disease project focusses on all types of disease and illness and provides a valid way of comparing across disease groups, including comparisons to and among communicable diseases, using DALYs as its outcome measure. In Ontario, researchers conducted a study of the burden of infectious diseases on population health (4). This study focused on 51 infectious diseases and associated syndromes, and derived the HALYs associated with these. The study found that hepatitis C represented the greatest burden in terms of HALYs. Others included HIV, foodborne diseases (e.g. *Escherichia coli*) and *Clostridium difficile*. However, due to different methodologies it is difficult to compare the results of these studies.

Most cost-of-illness studies have focussed on a particular disease or illness, such as that of HIV/AIDS in Canada (5,6). This lack of a comprehensive study on the overall economic burden of communicable diseases reduces the comparability of results across studies and diseases. Studies have also used different methodologies (e.g., prevalence- vs incidence-based), different cost components, and different measurement and valuation techniques. This ultimately limits the overall use of such results.

The Economic Burden of Illness in Canada (EBIC) database provides objective and comparable information on the cost-of-illness and injury in Canada across 24 diagnostic categories (7). These categories are based on the International Classification of Diseases (ICD) codes and are described in Appendix C of the EBIC 2005–2008 report. In 2008, the total economic burden of illness and injury in Canada was $188.9 billion, with the direct costs accounting for 91% ($172.0 billion) and the indirect costs for 9% ($16.9 billion) of the total costs of illness. However, only 50% of the total economic burden of illness and injury or $94.5 billion of the $188.9 billion, of all costs could be allocated by diagnostic category. As a result, the costs associated with each diagnostic category will be an underestimation of the actual costs. The overall distribution, however, of expenditures is unlikely to be significantly affected. Hence, much of this analysis will focus on the percentage of costs in relation to all allocated expenditures.

In addition, research shows an association between health and socioeconomic status. Those in lower-income groups tend to be less healthy and use more health care resources than those in the higher-income groups (8). McIntosh et al. (9), examining health-adjusted life expectancy in Canada, found that for both sexes there was a near-linear gradient across income deciles for health-adjusted life expectancy at age 25. In other words, compared with people in higher-income deciles, those in lower-income deciles had fewer years of health-adjusted life expectancy. These disparities were substantially larger than those revealed by life expectancy alone. Thus, in order to get the true picture of the economic burden of communicable diseases it is important to also examine the costs associated with such inequalities.

The objective of this paper was to derive the economic burden of illness associated with communicable diseases in Canada and to examine the hospital costs according to socioeconomic status in order to derive the costs associated with inequalities related to the use of the health care system. This analysis used data from the *Economic Burden of Illness in Canada, 2005–2008* (7).

Methods

Data sources

The data used in this analysis were all derived from the *Economic Burden of Illness in Canada, 2005–2008* (EBIC) (7). EBIC uses a prevalence-based approach to estimate the costs associated with illness and injury over a one-year period. A prevalence-based cost-of-illness study estimates the total cost of a disease incurred in a given year regardless of the date of disease onset.

The EBIC database uses a top-down approach to allocate the direct costs (7). The top-down method uses actual expenditure data, such as total hospital expenditures, to allocate the expenditures across all diagnostic categories using a utilization key. One of the benefits of using a top-down approach is that all expenditures are allocated to different disease groups in a mutually exclusive manner, avoiding any possible double

counting. A detailed explanation of data sources has already been published (7). The most recent year of available data is from 2008.

Analysis

In order to examine differences across socioeconomic groups in health care expenditures data, it is necessary to have data on income quintile that can also be allocated by diagnostic category. Income quintile information was only available for the majority of hospital expenditures and was derived using Statistics Canada's Postal Code Conversion File Plus (PCCF+) program. This program uses postal codes to assign socioeconomic and demographic data, including income level, by geographic area. In 2008, the top income quintile represented households (minimum two people) with an income greater than $122,500, while the lowest quintile represented households whose income was below $39,300. The minimum incomes required for quintiles 3 and 4 were $61,400 and $86,100, respectively (10).

Note that income quintile information was not available for all of the hospital expenditure data, specifically data from the Hospital Morbidity Database and the Hospital Mental Health Database, and so these were not included in the cost-by-income quintile analysis. As a result, the hospital expenditures included in the income quintile analysis represent 76% of total EBIC hospital expenditures. In addition, small differences (less than 1% for the communicable disease categories) may be seen between the EBIC and the income quintile analysis results by diagnostic category because more disaggregated data was used to distribute cost totals in the latter analysis.

As noted, the EBIC data are classified according to unique categories based on ICD coding. For the analysis, communicable diseases were defined as the two EBIC diagnostic categories, "Certain Infectious and Parasitic Diseases" and "Respiratory Infections." These correspond to all of ICD Chapter I (Infectious and Parasitic Diseases) and parts of Chapter VI (Diseases of the Nervous System), Chapter X (Diseases of the Respiratory System), and Chapter XIV (Diseases of the Genitourinary System) (see **Appendix**). Costs associated with these diagnostic categories were then compared to the overall economic burden related to all diagnostic categories.

Results

The total costs attributable to communicable diseases were $8.3 billion in 2008, approximately 9% of the total burden of illness (see **Table 1**). This included $4.7 billion in direct costs (56%) and $3.7 (44%) billion in indirect costs. Indirect costs played a much larger role in the economic burden of communicable disease compared to the overall economic burden of illness, where indirect costs were only responsible for 11% of the entire economic burden.

Hospital costs represented the largest component of direct costs related to all communicable diseases, accounting for 39% of the direct costs (**Table 1**), similar to the distribution of direct costs associated with all diagnoses in which hospital expenditures were responsible for 46% of the direct costs. This pattern, however, did not hold for direct costs related to respiratory infections. Physician costs were the greatest portion of direct costs in this area, responsible for 43% of the direct costs.

Although communicable diseases represented only 9% of all costs, they were responsible for 6% of all direct costs and 34% of all indirect costs (**Table 2**). Most of the indirect costs associated with communicable diseases were associated with the morbidity costs, that is, the value loss in production due to morbidity. In fact, 28% of the expenditures due to morbidity were attributable to respiratory infections.

Respiratory infections were responsible for over $2.8 billion in indirect costs, with the common cold and influenza costing society $1.4 billion and $1 billion, respectively, in lost production. While the costs related to mortality were relatively low, pneumonia, HIV/AIDS, and hepatitis B accounted for over 70% of mortality costs.

Table 3 shows results by diagnostic subcategories, which shed some light on the contribution of specific communicable diseases to the overall economic burden of illness. Unfortunately, due to data limitations, it was not always possible to allocate the costs to subcategories. Specifically, the morbidity costs associated with "Certain Infectious and Parasitic Diseases" could not be further broken down by subcategory. Pneumonia represented the greatest proportion of hospital costs related to communicable diseases (34.7%); hepatitis B and bronchitis accounted for 10% and 11% of the drug costs related to communicable

Table 1: Costs by diagnostic category and cost-type (allocated expenditures only) 2005–2008 (current dollars)[1]

Diagnostic Category	Certain infectious and parasitic conditions			Respiratory infections			All communicable diseases			All other diagnostic categories			All allocated expenditures		
	$ millions	% direct costs	% all costs	$ millions	% direct costs	% all costs	$ millions	% direct costs	% all costs	$ (millions)	% direct costs	% all costs	$ millions	% direct costs	% all costs
Hospital	871.1	41.9	29.9	958.9	37.0	17.7	1,830.0	39.2	22.0	37,096.1	46.8	43.0	38,926.1	46.4	41.2
MD	509.3	24.5	17.5	1,125.2	43.4	20.8	1,634.5	35.0	19.6	22,145.8	28.0	25.7	23,780.3	28.3	25.1
Drug	696.7	33.5	23.9	509.3	19.6	9.4	1,206.0	25.8	14.5	19,981.6	25.2	23.2	21,187.6	25.3	22.4
Total direct	2,077.0		71.2	2,593.3		47.9	4,670.3		56.1	79,223.7		91.9	83,894.0		88.7
Morbidity	826.9	-	28.3	2,812.4	-	52.0	3,639.3	-	43.7	6,569.0	-	7.6	10,208.3	-	10.8
Mortality	13.0	-	0.4	5.1	-	0.1	18.1	-	0.2	435.9	-	0.5	454.0	-	0.5
Total indirect	839.9	-	28.8	2,817.6	-	52.1	3,657.5	-	43.9	7,004.8	-	8.1	10,662.3	-	11.3
Total	2,916.9			5,410.8			8,327.7			86,228.7			94,556.4		

Abbreviations: $ = Canadian dollars; % = percentage; MD = physician
[1] Source: *The Economic Burden of Illness in Canada, 2005–2008 (7)*

Table 2: Costs by cost-type and diagnostic category (allocated expenditures only), 2005–2008 (current dollars)[1]

Diagnostic Category	Hospital		Drugs		Physician		Total Direct		Morbidity		Mortality		Total Indirect		Total Costs	
	$ millions	%	$ millions	%	$ millions	%	$ millions	%	$ millions	%	$ millions	%	$ millions	%	$ millions	%
Certain infectious and parasitic conditions	871.1	2.2	509.3	2.1	696.7	3.3	2,077.0	2.5	826.9	8.1	13.0	2.9	839.9	7.9	2,916.9	3.1
Respiratory infections	958.9	2.5	1,125.2	4.7	509.3	2.4	2,593.3	3.1	2,812.4	27.6	5.1	1.1	2,817.6	26.4	5,410.8	5.7
All communicable	1,830.0	4.7	1,634.5	6.9	1,206.0	5.7	4,670.3	5.6	3,639.3	35.7	18.1	4.0	3,657.5	34.3	8,327.7	8.8
Other diagnostic categories	37,096.1	95.3	22,145.8	93.1	19,981.6	94.3	79,223.7	94.4	6,569.0	64.3	435.9	96.0	7,004.8	65.7	86,228.7	91.2
All allocated expenditures	38,926.1		23,780.3		21,187.6		83,894.0		10,208.3		454.0		10,662.3		94,556.4	

Abbreviations: $ = Canadian Dollars; % = percentage
[1]Source: The Economic Burden of illness in Canada, 2005–2009 (7)

diseases; the common cold was responsible for 16% of the physician costs associated with communicable diseases.

To examine hospital cost distribution by income quintile, we looked at all health conditions and communicable diseases only. In both cases, hospital care costs decreased with higher income. For all health conditions (**Figure 1**), 24% of costs were attributable to individuals in the lowest income quintile, while only 17% of costs were attributable to those in the highest income quintile.

The gradient was more pronounced for communicable disease costs and income. Individuals in the highest income quintile accounted for 16% of hospital costs whereas individuals in the lowest income quintile accounted for 27% of costs (**Figure 2**). For all health conditions, costs for individuals in the lowest income quintile were 43% higher than those in the highest income quintile. For communicable diseases, costs for individuals in the lowest income quintile were 73% higher than those for in the highest income quintile.

The burden associated with these socioeconomic inequalities can be calculated as the difference between costs associated with the highest quintile of individuals and the costs associated with each successive quintile. Using this method, the economic burden associated with socioeconomic inequalities was $307.5 million for hospital costs associated with communicable diseases. The burden for hospital costs related to all health conditions was $4.6 billion.

Figure 1: Hospital expenditures for all health conditions by income quintile

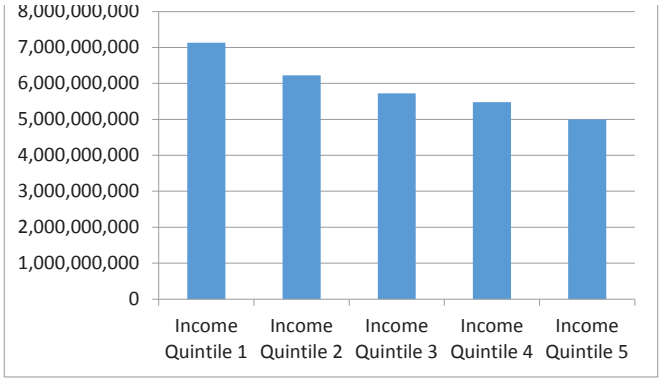

Figure 2: Hospital expenditures on communicable diseases by income quintile

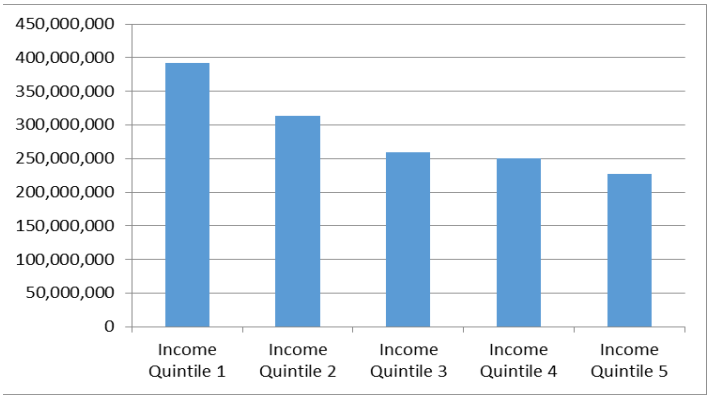

Table 3: Direct and indirect costs associated with communicable diseases, Canada, 2008 (current dollars)[1]

Diagnostic Category	Direct costs								Indirect costs						Total Costs	
	Hospital		Drugs		Physician		Total Direct		Morbidity		Mortality		Total Indirect			
	$ (millions)	%	$ (millions)	%	$ (millions)	%	$ (millions)	%	$ (millions)	%	$ (millions)	%	$ (millions)	%	$ (millions)	%
Certain Infectious and Parasitic Diseases																
Tuberculosis	24.6	1.30	1.8	0.10	9.1	0.60	35.5	0.8	-	-	0.2	1.1	0.2	-	35.7	0.4
Sexually Transmitted Diseases	25.5	1.40	10.3	0.90	12.9	0.80	48.7	1.0	-	-	-	-	-	-	48.7	0.6
HIV/AIDS	35.7	2.00	96.8	8.00	8	0.50	140.5	3.0	-	-	4.7	26.1	4.7	0.1	145.2	1.7
Diarrhoeal Diseases	159.9	8.70	43.9	3.60	82.9	5.10	286.7	6.1	-	-	0.4	2.2	0.4	-	287.1	3.4
Selected Vaccine preventable diseases	5.7	0.30	1.6	0.10	11.6	0.70	18.9	0.4	-	-	-	-	0	-	18.9	0.2
Meningitis	22.2	1.20	0.5	-	5.3	0.30	28	0.6	-	-	0.4	2.2	0.4	-	28.4	0.3
Hepatitis A	0.6	-	-	-	0.3	-	0.9	0.0	-	-	-	0.0	-	-	0.9	0.0
Hepatitis B	2.7	0.10	125.2	10.40	1.4	0.10	129.3	2.8	-	-	0.4	2.2	0.4	-	129.7	1.6
Hepatitis C	5.3	0.30	-	0.00	-	0.00	5.3	0.1	-	-	3	16.7	3	0.1	8.3	0.1
Malaria	1.2	0.10	1.4	0.10	0.5	-	3.1	0.1	-	-	-	-	-	-	3.1	-
Tropical-Cluster Diseases	0.2	0.00	-	-	0.2	-	0.4	-	-	-	-	-	-	-	0.4	-
Leprosy	0.3	-	-	-	0.9	-	1.2	-	-	-	-	-	-	-	1.2	-
Dengue	0.1	-	-	-	-	-	0.1	-	-	-	-	-	-	-	0.1	-
Encephalitis	14.4	0.80	-	-	1.5	0.10	15.9	0.3	-	-	0.1	0.6	0.1	-	16	0.2
Trachoma	0	-	-	-	0.1	-	0.1	-	-	-	-	-	-	-	0.1	-
Intestinal Nematode Infections	0.4	-	0.5	0.00	0.8	-	1.7	-	-	-	-	-	-	-	1.7	-
Brucellosis	0.1	-	-	0.00	0.1	-	0.1	-	-	-	-	-	-	-	0.2	-
Rabies	0	-	-	0.00	0.2	-	0.2	-	-	-	-	-	-	-	0.2	-
Infectious Mononucleosis	5.6	0.30	0.4	0.00	6	0.40	12	0.3	-	-	-	-	-	-	12	0.1
West Nile Virus	2.5	0.10	-	0.00	-	-	2.5	0.1	-	-	-	-	-	-	2.5	-
Listeriosis	2.7	0.1	-	0.00	-	-	2.7	0.1	-	-	-	-	-	-	2.7	-
Other Infectious	561.5	30.7	414.3	34.40	367.5	22.50	1,343.3	28.8	-	-	3.7	20.6	3.7	0.1	1,347	16.2
Other / not-classified	-	-	-	0.00	-	0.00	-	-	826.9	22.4	-	0.0	826.9	22.6	826.9	9.9
Total Infectious and Parasitic Diseases	871.1	47.6	696.7	57.8	509.3	31.2	2077.2	44.5	826.9	22.4	12.9	71.7	839.8	23.0	2917	35.0
Respiratory Infections																
Pneumonia	634.1	34.7	47.1	3.9	111.6	6.8	792.8	17.0	-	0.0	4.9	27.2	4.9	0.1	797.7	9.6
Influenza	14.9	0.8	9.1	0.8	36.2	2.2	60.2	1.3	969.5	26.3	0.1	0.6	969.6	26.5	1,029.8	12.4
Bronchitis and Bronchiolitis	91.5	5.0	134.6	11.2	146.7	9.0	372.8	8.0	-	0.0	-	0.0	-	-	372.8	4.5
Common Cold`	1.6	0.1	18.7	1.6	257.4	15.7	277.7	5.9	1,466.8	39.7	-	0.0	1466.8	40.1	1744.5	20.9
Otitis Media	51.1	2.8	74.3	6.2	203.8	12.5	329.2	7.0	-	0.0	-	0.0	-	0.0	329.2	4.0
Other Respiratory Infections	165.6	9.0	225.4	18.7	369.5	22.6	760.5	16.3	0.1	0.0	0.1	0.6	0.1	0.0	760.6	9.1
Other / not-classified	-	-	-	-	-	-	-	-	376.1	10.2	-	0.0	376.1	10.3	376.1	4.5
Total Respiratory Infections	958.8	52.4	509.3	42.2	1125.2	68.8	2,593.2	55.5	2812.4	76.1	5.1	28.3	2,817.6	77.0	5,410.7	65.0
Total (all communicable diseases)	**1,830.0**		**1,205.9**		**1,634.5**		**4,670.4**		**3,693.3**		**18**		**3,657.4**		**8327.7**	

Abbreviations: $ = Canadian dollars; % = percentage
[1]**Source:** *The Economic Burden of Illness in Canada, 2008 (7)*

Discussion

In 2008, the economic burden of illness in Canada for communicable diseases was $8.3 billion or 9% of the total economic burden of illness in Canada. Communicable diseases were responsible for 6% of all direct costs and 34% of all indirect costs, signifying the importance of disability associated with such diseases as HIV and hepatitis. In addition, the finding showed a clear cost to income gradient for hospital costs representing inequalities associated with the burden of such diseases; the gradient was much greater for communicable diseases than non-communicable diseases. For communicable diseases, costs for individuals in the lowest income quintile were 73% higher than those for in the highest income quintile. The majority of costs associated with communicable diseases were attributed to respiratory infection, specifically influenza and the common cold. These were responsible for 56% of the direct costs but 77% of the indirect costs. The results showing a socioeconomic gradient related to hospital expenditures are consistent with previous research reporting on the relationship between socioeconomic status and the need for and utilization of health care resources (8,9). Given the aggregate data used, it is not possible to assume a causal relationship between income and health status, but other evidence suggests that the directional relationship is generally from income to health and not vice versa (11-13).

Limitations

One of the main limitations of this study was that it did not include all of the potential economic costs associated with communicable diseases. EBIC 2008 included only the direct and indirect costs associated with diseases and did not include the value of pain and suffering or the value of life itself.

A second limitation is that the direct and indirect costs included in this analysis were not complete as many of the costs associated with illness, both direct and indirect, could not be properly allocated to a specific disease. This included a portion of the hospital, drug and physician costs; some whole categories have been excluded, such as spending on public health. With respect to the inequality analysis, some important components were excluded, such as out-of-pocket expenditures and expenditures for primary care, drugs and non-insured services. Such expenditures may serve as substitutes for hospital services and their inclusion would have provided a better picture of the inequalities.

In addition, lost production due to "presenteeism" was excluded from the analysis. "Presenteeism" refers to the concept when people go to work but work at a level of productivity of less than 100% due to illness. This may be a significant concern in relation to infectious diseases where people may be less likely to take time off work but show up at a reduced level of productivity. Furthermore, infected individuals showing up for work will likely increase the spread of infection, ultimately impacting many people in their organization.

A third limitation of this study relates to issues of diagnoses, comorbidities and the exclusion of sequelae associated with communicable diseases. The direct costs were all allocated to primary diagnoses and thus could not take into account all the impacts that communicable diseases had on expenditures. For example, many hospitalizations or deaths due to influenza are not diagnosed as such; many infectious diseases have multiple chronic sequelae such as cancer, liver diseases and infertility; large proportions of asymptomatic infections may be inaccurately attributed to non-infectious chronic diseases in mortality or even in morbidity data.

The impact of all these limitations is an underestimation of the true total costs associated with communicable diseases. As such, the findings of this study can be considered to be conservative.

Conclusion

In conclusion, the costs associated with communicable diseases are significant with a greater burden of hospital care on those with the lowest income compared to those with the highest income. More research is required to better understand the direct and the indirect costs associated with communicable disease and to see if these findings have changed in recent years. Work is underway to better identify hospital costs associated with comorbidities especially with respect to the complications of communicable diseases and adverse effects of treatment, such as those arising from antimicrobial resistance and the associated cost. Furthermore, more research on the true costs of the value of lost production, including better estimates of the disability costs and presenteeism, is needed. Better estimates of the economic burden associated with communicable disease can ultimately be used to improve the quality of economic evaluations, ensuring the most efficient allocation of scarce health care resources in combatting communicable diseases.

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Conflict of interest

None.

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Appendix: International Classification of Diseases chapters (ICD)[1] with communicable diseases

Chapter	Code	Part
ICD Chapter I: Certain infectious and parasitic diseases	A00–B99	Entire chapter
ICD Chapter VI: Diseases of the nervous system	G00	Bacterial meningitis, not elsewhere classified
	G03	Meningitis due to other organisms and unspecified causes
	G04	Encephalitis, myelitis and encephalomyelitis
	G05	Encephalitis, myelitis and encephalomyelitis in diseases classified elsewhere
ICD Chapter X: Diseases of the respiratory system	J00–J06	Acute upper respiratory infections
	J09–J18	Influenza and pneumonia
	J20–J22	Other acute lower respiratory infections
ICD Chapter XIV: Diseases of the genitourinary system	N70–N73	Salpingitis and oophoritis Inflammatory disease of uterus, except cervix Inflammatory disease of cervix uteri Other female pelvic inflammatory diseases

[1] Source: *World Health Organization (2004). International statistical classification of Diseases and health related problems: Tenth Revision. Geneva*