

## Executive Summary

This study performs a systematic review of economic evaluation and cost of illness studies in Korea setting to examine the cost estimation methodologies. Focus group interviews were conducted on Korean junior researchers in health care to find out the classification and calculation of costs that the researchers have used. We then identified the key issues and suggested cost estimation methods for each subcategory.

The study perspectives are the payer's perspective, health care perspective, and societal perspective. The categories for costs were matched to each study perspectives. The categories for costs were divided into medical costs, non-medical costs, and productivity costs. In the payer's perspective, only the medical costs including out-of-pocket payment for covered services, and out-of-pocket payment for non covered services were considered. In the health care perspective, both medical and non-medical costs were included. The medical costs were defined as all costs, including out-of-pocket expenses to utilize a medical facility, as well as unofficial medical costs. The non-medical costs considered long-term care services costs, transportation costs, time costs by the patient and caregivers. The societal perspective considered all costs including the costs associated with loss of productivity.

This study described the definitions, sources of data, calculation methods, and key issues for each of the following categories: official medical costs, unofficial medical costs, long-term care service costs for the elderly, transportation costs, time costs, caregiver costs, and productivity loss costs.

The official medical costs are the medical service expenses that cover the treatment of the illness at medical facility. The medical facility in this case include both western and eastern medical facilities. The sources of data used for the calculation of official medical costs include the claims or reimbursement data, data from medical facilities, data from patient surveys, and secondary data. The information on claims data can be obtained through the National Health Insurance Statistical Yearbook, the Public

Information System, or raw data. There are different advantages and disadvantages associated with each data source, therefore the understanding of such factors is crucial prior to using the data. The calculation methods for medical costs can be generally divided into a micro costing method and macro costing method. Micro costing method involves enumerating all factors and activities and matching its unit costs, then calculating the total costs. On the contrary, the macro costing method selects broader categories such as cost per visit and calculated all expenses in a given time frame. The calculation methods depend upon the nature of the study. Out-of-pocket payment for non covered services may be estimated using either the data provided by medical facilities, or the health insurance medical expense survey reports provided by National Health Insurance Corporation (subsequently NHIC), however the NHIC report on out-of-pocket expenses are reported in case of major disease. Additional issues in medical costs are opportunity costs vs. market price, price adjustment, oriental medicine service costs, and future medical costs unrelated to the current conditions.

Unofficial medical costs are defined as the expenses that an individual spends to purchase over the counter medications, health functional foods, medical equipments, and assistive devices in the purposes to prevent, treat or manage an illness. Micro costing method is usually used, because the data is based on patient survey.

The associated costs for the long-term care services covered under the National Long-Term Care Insurance should also be included in the cost category. However, it may be difficult to verify its relationship to the disease and thus need to be validated by the researcher.

The transportation costs include all transportation to visit medical facilities for treating a disease. Generally, this includes the transportation expenses to visit the treatment facility, including both outpatient and inpatient admission treatments. Round trip fares are used and transportation costs of caregivers can be included. The available sources of data are the National Nutritional Survey and the Medical Panel Survey. Patient surveys can also be used. The National Nutritional Survey and the Medical Panel Survey include the number

of admissions and outpatient visits, and the one-way fare. The Medical Panel Survey excludes the expenses for self-owned vehicle, and includes the expenses for guardians. Price is necessary to adjust using transportation price index of the National Statistical Office. It is recommended that price index include the subcategories for transportation such as railway passenger service, road passenger service, and domestic flights.

The time costs are defined as the loss of time that occurs when a patient visits a medical facilities or pharmacy to seek treatment for an illness. Time loss may occur in populations including paid workers, unpaid workers, and the unemployed, however this study recommends the human capital approach in a narrow sense to estimate time lost during paid work hours. The total time used in medical facilities, waiting time for treatment, treatment time and waiting time for prescriptions may be obtained through the Study on Analysis of 2000 National Medical Care Resources and Utilization Survey. The Korea Health Panel and the Third Korea National Health and Nutrition Examination Survey provide the time consumed for one way trip to the medical facilities. If the secondary data is not available, a direct patient survey may be used. The wage is used as the unit to convert the loss of time to monetary value. The Survey Report on Labor Conditions by Employment Type provides information regarding the paid worker's total work days, total work hours, and monthly wages. The Korean Labor and Income Panel Study also provide the average income for non-paid workers, and may be useful when considering factors related to unpaid laborers. Wage data may also be obtained through direct patient surveys, in addition to the loss of time. It is suggested to multiply the employment rate to the formula for estimating time costs because this study recommends the human capital approach in a narrow sense. However, to estimate the costs based on the human capital approach in a broad sense, the employment rate is excluded from the formula, since the human capital approach in a broad sense accounts for the value of labor of non-paid workers and the leisure time of all populations, and assumes the value of leisure time to be generally equal to market wages. However, there are populations, such as

children or adolescents, which lack market wage. Even the market wage exists, there are limitations in valuing their leisure time as equivalent to the market wage. More information will be provided if the both results of narrow and broad human capital approach can be presented.

Caregiver costs are defined as the costs to hire a paid caretaker during an illness or treatment of a patient, as well as the time lost by informal care of family or relatives. Caregiver costs can be categorized into paid caregiver costs, and time costs related to informal care by family. Firstly, the expenses for a paid caregiver can be estimated through the Korea Health Panel (KHP), Korea National Health and Nutrition Examination Survey (KNHANES), and other data (Caregiver Association, etc). Secondly, if the patient was cared by family, relatives or friends, their opportunity cost for care time consumed is exclusively estimated. It is recommended that the only time cost values included in such cases, are those hours lost during paid work hours of the caregiver. For unpaid laborers such as house workers, the only expenses included were the ones who hired other personnel to substitute their original duty, due to their time lost through care giving. This seems to be the most advisable method to relatively provide an accurate estimate of the informal care cost in a narrow perspective, as guidelines in estimating such expenses are currently very limited. It is anticipated that the accumulation of future studies in the same area will clarify the methodologies to estimate caregiver costs, specifically the value of informal care given by family members.

The productivity loss costs are defined as any damage or loss of the patient's ability to perform labor due to an illness, or the loss of economic productivity through early death due to a disease. The loss of ability to perform labor includes both the absence to work (absenteeism) as well as the inability to perform at the same functional capacity prior to the illness despite the presentation to work (presenteeism). It depends on study perspectives whether productivity costs is considered. While it can be included in a study taking on a societal perspective, it is excluded from any others. The approaches to estimate the productivity costs can be divided to

the human capital approach and the friction costs approach depending on the theoretical background. The cost-items as well as calculation methods will vary depending on the approach, even for identical illnesses. The friction costs approach does not account for the productivity lost due to premature death. The amount of time lost through a disease can be calculated by using productivity loss estimation tools. In the case where the desired tools are unavailable, or is difficult to utilize, a questionnaire designed by the researcher may also be used. The number of premature deaths resulting from an illness can be obtained from Annual Report on the Cause of Death Statistics or the micro data service system provided by the National Statistical Office. Although it is continuously debated whether the human capital approach, or the friction costs approach is more efficient in estimation, no conclusions have yet been made. Even when the friction costs approach is adopted, there is no socially agreed friction period, or labor time vs. labor productivity elasticity, thus subsequent studies are needed. Both approaches possess advantages and disadvantages in different theoretical backgrounds, and it is thus difficult to suggest one approach over the other. It is best that the researcher who seeks to estimate the productivity costs determine which of the two approaches to utilize.

We hope this study will be used as guidance for the cost studies in health care of Korea.