

Cost-benefit analysis CBA

Measuring Indirect and Intangible Benefits

The two most common methods seen in the pharmacoeconomic literatures are the human capital (HC) approach and the willingness-to-pay (WTP) approach ⁽²⁾.

Human Capital Method

As indicated previously, indirect benefits are *increases* in *productivity* or earnings because of a program or intervention. The HC approach is one way to measure indirect benefits. HC estimates **wage** and **productivity losses** because of illness, disability, or death. The HC approach **assumes that the value of health benefits equals the economic productivity that they permit.**

There are *two* basic components to calculating HC: *wage rate* and *missed time* because of illness (days or years). Because the HC approach is based on wages, it is necessary to have some estimate of income. Income estimates can be obtained from several sources (self-report; or any other data source that provides income estimates). Missed time (days or years) because of illness can be obtained by self-report ⁽²⁾.

Wage Rate Calculations

Depending on the type of study, a yearly wage rate or a daily wage rate can be calculated. A **yearly wage** rate (income per year) would be calculated for a program or intervention that would reduce **long-term** disability or **death**. For example, a pneumococcal vaccination program might result in preventing premature death. Thus, it would be appropriate to use a yearly wage rate and assess the value of the number of years saved because of the intervention ⁽²⁾.

A **daily wage rate** (income per year ÷ number of days worked per year) may be calculated for a program or intervention targeted at an **acute** or **chronic illness with short-term** disability. A person may not be adversely affected by the disease state on a continual basis, but he or she may have short-term periodic disability. For example, asthma, a chronic disease state, may include episodic asthma attacks. Thus, a person may only experience problems with the disease state on a periodic basis. For this type of disease state, a daily wage rate would be calculated. To calculate a daily wage rate both income and number of days worked per year must be assessed. We may assume

that the average person works 240 days a year when accounting for weekends, vacations, and sick leaves. A formula to calculate number of days worked per year is (2):

Number of days in a year (365) — Number of weekend days (104) — Number of vacation days (14) - Number of sick-leave days (7) = 240.

Missed Time (Days or Years) Because of Illness

If a yearly wage rate is calculated, then assessment of the number of years lost because of a disease or illness must be made. If a daily wage rate is calculated, an assessment of the number of missed days because of illness must be calculated. Because many pharmaceutical interventions involve chronic disease states with intermittent episodes, we will use an example calculating the daily wage rate and number of missed days. Missed days because of illness can fall into four groups (Table 7.2)⁽²⁾.

TABLE 7.2. CATEGORIES OF MISSED DAYS	
<i>Categories</i>	<i>Examples</i>
Missed work	Days missed from work (for employed)
Missed housekeeping	Days missed from housekeeping (for unemployed)
Restricted activity days	Percent of time during which work or housekeeping was restricted
	Did not miss an entire day of work or housekeeping but not productive for part of the day
Caregiver time	Parent's time spent as a caregiver to a child who has an illness

Notice that for housekeeping and child care, estimates of productivity loss are estimated (imputed) even though no payments are directly associated with these activities (2).

Using the asthma clinic example, we will calculate the indirect benefit. Assume that the population served by the clinic is made up of adults with an average income of \$40,000 and 240 days worked per year (2). The daily wage rate (average income/number of days worked per year) would be $\$40,000/240 = \$167/\text{day}$. An average of 20 days a year were missed from work before participating in the asthma clinic, and an average of 7 days a year were missed from work after participating in the asthma clinic. Multiplying the daily wage rate times the number of missed days results in the value of lost productivity. In other words, the value of 20 days lost from work is \$3340, and the value of 7 days lost from work is \$1169. The difference between before and after the program is \$2171, which is the **cost savings** or **increased productivity** represent the **indirect benefit** of the program or intervention (see Table 7.3 for the calculation) (2).

TABLE 7.3. CALCULATION OF INDIRECT BENEFIT (MISSED WORK)

<i>Daily Wage Rate</i>	<i>Average Number of Missed Days per Year</i>	<i>Average Value of Lost productivity</i>
Before: \$167	20	\$3340
After: \$ 167	7	\$1169
Indirect benefit per person = \$2171 (value of increased productivity)		

Advantages and Disadvantages of the Human Capital Method

Measuring indirect benefits using the HC approach has several advantages. It is fairly straightforward and easy to measure. Income estimates can be obtained or estimated from publicly available sources, and days lost from illness can be readily obtained from the patient or another secondary source ⁽²⁾.

The HC approach also has several disadvantages. The primary concern with using the HC approach is that it may be **biased against specific groups of people**, especially unemployed individuals. It assumes that if a person is not working, he or she has little or no economic benefit. Children and unemployed elderly individuals are two groups with which bias can occur ⁽²⁾.

The HC assumption that the value of health benefits equals the economic productivity they permit may also be biased. The earnings for some individuals may not equal the value of their output. For example, there is a large difference between the daily wage rate of a professional football player compared with that of an elementary school teacher ⁽²⁾. Some contend that because the underlying goal of using CBA is to measure the **effect** of an intervention **on society**, the HC approach is meant to measure the loss of productivity to **society**. Thus, wage rates should be based on those of the **average population**, not the specific patients included in a study. Although using **general wage rates** would not represent actual productivity losses or benefits to a specific group of patients, it would decrease some of the limitations of inequity already mentioned ⁽²⁾.

The HC method also does not incorporate values for pain and suffering if these values do not impact productivity ⁽²⁾. There may be certain disease states or conditions (e.g., menopause, hair loss) that may not impact productivity but do have an impact on a

person's health-related quality of life. For example, many women experience problems with menopause, including moodiness, hot flashes, and irregular cycles. Although this condition may have a significant impact on quality of life, most women do not miss many days of work because of complications from menopause. Thus, the HC method would not be sensitive enough to capture the benefits of a pharmacist-provided menopause clinic. Although biases exist with this method, it is the most commonly used method to measure indirect benefits ⁽²⁾.

References

1-Karen L.Rrascati. **Eessentials of Pharmacoeconomics**.copyright 2009 Lippincott Williams and Wilkins.

2-Rachel Elliot and Katherine Payne .**Essential of economic evaluation in healthcare**.2005 pharmaceutical press.