Chapter 13 Productivity Costs

Policy effects

According to the Centers for Disease Control and Prevention, the economic burden of diabetes in Georgia is $12.8 billion. Direct medical costs account for less than half of this total. The remainder fall into an "indirect cost" category, otherwise known as "productivity costs". These costs are broken down into the following components.

Absenteeism: The worker has to miss work due to illness but is still employed.

Presenteeism: The worker is at work but is not as productive due to illness.

Household productivity loss: Individuals who are not employed engage in "household production" like yardwork, laundry, and cleaning. In effect, they are working for themselves. When they get sick, their household production output falls.

Inability to work: This category refers to individuals who are out of the labor force as a result of their illness.

Mortality: Workers who die as a result of the disease. Costs are calculated under the assumption that workers would have worked until age 65 had they lived.

Annual Total Indirect Costs Attributable to Diabetes, Georgia, 2013 Dollars

Category	Total Cost ($ in Millions)
Medical costs	5,295
Indirect costs	7,607
Morbidity	4,222
Work Absenteeism	221
Presenteeism	1,263
Household Productivity Loss	212
Inability to Work	2,525
Mortality	3,385

Source: Centers for Disease Control and Prevention, Diabetes State Burden Toolkit, https://nccd.cdc.gov/Toolkit/DiabetesBurden/.

Productivity-related costs are typically calculated using the human capital approach. The cost of reductions in time at work and labor participation due to a disease equals the number of missed hours multiplied by the wage rate. Most of the time, analysts use national average wage rates, not the wage rate for a specific occupation or individual. Wages are also used to value lost household production.

The friction cost approach is an alternative to the human capital approach. It is based on the assumption that if a worker misses or has to quit work, the work isn't lost. Instead, coworkers and replacement workers make up the work. The friction cost captures disruptions due to illness-related absences and retirement. Friction costs depend on how easy it is to substitute one worker for another.

An example

Hanly et al. (2012)[1] calculated productivity costs associated with breast and prostate cancer using the human capital and friction cost approaches. They sent surveys to 1,373 Irish breast and prostate cancer survivors and received responses from 740. The survey asked respondents about their work history and current employment status. The authors calculated disability and absenteeism based on responses to the survey, assuming implicitly and a bit unrealistically that all absenteeism and workforce exits were due to cancer rather than some other cause. They calculated the number of lost work years assuming that had patients not been diagnosed with cancer, they would have died at rates similar to the overall population (i.e., not everyone would have lived to retirement at age 65).

Under the human capital approach, they valued productivity based on age- and gender-specific earnings. They assume that one day of missed work due to absenteeism results in one day of lost output.

Under the friction cost approach, they assumed that it takes 11.3 weeks to replace a worker (including training time). As in the human capital approach, they valued lost productivity under the friction cost approach by multiplying the friction period (11.3 weeks) by age- and gender-specific earnings.

Their results show that the human capital and friction cost approaches give very different answers (193,000 Euros versus 8,000 Euros). Not surprisingly, researchers and advocates who want to claim that "their" disease is associated with a greater burden use the human capital approach.

[1] Hanly P, Timmons A, Walsh PM, Sharp L. Breast and prostate cancer productivity costs: a comparison of the human capital approach and the friction cost approach. *Value in Health* 2012;15(3):429-36.

Average per person productivity costs for breast cancer patients, in 1,000s of Euros

	Approach	
	Human capital	Friction
	1,000s €	
Disability costs		
Temporary disabilty costs	26	6
Permanent disability		
Workforce departure	33	1
Reduced hours	50	<1
Total disability costs	109	7
Premature mortality costs	84	1
Total productivity costs	193	8

Source: Hanly et al. Value in Health 2012.

Team production

In teams, the absence of a worker affects the productivity of teammates. There are negative spillovers. According to one study[2], the average cost of a missed hour of work is 1.28 times the wage rate, reflecting the negative effect of an absence on the productivity of coworkers.

Wages

Productivity losses are typically valued using wage rates. Industry- and job-specific wage rates are available from the Bureau of Labor Statistics.

Measurement

There are several different approaches to measuring the impact of disease on labor force participation and hours worked. Some surveys ask whether individuals have stopped working or took time off work as a result of a health condition. This approach assumes the decision to exit the labor force or take a day off work can be attributed to a single cause and, in the case of absenteeism, that individuals can correctly recall how many days they took of work and the reasons why.

[2] Nicholson S, Pauly MV, Polsky D, Sharda C, Szrek H, Berger ML. Measuring the effects of work loss on productivity with team production. *Health Economics* 2006;15(2):111-23.

Another approach is to compare labor force participation and days worked between individuals with and without a disease after adjusting for age, sex, and other individual characeristics. This approach assumes that comparisons are not biased by unobserved individual characteristics. Maybe individuals who are sick would be less likely to work even if they were not sick.

Presenteeism (individuals are at work but not working as hard due to illness) is particularly difficult to measure. There are survey instruments designed to measure it, but there is probably a lot of measurement error.

Labor versus leisure. Or: Does the human capital approach yield a useful number?

If you do not work, the time you would have spent working does not disappear. You gain leisure. The wage rate is a good measure of the value of leisure under the assumption that workers work up until the point where the wage equals the marginal value of an additional hour of leisure.

Suppose a worker earning \$20 per hour misses an 8 hour day of work due to the flu. Is the productivity cost \$160 (=\$20 × 8 hours of work missed)? It is using the human capital approach. But the worker gains 8 hours of leisure.

If we value the leisure using the wage rate, then the benefit to the worker is \$160 (=\$20 × 8 hours of leisure gained). So the net cost is \$0 (\$160 productivity cost - \$160 gain in leisure). But that does not seem quite right. One of the defining features of illness is the inability to fully enjoy leisure. So maybe we should adjust the value of leisure downward to account for the impact of illness on quality of life. Suddenly, this analysis is starting to sound a lot like measuring quality-adjusted life years.

What to do? The human capital approach is the most widely used, but it is not necessarily the right approach. It does not capture the value of leisure gained, even if the recipient cannot fully enjoy the leisure due to illness. And businesses can adapt when a worker misses work. They can bring in another worker. They can shift workers to more urgent tasks. They can hire additional workers. The output is not necessarily lost forever. Which is not to say that absenteeism isn't costly, but valuing absenteeism based on the hours missed multiplied by the wage may overstate costs by quite a bit.