

## Introduction to Health Economics

### **What constitutes Health Care, and why is it important?**

- Health Care Services & Products
- Which are provided by Health Care Institutions
- All of which are in turn regulated by the Government

Its importance stems from the fact that personal expenditure on medical care falls below only expenditure on food and housing.

### **How is Health Care as an Institution different or the same as other economic institutions?**

- **Uncertainty** at all levels of health care.
- The misalignment of information between health care providers and their patients, i.e. **Asymmetric Information** between consumers and suppliers.
- **Externalities**
- High Levels of **Government Intervention**. Why should that be the case? What gave rise to it?

### **What is the extent of Government Intervention?**

- Why does the government and society demand high levels of competence from health care professionals?
  - Why does the influence of the government extend to individuals from all walks of life?
  - Why does the government wish to control the behavior of health care providers, from
    - Pricing of health care services and products,
    - to additional beds in a hospital or equipment, and
    - Entry and exit decisions of hospitals
- Wouldn't competition ensure that we enjoy the lowest prices possible?
- Why is the education of health care providers so heavily subsidized?
  - Why is research in health care heavily subsidized?
  - Why is new innovation subject to so much bureaucracy before it reaches us?
  - Why does the health sector enjoy so much tax favoritism?

These are but only some of the interventions we observe, but does not necessarily mean that their existence imply they are the right practices, or do they?

### **Uncertainty**

When do we “observe” uncertainty in the Health Care Sector?

- Patients are uncertain about the type of illness. The only certainty is that they feel different from their norm.
- Health Care providers may diverge in their prescribed care to the same individual, highlighting the possibility of uncertainty in the right care, both type and levels.
- There is also uncertainty about the effectiveness of new drugs/products, or type of care. Yet why is it that it seems new drugs reach our shelves with little trial?

### **Asymmetric Knowledge**

Asymmetry of information occurs when one party does not have complete information about the other party in a relationship, such as that between a doctor, and her patient, or between the insurance firm and their client. In the former, it is in the interest of the patient to reveal all information to her physician, however, the physician may not have the same incentives to reveal her diagnosis to the full. In the latter, the consumer purchasing a insurance policy may not have the incentives to reveal her entire health history to the insurance firm, but the firm does have a legal obligation to reveal everything about the insurance contract. Note that such asymmetry in information need not be unidirectional, that is it is also possible to have relationships where both parties have no incentives to reveal all the information at their disposal. If however both parties envisage continued interaction, there may be situations where everyone reveals the truth, and all information at their disposal. We will discuss this in detail in the rest of the classes.

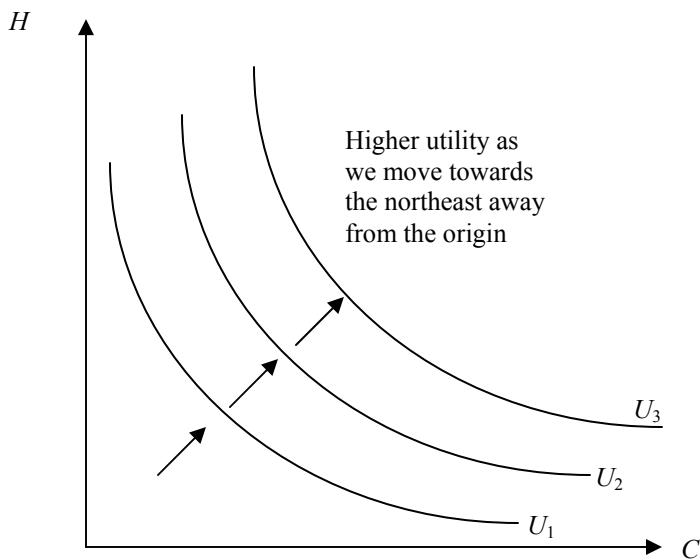
### **Externalities**

When we make our independent decisions, it is often the case that we do not take into full account all the benefits and costs it may exert on others. Consider this, when you choose to come for classes with a flu bug, you are ensuring that you do not miss any of the lessons taught, however since the flu virus is communicable, you put everyone in the class at risk of infection. Consider another example, suppose you have a great mind for conceiving new ideas, and inventions. When you make new discoveries, you may be quenching your own curiosity. But those discoveries and inventions may have benefits that may outlive you. These are but some examples of externalities. Formerly, externalities are external benefits and costs arising from an individual's actions purely borne out of self interest, i.e. the actions are privately motivated, and consequently does not account for the external effects the actions may have. A more relevant example in our study of health economics is the following; consider the situation where individuals who buy insurance are those who foresee themselves to be sick in the near future, thereby raising the odds of the insurance company of paying out for their clients' health care. If you are a healthy individual wishing the hedge against the cost of you falling sick, your premium would be higher than it otherwise would have been if the insurers can see which individuals are low risks, and which are high risks.

### **How should we consider Health and Health Care using the tools from Economics?**

Health products and services can hardly be considered a good in the traditional sense of the word. Unless if you enjoy visiting your doctor or dentist (though it may be possible!). However, your health or your continued ability draw your next breath should give your sufficient utility or happiness.

That is we can think of our health or the stock of it as a kind of **durable good** that we would like to have as much as possible. The healthier we are, the higher our utility or happiness. Let all other goods we consume as  $C$ , and our health as  $H$ , then we can depict how an increase in our health raises our utility.



Where  $U_1 < U_2 < U_3$ . The diagram shows you what combinations of goods and health gives an individual the same level of happiness. Or more generally, our utility can be noted as the following,  $U \equiv U(C, H)$ .

However, we have not connected health services and products to this idea of health and our welfare. We can do so by thinking of health as an output like any **production process**, with the exception that we are the “firm” doing the production using inputs namely health care services and products ( $M$ ), and lifestyle ( $L$ ). However, just as a firm is subject to the type of market competition that it finds itself in, how healthy we feel also would depend on the type of illness or condition ( $I$ ) we may live with, since not all of which are as amenable to treatment. Our consequent derived choices in  $M$  and  $L$  would then be dependent on  $I$ . Technically, we can write the following for health production;  $H = h(M, L, I)$ , and therefore our utility is  $U \equiv U(C, h(M, L, I))$ . Where  $h$  is just a mathematical function. **In words, this says the your lifestyle and medical care choices given the illness or condition you may live with produces your health, and together with other goods that you consume gives you utility or happiness.**

### Dynamics of Health

We cannot deny that our ability to deal with illnesses is also largely dependent on our age since as our ability to remain healthy deteriorates as we reach the end of our lifetime. That is if we were to consider a snapshot view of the above idea of health, medical care, and utility, we have to include our age,  $A$ , so that our utility becomes  $U \equiv U(C, h(M, L, I, A))$ .

We can also think of our health as dependent on our past lifestyle and health care choices. Consider a healthy lifestyle of exercise and healthy food consumption as a youth would raise your ability of meeting the challenges of deteriorating health. This then hints that

we can also think of our consumption of health care services and products in a dynamic sense throughout our lifetime, and instead of maximizing our instantaneous wellbeing, we are attempting to raise our lifetime welfare through our choices at each period of our lives.

You should note that each of the factors is not a singular entity, health care products is not one all inclusive products (although in dealing with a formal model, we will consider it as being a single product) but a countable number of products and services. You can think of them as vectors rather than scalars. And neither are the factors necessarily exhaustive; consider this, is our mortality dependent on our gender?

## A Simple Model of Utility Maximization

### Medical Care Markets with Fixed Technology

We will now make the connection between the various elements with the health care markets before we examine each of them in turn.

#### Demand for Medical Care

- **Illness Events:** Given our description of an individual's utility both instantaneous and in terms of dynamics over time, we know the demand for health care is determined by the illness that befalls the individual.
- **Systematic Factors:** As we age, dependent on our gender, our ability to defend against illness fall, and dependent on gender the types of illness may be specific to it. This then affect our demand for the degree and type of treatment.
- **Beliefs:** Dependent on our personal beliefs, we may or may not seek treatment for all illnesses. These beliefs may cause us to seek alternative and/or self treatment.
- **Advice from Providers:** You would recall from your last visit to the doctor or health care provider that upon diagnosing your illness, they will relay their prognosis. However, the ultimate decision to take the treatment is dependent on you. Whether you would buy the medication, or subscribe to the prescribed treatment depends on you, but that decision is affected by the advice the health care provider gave.
- **Income:** If health care is a normal good, we would expect that as our income increases, we would demand more of it to reduce the impact of aging and chance.
- **Monetary Price:** Because for most of us, treatment does not come free, it will affect our decision. The choice could be whether you choose to wait within your public health system, or seeking more expensive private health care in a province or country that provides it.
- **Time Price:** The opportunity cost of time in seeking consultation with a physician, and waiting time for treatment will determine your health care demand. A serious illness that is causing a fall in productivity may induce a perceived value of time to treatment.

### Supply of Medical Care

- **The Production Function:** This is a technical point, like any firm, the supply of health care is dependent on the inputs. Typically we classify inputs into two categories, capital and labor. The parallel in health care for capital include the hospital or clinic itself, beds, diagnostic and treatment devices, operating rooms, stock of pharmaceutical drugs, and research and development (R & D) equipment etc. And for labor, we have the physicians, nurses, administrative officers, R& D staff and sanitary workers. The manner in which these inputs are converted into health care determined supply.
- **Input Costs and Final Product Price:** The cost to the firm or government in providing the health care institution will determine the final price you see. For public health care, it would depend on their budget allocation, and tax revenues.
- **Laws and Regulation:** Although in much of the health care provision is provided for by the government in Canada, there are some aspects of it that are private such as pharmaceutical companies, and laws that determines property rights determine their supply. Similarly, health technology is guided by those laws.
- **Organizational Structures:** Depending on the structure, whether they be privately operated hospitals, government/public hospitals (which makes up almost all hospital in Canada, England and Wales.) and not-for-profit hospitals, the objectives may be different, and consequently their supply. Note that being a not-for-profit hospital does not preclude the organization from earning profits, but rather it eliminates the residual claimants to the profits, i.e. the share holders.
- **Final Product Price:** Like in your Introduction to Economics class, the supply of a product is ultimately determined by the final prices prevailing. The higher the price, the greater the profit, and the greater the supply. However, if the industry is truly competitive, the extraordinary profits would bring about greater entry driving down prices. **What kind of market structure do you think would characterize the health care market?**

### Demand for Health Insurance

- **Financial Risk:** Because illnesses that befall individuals “randomly” (**Is it truly random, or just a lack of information on our part in terms of how our actions affect the likelihood we may contract illness?**) can lead to severe financial burden which we as individuals would try to alleviate through insurance, particularly health insurance. However, because of our own information about our potential for serious illness differ, we may have differing attitudes towards this risk, and in turn differing demand. There is the additional aspect of how each individual may differ in their “preference” towards risk. What is yours? How has it evolved with time?
- **Price of Insurance:** As with any good, our demand for health insurance is guided by the price. However, it is not the premium that is the effective price. This is because, the health insurance pays out benefits should it become necessary to make a claim. Then the true price of health insurance is the individual’s perceived benefit net of the premium she has to pay.

- **Tax Laws:** Tax laws that allow purchase of health insurance to be exempt from taxation increases an individual's income and increases the consumption of health insurance. In a sense, the government is subsidizing health insurance.

### Supply of Health Insurance

The supply of health insurance is to a great extent determined by laws and regulations that exists with an economy. Laws that places exemption of income should the health insurance be purchased by employers have raised demand, and consequently supply of group health insurance, such as in the U.S. Elsewhere where tax exemption is placed on insurance purchased through employee incomes has raised the supply of more inventive insurance programs.

However, even if such tax exemption did not exist, it still remains viable and of interest to the insurance companies to offer group health insurance products strictly to employees of firms. This is because the collection of individuals thus derived are for the purpose of the client firm, and not for health insurance itself, thereby alleviating the risk of only collecting sickly individuals that may raise the risk of insurance payouts.

However, what is good to the insurers need not be so for private individuals since such a group strategy for insurers imply direct pooling of risk, so that if an individual who has more information about his or her own health might choose to opt out should such group policies be offered, which still leaves the insurers with a group of individuals more susceptible to claims. This is the phenomenon known as "adverse selection". We will be examining how this asymmetry in information affects the supply and consequently the equilibrium outcomes in the health insurance market subsequently.

### Interaction of Insurance and Medical Markets

Unlike life, auto and home insurance which make payouts upon claim for an event of loss, health insurance makes a payout not upon the loss of health or health event, but on the medical care event, i.e. the cost of health care. This is largely because the physicians are unable to fully determine the cost of reinstating the health of the individual. Therefore an insurance firm makes a payout when the medical care specified in the insurance contract is dispensed, and the payout may be in part or in full again depending on the insurance purchased. Health Insurance acts to subsidize the medical care at the time of purchase.

### Vertical Integration in Health Care

In their bid to reduce the cost of health care, many insurance firms have entered into alliances, either via contract or direct ownership with the health care providers, such as hospitals, and clinics, in the U.S. this has resulted in the formation of **Health Maintenance Organizations** (HMO). These arrangements essentially tie the providers with the insurers. Thereby in a sense determining the demand for the health care provider. Other forms of integration between insurers and health care providers

include tying physicians, hospitals, nursing homes, home health care agencies etc. They are also commonly referred to as ***Integrated Delivery Systems*** (IDS).

Although it eliminates direct choices by consumers who directly consume health care, such integration brings along with it efficiencies and possibly increasing the quality of care. These systems typically involve common medical record and entire treatment histories that eliminate duplication services, prescription errors, conflicting treatment plans. **What disadvantages and dangers can you envisage, and based on your understanding of economics, how could such problems be alleviated?**

### **Dynamic Issues**

We as social economic beings are constantly evolving both our institutions and ourselves. Then likewise when examining the market for health care, we have to consider how these institutions have evolved together with us, and vice versa.

Below are some variables that have affected our consumption of health care products and services across time. Can you come with others?

**Income Growth:** If our health is a normal good, our demand of health care should see increases over time as our income increases as we strive to prolong our enjoyment of economic life. If this is in your mind, you would be correct since this is exactly what is observed in data. Read your text, pages 52 to 57.

**Demographics:** We know our consumption of health care products and services is largely moderated by our age and gender. From a macroeconomic point of view, the composition of seniors within our economy would also dictate the level of health care consumption in the aggregate. Consider the baby boomers of the 1960s phenomenon; do you think the generation's consumption of health care would present a sizable component of current health care products and services? Read your text, pages 52 to 57.

**Research & Development and Technical Change:** As technology progresses our choices set expands not because of growth in our income, but because some products that could not be manufactured becomes available. Likewise as the production function, or production possibility frontier expanded through the decades, more illnesses become treatable, where before it was a death sentence, thereby raising consumption of health care services, and products. That is with the passage of time, there are more dimensions to our choice set.

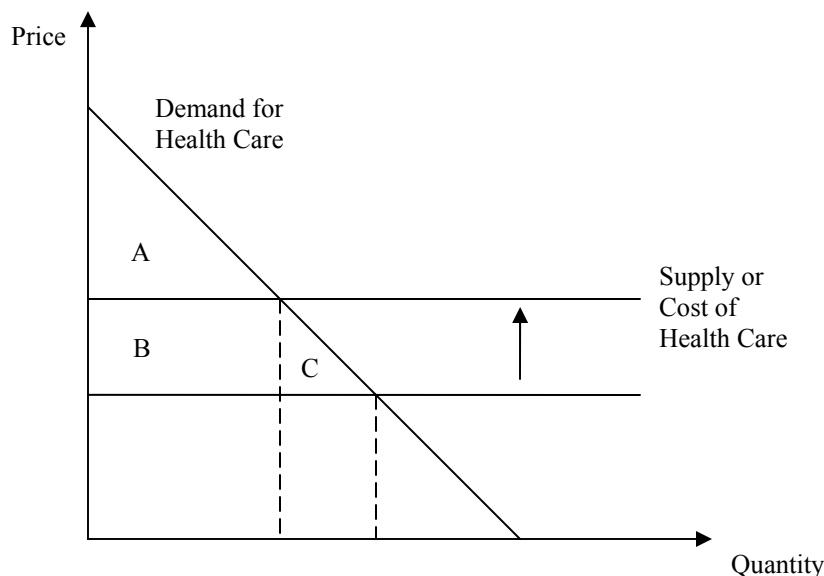
These advancements are possible on account of R&D which might not have been possible through both private and publicly funded research programs, which has grown over the decades as productivity of our economy expanded.

**Growth in Medical Prices:** From both a nominal and real point of view, it cannot be disputed that the price of health care has risen over time. However, the adjustment for real prices is does create problems for our interpretation of the summary statistics.

1. As noted R&D has raised the dimensions of products and services across time, this then in turn increases the bundle of goods that we consume. When this happens, it is in truth not possible to extrapolate how the demand would have looked like in the past when such treatments were not available, and yet to use the old consumption bundles would be erroneous.
2. As physicians still remain and constitute a large bulk of expenditures in health care, and they as a good has remained throughout, they are distinct beings from the physicians or yore on account of R&D and technological changes. So in treating them as the same, and making claims that the cost of physician consultation has rose disproportionately may be erroneous as well.
3. With the increased sophistication of the health care system, if health care expenditure is to be measured as only out-of-pocket expenditure, it would not be able to account for the expenditure due to health insurance firms, whose importance has risen over time.

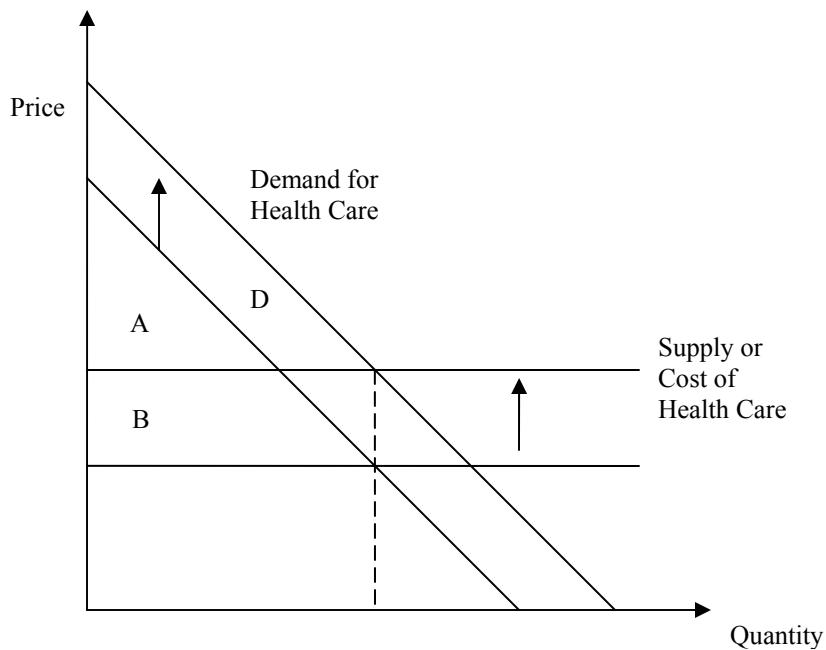
**A simple way to show that a rise in price is not synonymous with a fall in consumer wellbeing using our standard Demand and Supply tools:**

The standard argument that the rise in price implies that the quality of treatment remains the same, and consequently a drop in consumer welfare. This would be true if the following is true:



Here with no change in quality, since there is no change in consumers willingness to pay as revealed by the demand curve, the increase in price leads to a loss of B+C in consumer surplus, with C being the deadweight loss.

We know that the quality of health care has increased, and hence we should include a shift in demand curve to show a change in consumers' willingness to pay, depicted below:



That is although the consumer loses B, they gain in D. There is a loss in welfare if and only if D is less than B, or when the rise in quality of care is lower than the cost of producing it. This highlights the care we need to exercise when making such statements based on summary statistics. **If what we observe is true, in that there is increased consumption of health care products and services over time, using the above diagram what would that mean in terms of whether consumers has enjoyed a welfare gain? Can you show your argument using a simple demand and supply equation?**