Health Economics 101

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Prepared as part of an education project of the Global Health Education Consortium and collaborating partners
Learning objectives

• Know what makes health economics special and different from economics, in general
• Identify how the economy of health differs from other sectors of the economy
• Recognize the economic concepts of efficiency and inefficiency
• For a developing country of interest, what health concepts can you apply? Who are the actors, and how likely are these principles to apply to your country of interest?
Importance of Health Economics

Health economics provides an important perspective to analyze and understand:

1. The economic weight of the health economy to a nation's overall economy
2. The concerns with national policy that arise at an individual level with the affordability of health
3. The financial components that accompany national health issues
Size of Health Economy

• The Global Health Economy is growing faster than the Global Gross Domestic Product!

• 2000: 8% of Global GDP
• 2005: 8.6% of Global GDP

• However, expenditure on health as measured as % of national GDP is not at all similar among nations

Source: National Health Accounts series, World Health Organization 2009
Size of Health Economy (con’t)

- Overall global expenditure on health care:
- 1995-2000: $197 Billion annual increase in expenditure
- 2000-2005: $330 Billion annual increase in expenditure
- 59.8 million health care workers worldwide
Definitions

• **Health** → a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. (WHO)

• **Health Care** → Goods and services provided to promote health, or prevent, alleviate or eliminate ill-health. (Dictionary of Health Economics)

• **Economics** → a science which studies human behaviors as a relationship between given ends and scarce means which have alternatives uses. (Lionel Robbins)

Culyer, AJ. The Dictionary of Health Economics. Edward Elgar Publishing limited. 2005

And some more...

- **Human Capital** → People’s innate abilities and talents plus their knowledge, skills, and experience that make them economically productive. Human capital can be increased by investing in **health care**, education, and job training. (World Bank)

- **Health Economics** → Health economics is a branch of economics that is concerned with how resources are allocated and used in different health systems.

A Bidirectional Relationship Between Human Health and Economic Well-Being

Economics Affecting Health

- Strong Economic Performance
- Higher Individual Incomes
- Purchasing of health promoting goods and services
- Improved Health

Health Affecting Economics

- Good health
- Human Capital Increases
- Individual Productivity Increases
- Overall Economic Growth Rate Increases

Definitions
- There is a long relationship between human health and economic well-being. The traditional thought (as expressed by Larry Summers, and others) was that being wealthier led to the purchase of human health.
- However, starting in the 2000s, with the Macroeconomic Commission on Health, Jeffrey Sachs and others explored the impact that health may actually be a driver of the economic well-being of nations.
The United States: Economics and Health Do Not Match

- Economic Indicators
  - GDP (PPP) per capita: 46,716 (Int.$)
  - Spending on Health: 15.3% of GDP
- Health Indicators
  - Obesity in adult population: 34.3%
  - Life expectancy at birth (years): 78.1 (23rd among OECD members)
  - Infant Mortality per 1000 live births: 6.7 (28th among OECD members)
Norway: Economics and health do match

- Economic Indicators
  - GDP (PPP) per capita: 58,141 (Int.$)
  - Spending on Health: 8.6% of GDP

- Health Indicators
  - Life expectancy at birth (years): 80.6 (10th among OECD members)
  - Infant Mortality per 1000 live births: 3.2 (6th among OECD members)
Health as Human Capital

• Health is a form of human capital like education or skills

• HOWEVER:
  – It cannot be accumulated like education or skills
  – It is vulnerable to large risks
    • (e.g. trauma, severe disease, death etc)
How does the *health care economy* differ?

- 4 features distinguish health care in the realm of economics:
  1. Government intervention
  2. Uncertainty
  3. Asymmetric Knowledge
  4. Externalities

- These features are present in other sectors but are present together and with significance in the health economy

1. Government intervention

- Government has a special role as steward of the health sector …
  - Creates guidelines for private and public health sectors
  - Measures competency and qualifications of health care workers
  - Drives specific economic behaviors amongst health providers by dictating prices and specifying practice locations
  - Helps education of potential providers (e.g., student scholarships)
  - Conducts research (e.g., National Institute of Health, Canadian Institute of Health Research)
2. Uncertainty

- Level of the Patient
  - Patients often enter the health system *uncertain* about their current state of health

- Level of the Provider
  - Chosen interventions used for a specific illness can vary widely depending on the provider and their preferences
3. Asymmetric Knowledge

- Consumer – Insurer Relationship
- Patient – Physician Relationship
  - Physician has much more medical knowledge about the patient’s illness and treatment options than the patient
  - Patient is willing to reveal all his or her personal experience about the illness to the doctor for care
  - Physician should reveal all known knowledge to patient BUT financial incentives or personal emotions can influence the physician’s action and information may be withheld
3. Asymmetric Knowledge (con’t)

- Provider – Supplier Relationships
  - e.g. Pharmaceutical companies may not provide information on the cost of manufacturing drugs, so as to prevent drugs to be sold at different prices around the world
  - An example is HIV antiretrovirals, which were sold for thousands of dollars, but cost only tens of dollars to make. Manufacturers wanted to prevent movement of drugs from poor to rich countries.
4. Externalities

- The costs and benefits which arise from an individual’s action has an effect on other people

- Positive Externalities – impose benefits on others

- Negative Externalities – impose costs on others
Positive Externality: Immunization

- Immunization provides protection against a specific pathogen to the patient and eliminates a potential host for the pathogen, decreasing its capacity to spread to others – imposes social benefit

- Immunization against pathogens causing diphtheria, tetanus, pertussis and measles prevents 2.5 million deaths a year

Source: http://www.paho.org/English/DPI/categ05.htm
Negative Externality: Overuse of Antibiotics

• Example:
  – A elderly man from a seniors home complains of frequent and painful urination multiple times a year and each time is diagnosed with a urinary tract infection caused by *E. Coli* and given Septra (trimethoprim/sulfamethoxazole).
  – The more often Septra is prescribed, the higher the probability an antibiotic-resistant pathogen will emerge. This represents a negative externality for others as it reduces their chances of successful treatment if they get the same infection.
Drivers of Supply vs. Drivers of Demand

Drivers of Supply
- Health Care Providers
- In-patient Beds
- Equipment (CTs, MRIs, dialyses, etc.)
- New Technologies

Drivers of Demand
- Population Demographics
  - Age Structure
  - Total Population
- Health Status
- Health Behavior
- Education
Health Care Demand

- Public **demand** for health should *equal* public **need** for health (not public “wants” for health)
- Money should be budgeted to follow established health needs
- Money should not be budgeted in anticipation of assumed health needs
- Public demand for care is determined by the system’s
  - (1) Capacity to respond, and
  - (2) Quality of treatment

The “needs” for health do not necessarily equate to the “wants” for health. There is no doubt there is a need for emergency health services to try and keep an individual alive, but does everyone need botox injections to look younger? The answer to the second part is obviously no. Placing the demands for health and maximizing its value depends on the capacity of the system to respond, and the quality of treatment that is desired.

Health Care Demand

On the Concept of Health Capital and the Demand for Health

Michael Grossman
National Bureau of Economic Research

• Better health increases an individual’s health stock
• Health is a consumption and investment good
• Demand for health care is an indirect demand for health
Consumption and Investment

- **Health as an item of Consumption**
  - Health can be considered a fundamental commodity that all people desire as it provides a state of well being
  - Other goods and services can be consumed to enable health, such as:
    - Soaps, Antibiotics, Vaccinations, Vitamins, Health Care etc

- **Health as an item of Investment**
  - Going to the gym, eating healthy and so on are all activities which improve health
  - Improved health allows individuals to (1) gain more work time and (2) work more efficiently
    - These contributions lead to increased income
  - Therefore, investing in health is an economic investment
Grossman’s Model

Red Line – Represents the decline in rate of return (relative gain in health) as investment increases. The point where rate of return (gain in health) equates cost of investment indicates the Optimum level of Investment – The Optimum level of Demand.
Grossman’s Model

- Rate of return (ROR) decreases as investment increases
  - The more an individual invests in health the lower the rate of return (relative gain in health) each successive investment provides.
    - i.e., The effects of a healthy diet and consistent exercise will provide a larger health gain to an individual who is obese than to an individual who is an athlete and already very healthy
  - Optimal demand occurs when the rate of return (gains in health) equals the cost of investment

Applying Grossman’s Model

• An example of using Grossman’s model could justify the benefit of primary health care over tertiary health care
  – A small investment in preventive health care may prevent deaths in children (small amounts of $ prevents death) is better than tertiary health care (reviving every heart attack and cancer)

• Grossman’s model explores the fact that people will invest in health as long as the rate of return > cost of the investment. Once the investment cost equals the rate of return, the optimal demand point for health is achieved.
Efficiency

- Human demands for health are infinite but resources for the provision of health are finite
  - There is a scarcity of resources

- “Resources are allocated efficiently if their use results in the greatest possible benefit to society, i.e., they could not be reallocated in such a way that social welfare increases” (Evans, 1999)
  - Social welfare is maximized by resource usage
Opportunity cost

- Resource scarcity creates the situation where every decision made within a health care system has implications for social welfare
- Resources used for one action removes the possibility that the same resources be used for alternative actions.
- i.e., Opting for surgery eliminates funds for drug therapy

Abdominoplasty vs. Breast Cancer Resection in a Public system – Example

• The opportunity cost of a tummy tuck is:
  – The delayed treatment of patients with life-threatening conditions (i.e. breast cancer)

• Resources used for a tummy tuck that could be allocated for a cancer resection include:
  • Nursing time, anesthesiologist, operating room time, recovery room etc

Source: http://z.about.com/d/thyroid/1/0/K/X/surgery-clipart.jpg
Abdominoplasty vs. Breast Cancer Resection in a Public system – Example *continued*

- If we agree that society values cancer resections (an important medical procedure) over tummy tucks (a cosmetic procedure) AND
- If conducting tummy tucks prevents conducting cancer resections due to the usage of necessary resources…

THEN

1. Resources within the health system are being allocated inefficiently
2. Overall social welfare declines, which suggests inefficient resource usage
   - If the ability to perform cancer resections is threatened, then resource usage is not maximizing social benefit
   - See definition of Efficiency - slide 22
Inefficiencies in a health system

- Ineffective use of prescription drugs and surgical procedures
- Medical errors resulting in patient harm or death
- Ordering of diagnostic tests that have no impact on patient management
- Brand name drug use over generic drug use
Blue Pill vs. Red Pill

- Omeprazole and Nexium (Esomeprazole) are both proton pump inhibitors which treat acid reflux disease

<table>
<thead>
<tr>
<th></th>
<th>Esomeprazole</th>
<th>Omeprazole</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dosage</strong></td>
<td>20mg</td>
<td>20mg</td>
<td>Esomeprazole and Omeprazole contain the same active compound but Esomeprazole contains twice the amount</td>
</tr>
<tr>
<td><strong>Efficacy</strong></td>
<td>89.9%</td>
<td>86.9%</td>
<td>The difference is statistically significant (p&lt;0.05) but is unlikely to be clinically important</td>
</tr>
<tr>
<td><strong>Price ($US)</strong></td>
<td>120.99 for 30 x 20mg (branded)</td>
<td>$US115.99 for 30 x 20mg (branded)</td>
<td>$US93.99 for 30 x 20mg (generic)</td>
</tr>
</tbody>
</table>

Blue Pill vs. Red Pill continued

- Both are similar with comparable efficacy, however, following a robust marketing campaign by the pharmaceutical giant, AstraZeneca, physicians began prescribing Nexium
- Prescription of the more expensive drug results in unnecessary higher costs to patients and taxpayers

Source: http://www.healthsquare.com/common/images/I/LEK04220_56898_5.JPG
Source: http://assets.latimes.com/system/assets/images/002/6952/41194005-23172148_preview.jpg
Health Care Supply

• Some components of supply
  – Total practicing health care providers
  – Total students in health professional schools
  – New technologies
  – Medical equipment
  – Pharmaceuticals

• Some influences on supply
  – Restrictions on drug developments
  – Medical school accreditation
  – Licensing requirements
Service Provision

• Utilizing available resources and providing treatment/intervention

• Should emphasize cost-effective treatments, functional organization, and delivery of health services

Service Provision and Efficiency

• Efficiency is particularly important in this function

• The decision of which treatment or combination of treatments to employ must consider 2 principles:
  – Cost of treatment
  – Effectiveness (Gains in Patient Health)
A list of measures that can be used to address their respective health issues. The interventions are both cost-effective and have a disproportionately positive effect on the poor. World Health Report. World Health Organization. 2000.

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal health and Mothering</td>
<td>Prenatal and Delivery care, safe delivery by trained worker, postpartum care and specific care for high risk pregnancies</td>
</tr>
<tr>
<td>interventions</td>
<td></td>
</tr>
<tr>
<td>HIV/AIDS Prevention</td>
<td>Mass education, counseling, screening, treatment, emphasis on sex workers</td>
</tr>
<tr>
<td>Malaria</td>
<td>Case management and selected prevention procedures</td>
</tr>
<tr>
<td>Tobacco Control</td>
<td>Education, Tobacco tax</td>
</tr>
</tbody>
</table>
Making do with what is given

<table>
<thead>
<tr>
<th>Nation</th>
<th>Per capita total expenditure on health (PPP int. $)</th>
<th>Life expectancy at birth of both sexes (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>2498</td>
<td>83</td>
</tr>
<tr>
<td>Poland</td>
<td>843</td>
<td>75</td>
</tr>
<tr>
<td>South Africa</td>
<td>811</td>
<td>51</td>
</tr>
<tr>
<td>El Salvador</td>
<td>364</td>
<td>71</td>
</tr>
<tr>
<td>Swaziland</td>
<td>360</td>
<td>42</td>
</tr>
</tbody>
</table>
Making do with what is given (cont.)

• Japan's life expectancy is much higher than the other nations, however its health care system has access to much more resources – almost 7x more than El Salvador – which explains the high Life expectancy.
• El Salvador and Swaziland → both use similar amounts of resources BUT El Salvador has 29 years more in life expectancy, why?
  • Resource allocation and organization in El Salvador’s health system is more effective resulting in higher health outcomes amongst the population.
• Health system performance should be assessed on what it accomplishes relative to the resources it has available, not on what it could accomplish if it had access to more resources which are being used elsewhere (ie. education or military).
  • El Salvador’s performance should be compared to nations with similar amount of resource usage not to nations which use much more resources such as the United States or Japan.
Rationing Resources to Meet Priorities

• Resources must be rationed appropriately to meet specific priorities set by the health system

• Two typical ways of rationing:
  – Indirect rationing
  – Direct rationing

World Health Report 2000
Indirect Rationing

• Enforcing a strict expenditure limit and rationing for various priorities while keeping with this limit
• Disadvantage: Possibility of budgeted resources being dominated by politically powerful groups

• e.g. Access to the newest drugs (people with preferential access or money get the drugs first).

In indirect rationing expenditure controls are imposed to restrict budgetary obligations to affordable level. No specific health priorities (diseases or interventions) are targeted when imposing these controls. Further, the budget-holder, which is usually a governmental figure is responsible for rationing the resources for care. The main disadvantages of this form of rationing are:
1) In resource poor nations the overall quality of care can be lowered
2) The budget can be captured by politically powerful health providers leading to the exclusion of vulnerable groups from adequate care
Direct Rationing

- Rationing resources specifically for pre-determined priorities, e.g., providing access to emergency health care services

With direct or explicit rationing health care priorities are first determined by following a set of criteria that considers social, political and cost-effective factors. Once the priorities are established available resources are rationed to meet the unique requirements of each priority. Rationing explicitly is unique from imposing expenditure controls because it rations resources by directly targeting specific priorities.

Explicit rationing: remains cost-effective by considering cost-efficiency while determining which health priorities to ration for.

Expenditure controls: remains cost-effective by immediately imposing budgetary restrictions then rationing resources for non-specific health priorities.
Future Challenges in Health Care Costs

• Epidemiological transition
  – Communicable disease → Non-Communicable Disease
  – Diseases of Scarcity → Diseases of Plenty

• Challenge of an aging population
  – Costs and Resources
  – Long-term care facilities
Epidemiological Transition

- Historically, infectious diseases were the main cause of mortality until the 20th century
- However, non-communicable (chronic) diseases have exploded in modern times

Source: Mathers et al., 2003, as cited in Suhrcke, 2006
Epidemiological transition (cont.)

Modern technologies have led to the development of three important interventions: Vaccinations, Antibiotics and Improved Hygiene. The result of these actions has been improved life expectancy. With more people living well into adulthood more and more people have become ill due to non-communicable diseases which effect primarily older individuals. According to WHO estimates in 2002 of the 57 million deaths worldwide, 59% were due to non-communicable disease. Furthermore, even in low income nations where communicable diseases accounted for higher mortality in 2002, they are expected to be passed by non-communicable diseases by 2030.
Nutrient Transition: Obesity - no longer a disease of affluence

• Health systems in developing nations designed to deal with malnutrition must now manage with increasing rates of obesity
  – Why? – Dietary Transition
    • Transition has been fueled by demographic, social and economic factors, including in particular multinational food manufacturing corporations
Nutrient Transition: 
Obesity - no longer a disease of affluence

Health systems in developing nations over time have adapted to diseases of scarcity (malnutrition, infectious diseases etc.). However, there has been a nutrient transition where traditional grain based diets have transitioned towards unhealthy high saturated fat, high sugar diets. The prevalence of malnutrition and now obesity imposes serious pressures on these national health system’s, many of which are overburdened with many other health concerns. Globally there are 1.2 billion individuals overweight, of which 300 million are clinically obese (Boutayeb, 2005). Moreover, 115 million obese individuals reside in developing nations where malnutrition is also prevalent (Wolfe, 2006). The rise in global obesity rates also threatens to exacerbate the rise of non-communicable diseases as obesity is a gateway to cardiovascular disease, certain cancers, diabetes and other chronic illnesses.
Combating Non-communicable Diseases

- Population and Community oriented interventions
  - Involves education of large populations on diseases of high morbidity and mortality
- High risk group intervention
  - Occurs at a smaller scale at the individual level or with specific groups
  - Involves direct and selective treatment of those who are diseased or at an immediate risk of being diseased
- Interventions beyond the Health Sector
  - Integrated policy measures between the health sector and the education, communication, agriculture, finance and other sectors are also required
Population Ageing

Figure 1: Young Children and Older People as a Percentage of Global Population


Figure 2: Average health care expenditure per capita, by age group, 2000-2001, in Canada

Source: Health Canada, 2001
Population Aging (cont.)

In 2003, the World Health Organization estimated that were 600 million people who were 60 years old or older worldwide. In 2025 there will be 1.2 billion people and by 2050 there will be 2.0 billion elderly individuals globally. The rapid increase in an aged population results from two factors: declining fertility rates and declining mortality rates. While global population aging is a testament to the advances of modern medicine it imposes significant challenges to health systems. With older populations health system financing becomes challenged as….

1. The system must use increasing quantities of resources, since the elderly generally demand more treatment (see Figure 2), and as
2. The health systems recover lower revenues since growing proportions of the populations are becoming economically inactive.
Challenges:

- Impact on revenue collecting and financing mechanisms of health systems
- Increased incidence of non-communicable diseases
- Disproportionate use of health care facilities by elderly leaving insufficient resources available to the rest of the population
- Increased treatment of patients with multiple co-morbidities that require interventions from various health care sectors
- Inadequate resource allocation

With the inevitable increase in health care demand that will result from the current ageing populations, elderly individuals will begin to swamp health facilities such as hospitals/clinics and utilize higher volumes of nurses, physicians and other health professionals. By doing this they will block health resources from other members of the population who require them equally. Also, as elderly individuals contract chronic diseases they will begin to seek out treatment from different types of health professionals which can lead to inappropriate or counteracting treatments. Therefore, this emphasizes the importance of strengthened coordination amongst different health care sectors.
Potential Solutions

• Increased emphasis on preventive medicine via health promotion and disease prevention measures
  – Should focus on causes of co-morbidities and early death such as obesity, mental disorders and hypertension

• Expanded expenditure on long-term health care delivery by informal and formal health care providers
  – Increased use of out-patient treatment and patient self-care
  – Reduces exorbitant costs to the health system
  – Frees bed space and other resources
Potential Solutions, *continued*

- Reorienting allocation of resources
  - Transition towards systems more conducive to the health needs of an older population – devoting resources to the specific needs of the elderly
  - Movement away from expensive hospital technologies to more cost-effective primary care interventions
Financing a Health System

• Functions of Financing:
  – Active collection of funds
  – Pooling funds
  – Using funds

For more information on slides 50-53, see Module #34: Comparative Health Systems

Source: http://www.brookings.edu/~media/Files/Images/RotatingFeature/S/SP%20S
Financing a Health System

Overall Global Health Expenditure by Type – 2004 (%)

- General Taxes: 33%
- Social Insurance: 22%
- Private Insurance: 20%
- Direct Payment and Other: 25%

Collection of Funds

• Methods:
  – Taxation – involves various forms of taxation by government
  – Social insurance – degree of payment is relative to individual income level, payment is required
  – Private insurance – degree of payment is relative to individual health risk, payment is voluntary
  – Direct payment – out of pocket payment at point of care
  – Aid – health system receives donated funds from either outside governments, for-profit or non-profit organizations
Pooling and Using Funds

• Pooling
  – Reduces the financial risk borne by each individual contributor during illness by sharing the financial burden of health care expenditure amongst all contributors

• Using
  – Funds are transferred to health care providers (doctors, nurses, equipment manufacturers etc) to deliver appropriate health interventions
  – Interventions do not necessarily imply direct patient treatment but also include actions that indirectly augment care (i.e. custodial care of health facilities)
Summary

• Health is a unique form of human capital
• The health economy is crucial to the overall global economy but is distinct from other economic sectors due to the interaction of certain characteristics
• Each country has an optimal level of health care demand and it should reflect the public needs for health
• Allocation of given resources in a health system is efficient if overall social welfare is maximized
Credits

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