

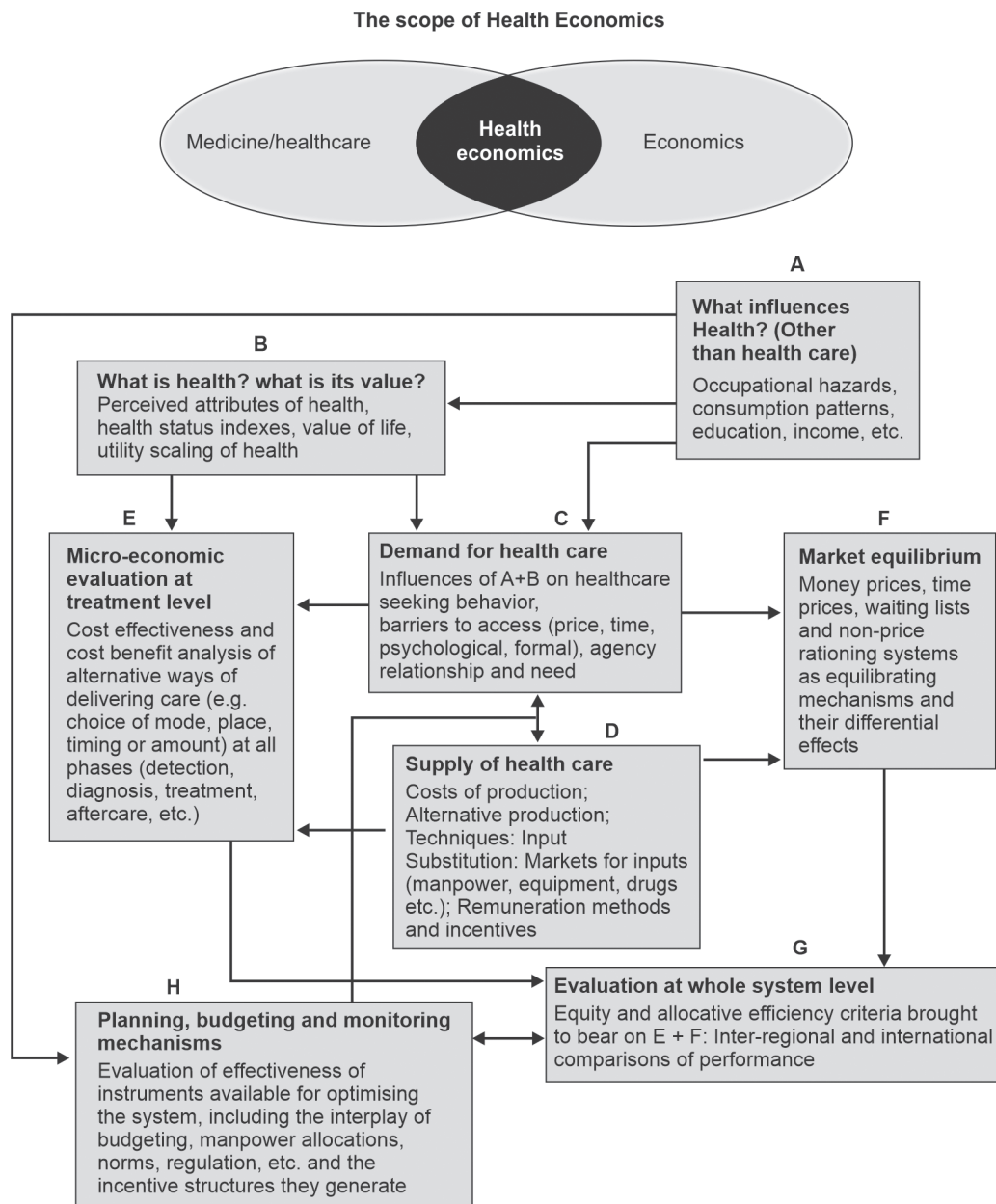
## The Scope of Health Economics

The scope of health economics portrays explanation of the nature of health economics. It has an important role in healthcare decision making and provides an overview of the structure of sub-discipline of health economics. Health economic has the ability of introducing and explanation of some fundamental concepts in health economics (Fig. 2.1).

Health economics lies at the interface of economic and medicine and applies the discipline of economics to the health field. As the health resources are restricted, one has to make a choice about which resources to be used for which activities. When making a choice, one has to be cautious in choosing right choice; when selected to use resources for one activity, the opportunity of using those resources for alternative activities is given up and the benefits associated with the best alternative use resources is lost. This is called the opportunity cost. This opportunity cost main endeavor is to ensure that the selected activities have benefits that outweigh their opportunity costs. In other words, most beneficial activities are opted within the available resources.

Economics is not only concerned with efficiency but also is more than that, as the efficiency is not only objective in selecting, but also how healthcare resources should be prudently allocated. We also need to think about justness, or the fair distribution of resources and benefits, that is also an endeavor in healthcare decision-making. Economics provides an information outline in which the objectives of both efficiency and equity may be pursued. Economics also provides a framework which aims at maximizing benefits within available resources.

**Economics:** The science that deals with the production, distribution, and consumption of commodities. Economics is a social science that seeks to describe the factors which determine the production, distribution and consumption of goods and services. The science that deals with the production, distribution and selling, using of goods and services. A social science that studies how individuals, governments, firms and nations make choices on allocating scarce resources to satisfy their needs. Economics is a science pertaining to the production, distribution, and use of income, wealth, and commodities. Economics also related to the science of economics. There are a variety of modern definitions of economics. Some of the differences may reflect evolving views of the subject itself or different views among economists. An ever popular field of study for undergraduate students is economics because many students have postgraduate high aspirations.



**Fig. 2.1:** Structure of the discipline of health economics according to Williams (*Courtesy:* Being reasonable about the economics of health. Selected essays by Alan Williams. Culyer, AJ and Maynard, A (eds.). Cheltenham. Edward Elgar. 1997. p.46.)

**Health Economics:** It is a branch of economics concerned with issues related to efficiency, effectiveness, value and behavior in the production and consumption of health. In other words: Health economics is a branch of economics concerned with the formal comparison of costs and consequences of healthcare. Health economics is devoted to the subject of how healthcare resources are allocated and utilized.

The division of economics focused on evaluating scarcity in healthcare systems in different economies. Health economics, a social system that studies the supply and demand of healthcare resources and the effect of health services on a population. Health economics is used to promote health through the study of healthcare providers, hospitals and clinics, managed care and public health promotion activities. The concept of health economics can be explained in layman language as the study of economical functioning of healthcare system in an economical way. Access healthcare data, key organizations, reports and publications, and meetings and conferences; access health economics data, key organizations.

## Health Economics Information Resources

### *Health Economics Means*

- It is a broad-based **sub-discipline of economics and deals with health issues**
- It is concerned with **maximizing benefits within available resources related to health**
- **Overlaps** with a number of topics, both within and apart from, health and medicine
- **Interacts** with many other medical disciplines and public health projects
- **Encompasses more than economic evaluation** and inject into health field
- It has a **significant role in healthcare decision-making** at policy and clinical level
- Outlines the **range and type of information** relevant to health economics
- Outlines and highlights **key sources and tools** which may be used in **accessing information** for health economics

Health economics is a branch of economics concerned with issues related to efficiency, effectiveness, value and behavior in the production and consumption of health and healthcare. In broad terms, health economists study the functioning of healthcare systems and health-affecting behaviors such as drinking alcohol, smoking and so on.

The factors that distinguish health economics from other areas include extensive government intervention, intractable uncertainty in several dimensions. In healthcare, the third-party agent is the physician, who makes purchasing decisions (e.g. whether to order a lab test, prescribe a medication, perform a surgery, etc.) while being insulated from the price of the product or service.

Health economists appraise multiple types of financial information: Charges, costs, and expenditures. And uncertainty is inherent to health, both in patient outcomes and financial concerns. The knowledge gap that exists between a physician and a patient creates a situation of distinct advantage for the physician, which is called asymmetric information.

Economic evaluation is the comparison of two or more alternative courses of action in terms of both their costs and consequences (Drummond et al.). Economists usually distinguish several types of economic evaluation, differing in how consequences are measured:

- Cost-minimization analysis (CMA)
- Cost-benefit analysis (CBA)
- Cost-effectiveness analysis (CEA)
- Cost-utility analysis (CUA)
- Cost consequence analysis (CCA)

In cost minimization analysis (CMA), the effectiveness of the comparators in question must be proven to be equivalent. The 'cost-effective' comparator is simply the one which costs less (as it achieves the same outcome). In cost-benefit analysis (CBA), costs and benefits are both valued in cash terms. Cost effectiveness analysis (CEA) measures outcomes in 'natural units', such as mmHg, symptom free days, life years gained. Finally cost-utility analysis (CUA) measures outcomes in a composite metric of both length and quality of life, the quality adjusted life year (QALY). (Note there is some international variation in the precise definitions of each type of analysis).

A final approach which is sometimes classed an economic evaluation is a cost of illness study. This is not a true economic evaluation as it does not compare the costs and outcomes of alternative courses of action. Instead, it attempts to measure all the costs associated with a particular disease or condition. These will include direct costs (where money actually changes hands, e.g. health service use, patient co-payments and out of pocket expenses), indirect costs (the value of lost productivity from time off work due to illness), and intangible costs (the 'disvalue' to an individual of pain and suffering). (Note specific definitions in health economics may vary slightly from other branches of economics.)

### Healthcare Market Equilibrium

The five health markets typically analyzed are:

- Healthcare financing market
- Physician and nurses services market
- Institutional services market
- Input factors markets
- Professional education market

Although assumptions of textbook models of economic markets apply reasonably well to healthcare markets, there are important deviations. Many states have created risk pools in which relatively healthy enrollees' subsidize the care of the rest. Insurers must cope with adverse selection which occurs when they are unable to fully predict the medical expenses of enrollees; adverse selection can destroy the risk pool. Features of insurance market risk pools, such as group purchases, preferential selection ("cherry-picking"), and pre-existing condition exclusions are meant to cope with adverse selection.

Insured patients are naturally less concerned about healthcare costs than they would if they paid the full price of care. The resulting moral hazard drives up costs, as shown by the famous RAND health insurance experiment. Insurers use several techniques to limit the costs of moral hazard, including imposing copayments on patients and limiting physician incentives to provide costly care. Insurers often compete by their choice of service offerings, cost sharing requirements, and limitations on physicians.

Consumers in healthcare markets often suffer from a lack of adequate information about what services they need to buy and which providers offer the best value proposition. Health economists have documented a problem with supplier induced demand, whereby providers base treatment recommendations on economic, rather than medical criteria. Researchers have also documented substantial "practice variations", whereby the treatment depends on service availability to rein in inducement and practice variations.

**Competitive equilibrium in the five health markets:** While the nature of healthcare as a private good is preserved in the last three markets, market failures occur in the financing and delivery markets due to two reasons: (1) Perfect information about price products is not a viable assumption; (2) Various barriers of entry exist in the financing markets (i.e. monopoly formations in the insurance industry).

**Medical economics:** Often used synonymously with health economics, medical economics, according to Culyer, is the branch of economics concerned with the application of economic theory to phenomena and problems associated typically with the second and third health market outlined above. Typically, however, it pertains to cost-benefit analysis of pharmaceutical products and cost-effectiveness of various medical treatments. Medical economics often uses mathematical model to synthesize data from biostatistics and epidemiology for support of medical decision-making, both for individuals and for wider health policy.

**Behavioral economics:** Peter Orszag has suggested that behavioral economics is an important factor for improving the healthcare system, but that relatively little progress has been made when compared to retirement policy.

**Nursing economics:** The scientific application of principles of care to prevention of illness and care during illness. Feeding an infant at the breast; tending and caring for a child. The provision of various levels of preparation, of services essential to or helpful in the promotion, maintenance, and restoration of health and well-being in prevention of illness, as of infants, of sick and injured, or of others for any reason unable to provide such services for them. The profession of a nurse is to serve the sick and injured with best of her/his ability to bring back to normalcy or minimize the sufferings and utmost care for safety of a patient.

The practice in which a nurse assists “the individual patient, sick or injured, in the performance of activities that contributing to health or its recovery (or to a peaceful death) that he/she would perform unaided if he/she had the necessary strength, will or knowledge to help the patient gain independence as rapidly as possible.

**The diagnostic measures and treatment of human to actual and latent health problems:** The American Nursing Profession suggests the following principal characteristics that define nursing care:

*The phenomena that concern nurses:* The phenomenon is the use of theoretical knowledge to observe the need for nursing intervention and plan for nursing action; the nursing action leads to evaluation of the effects of the actions relation to the phenomena. This definition of nursing provides a framework for the nursing process, including data collection, diagnosis, planning, treatment, and evaluation. The nursing process is supported by standards of nursing practice that are harmonious with the definition and that provide more specific guidelines for practice. These standards include systematic, continuous collection of data concerning the health status of the patient in recorded form that is accessible and that may be easily communicated.

A nursing diagnosis is derived from the data collected. With that a plan for nursing care incorporates goals from the derived diagnosis and prioritized the approaches to achieve the goals that required dealing with the noted diagnosis. Nursing actions include nursing care by performing with the client’s participation, continue supervision,

monitoring for, or restoration of the patient's health with utmost abilities to restore normalcy and minimizing the suffering or damage. The improvement or lack of progress toward the goal is mutually determined by the patient's progress record, that resulting in reassessment, reordering of priorities, establishment of new goals, and revision of the plan for nursing care.

Nursing coordinates, intersects with, and complements with other professionals for better healthcare, acts according to the needs of patient and addresses appropriately for those who are well, and those who are not well. Further steps are to ensure that those who are not well-understand the problems that hampering the progress, and take suitable measures in consultation with seniors and other treating physicians.

These concerns include the following: Limitations of the client's self-care ability; impaired ability to function in any fundamental area such as sleeping, breathing, eating, maintaining circulation; pain, anxiety, fear, loneliness, grief, or other physical or emotional problems related to health, illness, or treatment; impaired social or intellectual processes; impaired ability to make decisions and choices; alteration of self-image as required by the change in health; dysfunctional perception of health or healthcare activities; extra demands posed by such normal life processes as birth, growth, or death; and relationship difficulties. Various concepts, principles, processes, and actions developed and examined in nursing research guide the steps in the nursing process from initial observation and diagnosis through evaluation, based on intrapersonal, interpersonal, and systems theories.

The boundary for nursing practice is not limited to, as it tends to move outward according to the needs and aptitude of society to change. Collegial, collaborative practice with members of other healthcare professions further softens the boundaries of nursing practice. All healthcare professionals share a scientific database for the given task, and to some degree, their practices overlap. At its core, nursing endeavor is to nurture, protective; preventive care is a part of every nurse's practice. Nurses value independence and self-respect and are guided by an ethical and humanitarian philosophy in which every human being deserves respect, regardless of racial, social, cultural, sexual, economic, religious, or other factors.

The nurse practices in the context of a relationship with the client, family, or group of professional and yet close, in an interpersonal sense. The function of a nurse involves the physical intimacy and personal touch and care. Compassion and constant recognition of the person's dignity are essential. Nursing is practiced by specialists and generalists. Generalists provide most nursing care; specialists, having added to their basic knowledge on an organized and systematized body of knowledge and competencies, practice in specialized areas of nursing. Nursing care is given to people at all stages of life in the home, hospital, place of employment, school, or any environment where nursing care is needed. Nurses are ethically and legally accountable for their practice and for delegation of responsibilities to others.

Nursing is a disciplined profession and area of practice. As a discipline, nursing is centered on continued knowledge development as such emphasis is placed on discovering, describing, extending, and modifying knowledge for professional nursing practice. As a profession, nursing has a social mandate to be responsible and accountable to the public it serves. Nursing is an integral part of the healthcare system, and as such encompasses the promotion of health, prevention of illness, and care of

physically ill, mentally ill, and disabled people of all ages, in all healthcare settings and other community contexts. Within this broad spectrum of healthcare, the phenomena of particular concern to nurses are individual, family, and group "responses to actual or potential health problems." The human responses range broadly from health-restoring reactions to an individual episode of illness to the development of policy in promoting the long-term health of a population.

Other most important responsibilities are feeding an infant at the breast; tending and caring for a young child and are the application of prescribed therapies and the management of the patient and environment to assist in healing. Nursing dental caries of the maxillary primary teeth caused by the oral retention of milk or formula in the oral cavity. Nursing home care service includes a convalescent facility for the care of individuals who do not require hospitalization but who cannot be cared for at home.

## Need for Healthcare Economic Research

Due to advent of technology, innovative methods to improve healthcare, it has become crucial to conduct health economics research to promote and understand how the healthcare providers, healthcare system, insurance and payers and the patient behavior and value of new methods endeavor. Research on this topic, can provide insight into what products and services are essential and beneficial or valueless. And regular market conditions that are applicable for healthcare economics, e.g. studies of the effects of benefits or losses that influences on healthcare delivery. Careful studies of diagnosis, course of treatment for curative cases, and approaches for preventive measures that can optimum their impact on health well-being. The technologies and methods that proved good could be applied, and those showed negative results, need modification or avoiding applying those methods. To quote for instance; study results from health economics-funded researcher Jody Sindelar suggest that for low-income individuals, a greater emphasis on the financial costs of smoking could be more effective to motivate quitting than health-related message.

Research studies are being carried out on a range of issues affecting health outcomes, in an environment in which healthcare delivery systems, healthcare financing and healthcare technology are all changing rapidly, obviously with the assistance of funds from one source or the other are applied to get to know intensively. If research is done scientifically, with the application of appropriate technology and database, the outcome would be vital for taking economical measures to improve efficiency as well as safety measures and to minimize the cost of care that ultimately benefits to patients. It would be prudent to take the patients perspective in making studies for which the following points need to be considered:

- Patients have diverse preferences that influence their healthcare choices, including risks involved during medical examinations, medical tests or investigations, treatment, anxiety and end results and ultimately quality of care and life.
- Personalized medical care with individual preferences of selected choices to be considered with the patient's healthcare problem.
- Patient due to lack of healthcare knowledge, craves for quick information related to his/her suffering and diagnosis and types of treatment or exercises that he/she needs to undergo.
- Patient to be educated about different methods in caring, and useful and meaningful information to be provided and complications and risk involved during the course of care/treatment.

- Clinical guidelines are to consider personalized medicine, especially genomic tests and biomarkers, as evidence base for clinical use grows.
- Information on cost-effectiveness could affect guidelines, provided the information is current, reliable, reproducible, and efficiently produced.
- Personalized medicine tests and clinical evidence emerge, payers and providers will need new tools to manage, interpret, and make decisions based on ample new information.
- New measures that have been proved favorable will also be needed to better aligned practice with emerging evidence.
- Information on different hospital/health institutions are needed as variation exists among hospitals in their quality of care, operating expenses, unit prices, and value.
- Information on competitive through health plan networks resulting in individual steering themselves or physician steering patients to higher-value, lower-cost hospitals need to be known.

### **Payment Incentives**

- Regulation (e.g. minimum nurse staffing ratios)
- The level of resources a hospital spends on treating a discharge will be measured as “standardized cost per case,” which includes hospital operating expenses from Medicare fee.
- In view of very little competition over specialized services, such as Level I Trauma Centers, heart transplant hospitals, and hospitals with neonatal intensive care units and so on...coupled with lack of competition, leads to higher prices.
- Adequate comparable data analysis needed on private plans, network benefit designs, patient flows, hospital payment methods, and possible negotiated prices currently practiced in the market.
- Primary lever for improving quality and contained cost of care will be recognized by only increasing competition in hospital market.
  1. Research issues on healthcare markets Martin Gaynor, Federal Trade Commission (FTC)
  2. Carnegie Mellon University, University of Bristol, and National Bureau of Economic Research (NBER).

### **Rapid Growth of Healthcare Expenses**

The enormous healthcare expenses and the high demand for healthcare services that are growing at rapid speed and it is becoming for any nation to provide efficient care to all the population with limited resources is a herculean task. This has necessitated for policymakers to focus on coverage of population health through market structure.

- There is an insufficient data, particularly nationwide, on the market structure for physician practices.
- Researchers need access to basic information about organizational and contractual relationships for physicians, which are becoming more complex. In fact, there is no comprehensive data available on national health source of data on demographic, different diagnoses treated, surgical procedures carried out, and outcome of the services provided, health insurance market structure.

- There is an insufficient knowledge on physician and insurance market that is highly concentrated in small group markets also adds to the problem.
- Important component is the need of information on infrastructure on healthcare organizations and markets.
- The studies have found that hospital prices are higher whether they are for-profit or not-for-profit, especially in more concentrated markets, where fewer competitors.
- Another important concern, as there is no evidence on physician prices.
- Recent studies indicate that physician prices are higher in more concentrated markets and also insurance premiums are higher in more concentrated large employer markets as healthcare services are not a standard commodity which complicates price analysis.
- There is a “price” for a service, but the variables that determine differences in the cost to service provider versus the price paid by payer are not transparent.
- Evidence for private insurance is mixed, while that hospital quality is higher in less concentrated markets.

Work is being done to develop better outcomes and quality measures, but more research is needed. Inpatient risk-adjusted mortality is just one measure; a broader measure would be useful. Current research has demonstrated some causal mechanisms but cannot give insight into what the mechanisms are (i.e. why are mortality rates lower in less concentrated markets?). This is an area where careful qualitative case studies about organizations and management could provide a more nuanced understanding of some of the underlying reasons for higher or lower rates of risk-adjusted mortality.

Yet, for many national health institutes and centers, chronic disease management (e.g. diabetes, hypertension, etc.) is of great interest. It is possible that market concentration would have a different or opposite effect on quality of behavioral medicine and disease management. Costs, Technology, Innovation: There is a fair amount of data available to suggest the impact of market changes on hospital costs. Mergers do not lead to lower costs for hospitals in general but integration can lead to lower costs. Literature on scale economies and hospitals should be updated, and economists have contributed to literature on volume outcome relationships.

It is inevitable by those nations who are endeavoring to conduct workshops, seminars, and conferences to connect a variety of stakeholders in discussion about how a nationally funded research can enhance the role of personalized medicine in improving the efficiency and effectiveness of health care. The goal of the workshop should be to facilitate dialogue among researchers, stakeholders, and research scholars to inform stakeholders of ongoing research initiatives and help researchers focus on questions of critical value to stakeholders. The group to be invited should include; healthcare providers, HIM and IT professionals, patient advocates, guidelines organizations, insurers, payers, and health technology assessment organizations and pharmaceutical and diagnostic developers, manufacturers, and regulators.

**Patient Advocates:** It is highly essential to collect and understand more about patient’s advocates on importance of personalized medicine from the patient outlook.

- Preferences of patient varies and diverse that influence healthcare options, and also different observation about quality of care and risks involved in the treatment process, and

- Anxiety of patients to know more information and understanding of data that are clinically useful and valuable for his care and information that is not useful or favorable.
- Obvious anxiety is always drive the patient the choosing the right choice of services that are rendered.

**Payers:** Since the medical care rendered varied from institution to institution, area to area, and the charges are also different for different diagnostic tests, treatments including surgical procedures, this is a great challenge for payer to understand the scheme and payment criterion.

There health institution differ from those located in rural and urban or city, general to specialty, acute to chronic and emergency types of care, type of insurance coverage, difference between private and public payment systems and coverage methods, etc. Generally, the public payments are governed by rules and regulations, private have their own norms, whereas evidence of clinical utility is the primary criterion for coverage by private insurers.

Payers and providers to have clear understanding on dealing with personalized medicine patient, examination or consultation, conduct different types of tests, clinical examination evidence based diagnosis, treatment including surgical procedure and medications. This requires comprehensible initiative to conduct better practice with appropriate evidence.

**Payment of lowest price without sacrificing quality:** Majority of people have no idea how much medical care actually costs for different ailments. This generally, leads to compare the prices charged by different institutions, though, this is not sensible way of understanding. The following information will enlighten the pricing and quality of care system:

Lack of accurate and complete information, some nations have to bear a large portion of their healthcare costs. Similarly, issues regarding the insurance policies, the insurers increase, they have to switch to co-payments to coinsurance and out of pocket payments on a percentage of the total costs.

Patients having no knowledge of realistic costs, attempt to compare healthcare prices of different consultants' charges or hospitals for medical procedures, ultimately, end up paying the heavy charges as the mechanism of calculation by the health institution is beyond his understanding.

The national health system is managed by the government tries to standardize and equalize the quality care rendered to the people in all areas including rural and urban alike with the objective to provide accurate measures of success, and to accomplish with low cost without sacrificing the quality. Thanks to the advent of information technology, that forms a vital part of finding right solutions. The focus should be on accurate and complete information system which was initiated must enhance the quality, by bringing the cost, and help the healthcare providers. The attention should be to have scientific knowledge for healthcare field that is vital, which is enormous and complex, for healthcare providers. Instead of dumping too complicated information, it should be practicable technology, easy to assimilate and implement in their day to day work to manage efficiently within the constraints of time and resources. This is a definite benefit the nation and as well as individual patients.

The infrastructure including the systems and methods to be oriented towards the patient and physician and not the technology, the technology system should be more of 'user friendly' so that healthcare providers including physician feel comfortable with the technology system.

### **Technical Goals**

The technology put into practice should be:

- Reliable storage and retrieval of compound medical information for speedy application
- Relevant and timely information for quick medical decisions
- Real-time data entry by all healthcare providers including mobile medical personnel
- Timely and promptly transfer of complete and accurate medical records with security
- Imparting computer application medical training, for concerned staff

### **Business Goals**

The methods and mechanism applied should be capable to:

- Reduce unit healthcare costs
- Increase healthcare providers productivity by focusing the patient care and shifting by paper to paperless records
- Reduce length hospital stays by effective clinical management
- Reduce repeated outpatient visits per illness by providing well-organized care
- Decrease duplication of records by keeping a single record for all visits and episodes
- Decline duplication of ordering tests and making all tests available in one place
- Develop systematized handling of financial management system

### **Improve quality of healthcare (effective treatment measures in avoiding of complications)**

- Enhanced patient monitor for physical and diagnostic tests
- Establishing accurate diagnosis
- Rapid consultation with other specialists for expert medical advice
- Faster and more accurate analysis of data for decision making
- Coordinate with the care team including medical, nursing and paramedics
- Swift delivery of treatment including surgical procedures in related cases
- Reduced occurrence of errors in treatment including surgical procedures
- Impart patient education on his/her health problem
- Pay attention to the quality of care and minimizing care cost without sacrificing the quality.

### **The US Economic Benefits: Medical Spending**

According to the Health Care Financing Administration, medical spending in 1994 exceeded \$938 billion. That means one out of every seven dollars spent in the United States is on healthcare. Only a few decades ago, health and education consumed equal amounts of the US GDP; now the amount for healthcare is more than double that for education. There are 6,500 hospitals and 700,000 doctors in the US. When analyzing the workforce, we see that one in every 11 people is in the healthcare business. Take

Pittsburgh, e.g. where 25,000 work in the steel industry, but 106,000 work in medicine. Similarly take Houston, where 66,000 are employed by the oil industry, but 110,000 by the healthcare industry.

Indeed, the healthcare industry has a pivotal role in the economic health of any country. The United States has long been the recognized leader in providing high quality innovative care and has been the pioneers in life-saving advances such as bone marrow transplants and coronary artery bypass surgery and has developed advanced diagnostics and therapeutic products, which in themselves form an important export industry with significant growth potential (e.g. US exporters control half the world's \$71 billion medical device market). Medical technology is the fastest growing sector of American exports.

The healthcare industry is not generally integrated in its information management system. Patient information is often not easily accessible at the time of healthcare decisions are made. Healthcare professionals spend invaluable time looking for records, calling each other for basic information, or repeating tests due to non-availability of previous test results could not be found or obtained quickly. It has been estimated by the Parkview Episcopal Medical Center, Parkview, Colorado (July 1994) that physicians spend 35% of their time and nurses spend 50% of their time on paperwork. A recent study performed by Ira Magaziner, Senior Advisor to the US President for Policy Development, confirmed that nurses are so burdened with administrative costs that they spend more time with paper than with patients. Data are not readily available to evaluate and compare alternative treatments and interventions on an ongoing basis.

There are also high technical risks in the systems engineering to ensure reliability, availability, maintainability, data integrity, and the high level of confidence needed to make data available 24 hours a day, 365 days a year for each and every patient. This program will provide evolutionary changes and advances in information technology applied to healthcare that will change and improve the delivery of care and will reduce care costs. With estimates that a minimum of 15 to 25% of today's healthcare costs are related to the processing of information, the economic benefit of such a program is clear.

Although there are many barriers in collecting cost-benefit information, and it is difficult to obtain reliable figures to evaluate the overall cost-effectiveness of modern systems, evidence exists that shows partially automated systems can be cost effective.

For example: Healthcare is the fastest growing market in the computer field. Healthcare software systems help in monitoring of patients, tracking financial information, and collecting and analyzing data from medical instrumentation. Sheldon I Dorenfest and Associates, Ltd., estimates that hospitals will spend \$6.7 billion a year on information systems in 1996, 36.7% increase over 1993. Computer companies are taking note.

**In addition to the economic benefits discussed above, there are qualitative benefits, including:**

- Better quality and swift care
- Improved efficient patient care management (decreased duplication of tests, reduction in length of stay (LOS))
- Significant improvements in productivity and job satisfaction within the healthcare industry
- Education and preventive care (with focus on cost containment measures).

## Health Reforms

Nevertheless, healthcare reform is, and has been a hot issue for some time and is likely to remain so until there has been additional progress in resolving some of the basic issues that have been mentioned. Americans are conscious of, and troubled by, the flaws with the system of providing healthcare and healthcare reform is often on the minds of those who work in healthcare and for the government.

It is likely that healthcare researchers, policy-makers, decision-makers, as well as the general public who are taxpayers and consumers will continue to **seek improvements** in healthcare and that, in doing so; they may approach you for assistance in identifying and retrieving healthcare expenditure and related data. To that end, it is important to take a closer look at **major funders** of the healthcare system and at some of the data available.

“Ultimately, the people pay all healthcare costs. Thus, when we say healthcare monies come from different sources, we really mean that **dollars take different routes on the way from consumers to providers** through government (taxes), private insurance companies (premiums), and independent plans, in addition to out-of-pocket payments.”

The nation’s health dollar comes from the taxes and **insurance premiums** we pay, as well as from our **co-payments** and **out-of-pocket expenditures**. And perhaps this is one of the most compelling reasons that healthcare reform is of such vital interest to researchers and the general public alike.

**Let us continue and look at routes those healthcare dollars taken from consumers to providers. As we do so, we will address three basic questions:**

1. What **funders** are included in this category?
2. How does this **funding scenario work**?
3. What are the **trends**?

Funds in this category of “private insurers” include **premiums** paid to commercial carriers, Blue Cross Blue Shield and managed care plans, as well as self-insured employers.

Other private funding sources include, among other things, privately funded construction, and additional non-patient revenues, including philanthropy. Out-of-

pocket expenditures come from private sources in that they include **direct spending by consumers** for all healthcare goods and services, such as co-insurance, deductibles, and any amounts not covered by insurance.

### Application of Technology for Hospitals

With the long-term vision and impact of technology application for hospitals will significantly help in view of huge increase in the number of customers who will need to be served, the healthcare industry will achieve increased quality of care results, consistent quality between rural and urban providers, accountability for outcomes, and accurate measures of success. All this may be accomplished with lower costs provided a timely implementation of apt technology. The driving force behind these advances is the development of open, interoperable, yet secure systems. The systems will provide the medical community to integrate diverse information and business systems as well as the data necessary to support continuous quality improvement. Through enhanced user interfaces, the real needs of the healthcare providers will be met from prenatal to geriatrics that includes inpatient care, preventive care, improving long-term and home care.

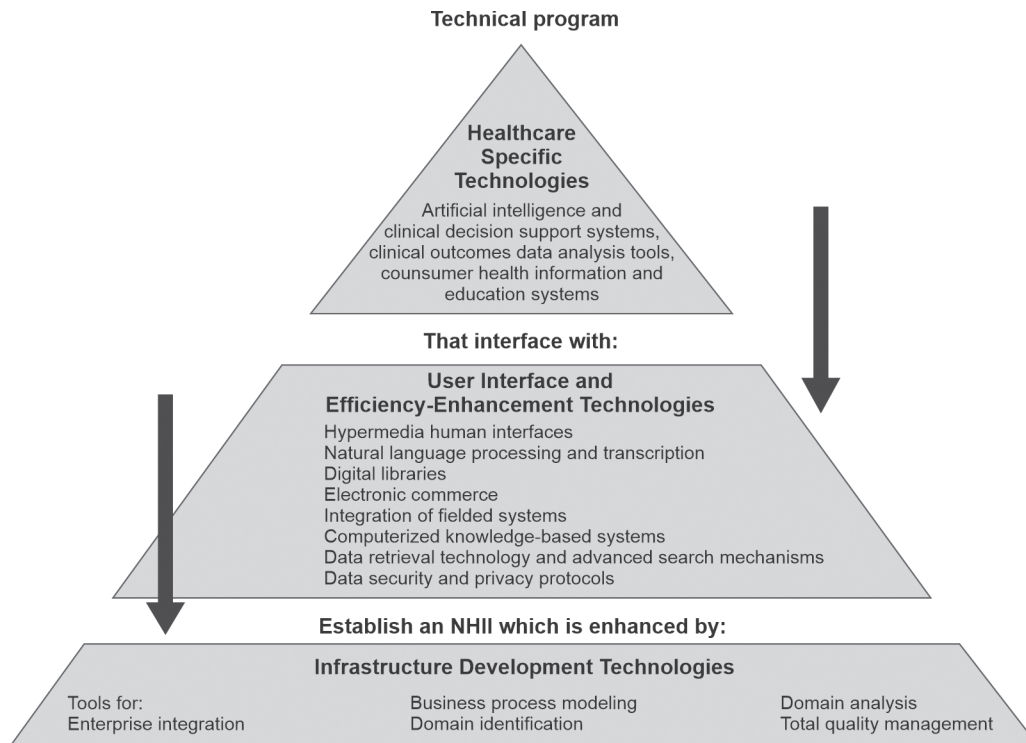
### Network Infrastructure

A hospital's network with IT infrastructure, that helps in connecting between providers and patients within a single hospital, or between hospitals or at the state or nationwide health information network allows providers to better coordinate care and retrieve data across a wide spectrum (Fig. 4.1).



Fig. 4.1: Hospital's network with IT infrastructure

In the process of reforms to force hospitals to find new ways to cut costs and increase effectiveness, however, due to ineffective plan to run the business, end up incurring extra expenditure. An estimated "\$5 billion is lost annually in the implantable device supply chain as a result of waste, inefficiency and lack of visibility" states Bruce Johnson, CEO of GHX, a leading healthcare supply chain management software/services company. Getting a better grip on managing a healthcare organization's supply and demand will save huge money to the organization while also increasing positive patient care. "The supply chain is the second largest and fastest growing expense for healthcare providers; with only labor costing most providers more" (Fig. 4.2).



**Fig. 4.2:** Healthcare specific technologies process for enhancement of efficiency

Healthcare organizations everyone including supplier and provider to consider has a better control on expenses taking all the measures, with using e-commerce solutions. E-commerce solutions like expense management software, when implemented rightly, save efforts, time and money and also generate critical connections across organizational functions, providing data transference enabling effective management of data with less scope for wrong data entries.

Accurately capturing and use of data from the beginning will help in reducing costs, e.g. accurate capturing of charges, prompt inventory management, demand forecasting, recall management and facilitate research on comparative effectiveness.

People with pre-existing health conditions find it difficult to get required health services; due to huge cost, and sometimes impossible to get health insurance to meet these expenses. The US government spends much more on healthcare than other industrialized nations, yet has poorer health when judged by the number of preventable deaths and other measures.

**Problems with excess medical care than required:** More medical care than required can lead unnecessary inconvenience and problem, e.g. avoidable history taking, physical examinations, consultations, varieties of lab and radiology tests and procedures can have side effects, sometimes serious ones. A person back pain might opt for a type of invasive back surgery, but research might show that the approach is less effective, and riskier, than taking a painkiller.

**As part of educating yourself about healthcare reform, become a smarter patient. When a doctor gives you some options for treatment, ask questions like:**

- Which treatment has the best evidence?
- Which treatment has the fewest side effects?
- Which treatment will cost the most even if my insurer is paying the bill?

Becoming aware of these details will make us all knowledgeable about our healthcare. It could also make us healthier. "Do not wait until you are in a crisis to understand how your healthcare works, because by then it could be too late." Start paying attention to your medical bills, not only what you pay, but how much a drug or doctor's visit or procedure cost in total, will facilitate in taking care for your future health problems.

### **Relationship of Health and the Economy**

According to Julio Frenk, Mexican Minister of Health and Chair of the 2004 meeting of OECD Health Ministers; Healthcare performance is strongly dependent on the economy, but also on the health systems themselves. This link should not be underestimated. Investment in health is not only a desirable, but also an essential priority for most humanity. However, our health systems has may challenges to encounter besides providing services to routine sick and injured cases, the increasingly growing aging population, prevalence of chronic diseases, and use of expensive technology for improved quality care also add the expenditure.

Moreover, we must deal with higher expectations of citizens and resolve persistent inequities in access and in health conditions among different groups.

A basic message has emerged: Investments in health and the design of health financing policies should be addressed in terms of the interaction between health and the economy. Just as growth, income, investment and employment are a function of the performance and quality of the economic system, its regulatory frameworks, trade policies, social capital and labor markets, etc. so health conditions (mortality, morbidity, disability) depend not just on standards of living, but on the actual performance of health systems themselves. Let us go over some of these interactions.

Health performance and economic performance are interlinked. Wealthier countries have healthier populations for a start. And it is a basic truth that poverty, mainly through infant malnourishment and mortality, adversely affects life expectancy. National income has a direct effect on the development of health systems, through insurance coverage and public spending, for instance. As demonstrated in 1997 by the WHO Commission on Macroeconomics and Health for a panel of 167 countries, while health expenditures are determined mainly by national income, they increase faster than income.

Another well-known relationship is an institutional one. Take the case of tobacco use. Efficient fiscal systems in the OECD have meant that increases in taxes on tobacco could reinforce other public health policies like rule-based restrictions on smoking in public places. Some countries have gone very far in this respect, with Ireland actually banning smoking in its famous pubs! Such courageous initiatives cannot succeed without institutional backing, whether legalistic or otherwise.

Another example of how institutional arrangements can help is through universal provision of insurance coverage, which a larger fiscal base and a small informal sector

help to attain. Globalization in general, and trade liberalization in particular, also affect healthcare, via constrained pricing and trade policies of pharmaceuticals, and the need for enhanced health surveillance across borders and populations. The effects of health on development are clear. Countries with weak health and education conditions find it harder to achieve sustained growth. Indeed, economic evidence confirms that a 10% improvement in life expectancy at birth is associated with a rise in economic growth of some 0.3–0.4 percentage points a year.

Disease hinders institutional performance too. Lower life expectancy discourages adult training and damages productivity. Similarly, the emergence of deadly communicable diseases has become an obstacle for the development of sectors like the tourism industry, on which so many countries rely.

## **Understanding and using the Economic Evidence**

### ***The Importance of Economics to Health Policy Decision Making***

In order to develop good health of nation's inhabitants the country's policy makers especially the health related department's needs to have lucid and comprehensive information related to the existing situation and compare with what level of care is being envisaged. To implement any reforms and especially health reforms which are considered to be financial drain to the exchequer as lots of expenditure involved to be spent while any revenue or income is expected. Besides, many other considerations, for the health ministry or health policy makers, need to prioritize among various needs to meet jargon "good or best possible health of a nation", among them, most often are improved quality and cost containment, as both are extremely difficult challenges to accomplish. As health field is much broader, encompasses curative, preventive, rehabilitative, promotive and palliative services. The public health deals mainly with preventive medicine, which is a major concern as the majority of population lives in rural areas that covers more than 65 to 75% of total population coupled with only 25 to 35% of healthcare professionals including medical, nursing and paramedics are attached. While the rest of population live either in urbanized or city/town areas, the healthcare issues are dealt by the curative oriented hospitals/health institutions where 70% of healthcare providers with highly professional expertise are available.

As regards to health economics is concerned, one has to have clear evidence on the effectiveness of health delivery system in general and particularly public health which is most critical. It is well known fact that finance plays a vital role in any quantity or quality improvement. The entire healthcare services rendered for curative and especially preventive have to be worked out to the lacunae and what gaps have to be filled. This will become essential to find out size of the impact, best solutions and what would be the cost? Need to be diagnosed as to what is reason for in-effectiveness, is it quality of service, infrastructure, professional abilities or education, or cost that hamper the progress. Public health decision makers are generally, faced with limited resources as such need to know the problems to find suitable solutions with required finance to make effective implementation to achieve the set goal. Economic appraisal will enlighten the policy makers the real causes that need to be dealt with. The following are some of measures that have been evaluated to know real picture in health economic perspective.

**Economic assessment methods:** The following four methods are used in economic evaluations:

- Cost analysis (CA)
- Cost-effectiveness analysis (CEA)
- Cost-utility analysis (CUA), and
- Cost-benefit analysis (CBA)

The explanation of these term definitions is given in Annexure I.

### Cost Analysis

**The cost analysis (CA) is a comparative cost of alternative interventions or programs.** The CA does not include consequences. Cost analysis involves the systematic collection and assessment of costs associated with an intervention in terms of national currencies; e.g. US \$ or Japan Yen or Indian ₹. When a patient visits for care, each episode depends upon the type of case and services required are calculated in terms of unit price or unit cost. Cost analysis can be conducted independently, but to have more clarity, need to be associated with CEA, CUA, and CBA. Cost analysis takes into account the costs incurred to develop and implement an intervention, including direct costs, indirect costs, and intangible costs. Generally, the direct costs signify the value of resources used specifically for the intrusion. These costs can be classified as medical or non-medical. The direct medical costs include costs such as clinical examinations, consultations, diagnostic tests and medications. Direct non-medical costs which are associated with training, the cost of advertising, mass media campaign, etc. Indirect costs include the resources that are lost by a person his/her time by involving in interference of any work, measures as lost wages or lost leisure time for that particular period of time. This time loss can be considered as 'unit of time losses to measure economic value. Suffering pain, or grief with interference, can be considered as intangible costs, are not included in economic assessment, as they are difficult to measure and work out a price.

Financial costs are those costs which are spent for services, or for care purpose as in curative institution situation. While for public health, the programs that are applied are considered to be program costs. The staff salaries, supplies, rent, etc. are part of financial costs. The economic costs include the opportunity costs or value of resources for which there is no direct financial expenditure.

Opportunity costs include the supplies, donated materials, time given by a volunteer, space used for public health purpose. The financial or economic costs can be compared with alternative interferences; however, they cannot be directly compared. Cost analysis includes estimated cost of illness (COI) which incorporates the direct cost including medical and non-medical and indirect costs associated with health condition. Cost of illness estimates that includes total lifetime costs of a disease or illness, or prevalence-based (reflecting total costs of a disease in a specific time frame, e.g. one year, divided by the total number of cases of that year. Cost analysis is projected as net costs, which is calculated by subtracting the cost of illness/injury taking away from the total program costs. For example, the COI of an intervention for women with established diabetes that provides preconception care besides prenatal care would include the total program costs, then less the cost of illness taking away (other anomalies). The outcome is as a rule expressed in local currencies per person for each intervention.

### Cost-effectiveness Analysis

The **cost-effectiveness analysis (CEA)** is an economic evaluation in which the costs and consequences of alternative interventions are expressed cost per unit of health outcome. CEA is used to determine technical efficiency, i.e. comparison of costs and consequences of competing interventions for a given patient group within a given budget.

The CEA comprises costs include the costs of an intervention with the measure of gained health, this could be expressed in terms of local currency per additional life saved. Any activity preventive measure adopted for prevention of the health problem, or by intervention the problem is solved, the outcome of this effort and equivalent amount should be co-related for calculation of cost-effectiveness in terms of money. Precisely, it is the cost per unit of health effect (cost per year life saved). Another important point to be noted, by intervention of an action that produced improvement, the unit cost is not only contributing factor, but also the other related effects, e.g. an infection case controlled by immediate vaccination, by saving the family members and other members, all events have to be considered and average CE ratio, uses a no-program comparison. In order to express, the effectiveness of an intervention can be measured using intermediate outcomes (e.g. number of people who stop smoking) or final outcomes (e.g. cases of disease prevented or years of life saved). Intermediate measures are generally, taken only where they are linked to final outcomes.

### Cost-utility Analysis

The cost-utility analysis (CUA) is a special type of CEA that compares costs of an intervention with one particular measure of health improvement, the quality-adjusted life year (QALY). The QALY is an effort to take into account measures of both mortality and morbidity. For example, a year lived in perfect health may count as 1 QALY; whereas a year spent living with a serious illness might count as only 0.6 QALY. The advantage of these measures is that they allow direct comparison on the same scale of different types of health effects and results of CUA is expressed as cost/QALY saved.

### Cost-benefit Analysis

The **cost-benefit analysis (CBA)** is an economic evaluation in which all costs and consequences of a program are expressed in the same units, usually money. CBA is used to determine allocative efficiency, i.e. comparison of costs and benefits across programs serving different patient groups. Note: Even if some items of resource or benefit cannot be measured in the common unit of account, i.e. money, they should not be excluded from the analysis.

The CBA considers and takes into account all costs and consequences, e.g. benefits and losses associated with an intervention and express them in local currency value.

Typically, costs in prevention effectiveness studies are incurred at or near the beginning of the intervention, whereas the benefits are spread out over several years. The two most commonly used summary measures for CBA are net benefits (present value of benefits less harms, minus cost of prevention) and benefit-cost ratio (present value of benefits divided by present value of costs). For example, if the present