Healthcare Economics Management

GD Mogli

CBSPD Dedicated to Education
CBS Publishers & Distributors Pvt Ltd

Chapter

1

Introduction to Healthcare Economics Management

INTRODUCTION

The enormous healthcare expenses and the high demand for healthcare services are growing at rapid speed has become a huge challenge for any nation to provide efficient care to all the population with limited resources which is a Herculean task. This has necessitated for policymakers to focus on health coverage of population by applying various methods and carrying research to know more about the mechanism for higher cost, and other related intricacies, that need to be established and suitably addressed. Unless and until, the problems existing in the system are clearly known, any action will not be adequate to provide the best possible healthcare to entire population with the limited finance and this is a global phenomenon.

Complexities of Healthcare System

In healthcare system, there are many complexities such as infrastructure, finance, highly trained human resource, dealing with complex health and modern technologies, sophisticated medical instruments for diagnostic and therapeutic purposes. Medicines are another issue and the patient or customer, is most complex entity to deal with. The medical field is dynamic, with highly qualified trained personnel such as doctors, nurses, paramedical and allied support service staff engages at primary, secondary and tertiary care level work to deal with curative, preventive, rehabilitative, promotive and palliative aspects. Another aspect is the political system, economical status, living environment, culture, race, religion, and inherent habits are contributing factors for healthcare programs. One has to understand all aspects, and then appropriate steps could be initiated to accomplish the set objectives.

Healthcare in Technologically Advanced Nations

It has been observed, that technologically advanced countries have developed better healthcare systems with advent of technology has brought new methods and techniques to deal with most complicated cases much faster, with less risk and good quality care, however with exorbitant cost. To have efficient method of processing the healthcare cases, by applying case mix studies, classifying the diseases and procedures to work out the actual efforts and services used to convert into financial terms to be of value to fix healthcare charges and to settle reimbursement cases from the insurance agencies and third party payers.

Despite, these nations have an excellent healthcare polices, strategies, adequate finance, infrastructure, experienced healthcare professionals, are also experiencing health economical issues such as huge health cost due to technology and other infrastructure, highly qualified human resource, hence, all the population with varied economic strata cannot have easy access of health, the complications are insured, non-insured, prospective payments, reimbursement and over prescription of drugs and ill effects, medical errors, acquiring nosocomial infections, mortality, patient falls and other adverse effects are hampering efficient healthcare delivery to all inhabitants alike.

And also there is a hidden discrimination in awarding the returns for the work performed by different healthcare teams. For some services, such as for diagnosis tests, medications, surgical procedures, therapies rendered by physicians, therapists, and other paramedics, the charge are estimated and carried out, while for some vital staff such as nursing and other who spend much time in the care of patients with enormous responsibilities are rewarded much less and considered least important.

The developing countries: The developing countries with huge population to serve, financial constraints coupled with many other economical, social, cultural and other inherited issues, endeavor is to provide effective quantitative and qualitative healthcare services to all the inhabitants alike have tremendous problems to deal with effectively. This topic on health economics should address most of the issues of both technologically advanced and less privileges nations. With this objective, this book has been written to encompass all possible aspects to come out with reasonably appropriate solutions to have better healthcare to all alike.

Need for Health Economics Research

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. 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 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. Citizens and especially affluent 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 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.

Health Economics

It s 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. As per the **World Bank,** the Health economics is the study of how scarce resources are allocated among alternative uses for the care of sickness and the promotion, maintenance and improvement of health, including the study of how healthcare and health-related services, their costs and benefits, and health itself is distributed among individuals and groups in society. Whereas economics is the study of how individuals and societies choose to allocate scarce productive resources among competing alternative uses and to distribute the products from these uses among members of the society.

The healthcare cost is the actual costs of providing services related to the delivery of healthcare, including the costs of procedures, therapies, and medications. The difference between health and expenditure, that refers to the amount of money paid for the services, and from fees, which refers to the amount charged, regardless of cost. As regards to health expenditure that is the amounts spent by individuals, groups, nations, or private or public organizations for total healthcare and/or its various components. These amounts may or may not be equivalent to the actual costs (Healthcare costs) and may or may not be shared among the patient, insurers, and/or employers.

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.

Health Insurance

Given that illness is unpredictable and that everyone's future health status is uncertain, demand for healthcare is also uncertain. The institutional response to this uncertainty is the development of insurance mechanisms whereby covered individuals make regular payments to some risk-pooling agency in return for guarantees of some form of reimbursement in the event of illness. This agency might be a public body or a private firm, the payments might be premiums or taxes, and the benefits might be indemnities (fixed cash payments) varying across illness events, reimbursement of all

or part of actual healthcare expenditure, or direct provision (public or private) of services as needed (Evans WN, 2006).

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.

In the process of reforms to force hospitals to find new ways to cut costs and increase effectiveness, 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".

Cost Analysis (CA): The **cost analysis** 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 cost economic analysis (CEA), cost utility analysis (CUA), and cost benefit analysis (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.

Economic Evaluation in Public Health Decision Making

There is a great deal of interest in determining the economic impact of health promotion and disease prevention. Despite the inconsistencies in the methods employed in many published, peer-reviewed economic evaluation studies to date, researchers have applied methods of economic evaluation to virtually all areas of public health the number of economic studies has increased over time, the opportunity to summarize and compare economic information to inform public health decision making has increased as well. One of the goals of the community guide is to help decision makers and other stakeholders to use resources wisely through careful assessment of the value of public health prevention interventions.

Economic evaluations provide explicit descriptions of the costs and consequences of different courses of action in public health. They also provide a framework for thinking about costs, benefits, and the structure of a decision. Although these evaluations have limitations that need to be assessed carefully, they are nonetheless a useful tool for public health decision making. Systematic reviews of economic evaluations contribute to that goal by summarizing a body of economic evidence, adjusting economic data to facilitate study comparisons, raising awareness of the limitations and applicability of the existing evidence, and guiding a research agenda for future economic evaluations of public health prevention programs. By summarizing and interpreting economic studies, systematic reviews make economic information available in a more useful and accessible form. The real value of economic information is that it can improve the efficiency of public health programs, furthering the public health mission by making the greatest possible improvement in the health of a population using available resources.

Economic Values for the Registered Nurse Services in Deciding the Staff Pattern

It has become necessity to recognize the economic value of the registered nurse services in deciding for staff pattern. In order to quantify the economic value of professional nursing, information gathering started from different sources, e.g. literature on the relationship between nurse staffing levels and nursing-sensitive patient outcomes in acute care hospitals. Using hospital discharge data to estimate incidence and cost of these patient outcomes together with productivity measures and the economic implications have changed in registered nurse staffing levels. The data used for medical and surgical patients in federal acute care hospitals was the information collected from a literature review, and hospital discharge data from the 2005 Nationwide Sample. Special attention was bestowed on information related to patient nosocomial complications, healthcare expenditures, and national productivity. It is observed that as nursing staffing levels increased, patient risk of nosocomial complications and hospital length of stay decreases, resulting in medical cost savings, improved national

productivity, and lives saved. Though the conclusion is not a complete one, only some portion of the services that professional nurses provide can be quantified in pecuniary terms, however, the partial estimates of economic value presented illustrate the economic value to society of improved quality of care achieved through staffing levels.

Nursing Sensitive Quality Indicators

Of late, the research linking hospital nurse staffing issues and adverse patient outcomes has become a hot discussion and sought the attention of those both inside and outside of healthcare. The studies carried out during the '90s and the early 2000s, when there was acute shortage of nursing personnel and nurses were not easily found to be recruited. Those who were in the job have to shoulder heavy load of patient care and other administrative duties that brought the attention of authorities of understaffing in units, frustration and job dissatisfaction. The studies indicated that the outcome of under staff have indirectly associated with increased mortality, that has caught the attention of media and public became interested in the conclusion of studies. It was also realized not only increase mortality, the quality of care would not be as expected with less ratio of patients and the nursing staff. All this has lead to undertake studies on different indicators that could relate to the quality of care.

Patient or Consumer of Health should know about Healthcare Quality

Most patients or consumer of health users or people would probably define quality as receiving the best care possible for one's illness or condition at par with state or national international standards. It would certainly include the avoidance of errors or mistakes. And for many, it also includes the entire experience of receiving care-including respectful treatment by medical professionals and clear answers to their question and inquest.

Monitoring Quality of Care

Many organizations are interested in monitoring the quality of care provided by hospitals and medical groups, including central or federal and state agencies, employer coalitions, and health plans. They use this information to ensure that patients receive care that is safe and effective. It is expected that each licensed clinic and physicians, hospital or healthcare institution, and organizations to provide best quality care services to the patients at par with established standards.

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.

Nursing Intellectual Capital Theory

Increased demands for healthcare coupled with its rising costs have led to a keen interest to understand how nursing professional knowledge and skills influences on the quality of care administered to hospitalized patients. This has lead Chritine L. Covell, PhD, RN and Souraya Sidani, PhD to make a study and present intellectual capital theory in the context of its application to and impact on nursing research and practice.

Nursing Intellectual Capital

Hence, the nursing intellectual capital theory was initiated to assess whether there was any difference in the patient care outcomes while administrative, clinical decision making and also any impact on continuing professional growth. The studies having indicated that there is a difference, in relationship between nursing knowledge and outcomes in the quality of services rendered and professional development. This challenging move has effected several changes in registered nursing staffing pattern, in order to keep patients safe and from adverse effects and to achieve the best patient care.

The application of intellectual capital theory at all the organization levels, as a knowledge stocks for business performance to enhance the individual and group quality service. It is obvious to have intellectual capital; the organizations need to invest in learning and hiring or retaining those characteristic employees. With the help of social networks among employees, the innovation, learning by increasing the efficiency by dissemination of information and cost of transaction can be minimized with encouraged cooperative behavior of the staff.

Hospital Cost with Nursing Cost Offset

The exorbitant cost for healthcare throughout globe has been a hard discussion for every one especially, the healthcare developers, managers and providers. The main person who bears this burden is the patient. There is much evidence in industry directions, endeavor to find decisions how to contain cost in healthcare. When we look into other intricacies, there is one most important but largely unrecognized and/or unacknowledged negative impacts on nurse workforce who are directly involved in providing in quality care and safety of patients. Nevertheless, payment reforms that focus on producing higher quality care and/or that bring more resources to support nursing care are fascinating opportunities that deserve attention, study, and potential advocacy by nurses. Hospital prospective payment system (PPS) practiced in some of the countries that have been under research with respect to its effects on the nurse workforce and patient safety.

The advantages and impact of PP system has been significant as in US, inpatient hospital days fell by 51 million annually between 1981 and 1987 as a result of PPS incentives for shorter hospital stays. This scenario, a large numbers of new registered nurse (RN) graduates and huge reductions in inpatient days was consistent with nurse surplus rather than shortage, but soon hospitals nationwide were reporting high RN vacancy rates.

Concluding Thoughts

It is motivating to note that hospital charges increased an astounding $59 billion in the United States in just one year between 2004 and 2005 (Modern Healthcare, 2007), and operating margins the public is concerned about patient safety, and the remains a problem. The burnout scores for bedside nurses in US hospitals are among the highest recorded shortage, nurses spend considerable time on tasks that of non-nursing functions, which do not require their special expertise, thereby, the nursing care required is left undone. The majority of nurses conveyed that management attaches less importance to the problems that they identify in care at the bedside (Aiken et al., 2001). That nurses in countries with differently organized healthcare and different provider financial incentives report remarkably similar problems in hospital care, suggests that modest payment reforms may be weak instruments to bring about enduring improvements in quality and to retain a qualified nurse workforce (Aiken, Clawrke, and Sloane, 2002).

The healthcare growing bureaucracy has to realize that financial incentives are not the only way to bring about change. Political advocacy is one route to change, as represented by California's mandated hospital nurse staffing ratio legislation and Pennsylvania's health reform plan that builds on access to advanced practice nurses (Aiken, 2007). Thus, nursing should place a high priority on increasing the number of nurse researchers with the knowledge and skill to conduct rigorous studies on the impact of public policies on nursing.

In market economies, financial incentives are important in shaping healthcare. Further development of the subfield of nursing economics could provide a stronger scientific basis for influencing policy decisions that impact the nurse workforce and the quality of nursing care. But it is instructive that countries with centrally controlled healthcare systems have shortcomings in their hospitals that are similar to those in countries with market economies, and even in market economies, there are examples of influential noneconomic drivers of policy and cultural changes in healthcare. Nursing profession would be best positioned to influence the future shape of healthcare if it combines its quest for holistic and patient centered care with science-based advocacy and evidence-based skepticism about any kind of reform that does not fundamentally change the organization and culture of healthcare.

Reduced nurse turnover produces substantial savings to hospitals when all the costs of replacing nurses are considered, including recruitment, overtime, and use of supplement agency nurses (Jones, 2004, 2005). Thus, nursing should place a high priority on increasing the number of nurse researchers with the knowledge and skill to conduct rigorous studies on the impact of public policies on nursing.

Chapter

2

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.

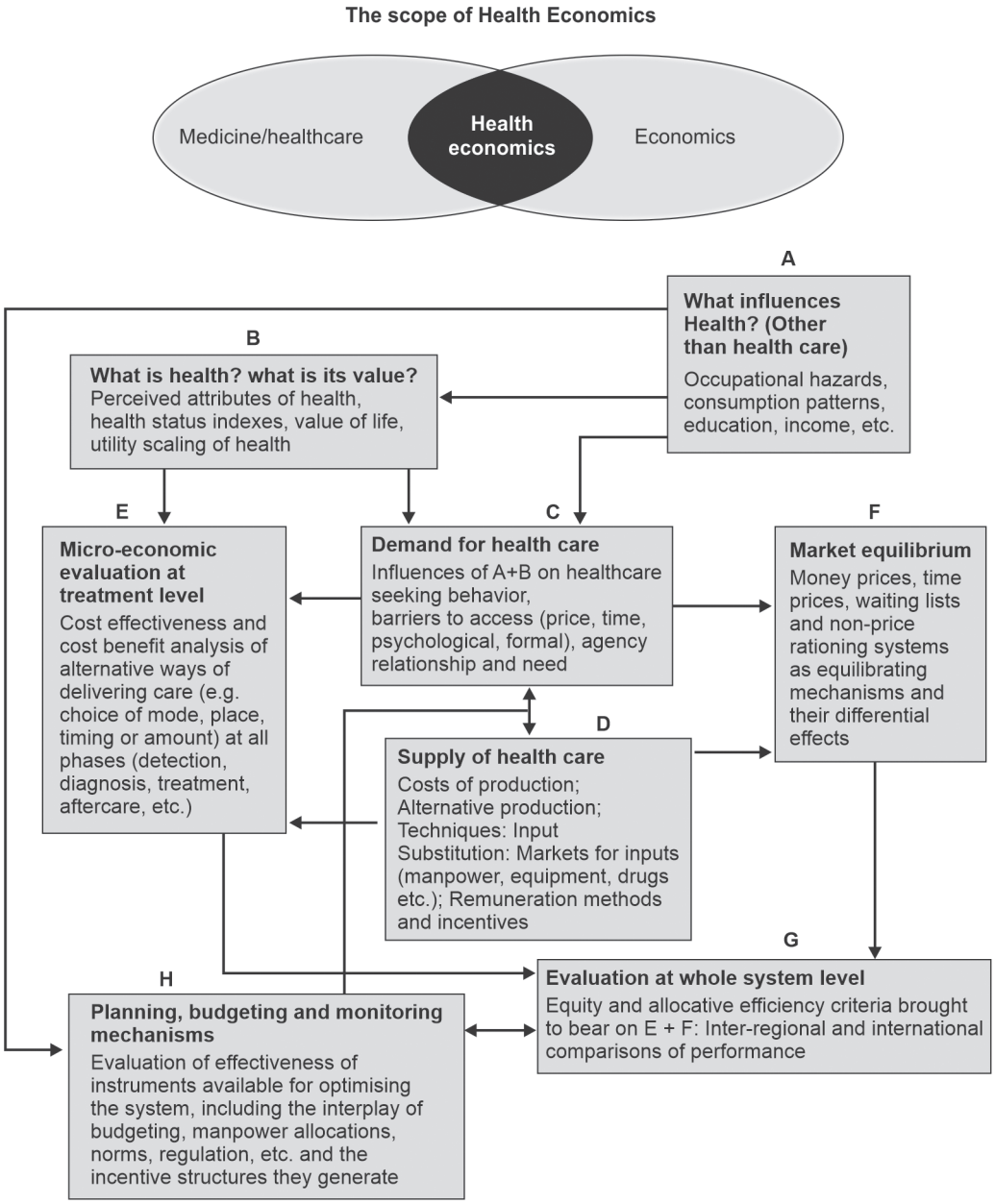

Fig. 2.1: Structure of the discipline of health economics according to Williams (*Courtesy*: Being reasonable about the economics of health. Selected essays by Alan Williams. Culyer, AJ and Maynard, A (eds.). Cheltenham. Edward Elgar. 1997. p.46.)

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' subsidies 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.

Chapter

3

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).

Chapter

4

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).

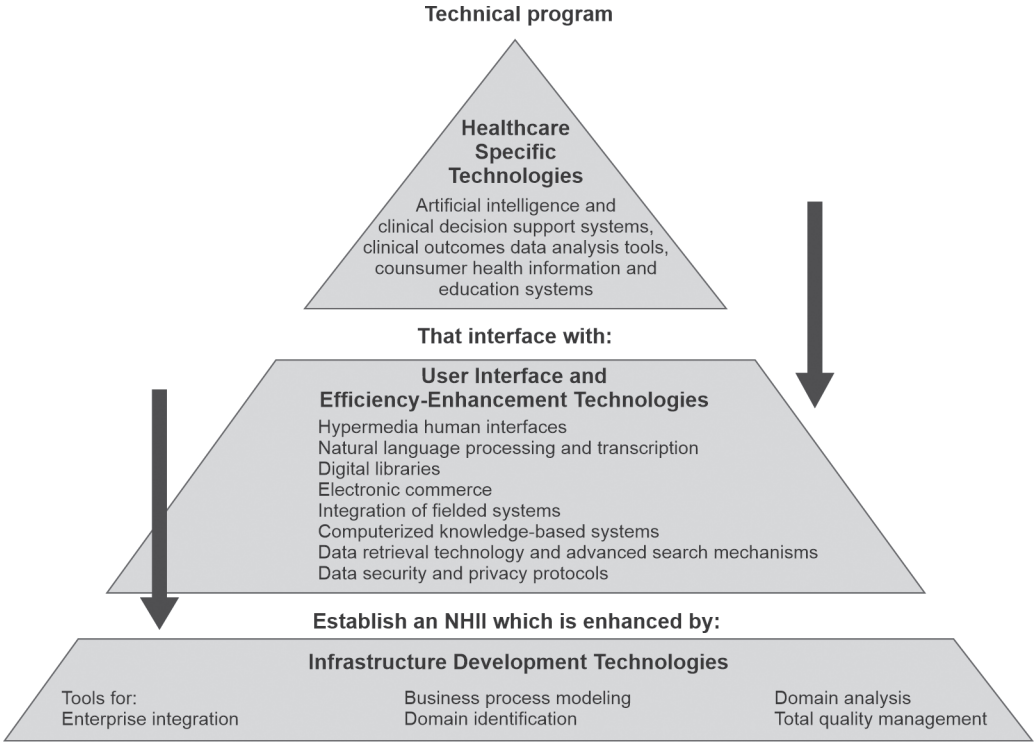

Fig. 4.2: Healthcare specific technologies process for enhancement of efficiency

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 not 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

benefit of an exercise program is, e.g. ₹42,000, per participant and the present value of associated costs is ₹17,500 per participant, then the net benefits are 24,500 per participant. The benefit–cost ratio of this intervention would be ₹42000/17,500 or 2.44. Benefits of public health interventions found in CBAs, CEAs, and CUAs, are often expressed in terms of increased life expectancy, decreased morbidity, avoid medical costs, and increased work productivity.

Besides this, CBA can capture important non-health effects such as the increased value of housing with good sanitation systems), and the costs of harms related to an intervention can be factored into the analysis as well. For example, a potential harm could be loss in productivity incurred by a business associated with an on-site occupational health clinic. As a general rule, if the benefits exceed the cost (that is, if the benefit–cost ratio is greater than 1 or the net benefit is greater than 0), the program is considered to provide good economic value.

Economic Evaluation for Decision Making

The context in which a decision is made determines what type of economic evaluation is most useful and appropriate. If lawmakers need to allocate resources for interventions in two different sectors of the economy, e.g. health and education, the outcomes of interest must be converted to a common unit (in rupees) to make the interventions comparable. A cost-benefit analysis is appropriate in this case. Public health policy makers often must decide how to allocate limited resources to address varied public health issues that have different outcomes with respect to survival and quality of life such as diabetes, hypertension, and arthritis. Cost-utility analysis is an appropriate technique to use to form a common unit , e.g. QALY. Public health doctors must often decide between two interventions that affect the same outcome, such as reducing initiation of controlling sugar levels of diabetic cases. In this circumstance, it is possible to use cost-effectiveness analysis to compare the cost and outcomes of two or more interventions designed to control sugar level.

Community Guide Methods for Systematic Review of Economic Evaluation

The lack of standardized methods and reporting of economic data hampers the use of data on costs and financial benefits in evidence-based reviews of effectiveness; despite for each intervention recommended by the task force on community preventive services (the task force has been applied). To improve the comparability and usefulness of the very limited body of economic evidence, the economic data presented by the task force are abstracted and adjusted using the standardized economic abstraction form developed as part of the initiative. The objective is to make economic research more accessible to decision makers and other stakeholders in order to help them use resources in the most efficient way to achieve a given health improvement at the lowest cost. In this section, we briefly describe methods for systematic reviews of economic evaluations. These methods follow the same basic steps as the reviews of evidence of effectiveness and include a systematic search for economic evidence, assessment of individual studies (data abstraction and quality assessment), and a summary of the body of evidence. The first step is to conduct a systematic search of the literature to find studies on intervention effectiveness that include economic evaluations (such as

CA, CBA, CEA, and CUA). A study must meet certain criteria, determined by the task force, to be included in the review. It must be a primary study (not a review), published in English, and conducted in an established market economy (a developed country, as defined by the World Bank). The study must also include sufficient detail to abstract and adjust economic results.

Finally, the study must have been published within a relevant time frame such that the costs and the intervention effectiveness are thought to be reasonably applicable to the current US context. Studies that meet the inclusion criteria are subjected to data abstraction, cost adjustment, and quality assessment by two independent reviewers. Disagreements are resolved between the two reviewers. To abstract the data, reviewers use a standardized form (available at www.thecommunityguide.org/methods/econ-abs-form.pdf) to guide them through the process of summarizing studies. The abstraction form captures important information about each study, including study characteristics, intervention description, type of economic evaluation, costs and benefits, and data sources. Abstracted economic data are converted to a common currency (US dollars). Costs are then adjusted for inflation with reference to a base year. Studies are also adjusted, when possible, to reflect a discount rate of 3% over the relevant time horizon. After the data are abstracted, the quality of the study is assessed across five categories: Study design, measurement of costs, measurement of outcomes, evidence of effectiveness, and analysis. Based on this assessment, study quality is characterized as very good, good, satisfactory, or unsatisfactory.

Results of unsatisfactory studies are excluded from further review. Studies that contain fatal flaws, as determined by the reviewers, are also considered unsatisfactory and are excluded from the review. For example, if a CEA of a smoking cessation program evaluated the outcome of quitting smoking for only one week following the intervention, the study would be considered to have a fatal flaw, because this is an insufficient time period to assess the cost-effectiveness of the intervention. For more details on the methods used in our systematic reviews, see Carande-Kulis, et al. The economic data abstraction form and quality assessment scale can be found on the website at www.thecommunityguide.org/methods/econ-abs-form.pdf.

How to Interpret and use Economic Results

Although systematic reviews of economic evaluations can provide useful summaries of published information on costs and benefits of interventions, decision makers should interpret any summary economic measures with caution. In this section, we provide information on how to use and interpret economic evaluations in the community guide. The design of the economic study, parameters study including study perspective, methods, and time frame is important and should be taken into account when interpreting results (see details below). The parameters can be used to identify costs after the program has been completed or they can be used when the program is in effect to frame (define the context of) the study. Other important considerations, interpreting and using the results of economic analysis are the baseline prevalence of disease risk factors, the nature and scale of the intervention, the target population, and the setting in which the intervention was delivered.

Economic Evaluation Parameters

The parameters of an economic evaluation, including study perspective, analytic methods, relevant time frame, audience for the evaluation, and other key issues, determine what types of data are included and analyzed in the study. Study parameters affect the applicability of study results to different situations and populations, and should be taken into consideration when interpreting and using study results. One important parameter is the perspective (the viewpoint from which the analysis is conducted), which determines the costs and health outcomes included in the analysis. For example, a study conducted from a government perspective includes only those costs and benefits experienced by the government and may not account for costs or benefits relevant to a health insurance purchaser.

The types of costs included in a typical CEA from four perspectives: Society as a whole, the insurer or other payer, the employer, and the client. Direct medical costs that are not covered by an insurer or an employer, such as deductibles and co-payments, are incurred by the client. These non-covered payments would be included in the client perspective. However, the societal perspective would include all direct medical costs, both covered and non-covered. Although decision makers need to consider the relevance of the perspective to their own situations, they also need to appreciate the societal perspective so that they can assess the full consequences of decisions. For example, if an employer wants to determine whether to provide reimbursement for vaccination as an employee benefit and a program to encourage employees to be vaccinated, the employer's perspective would obviously be a significant consideration, since the organization's net profit might be affected.

Costs would include healthcare system and provider charges reimbursed by the employer as well as productivity losses due to employees' absence from work. However, as a corporate citizen, the employer may also be interested in the societal perspective; does this program provide good value from the perspective of the general population by enhancing the health and attractiveness of the local community? From the societal perspective, all costs and benefits would be taken into account, regardless of who pays or who receives them. By considering multiple perspectives, the employer has a better understanding of a program's overall financial impact. The time frame of an economic study is also important in interpreting economic findings. The time frame is the period during which the intervention or treatment is delivered along with necessary follow-up.

In contrast, the analytic horizon (or time horizon) refers to the entire period during which the costs and benefits are measured. If all the important results of an intervention can be measured in the short term, then the analytic horizon will be short. For most prevention programs, the analytic horizon should be sufficient to assess all of the benefits of the program. Yet, it is important to note that health effects may be realized long after the intervention has concluded and may span a person's lifetime. For example, consider a tobacco cessation program. With such a program, the time frame during which the intervention is delivered may be relatively short, possibly one year or less. However, the analytic horizon would include the lifetime of the (former) smoker to account for the period over which the benefits of reducing tobacco-related illnesses (e.g. cancer or heart disease) are realized. The value of the benefits that accrue during the analytic horizon must be included in the economic analysis.

Additional Considerations

Decision makers should also consider the current prevalence of risk factors, the nature and scale of the intervention at start-up versus maintenance phase, the target population, and the setting in which the intervention was delivered. The prevalence of risk factors has economic implications. For example, a mass media smoking cessation intervention aimed at a large population will have both higher costs and greater potential benefits in settings' with high smoking prevalence than a telephone smoking cessation counseling intervention. A program may have high intervention costs, but through' economies of scale, the cost per person of the program might be less than if' it were aimed at a smaller population. In addition, costs may vary by geographic region, which could also affect the applicability of an economic evaluation. Decision makers should consider all of these factors, which affect the 'costs of interventions and the potential returns on investments. Other factors to consider include the feasibility of implementing an intervention, the acceptability of the intervention to a population, ethical and political concerns,' and regulatory and legal issues.

Limitations of Economic Evaluations

The usefulness of economic findings may be limited by aspects of the methods of economic evaluation. One issue is the various methods for measuring costs and benefits. The lack of one standardized method of measurement may limit the comparability of studies. Significant progress in this area has recently been made with the publication of several books that provide guidelines for conducting economic evaluations of healthcare, public health programs, and HIV prevention. Another issue is the highly variable quality of published economic evaluations. Such variation in quality was apparent in assessing economic evidence associated with most interventions. To specify one example, when we reviewed, economic evaluations of vaccine programs in schools, one evaluation which received a "very good" quality score, reported quantities and costs of resources attributable to personnel, communications, transportation, advertising, over-head, follow-up, supplies, medication, diagnostic procedures, outpatient services, and disease complications, all from a societal perspective.

This study also calculated income lost due to illness and death. The summary measures were reported as cost per life-year saved and cost per child vaccinated. In comparison, a second study failed to specify the study perspective, did not report quantities of resources separately from resource prices, omitted volunteer time, and neglected to discount future costs and outcomes. The resulting "unsatisfactory" quality score led to its exclusion from the overall review of the intervention. To improve quality, checklists have been developed to assess adherence of an economic evaluation to specific quality standards. The community guide uses a quality assessment scale to determine if studies meet minimum quality requirements for inclusion in a review. This scale also identifies areas of deficiencies in study quality.

Specific economic measures also raise concerns about appropriate interpretations. For example, important limitations of CE ratios have been described. These ratios sometimes indicate that an intervention is both more costly and more effective than comparable interventions. For example, the most cost-effective approach to hepatitis B vaccination (in terms of cost per case prevented) might be vaccination of selected

healthcare workers. Nevertheless, that would have only a minor impact on the overall burden of hepatitis B. Universal newborn vaccination may have a higher cost per case prevented, but it prevents many more cases. In such cases, decisions have to be made about the reallocation of resources away from another program. However, CE ratios do not provide information on the opportunity costs of such decisions of health-related quality-of-life measures that are used in CUA. Some measured are based on general improvements in health, and others are based on disease-specific health improvements. Such differences can make it impractical to compare one QALY with another.

Therefore, prior to making comparisons between prevention strategies targeting different diseases or health problems, the decision maker should be aware of the methodology used to derive the QALYs. A challenge in the greater use of economic evaluation to support decisions is the continued debate about what represents good economic value. Differences in study perspective and methodology can greatly affect study results. Therefore, a judgment about the relative economic value of an intervention requires the economic evaluation of other interventions by similar methods, but such evaluations are not usually available.

Finally, economic evaluations can present challenging ethical issues, such as equity concerns: Who "wins" and who "loses" in an economic evaluation? Does a particular economic evaluation favor the concerns of the younger members of a population at the expense of the elderly? Another area of concern is that health values (preferences) are generally elicited from a small segment of a population and may not be representative of the population as a whole. Attempts are made to address these challenges and concerns through the derivation and use of QALYs. However, the success of these attempts may be considered subjective.

Gaps in Economic Data about Preventive Services

One conducts systematic reviews of economic data in the hope of providing useful summaries for decision makers. However, one frequently find that no economic evaluations are available for interventions recommended by the task force (economic evidence was available for only about half of the interventions recommended by the task force as of February 2004, and the available evidence was frequently just a single study).

These gaps make in our knowledge are created because so few studies exist, and available studies often do not fit the intervention recommended by the task force or do not meet the quality requirements for inclusion in the review. Evidence gaps can also be seen in a positive light. Because interventions chosen for task force review address important health issues, evidence gaps guide the research agenda for future economic evaluations of public health prevention programs.

Summary of Economic Evaluation in Public Health Decision Making

There is a great deal of interest in determining the economic impact of health promotion and disease prevention. Despite the inconsistencies in the methods employed in many published, peer-reviewed economic evaluation studies to date, researchers have applied methods of economic evaluation to virtually all areas of public health the number of economic studies has increased over time, the opportunity to summarize and compare economic information to inform public health decision making has increased as well.

One of the goals of the community guide is to help decision makers and other stakeholders to use resources wisely through careful assessment of the value of public health prevention interventions.

Economic evaluations provide explicit descriptions of the costs and consequences of different courses of action in public health. They also provide a framework for thinking about costs, benefits, and the structure of a decision. Although these evaluations have limitations that need to be assessed carefully, they are nonetheless a useful tool for public health decision making. Systematic reviews of economic evaluations contribute to that goal by summarizing a body of economic evidence, adjusting economic data to facilitate study comparisons, raising awareness of the limitations and applicability of the existing evidence, and guiding a re-search agenda for future economic evaluations of public health prevention programs. By summarizing and interpreting economic studies, systematic reviews make economic information available in a more useful and accessible form. The real value of economic information is that it can improve the efficiency of public health programs, furthering the public health mission by making the greatest possible improvement in the health of a population using available resources.

Glossary

Analytic horizon: The period of time after an intervention ends, during which costs and outcomes accrue and are measured.

Cost analysis (CA): An economic evaluation technique that involves the systematic collection, categorization, and analysis of program costs.

Cost-benefit analysis (CBA): An analysis that compares both costs and benefits in dollar terms.

Cost-effectiveness analysis (CEA): An analysis used to compare the cost of alternative interventions that produce a common health effect.

Cost-utility analysis (CUA): A type of cost-effectiveness analysis that uses years of life saved combined with quality of life during those years as a health outcome measure. Costs the value of resources (people, buildings, equipment, and supplies) used to produce a good or service. Economic costs the value of resources, including opportunity costs, often used to compare alternative interventions.

Final outcomes: The ultimate outcome of interest, such as diseases averted or years of life saved. Financial costs the actual dollar costs for services, typically the actual costs of care.

Intermediate outcomes: The near-term effects of a policy, program, or intervention, such as persons screened or cases prevented.

Opportunity costs: The value of the alternatives given up in order to use the resource as the program so chooses.

Perspective: The viewpoint of the bearers of the costs and benefits of an intervention (e.g. society, government, healthcare providers, business, or clients). *Productivity loss:* Costs associated with the decrease in production and income attributable to a disease, disability, or death.

Time frame: The period, during which the intervention or treatment is delivered, including any follow-up.

Health economics evidence is a key element in health services research and particularly in health technology assessments. Identifying economic evidence to inform such research can involve searches in a range of databases and using a variety of strategies.

Health economics has been an established feature of the research, policymaking, practice and management in the delivery of healthcare. However its role is increasing as the cost of healthcare begins to drive changes in most healthcare systems. Thus the output from cost effectiveness studies is now being taken into account when making reimbursement decisions, e.g. in Australia and the United Kingdom. Against this background it is also recognized that the health economic tools employed in healthcare and particularly the output from the use of these tools however, are not always employed in the routine delivery of services. One of the notable consequences of this situation is the poor record of innovation in healthcare with respect to the adoption of new technology.

The evidence base for the effectiveness of diagnostic services is well known to be limited, and one consequence of this has been a very limited literature on cost effectiveness. One reason for this situation is undoubtedly the reimbursement strategies employed in laboratory medicine for many years, simplistically based on the complexity of the test procedure, and the delivery as a cost-per-test service.

Point-of-care testing creates a particularly challenging scenario because, on the one hand, the unit cost-per-test is larger through the loss of the economy of scale offered by automation, whilst it offers the potential of substantial savings through enabling rapid delivery of results, and reduction of facility costs. This is important when many health systems are planning for complete system redesign.

There is a growing realization around the world, particularly in developed nations, that healthcare budgets cannot continue to grow at the rate that they have done so over the last half century and resources are now limited. In addition there are also concerns about the quality and efficiency of care delivery systems. These issues pose considerable challenges which have been exacerbated by the recent global financial crisis (GFC) and indeed, the post-GFC reality for some countries is that healthcare budgets are now being reduced. We are thus entering an era where health economics and the allocation of resources are going to play an even more important role.

The HSRR is a searchable database for health economics: The Health Services and Sciences Research Resources (HSRR) is an important new searchable database being developed by NICHSR. HSRR provides descriptions of data sets used in health services research, including data sets pertaining to health economics. The following information is incorporated for the benefit of readers.

Statistical data: Health economics depends on large amounts of data in the following areas for credibility:

- Healthcare financing
- Cost of care
- Demographic

  - Epidemiological
  - Socioeconomic
  - Economic burden of disease (cot of illness)
  - Comparative
- Availability and sources of statistical data will be influenced by the type of healthcare system in place
- Availability and sources of statistical data may vary between regions within countries

Statistical data-sources: Many national, state, regional and local entities provide data that can be useful in researching health economics. Several but not limited to the following are listed below:

- Government departments and agencies
- Private health policy research organizations ("think tanks")
- Healthcare providers
- Health-related organizations such as associations, NGOs (non-governmental organizations)
- Health insurance industry
- Healthcare information technology industry

International initiatives such as OECD and WHO (listed below) are large providers of health data

- Organization for Economic Co-operation and Development
  - OECD Health Data
  - Comparative Cross-National Data
- World Health Organization Statistical Information Service (WHOSIS).

Chapter

5

Economic Values of the Registered Nurse Services in Deciding the Staff Pattern

INTRODUCTION

It has become necessity to recognize the economic value of the registered nurse services in deciding for staff pattern. In order to quantify the economic value of professional nursing, information gathering started from different sources, e.g. literature on the relationship between nurse staffing levels and nursing-sensitive patient outcomes in acute care hospitals. Using hospital discharge data to estimate incidence and cost of these patient outcomes together with productivity measures, the author estimated the economic implications of changes in registered nurse staffing levels. The data used for medical and surgical patients in federal acute care hospitals was the information collected from a literature review, and hospital discharge data from the 2005 Nationwide Sample. Special attention was bestowed on information related to patient nosocomial complications, healthcare expenditures, and national productivity.

It is observed that as nursing staffing levels increased, patient risk of nosocomial complications and hospital length of stay decreases, resulting in medical cost savings, improved national productivity, and lives saved. Though the conclusion is not a complete one, only some portion of the services that professional nurses provide can be quantified in pecuniary terms, however, the partial estimates of economic value presented illustrate the economic value to society of improve quality of care achieved through staffing levels.

Professional nursing: Professional nursing care is a vital component of the healthcare system. More than 2.4 million registered nurses (RNs) are employed in nursing (56% in hospitals), making registered nursing the largest healthcare profession. As healthcare costs increase, efforts to improve the efficiency and effectiveness of the healthcare system must take into account nurses' contribution to ensuring cost-effective, high-quality care.

Economic value of professional nursing: The term economic value of professional nursing refers to a monetary assessment of the value of services provided by nurses. In this study, the focus was on the economic value of incremental changes in nurse staffing that result in improved quality of patient care. This definition emphasizes the changes in nurse staffing that affect medical costs via the impact on patient outcomes. Improved patient care that prevents nosocomial complications, mitigates complications

by more rapid identification and intervention, and leads to more rapid patient recovery, creates medical savings. Reduced length of recovery and mortality has national productivity implications. From an economic perspective, healthcare facilities and other employers of RNs want to achieve a staffing level and mix such that the marginal value of employing one additional RN will equal or exceed the marginal cost.

Impact of nurse staffing on patient outcome: There have been many studies on the impact of nurse staffing on patient outcomes. A recent meta-analysis found 2858 potentially relevant studies of which 28 studies met inclusion criteria and reported adjusted odds ratios of the association between RN staffing and patient outcomes. The meta-analysis shows an association between higher staffing level and reduced hospital-related mortality, hospital-acquired pneumonia, unplanned extubation, failure to rescue, nosocomial bloodstream infections, and length of stay (LOS). There seems to be little association between RN staffing level and urinary tract infection (UTI) and surgical bleeding.

In their latest study, completed before the meta-analysis was published. The identified studies that estimated the impact of nurse staffing and were methodologically sound, recent, and reported findings primarily using multivariate regression analysis. These studies examined the relationship between changes in RN **hours per patient day** (HPPD) and changes in nurse sensitive patient outcomes (NSOs). We analyzed hospital discharge data from the 2005 Nationwide Inpatient Sample (NIS) to estimate incidence and costs of these patient outcomes and then applied the RN HPPD findings to the cost data in a model to estimate the economic implications of changes in RN staffing.

Nurse Staffing Literature Review

The research literature was reviewed on the relationship between RN staffing level in hospitals and patient risk for UTI, hospital-acquired pneumonia, pressure ulcer, upper gastrointestinal bleeding, sepsis, shock/cardiac failure, pulmonary failure, central nervous system complications, deep vein thrombosis, postoperative infection, adverse drug events, and patient falls.

Economic value for adding additional nurse: The economic value of adding one more RN to a nursing unit depends on current staffing levels. At low staffing levels, the services of each additional RN make a large contribution to patient care and thus have high economic value. As staffing levels improve, the value of services provided by each additional RN is positive, but declining. Because the marginal value of services approach attempts to estimate the value of the services provided by the last RN hired, this approach will underestimate the average economic value of RNs for a given staff level.

To quantify the relationship between patient risk of a particular NSO and HPPD, we projected patient risk for different staffing levels with findings from several studies.

While estimate multivariate regressions with NIS data to quantify the change in mortality risk, LOS, and cost per discharge associated with the presence of each NSO. Using the regression findings, for each discharge with a complication that projected mortality risk both in the presence that and absence of the complication, with the average difference in mortality risk assumed to be attributed to the complication.

For the LOS analysis, poisson regression with LOS was used as the dependent variable. The risk adjustment variable was average LOS associated with the DRG. Similar to the mortality analysis, we predicted LOS both in the presence and absence of each complication and attribute the average difference in LOS to the complication.

Reduction of hospital medical cost: To estimate the reduction in hospital-related medical costs via prevention of nosocomial complications, it was estimated the impact of each complication on hospital cost using ordinary least squares regression. Charges were converted to cost with hospital-specific cost-to-charge ratios. The risk adjustment variable was average cost associated with the DRG. The coefficient for each complication is the increase in hospital costs associated with the complication.

Use of hospital discharge data for patient outcome: The hospital discharge data used are hierarchical, with patient outcomes influenced by both patient level characteristics and hospital level characteristics. The actual models used in their analysis (poisson, logistic and ordinary least squares) do not explicitly consider the data hierarchy. Hierarchical models allow one to better understand the impact of explanatory variables at different levels in the hierarchy and to study variation at different levels of the hierarchy.

The primary focus of regression analysis is to estimate the association between presence of nosocomial complications and patient outcomes (mortality, LOS, and cost), with patient and hospital characteristics used as control variables. When the results reported were compared in this article using a random-intercepts model, they found differences in the estimates of control variables but minimal differences in the estimates of nosocomial complications predicting mortality, LOS, and cost. Also, analysis with a random-intercepts model suggests that the proportion of total variance that is accounted for at the hospital level is small.

Professional cost: Costs for professional services provided in the hospital and post-discharge costs for each NSO were based on expert medical opinion regarding patterns of physicians' hospital rounds and the following assumptions: (1) The average hospital visit by a physician or other clinician costs approximately $100; (2) patients who experience a fall receive 1 examination by a clinician; (3) for each additional day in the hospital attributed to the complication, patients are visited by their attending physician and for some complications are also visited by a specialist; and (4) after discharge, some nosocomial complications require one or more follow-up ambulatory visits for medications and tests.

Economic Benefits per Additional RN

An economic value of nursing model was developed that combines the HPPD elasticity estimates and the NIS regression results. The calculated patient risk of complications at 3 staffing levels: 6.4, 7.8, and 9.1 HPPD with the assumption the national average NSO risk is associated with HPPD of 7.8, and then use the findings from each applicable study in the literature to predict NSO risk at 6.4 and 9.1 HPPD. For most NSOs, multiple studies reported findings, having calculated multiple values for NSO risk at each staffing level and taken the average in order to obtain point estimates of the economic value of an additional RN at each staffing level. Then computed the change in NSO risk associated with a 0.01 change in HPPD.

Multiplying NSO risk by patient volume produces an estimate of total adverse patient events during the year for a given staffing level. Comparing the projected number of adverse outcomes for any 2 nurse staffing levels suggests how quality of care changes when nurse staffing changes. Multiplying the number of adverse patient outcomes by cost per case provides an economic estimate of the benefit of reduced incidence of complications, mortality, and LOS.

Productivity Loss

Using Bureau of Labor Statistics data on average earnings and labor force participation rates by age and gender, the estimated the lost productive value to society from premature mortality and increased LOS using the following assumptions: (1) Annual earnings is used as a proxy for the value of productivity for people in the labor force; (2) for people not in the labor force the value of their productivity is assumed to be 75% of the annual earnings of their peers in the labor force (to account for the value of services in the home and volunteer work); (3) for a person age "A" in year "Y," their productive value in year "Y+1" is calculated $V_{A,Y+1} = 1.01 \times V_{A+1,Y}$, where the 1.01 accounts for the annual increase in productivity; and (4) a 3% discount rate is used to calculate the net present value of future productivity.

Results

Nurse Staffing Elasticity Estimates

The elasticity point estimates in below given shows the percent change in patient risk for each NSO associated with a 1% rise in HPPD evaluated at 7.8 HPPD (median staffing level). The strength of the relationships is:

- Strong (elasticity of 0.1 or below) for patient falls, hospital-acquired pneumonia, upper gastrointestinal bleeding, shock/cardiac failure, pressure ulcer (for surgical patients), and UTI (for surgical patients).
- Modest (elasticity between 0.1 and 0.05) for UTI (for medical patients), pressure ulcer (for medical patients), pulmonary failure, adverse drug events, postoperative infection, and deep vein thromboses (for surgical patients).
- Weak (elasticity between 0.05 and 0) for central nervous system complications, sepsis, and deep vein thromboses (for medical patients).

Nurse Staffing and Mortality Risk

Logistic regression results suggest that presence of nosocomial complications is associated with a rise in risk of in-hospital mortality (Table 2). The regression coefficients for all complications are statistically different from 0 at $P < 0.05$, with the exception of pressure ulcer for medical patients. Unexpectedly, UTI is associated with lower mortality risk so for modeling we assume no mortality associated with UTI.

By comparing two approaches to estimate the relationship between HPPD and mortality. One, combined elasticity estimates from the synthesis of the literature on the relationship between HPPD and nosocomial complication risk with estimates from the regression analysis of the nursing infermation system (NIS) on the increase in mortality risk associated with having each complication.

Equation: Second, the method directly calculated εHPPD (essentials for healthcare practice and professional development) mortality based on a literature synthesis—for mortality, findings from Needleman et al and Aiken et al., compared with the first approach, the second approach produces a weaker relationship between HPPD and mortality risk for medical patients and a stronger relationship for surgical patients. Combining both medical and surgical patients, the 2 approaches produced similar estimates of change in mortality risk associated with increased RN staffing levels. The first approach (which measures lives saved by preventing NSOs) produced estimates that are approximately 87% the size of the estimates produced by the second approach. Although both approaches produced estimates with some level of imprecision, one possible interpretation was that approximately 87% of lives saved by improved RN staffing levels is achieved by preventing nosocomial complications while approximately 13% of lives saved is achieved by early detection and mitigation of complications that still occur. The second approach provided a more complete picture of the impact of RN staffing levels on patient mortality risk, and used findings from the second approach to compute the economic estimates presented.

Nurse Staffing and Length of Stay

The poisson regression results estimate the average increase in LOS when each of the nosocomial complications was present as given below. As with the mortality analysis, it was compared 2 approaches to estimate the relationship between HPPD and LOS. The approaches were identical to those used for the mortality analysis but used the elasticity estimates for LOS-ENSO (El Niro-Southern Oscillation) instead of mortality. The second approach produced a more complete (and larger) estimate of nursing's impact on LOS. Although the first approach only models prevention of NSOs, the second approach also included the impact via mitigation of nosocomial complications that do occur and faster patient discharge unassociated with nosocomial complications. Results from the second approach were used to calculate the total economic value estimates presented.

Patient Medical Costs

The results of the ordinary least squares regression analyses estimating the impact of each nosocomial complication on hospital cost is shown below. For hospital days that are prevented unassociated with prevention of NSOs, each inpatient day avoided was assumed to generate cost savings of approximately $1522 (the 2005 national average cost per inpatient day in community hospitals).

Estimates of increased mortality risk, LOS and medical cost associated with each NSO are summarized below. Combining this information with estimates of the number of adverse events in 2005 suggests that these adverse events were associated with 251,000 in-hospital deaths, 22.6 million hospital inpatient days, and $41.8 billion in medical costs.

Productivity Loss

Based on the age distribution of the patients with complications and who died in the hospital, were calculated that the net present value of future productivity would average $222,400 per life saved. The estimate for individual demographic groups ranges

from $1,194,000 for men age 15–44, to $13,819 for women age 65 and older. Approximately 63% of the projected deaths averted would occur among the population age 65 and older, 24% would occur among the population age 46–64, 10% would occur among the population age 18–44, and 3% would occur among the population under age 18.

Economic Benefits per Additional RN

While by quantifying the economic value of only a subset of the services that RNs provide, these partial estimates of economic value per additional full time equivalent (FTE) RN range from $58,100 (to add an RN when already at 9.1 HPPD) to $62,500 (to add an RN when already at 6.4 HPPD). That the benefits per additional RN changes relatively little between low HPPD and high HPPD is surprising and likely reflects the many data challenges faced by researchers whose work that was synthesized (e.g. few hospitals staff at extremely low or high levels so there is only modest variation in staffing levels across hospitals after one control for patient mix).

At 7.8 HPPD the quantified benefits per FTE RN is $60,000. Annual medical savings per RN include $7400 from preventing nursing sensitive adverse events (91% of which are reduced hospital costs and 9% are reduced costs for professional services and other post-discharge costs); and $38,100 for hospital-related savings and $2500 for professional services savings related to reduced LOS unassociated with preventing adverse events. Productivity benefits to society per additional FTE RN include $10,300 for reduced patient mortality, and $1800 from faster recovery.

The approach used provides an estimate of the value of the next RN hired, for a given staffing level. The value of each additional nurse declines at higher staffing levels, so this marginal value approach underestimates the average value per nurse. Reflecting the nurse staffing measures in studies synthesized, this definition of FTE does not distinguish between additional staff and working longer hours.

Economic Value of Increase Hospital Nurse Staffing at the National Level

Estimates from this study suggest that adding 133,000 FTE RNs to the acute care hospital workforce [the estimated number of RNs needed to increase those hospitals below 9.1 HPPD (75th percentile) up to 9.1 HPPD] would save 5900 lives per year. The productivity value of total deaths averted is equivalent to more than $1.3 billion per year, or about $9900 per additional RN per year.

Adding 133,000 RNs nationally would decrease hospital days by 3.6 million. The value of national productivity when nurses help patients recover more rapidly is conservatively estimated at $231 million (or $1700 per additional RN per year).

Medical savings (before increased nursing labor costs) is estimated at $6.1 billion (or $46,000 per additional RN per year). Combining medical savings with increased productivity, these partial estimates of economic value average $57,700 for each of the additional 133,000 RNs. Although this national scenario highlights the potential impact of improved staffing in acute care hospitals, it was acknowledged the challenges faced by the nation to meet the current and growing demand for RNs just to maintain current staffing levels. Also, improved nurse staffing is one of several factors needed to improve

quality of care—including the contribution of other clinician specialties, and advances in training, processes, and technology.

Discussion

This study draws heavily on the growing body of literature to quantify the economic value of professional nursing. The findings are generally consistent with findings published by Kane et al on the relationship between staffing and complication risk, by Needleman et al, on the business case for nursing and by Aiken et al, on the relationship between nurse staffing level and patient mortality, despite using a different approach and combining findings across multiple studies. Outcome of findings help to confirm the basic overall findings reported in the literature.

Not all services that nurses provide can be quantified in pecuniary terms. Although there is a growing body of literature on the impact of nursing care on preventing nosocomial complications, it was recognized that very little research on the impact of nursing on mitigating the severity of complications that still occur.

Average annual cost for hospital staff: The average annual cost for hospitals to employ an RN in 2005 was approximately $83,000 (salary of $57,820 and a fringe benefit rate of 30.4%). An expansion in RN supply of RNs to improve staffing levels could cause the cost per RN to rise. The benefits of increased RN staffing included in our analysis find that each additional patient care RN employed (at 7.8 HPPD) will generate over $60,000 annually in reduced medical costs and improved national productivity (accounting for 72% of labor costs). This is only a partial estimate of the economic value of nursing, omitting the intangible benefits of reduced pain and suffering by patients and family members; the risk for patient re-hospitalization; benefits to the hospital such as improved reputation, reduced malpractice claims and payouts, and reduced compliance-related costs; the benefits of increased staffing related to improved work environment (e.g. reduced turnover and risk of injury); and the value of administrative activities that patient care nurses perform (e.g. functions related to billing and ordering). Omitted areas of economic value reflect gaps in the literature and warrant future research. The approach we used to quantify the economic value of increased staffing levels has several limitations:

One, the estimates omit the value of some services that RNs provide and consequently underestimate their economic value.

Two, a major component of estimated medical savings is reduced patient LOS. Prevention of nosocomial complications explains only a small portion of the total decrease in inpatient days. Additional research is needed to better understand the pathways that lead to reduced LOS.

Three, the approach used may encounter effect modification. If overall healthcare quality improves causing patient risk of nosocomial complications to decline with existing staffing levels, effect modification causes the estimates of economic value per RN to decline (there is less potential for quality improvements).

Four, estimates from the literature on the relationship between RN staffing level and quality of care are based on cross-sectional studies. These studies rely on associations that imply but do not establish causality. Work by Mark et al suggests that failure to adequately control for hospital characteristics can bias the estimated

relationship between nurse staffing and quality of care. When compared the results reported in their paper to results using hierarchical linear models, they found differences in the estimates of control variables but minimal differences in the estimates used in their analysis (i.e. the impact of nosocomial complications on predicting mortality, LOS, and cost).

Findings of the Study

The findings from this study point to two related issues with policy implications. First, because healthcare facilities realize only a portion of the economic value of professional nursing, under current reimbursement systems the incentive (and financial reality) is for facilities to staff at levels below where the benefit to society equals the cost to employ an additional nurse. Perception of a market failure or the increased potential for social good often results in calls for political action—as is the case with calls for mandated minimum nurse staffing ratios. A study by Evans and Kim (2006) studied the relationship between hospital staffing levels and adverse patient events in California hospitals to investigate the merit of California's mandated minimum nurse-to-patient ratios.

Second, the economic value of nursing is greater for payers than for individual healthcare facilities. By reducing patient recovery periods and preventing nosocomial complications, nurses reduce the demand for selected physician services. Furthermore, depending on reimbursement method, the healthcare facility might fail to realize estimated financial benefits that accrue from prevention of nosocomial complications and reduced LOS. Regardless, insurers and other payers have a financial incentive to ensure that healthcare facilities have appropriate nurse staffing mix and levels. One potential solution that is gaining acceptance is to pay more for quality, with payers raising reimbursement rates for facilities that provide higher levels of care. More closely linking reimbursement to patient outcomes could help facilities capture more of the benefits from improved staffing, thus strengthening the financial incentive and providing the financial means to improve quality of care.

Our findings support the findings of others, strengthening the economic case for hospital investment in nursing, particularly in low staffed hospitals.

Chapter

6

Nursing Sensitive Quality Indicators

INTRODUCTION

Of late, the research linking hospital nurse staffing issues and adverse patient outcomes has become a hot discussion and sought the attention of those both inside and outside of healthcare. The studies carried out during the '90s and the early 2000s, when there was acute shortage of nursing personnel and nurses were not easily found to be recruited. Those who were in the job have to shoulder heavy load of patient care and other administrative duties that brought the attention of authorities of understaffing in units, frustration and job dissatisfaction. The studies indicated that the outcome of under staff have indirectly associated with increased mortality, that has caught the attention of media and public became interested in the conclusion of studies. It was also realized not only increase mortality, the quality of care would not be as expected with less ratio of patients and the nursing staff. All this has lead to undertake studies on different indicators that could relate to the quality of care.

A team of researchers in 1996 could phrase "nursing-sensitive indicators" to reflect elements of patient care that are directly and indirectly affecting due to nursing services. This has gained the importance and the following indicators are said to reflect mainly three aspects of nursing care e.g structure, process and outcome.

- **Structure indicator:** It includes the supply of nursing staff, the skill level of nursing staff, and the education and certification levels of nursing staff.
- **Process indicator:** Measure methods of patient assessment and nursing interventions. Nursing job satisfaction is also considered a process indicator.
- **Outcome indicator:** Reflect patient outcomes that are determined to be nursing sensitive because they depend on the quantity or quality of nursing care. These include things like pressure ulcers and falls. Other types of patient outcomes are related to other elements of medical care and are not considered to be nursing-sensitive. These include things like hospital readmission rates and cardiac failure.

The American Nurses Association (ANA) identified ten critical nursing indicators for acute care settings in the year 1999. The ANA added ten others that are applicable to community-based, non-acute care settings in the year 2002. Since then, the lists have been refined and expanded many times, with new indicators added according to the need every year. The ten original indicators that apply to hospital-based nursing are as follows.

- Patient satisfaction with pain management
- Patient satisfaction with nursing care
- Patient satisfaction with overall care
- Patient satisfaction with medical information provided
- Pressure ulcers
- Patient falls
- Nurse job satisfaction
- Rates of nosocomial infections
- Total hours of nursing care per patient, per day
- Staffing mix (ratios of RNs, LPNs, and unlicensed staff)

By identifying this first group of indicators, the ANA became a pioneer, of sorts, in evidence based practice. The next step was a literature search to identify other indicators that were potential nurse-sensitive. Those were then reviewed and either validated as being truly nurse-sensitive are approved, if not they are discarded.

In 1998, the ANA established the National Database of Nursing Quality Indicators™ (NDNQI®), in order to continue to build on data gained from earlier studies. There was already an established link between nurse staffing and patient outcomes, but more data and reporting was needed to evaluate other indicators of nursing quality at the unit level.

Nursing sensitive quality indicators are an important part of the equation when it comes to establishing evidence-based practice guidelines. But measuring these indicators is not simply good science—it is an ethical imperative. Nursing's foundational principles and guidelines state that, as a profession, nursing has a responsibility to measure, evaluate, and improve the quality of nursing practice.

Chapter

7

Quality of Patient Care

Hospitals are committed to providing the safest and highest quality care to patients. The hospitals have to measure the performance against the standards as well as compare the outcomes of care with top medical centers/institutions nationwide in the effort to continually improve the quality of care that they provide. The optimal quality care could be defined as:

- Better consistent care for better outcomes
- Excellent patient safety and prevent from adverse effects
- Timely render apt care
- Fair and unbiased access to healthcare from a right healthcare provider

Quality Improvement and Patient Safety

The following six characteristics could be applied for high-quality healthcare.

Care must be Safe

Patient safety is fundamental to high-quality healthcare. They could not believe that millions of people were harmed annually because of errors, many patients die. Most errors occur as a result of multiple interrelated contributing factors—not just the behavior of one individual. Assuring that all care is safe for all patients requires examining the systems and processes of care, identifying the points of failure, and modifying the factors that cause systems to breakdown.

Care must be Effective and Reliable

Effective care means that patients do not receive care that cannot help them and/or where the risks of care outweigh the benefits, and that patients reliably receive care where the known benefits outweigh the risks. To say that healthcare is effective implies that there is an evidence base to support that claim. Unfortunately, for many aspects of healthcare, the data to support best practices are inconsistent and do not reflect the full range of conditions and treatments relevant to day-to-day practice.

Reliable care implies that patients will consistently receive the same standard of care regardless of when, where, and from whom they receive care. However, there continues to be significant variation in the quality of care that patients receive. A 2004

study by RAND Corporation shows that for many clinical conditions with known best practices for quality care, only about 50% of patients receive care consistent with the guidelines for recommended care.

Care must be Patient-centered

Patient-centeredness focuses on the patient's experience of illness and healthcare and the degree to which systems succeed or fail in meeting individual patient needs. Anyone who has ever been seriously ill knows the fear, anxiety, and helplessness that are part of being a patient. Patient-centered care works to relieve this emotional pain as well as the patient's physical pain. Truly patient-centered care is characterized by:

- Respect for patients' values, preferences, and expressed needs;
- Accurate information about their condition and treatment, given in a language that patients understand;
- Relief from unnecessary physical pain and discomfort, such as shortness of breath, especially at the end of life;
- Emotional support to address the anxiety that accompanies all injury and illness; and
- Provide accommodation for family and friends on whom patients rely for support and comfort.

Care must be Timely

Timeliness of care is interrelated with safety, efficiency, and patient-centeredness of care. Long waits for appointments, long waits at registration and clinics or physicians' offices, emergency rooms, on gurneys in hallways, and long waits for test results not only result in emotional distress, but may result in physical harm. For example, a delay in test results can cause delayed diagnosis or treatment-resulting in preventable complications. Waits also affect the providers of care. Surgeries are delayed and doctors and nurses wait while staff tries to track missing information that is vital to a patient's care. Delays and barriers in care, such as referral and authorization processes, consume time and energy. Any high-quality process should flow smoothly.

Care must be Efficient

An efficient healthcare system uses its resources to get the best value for the efforts and money spent. The current system is characterized by a great deal of waste-resources used without benefit to the patients the system is intended to help. Efficiency can be improved at all levels of the system, from the primary or solo office practice to secondary or regional health systems to superspecialty national healthcare programs. There are a number of strategies that can be used to reduce waste-managing access to care by matching supply to demand; managing flow through the system by eliminating tests, processes, and layers of control that add complexity or are not necessary; avoiding duplication of tests and procedures through consistent, accessible record keeping; and appropriate recycling and reuse of resources or wise substitution of more efficient resources.

Care must be Equitable

Equity in healthcare operates at two levels: At the population at the individual and population level. At the individual level, the goal is for healthcare providers to treat all individuals fairly and deliver high-quality care regardless of personal characteristics, such as age, gender, race, ethnicity, education, disability, sexual orientation, income, or location of residence while at the population level, the goal of the system is to improve health status and reduce disparities among subgroups.

Quality Improvement and Pay-for-performance

It is possible to find private physician practices and clinics and healthcare facilities that exemplify one or more of these characteristics of high-quality care, but it is rare, if not impossible to find an organization that consistently meets all of them. Despite one knows that it is possible to do better, unfortunately, the health industry fall much behind other organizations such high-risk endeavors, such as the airline industry, railways and many private industries do a better job than the healthcare industry in consistently producing appropriate outcomes and preventing adverse events.

Quality improvement is the science of analyzing where organizations and systems fall short of providing high-quality care and the practice of devising, testing, and evaluating tools and techniques to address those shortcomings. Many organizations, public and private, are working to improve patient safety and the quality of care. Many of the resources necessary to evaluate and improve care are publicly available. Pay-for-performance programs, when designed primarily to improve the effectiveness and safety of patient care, attempt to align the incentives of all members of a healthcare delivery system toward the common goal of providing high-quality care encompassing all six characteristics stipulated above.