Chapter III
3.1 INTRODUCTION AND BRIEF HISTORY

Health is defined as a state of complete physical, mental and social well-being and not just the non-existence of disease or infirmity. Health is a primary human right and has been accorded due importance by the constitution. While Article 21 stresses upon state government to safeguard the health and nutritional well-being of the people, the central government also plays an active role in this sector. Recognising the critical role played by the health Industry, the industry has been conferred with the infrastructure status under section 10(23G) of the Income Act.

The Indian Health Sector Consists of

1) Medical Care providers like physicians, specialist clinics, nursing homes, hospitals.
2) Diagnostic service centers and pathology laboratories.
3) Medical equipment manufacturers.
4) Contract research organizations (CRO’s), pharmaceutical manufactures
5) Third party support service providers (catering, laundry).

Before Independence

Conventionally health care in India has been on voluntary work. From ancient times, traditional practitioners of health care have contributed to the medicinal needs of society. Acute knowledge in the medicinal properties of plants and herbs were passed on from one generation to another for use in treatment. Colonial rule and the
dominance of the British changed this scenario. Hospitals managed by Christian missionaries took center stage. Even the intellectual elite in India with their pro-west bias favored western practices.

After Independence

Prior to independence, healthcare in India was in shambles with large number of deaths and the spread of infectious diseases. After independence the Government of India laid stress on Primary Health Care and India has put in sustained efforts to better the health care system across the country. But government initiative was not enough to meet the demands from a growing population be it in primary, secondary or tertiary health care. Alternate sources of finance were critical for the sustainability of the health sector.

Entry of Private Sector

Till about 20 years back, the private sector’s venture into the health care sector consisted of only solo practitioners, small hospitals and nursing homes. The quality of service provided was excellent, especially in the hospitals run by charitable trusts and religious foundations. In 1980’s realizing that the government on its own would not be able to provide for health care, the government allowed the entry of private sector to reduce the gap between supply and demand in healthcare. Private hospitals are managed by corporate, non-profit or charitable organizations. The establishment of private sector has resulted in the emergence of opportunities in terms of medical equipment, information technology in health services, BPO, Telemedicine and medical tourism.
Large companies and affluent individuals have started five star hospitals which dominate the space for the high end market. The private sector has made tremendous progress, but on the flip side it also responsible for increasing inequality in the healthcare sector. The private sector should be more socially relevant and efforts must be made to make private sector accessible to the weaker sections of society.

**Role of Information Technology in Health Services**

Information technology is increasingly being used in health services. Some of its applications are:

1) Barcode Medication Administration where technology is used to reduce medication dispensing errors & improve patient safety in hospital settings.
2) Chronic Disease Management where information technology is used to manage chronic illness like diabetes and heart failure.
3) Tele health where into technology connects doctors and patients in different geographical locations.

**Medical Tourism**

Medical tourism is a relatively new concept, which is becoming popular globally. India has several advantages in favour or medical tourism like infrastructure, technology, cost effective medical care and hospitalization and qualified and skilled doctors. Traditional Indian rejuvenation methods like yoga, ayurvedic massage find favour with people in western countries and corporate hospitals and wellness centers are cashing in on this.
A growing healthcare sector

Healthcare is one of India’s largest sectors, in terms of revenue and Employment and it is expanding rapidly. During the 1990s, Indian healthcare grew at a compound annual rate of 16%. Today the total value of the sector is more than $34 per capita, or roughly 6% of GDP. By 2012, India’s healthcare sector is projected to grow to nearly $40 billion.

The private sector accounts for more than 80% of total healthcare spending in India. Unless there is a decline in the combined federal and state government deficit, which currently stands at roughly 9%, the opportunity for significantly higher public health spending will be limited.

Growing population and economy

One driver of growth in the healthcare sector is Indian’s booming population, currently 1.1 billion and increasing at an annual rate of 2% By 2030, India is expected to surpass China as the world’s most populous nation. By 2050, the population is projected to reach 1.6 billion.
This population increase is due in part to a decline in infant mortality, the result of better healthcare facilities and the government’s emphasis on eradicating diseases like as hepatitis and polio among infants. Additionally, life expectancy is rapidly approaching the level of the western world. By 2025, an estimated 189 million Indians will be at least 60 years of age triple that of 2004, thanks to greater affluence and better hygiene. The growing elderly population will place an enormous burden on Indian’s healthcare infrastructure. The Indian economy, estimated at roughly $1 trillion, is growing in tandem with the population. Goldman Sachs predicts that the Indian economy will expand by at least 5% annually for the next 45 years (see chart), and that it will be the only emerging economy to maintain such a robust pace of growth.

Expanding middle class

Indian traditionally has been a rural, agrarian economy. Nearly three quarters of the population still lives in rural areas, and as of 2004, an estimated 27.5% of Indians
were living below the national poverty line. Some 300 million people in Indian live on less than a dollar a day, and more than 50% of all children are malnourished.

<table>
<thead>
<tr>
<th>Middle class</th>
<th>% of entire population</th>
</tr>
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<tbody>
<tr>
<td>1998-99</td>
<td>44.92</td>
</tr>
<tr>
<td>2001-02</td>
<td>50.53</td>
</tr>
<tr>
<td>2009-10 (estimate)</td>
<td>62.95</td>
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Source: CRIS Infac, 2005

However, India’s thriving economy is driving urbanization and creating an expanding middle class, with more disposable income available to spend on healthcare. While per capita income was $620 in 2005, over 150 million Indians have annual incomes more than $1,000, and many who work in the business services sector earn as much as $20,000 a year. While this is a fraction of the income that their US peers earn, it is the equivalent of more than $100,000 per year when adjusted for purchasing power parity. More women are entering the workforce as well, further boosting the purchasing power of Indian households. Between 1991 and 2001, the percentage of women increased from 22% to 26% in workforce, according to the latest Indian government census. Many of these women are highly educated: the ratio of women to men who have a college degree or higher level of education is 40:60. Thanks to rising income, today at least 50 million Indians can afford to buy Western medicines – a market only 20% smaller than that of the UK. If the economy continues to grow faster than the economies of the developed world, and the literacy rate keeps rising, much of western and southern India will be middle class by 2020.
Rise of disease

Another factor driving the growth of Indian’s healthcare sector is a rise in both infectious and chronic degenerative diseases. While ailments like poliomyelitis, leprosy, and neonatal tetanus will soon be eliminated, some communicable diseases once thought to be under control including dengue fever, viral hepatitis, tuberculosis, malaria, and pneumonia, having returned in force or have developed a stubborn resistance to drugs. This troubling trend can be attributed in part to substandard housing, inadequate water and sewage and waste management systems, a crumbling public health infrastructure, and increased air travel In addition to battling infectious diseases, Indian is grappling with the emergence of diseases like AIDS as well as food and water – borne illnesses. And as Indians live more affluent lives and adopt unhealthy western diets that are high in fat and sugar, the country is experiencing a rise in lifestyle diseases such as hypertension; cancer and diabetes, which are reaching epidemic proportions (see sidebar, The Indian Diabetes Epidemic). Over the next 5-10 years, lifestyle diseases are expected to grow at a faster rate than infectious diseases in India, and result in an increase in cost per treatment. Wellness programs targeted at the workplace, where many sedentary jobs are contributing to an erosion of employees’ health, could help to reduce the rising incidence of lifestyle diseases.

Pharmaceuticals

Paralleling the rise of diseases is the emergence of a robust pharmaceutical industry in India. The Indian pharmaceutical market is one of the fastest growing markets in the world; sales increased by 17.5% to $7.3 billion in 2006, according to IMS Health. Many factors, including a strong economy and the country’s growing
healthcare needs have contributed to the accelerated growth, which is especially strong in the over-the-counter (OTC) market.

Overall the domestic pharmaceutical industry is highly fragmented; more than 10,000 firms collectively control 70% of the market. Only three foreign multinationals rank in the top 10 companies, as measured by sales and collectively they have only 11.9% of the market between them. But many of the local players are generics producers specializing in anti-infective drugs illness of affluence and age increase, the demand for innovative new pharmaceuticals will rise. The federal government uses price controls to ensure that vital drugs are affordable to the Indian population. Under the proposed pharmaceutical policy 2006, the government revealed its intention to raise the number of essential drugs under price controls from 79 to nearly 354, which would bring almost a third of the industry under price controls and adversely impact foreign pharmaceutical firms that want to do business in India. It is an ongoing challenge to balance the commercial interest of pharmaceutical companies with the broader social objective of curing diseases and preventing epidemics that could decimate the Indian population.

**Deteriorating infrastructure**

Indian’s healthcare infrastructure has not kept pace with the economy’s growth. The physical infrastructure is woefully inadequate to meet today’s healthcare demands, much less tomorrows. While Indian has several centers of excellence in healthcare delivery, these facilities are limited in their ability to drive healthcare standards because of the poor condition of the infrastructure in a majority area of the country. Of the
15,393 hospitals in India in 2002, roughly two-third was public. After years of under–funding, most public health facilities provided only basic care. With a few exceptions, such as the All India Institute Of medical Science (AIIMS), public health facilities are inefficient, inadequately managed and staffed, and have poorly maintained medical equipment. The number of public health facilities also is inadequate. For instance, India needs 74,150 community health centers per million populations but has less than half that number. In addition, at least 11 Indian states do not have laboratories for testing drugs, and more than half the existing laboratories are not properly equipped or staffed. The principal responsibility for public health funding lies with the state governments, which provide about 80% of public funding. The federal government contributes another 15% mostly through national health programs. However, the total healthcare financing by the public sector is dwarfed for 82% of Indian’s $30.5 billion expenditure on healthcare. This is an extremely high proportion by international standards.

Private firms are now thought to provide about 60% of all outpatient care in India and as much as 40% of all in-patient care. It is estimated that nearly 70% of all Hospitals and 40% of hospitals beds in the country are in the private sector.

Table 3.2

<table>
<thead>
<tr>
<th>Per Lakh (100K) Population</th>
<th>Beds</th>
<th>Hospitals</th>
<th>Dispensaries</th>
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<tbody>
<tr>
<td>Urban</td>
<td>178.78</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td>Rural</td>
<td>9.85</td>
<td>0.36</td>
<td>1.49</td>
</tr>
</tbody>
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Source: Review of Health Care in India, 2005
The healthcare divide

When it comes to healthcare, there are two Indians: the country that provides high-quality medical care to middle-class Indians and medical tourists, and the India in which the majority of the population lives- a country whose residents have limited or no access to quality care. Today only 25% of the Indian population has access to Western (allopathic) medicine, which is practiced mainly in urban areas, where two-third of Indian’s hospitals and health centers are located. Many of the rural poor must rely on alternatives forms of treatment, such as ayurvedic medicine, unani and acupuncture. The federal government has begun taking steps to improve rural healthcare. Among other things, the government launched the National Rural Health Mission 2005-2012 in April 2005. The aim of the Mission is to provide effective healthcare to India’s rural population with a focus on 18 states that have low public health indicators and/or inadequate infrastructure. These include Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Himachal Pradesh, Jharkhand, Jammu & Kashmir, Manipur, Mizoram, Meghalaya, Madhya Pradesh, Nagaland, Orissa, Rajasthan, Sikkim, Tripura, Uttaranchal and Uttar Pradesh. Through the mission, the government is working to increase the capabilities of primary medical facilities in rural areas, and ease the burden to on tertiary care centers in the cities, by providing equipment and training primary care physicians in performing basic surgeries, like cataract surgery. While the rural poor are underserved, at least they can access the limited number of government – support medical facilities that are available to them. The urban poor fare even worse, because they cannot afford to visit the private facilities that thrive in Indian’s cities.
Health for All

The health of a nation is difficult to define in terms of a single set of measures. At best, we can assess the health of the population by taking into account indicators like infant mortality and maternal mortality rates, life expectancy and nutrition, along with the incidence of communicable and non-communicable diseases. According to these measures, the health of the Indian population has improved dramatically over the past fifty years. Life expectancy has risen from 33 years to 64 years. The infant mortality rate (IMR) has fallen from 148 to 71 per 1000. The crude birth rate (CBR) has declined from 41 to 25 and the crude death rate (CDR) has fallen from 25 to under 9. The couple protection rate (CPR) and total fertility rate (TFR) have also improved substantially. Despite these achievements, wide disparities persist between different income groups, rural and urban communities, and between different states and even districts within states. The infant mortality rate among the poorest quintet of the population is 2.5 times higher than that among the richest. Maternal mortality remains very high. More than one lakh women die each year due to pregnancy-related complications. Like population growth and economic growth, the health of a nation is a product of many factors and forces that combine and interact with each other.

Economic growth, per capita income, employment, levels of literacy and education—especially among females—age of marriage, birth rates, availability of information regarding health care and nutrition, access to safe drinking water, public and private health care infrastructure, access to preventive health care and medical care, health insurance, public hygiene, road safety, and environmental pollution are among the factors that contribute directly to the health of the nation. Fifty three Communicable
diseases like malaria, kalaazar, tuberculosis and HIV remain the major causes of illness in India. During the next five to ten years, existing programmes are likely to eliminate polio and leprosy and substantially reduce the prevalence of kalaazar and filariasis. However, TB, malaria and AIDS will continue to remain major public health problems. India has about 1.5 million identified cases of TB which cause more than 3, 00,000 deaths annually. Improved diagnostic services and treatment can reduce the prevalence and incidence of TB by 2020. About 2 million cases of malaria are reported in India annually. Restructuring the "malaria workforce" and strengthening health infrastructure can reduce the incidence of this disease by up to 50 per cent within a decade. Assessing the impact of HIV epidemic is more difficult; according to an estimate, there are about 4 million persons infected with HIV.

The National Health Policy aimed at achieving a plateau in the prevalence of HIV infection by 2007. Childhood diarrhoea, another major cause of illness, is largely preventable through simple community action and public education, and deaths due to diarrhoea were to be eliminated by 2010. Childhood under-nutrition, the other major area of concern, can be addressed by targeting children of low birth weights and employing low-cost screening procedures to detect under-nutrition at an early age. Given the projected improvement in living standards, food security, educational levels and access to health care among all levels of the general population, substantial progress can be made in reducing the prevalence of severe under-nutrition in children by 2020. China’s remarkable success in combating disease over the past two decades is proof that a determined commitment to improving public health can dramatically reduce the incidence of infectious diseases within one or two decades. With the
demographic and epidemiological transition taking place in the coming years, non-communicable diseases are also likely to emerge as major public health problems. Modernization of life styles will further aggravate health problems.

The rapid proliferation of two and four wheel motor vehicles, increasing congestion on city roads and intercity highways have all contributed to an increasing number of deaths and serious injuries from traffic related accidents. Greater emphasis on education and enforcement of road safety rules by both drivers and pedestrians is the need of the hour. As already noted, there will be a massive increase in population in the 15-64 age groups. Reproductive and Child Health care programmes must meet the needs of this rapidly growing clientele. The population in this age group will be more literate and have greater access to information. They will have greater awareness and expectations about access to quality services for maternal and child health, contraceptive care, management of gynecological problems, etc. India’s significant achievements in the field of health have been made possible by the establishment of a huge rural health infrastructure, along with the formation of a massive health care manpower consisting of over five lakh trained doctors working under plural systems of medicine, and a vast frontline of over seven lakh nurses and other health care workers; 25,000 primary and community health care centers; and 1.6 lakh sub-centers, complemented by 22,000 dispensaries and 2,800 hospitals practicing Indian systems of medicine and homeopathy. This infrastructure remains under-equipped, under-manned and under-financed to cope with the challenge of eradicating major threats to human life. The inadequacy of the current health care system is starkly illustrated by the fact that only 35 per cent of the population has access to essential drugs, while the UMI
reference level is above 82 per cent. Infant immunization against measles and DPT for children less than 12 years is only 60 Percentage and 78 percent respectively compared to the UMI level of over 90% percent for both diseases.

As a larger proportion of the population reaches middle Class standards of living, an increasing number of people will turn to private health care providers. This development is welcome, because it will permit the public health care system to concentrate more resources on meeting the needs of the poorer sections. But at the same time, the level of public expenditure on health care needs to rise about four-fold from the current level of 0.8 per cent of GDP to reach the UMI reference level of 3.4 per cent. Rapid growth of the private health care system, however, requires the formulation of competence and quality standards to check and balance the increasing emphasis on health care as a business.

**Criteria for a More Equitable and Effective Health Care System:**

1) Universal access and access to an adequate level of health care without financial burden.

2) Fair distribution of financial costs for access and fair distribution of burden in rational care and capacity.

3) Ensuring that providers have the competence, empathy and accountability for delivering quality care and for effective use of relevant research.

4) Special attention to vulnerable groups such as women, children, the disabled and the aged.
Development plans for India’s health care systems need to place greater emphasis on public health education and prevention. The wide dissemination of health and nutrition related information through traditional channels should be supplemented by an ambitious and persistent programme of public health education through the print, television, radio and electronic media. Health insurance can play an invaluable role in improving the overall health care system. The insurable population in India has been assessed at 250 million and this number will increase, rapidly in the coming two decades. This should be supplemented by innovative insurance products and programmes by panchayats with reinsurance backup by companies and government to extend coverage to much larger sections of the population. The life expectancy of the Indian population is expected to reach above 65 years in 2020, which compares favorably with the UMI reference level of 69 years. Infant Mortality rates are expected to decline to about 20 per 1000 in 2020, which compares favorably with the UMI reference level of 22.5.

Vulnerability

During the next 20 years, the aged population in India will nearly double, placing great demand on the infrastructure of hospitals and nursing homes, while at the same time shifting the profile of health disorders from problems of the young to those of the aged. The population above 65 years of age will increase from 45 to 76 million persons by 2020. Reference has already been made to the very high incidence of malnutrition among this group and the growing incidence of diseases associated with aging, such as cancer and cardiovascular diseases. A disproportionate number of the aged population is illiterate and living below the poverty line. While majority of these
people live in rural areas where the extended family system remains prevalent, increasing urbanization and mobility will destabilize their situation in future. The problem of coping with a larger aged population will be partially solved by a big surge in the size of the working age labour force and a reduction in the dependency ratio, meaning that there will be a larger proportion of workers to support the aged. Specific strategies will be needed to provide targeted assistance for the most vulnerable members of this group, including research on the disabilities of the aged, greater development of geriatric medicine, training of minders for the aged, and establishment of innovative support systems like the highly successful Japanese model. Like the aged, the disabled persons also form another subgroup that is particularly vulnerable and unlikely to benefit directly from the general advance of society, unless specific provisions are made to address their specific needs, including a special system of clinics and home based learning programmes, combined with therapeutic and institutional care.

**Issues in Measuring GDP of Health Care Service in India in the Standard National Accounts Framework**

The National Accounts Statistics provides a comprehensive estimate of national income (NI) as well as other macro-economic parameters for proper evaluation of the performance of an economy. These estimates also help in formulating future development policy planning of a country. During the last two decades it has been observed in both developed and developing countries that the growth of the service sector becomes much higher than that of the other two sectors (primary, and secondary). Some economists argue that the output of the service sector is
overestimated and hence shows such a robust growth rate. One may also argue that this happens due to application of the same techniques for measuring both goods and services. Outputs of the Service sector have some special characteristics of its own, e.g. they are intangible and heterogeneous and thus make distinct differences from that of goods sector outputs. Among the service sectors, estimation of the health service sector output is more critical as, in addition to intangibility and heterogeneity characteristics, risk and uncertainty factors are also associated with it. However, Health is the prime source of generating human capital. As a result a different estimation technique is necessary for proper estimation of the quality adjusted output of the service sector, especially for the health care service. The present study evaluates and critically examines the existing methods of output estimation of the health care services, especially in India, and tries to suggest possible alternatives which will be internationally comparable.

I. Introduction

The terms ‘National Income’ (NI) or ‘Gross Domestic Product’ (GDP) have become a common both to economists and others to indicate the economic performance of a country when occasion demands. The terms simply indicate the aggregate incomes of all the individuals in an economy or the money-value of the total products derived directly from the production of goods and services within the geographical boundaries of the national economy in a given time period (usually one year) without duplication. Although it cannot provide information on how development is distributed among the population and thus fails to reflect the inequality and derivational aspects of development, yet it established itself as a prominent indicator to give a bird’s eye view
of a country’s economic development and thus continues to be in use. For the proper understanding of the needs and setting the priorities of development plans, an economy is divided into three sectors- primary sector, secondary sector and tertiary sector (called service sector).

All these sectors are complementary to one another and make up composite national economic activities. GDP is the aggregated output produced in these three sectors expressed in monetary terms. Generally, the outputs produced in primary and secondary sectors are physical goods and tertiary sector (or service sector) produces services. The total output of an economy (GDP) therefore constitutes both goods and services produced in different sectors of the economy. The characteristics of goods and services are different both in terms of output and mode of consumption. This implies that the measurement technique for estimating outputs of goods and services cannot be the same or identical. On the other hand, services are also of different kinds within the service sector itself and for that measurement procedures are also likely to be different for estimating output of some services. But in India, to measure the GDP some sectors follow the production approach to measure their output while output of some others’ is estimated through the income approach irrespective of the nature and characteristics of the output. This is observed during the past two decades in which the service sector has emerged as the largest and fastest-growing sector in a global economy, providing more than 60 per cent of global output, and, in many countries, an even larger share of employment. In India, it accounts for more than 50 percent of the GDP (R.Banga, 2005). Some economists (Nagaraj, 2009) argued that the output of services is over estimated due to inadequate availability of reliable data and use of faulty methodology.
Measurement of services is, in general, difficult due to its complex domain and varied characteristics (Sherwood, 1994). Problems like, quantification, identification, intangibility, asymmetric information etc. comes in the way of estimation. Both goods and services are assessed by their qualitative and quantitative dimensions. There are techniques available for assessing quality of goods but there is no such technique available to assess the quality of services. This paper deals with the existing process of estimating health care service in India and tries to identify its limitations and suggest possible alternative suggestions to improve measuring techniques.

II. Some basic concepts of health and health (or medical) related issues

a. Health

The widely accepted definition of health is given by WHO (1948) in the preamble to its constitution, which is as follows: “Health is a state of complete physical, mental and social wellbeing and not merely an absence of disease or infirmity”. But in 1978 (Health for All, Sr. No.2) this statement was amplified by WHO to include the ability to lead a “socially and economically productive life”. The WHO definition of health has been criticized by arguing that health cannot be a ‘state’ condition and it must be seen as a process of continuous adjustment to the changing demands of living and of the changing meaning we give to life. It is therefore a dynamic concept. It helps people live well, work well and enjoy themselves. The WHO definition of health is therefore considered by many as an idealistic goal rather than a realistic proposition. It refers to a situation that may exist in some individuals but not in everyone all the time; it is not observed in groups of human beings and in communities (WHO, 1981, Tech. Rep. Ser. No. 667). Some consider it irrelevant to everyday
demands, as nobody qualifies as healthy with respect to perfect biological, psychological and social functioning. This means, if we accept WHO definition then we are all sick. However, the concept of health as defined by WHO is broad and positive in its implications.

The WHO definition is multidimensional which envisages three specific dimensions - physical, mental and social. Physical dimension implies the notion of perfect functioning of the body. Mental health is a state of balance between the individual and the surrounding world. Social dimension has been defined as the “quantity and quality of an individual’s interpersonal ties and the extent of improvement with the community”. Actually, it sets out the standard of ‘positive’ health, it symbolizes the aspiration of people and represents an overall objective / goal towards which nations are striving. While, the common saying is that ‘prevention is better than cure’, one cannot deny the fact that all dimensions of health (physical, mental and social) need care to carry out their respective functions perfectly. Health care consists of prevention of diseases, treatment and management of illness and the through services by the medical, preservation of mental and physical wellbeing nursing and other allied health related activities. According to WHO, health care embraces all goods and services designed to promote health, including preventive, curative, and palliative intervention whether directed at individual or to populations.
b. Characteristics of Health Care (or medical) service

Health care services have some unique characteristics which are distinctly different from other services. Some of the characteristics of Health Care service are given below:

1) Other than preventive care, the demand for health care services arises when normal functioning of a human organism fails due to the presence of diseases. This kind of unpredictability of demand cannot be observed in other services except public welfare services like, police, national defence, and fire services. It is unpredictable when an individual will be attacked by a disease. Hence, the demand for health care service is sporadic and irregular.

2) The outcome of Health Care service is not deterministic. Risk of disability, patient’s survival treatment and health recovery remains, to a greater extent, always uncertain. Hence, consumption of this service never implies that the consumer (patient) will get desired utility or satisfaction from the service.

3) The service is guided by the objective of customer’s welfare but the customer (Patient) cannot test the product before consuming it. Here doctors or physicals act as at main intermediate agent of the service producing units. The quality of Medical product and physical’s efficiency is affected by the producer-customer relations.

4) Asymmetric information is more than that of other services because in the health service a patient is not always aware, exactly what disease affected him/her or the degree of severity he/she is facing and the kind of treatment required to cure it.
5) The market for health care service is not perfectly competitive. Here the entry to the profession is restricted by licensing. So supply is limited, and that makes the market, monopolistic in nature.

6) The price of the goods and other services are determined by the market Mechanism and/or profit maximization motive but medical-service-prices are in many cases influenced by the modalities of social welfare, as a result, extensive, price discrimination is observed in this service.

III. Measurement of health (or medical) care service output

While measuring output of the goods sector, it is not necessary to consider the qualitative aspects of the factor separately, because the price of the product is quality adjusted. But difficulty arises in measuring service output due to the intangibility and heterogeneity nature of services where it is difficult to quantify the volume of output as well as to identify their characteristics. The problem is more complicated in measuring the value of output of the health sector which is complex in nature (as output varies according to the disease groups, method of treatment etc.), and where no market mechanism holds, in many cases the services are provided at economically insignificant (subsidized) prices or free of cost by the government and/or various nonprofit institutions serving households (NPISHs).

Few countries like European Union, OECD& UK have made attempts to measure the output of health care service through a direct method (output approach). In Eurostat Handbook of Price and Volume Measure of National Accounts (2001) health output is defined as “the quantity of health care received by patients, adjusted to allow
for the qualities of service provided, for each type of health care”. Here it is stated that
the quantities should be weighted together using data on the costs or prices of the health
care provided and the quantity of health care received by patients should be measured
in terms of complete treatments.

According to Health Division of OECD (2009) Health care output is the number
of complete treatments with specified bundles of characteristics so as to capture quality
change and new products. A complete treatment refers to the pathway that an individual
takes through heterogeneous institutions in the health industry in order to receive full
and final treatment for a disease or condition. Thus, both Eurostat Handbook and
OECD have mentioned measuring health care output through complete treatment,
whereas UK gives emphasis to measuring health service output by the value weighted
method considering the marginal social valuation of two qualitative aspects (health gain
and patient’s experience) of the patients treated as weight instead of determining the
output only by applying the cost weighted method. So it would be worthy to mention
the methods of measuring health care service output in different parts of the world,
which are given below –

(a) **Methodology according to SNA (2008)**

In the System of National Accounts (SNA) a uniform method is used to
measure the value of outputs of goods and services. To compute the total production of
an economy, these two types of outputs are also treated as a uniform entity while
measuring marketed output, output used for own final use and non marketed outputs.
The value of market output is determined as the sum of the value of goods/services
sold at economically significant prices, the value of goods/services bartered, the value of goods/services used for payments in kind, the value of goods/services used as intermediate inputs, the value of changes in inventories and the margins charged on the supply of goods and services.

The outputs produced for own final uses are valued at the basic prices of similar goods or services sold in the market or by their costs of production if no suitable basic price is available. For non-market outputs that are individual or collective goods or services produced by non-profit institutions serving households (NPISHs) or by government providing free or at subsidized products to the households, would be valued by their cost of production which is the sum of intermediate consumption, compensation of employees, consumption of fixed capital and other taxes and less subsidies on production.

It is mentioned in SNA 2008 that there are three possible methods of compiling volume estimates of the output of non-market goods and services. The first one is to derive a pseudo output price index. The second approach is the ‘output volume method’, recommended for individual services, in particular health and education based on the volume indicator of output which reflects the changes in both quantity and quality. The quantity indicators will be adequately quality adjusted, weighted with the average cost weight. The third one is ‘input method’ which measures changes in output by changes in the weighted sum of volume measures of all the inputs where both quantity and quality factors will be reflected.
To measure the volume of non-market individual services the services rendered to the customer should be measured and the change in volume of the output of the nonmarket unit cannot be reflected by the change in the indicators of outcome. Measuring the changes in the volume of collective services is more difficult than the measuring the change in individual services. It is mentioned that when an input measure is impossible to avoid as a proxy for an output measure, the input measure should be a comprehensive one and should not be confined to labour inputs. Thus, for measuring the GDP of health care service, the above mentioned methodologies will be followed according to the SNA (2008).

(b) Methods followed in UK for pricing the Hospital Services

In the UK, the National Health Service (NHS) output provided by the government has no market price available. The method followed by the Department of Health (DH) of government of UK up to 2004 is the cost weighted method where the volume of NHS activity is multiplied by the cost. This cost weighted method is different from the value weighted method where volume of output is multiplied by its marginal value i.e. Price. The cost weighted method will be equal to the value weighted method only when marginal value will be equal to the marginal cost. NHS cost weighted method was based on the volume of different types of NHS Procedures (the number of operations, ambulance journeys or GP appointments) and their unit costs. The form of the cost weighted output index (CWOI) is

$$\sum_{j} \frac{X_{jt+1}C_{jt}}{\sum_{j} X_{jt}C_{jt}}$$
Where $x_{jt}$ is the volume of output $j$ in period $t$, $c_{jt}$ is the unit (average) cost of output $j$.

But counting ‘episodes’ or ‘activity’ in the NHS is not an ideal way of measuring the positive gain for patients. Again, another problem exists with preventive treatments.

The public health value to the population of avoiding illness is higher than the cost of the preventive treatments. In a crude sense, NHS output would be higher if patients were not vaccinated (for example, against flu) and there were many more episodes of acute illness and hospital admission. That would be a perverse measure. The Atkinson Report (2005) made recommendations on measuring the output of public services in a way that takes account of the quality of different types of activity in proportion to their benefits to users / society rather than the cost of production. It proposed to measure quality as an aspect of health care output. It is suggested by the report of DH (2007) of UK (by the supervision of York/NIESR) to measure the quality of outputs in terms of two broad aspects of quality – health gain (which includes safety and effectiveness) and patient experience (which includes aspects of responsiveness, user focus, acceptability, access and timeliness). On the measurement of health gain it is mentioned that health gain is controlled by the factors - short term post–treatment survival rate, Quality Adjusted Life Years (QALYs) conditional on post–treatment survival, QALYs if not treated. According to the value weighted output method output should be measured in terms of the number of patients treated, weighted in proportion to the extent to which the NHS delivers characteristics of output which are valued by individuals (i.e. quality), with the weight attached to each characteristic reflecting the marginal social value of the characteristic. The value weighted output index (VWOI) is given as
Where, $x_{jt}$ is the volume of output $j$, in period $t$, $q_{kjt}$ is the amount of characteristic $k$ produced by a unit of $j$, and $kt$ is the marginal monetary value of characteristic $k$. The characteristics valued by patients are – health effects, waiting time, food, cleanliness, respect and dignity etc.

The CWOI is equivalent to the VWOI if and only if (Dawson et al., 2004)

(a) quality change is zero for all characteristics of all outputs,

(b) $C_{jt}$ is proportional to the marginal social value of output.

As data is not presently available to calculate a value weighted output index of NHS, the researchers proposed an interim approach, that the cost weighted NHS output index should be quality adjusted instead of value weighted output index.

The quality adjusted CWOI is

$$\frac{\sum_j x_{jt+1} \sum_k \pi_{kt} q_{kjt+1}}{\sum_j x_{jt} \sum_k \pi_{kt} q_{kjt}}$$

(c) **Methods followed in EU**

For measuring health care service in the national accounting framework a distinction is made between the terminologies – input (resource used, like capital, labour, intermediate goods), activity (number of procedures, days in hospital,
consultations), output (completed treatments as a bundle of activities) and outcome (change in health status attributed to health care interventions) in the Eurostat Handbook of Price and Volume Measures of National Accounts (2001). It recommended that in measuring volume, focus should be on outputs, not on the final outcomes and quality adjusted by counting activities classified by Diagnostic Related Groups (DRG). It is stated that quantities should be weighted by the costs or prices of the health care provided and the quantity of health care received by patients should be measured in terms of complete treatments. In Eurostat Handbook, the methods for measuring quality-adjusted output volume are ranked in three categories - A (preferred), B (less satisfactory but acceptable), and C (unacceptable) methods. An A method is one which satisfies the following four criteria: (I) provides complete coverage of the product, goods or service; (ii) weight outputs by the cost of production; (iii) accounts for quality changes; and (iv) maintains conceptual consistency between indicator and the national accounts concept, that is the indicator measures outputs rather than activities. If one or more of the criteria is not met, the method becomes a B method or a C method as it moves further away from an A method. The precise definition of A, B and C methods are specific to products and industries. However, the use of inputs as proxies for output volumes is consistently regarded as an unacceptable method for measuring output volumes, i.e. a C method.

(d) **Methods followed in OECD countries**

For marketed health output, the major problems and shortcomings of price measurement mentioned in the System of Health Accounts by OECD (2000) are:
a) Fragmentation of services into units of measurement that are of an input rather than an output type; such as bed days in hospitals, fees for selected procedures that constitute only part of medical treatment;

b) Use of regulated / administrated prices from fee-for-service lists for selected procedures; distorted and volatile price movements are a frequent consequence of physicians performing more procedures to achieve similar medical results in order to obtain increased income under regulated prices, resulting in underestimation of actual price increases;

c) Inadequate treatment of cost-sharing arrangements of, for example, Pharmaceuticals;

d) Relatively small baskets for coverage of core health care services;

e) Inadequate surveys for determining weighting schemes;

f) Inadequate capturing of technological and therapeutic advances and outdated baskets of services;

g) Use of crude output measures like number of visits to physicians, bed days.

According to the System of Health Accounts by OECD (2000) estimation, strategies for Non-market health output focused on the following methods:

(a) The use of input or input price indicators as proxies for output (numbers employed, hours Worked; wage indices; with/or without additional exogenous assumptions about labour productivity trends);

(b) The use of composite indexes (mix of input and output indicators);

c) The use of relevant CPI components for the deflation of non-market services.
The steps suggested by the System of Health Accounts by OECD (2000) to measure the health output are

(a) Bundles of services that together constitute the treatment of an episode of illness and which can lead to more homogenous units of output have to be considered instead of the fragmentation of services. These bundles of services are more capable of tracking actual cost per treatment which, over time, may consist of a rapidly changing mix of services due to technological advances.

(b) The cost-per-episode of illness approach has been suggested as an alternative to traditional health care price indexes.

(c) Consideration of the treatment of an episode of illness as a statistical measurement unit needs various parameters inclusion for standard classification systems and patient information systems:

1) The nature of the patient’s underlying disorder (disease or impairment);
2) The severity of cases (with/without complications);
3) The patient’s age and gender;
4) The commonly performed interventions, resources and technology used (e.g. type of surgery, physician’s consultation, obstetric procedures, laboratory, etc.).

(d) Diagnosis Related Groups (DRG) systems have been taken as the starting point for improved output indicators of non-market in-patient care in several recent pilot Implementations (Australian Bureau of Statistics, 1997). It is required to use prices for similar bundles of services on the basis of corresponding units of output and also for direct price measurement in market services.
For improving the methodological underpinnings of health care price and volume indices it is needed to consider on the production of hospitals, ambulatory care and medical goods.

Methods followed in India

In India, for National Accounting purpose the entire service sector is classified into a number of broad categories, e.g. a) trade, hotels & restaurants; b) transport, storage & communication; c) banking & insurance; d) real estate, ownership of dwellings & business services; e) public administration & defence and f) other services. Human health service is a sub-category under the ‘human health activities including veterinary activities’ which in turn is one of the twelve sub-categories under the broad category of the “other services”. Accounting procedure is used to carry out for the above, broad and sub-categories of the service sector separately for the three institutional sectors, i.e., public sector, private organized sector and private unorganized sector.

The Central Statistical Organization (CSO) follows the guidelines of the System of National Accounts (SNA) for the computation of the National Accounts Statistics (NAS) of India in order to make the estimates comparable internationally over time. At present, the concepts and methods of compilation of NAS followed in India have been mostly standardized in the tune of the systems of the SNA 1993 by CSO. Again, according to the NAS Sources and Methods, 2007, the Gross Value Added (GVA) of almost all categories of services is estimated separately for the public sector, private organized sector and private unorganized sector.
**Coverage of Health Care Service**

Health care service in India includes the economic activities mentioned in the NIC (National Industrial Classification) 2004 which is similar with the ISIC (International Standard Industrial Classification) Revision 3, under Section N and Division 85 (Health and Social Work) except the social work activities. Thus, the health care service covers –

Human Health Activities, which consists of

1) Hospital Activities (including the activities of general and specialized hospitals, Sanatoria, asylums, rehabilitation centers, dental centers and other health institutions that have accommodation facilities, including military base and prison Hospitals)

2) Medical and dental practice activities (including consultation and treatment activities of general physicians and medical specialists including dentists)

3) Other human health activities (including all activities for human health other than by hospitals and medical doctors and dentists)
Diagrammatic representation of the structural form of the Indian Health Care Service in the National Accounting Framework

Figure 3.2
Methods of estimation in Public Sector

In the public sector, health care service is provided by the government through the public authority and public enterprises free of cost or at subsidized rates and to measure the GVA of this sector, input cost approach (i.e. total cost entailed for the production) is followed. The estimates of GVA of this sector are based on the budget documents of Centre and State Governments and the annual accounts of the different public enterprises which provide health services.
Health care service provided by Public Sector& Private Sector include Primary health center (PHC) Secondary health center [PSU,(Public sector undertaking) Dist. Hospital, CHC(Community Health centers )] Tertiary health care (Medical college & hospitals) Organised & Unorganised Private hospitals charitable hospitals Nursing homes & Private Practitioner

Methods of estimation in Private organised Sector

The estimates of GVA of producers of health services in the private organized sector are based on the studies of the audited annual accounts of the Company Finances statistics, conducted by the Reserve Bank of India on sample basis. The value added at factor cost is measured as gross output minus intermediate consumption or as sum of compensation of employees and gross operating surplus. Besides this alternative method, the labour input method is followed for estimating the GVA of health services in private corporate sector.

Methods of estimation in Private unorganised Sector

The approach followed for estimating the GVA of health services provided in this Sector is the labour input method, in which gross value added per worker (GVAPW) is multiplied by the number of workers to compute the GVA. The estimates of the workforce in the unorganized sector of various services are obtained after subtracting the estimates of the workforce of the public and private corporate sector as available in the annual Employment Market General of Employment and Training Intelligence (EMI) of the Directorate (DGET) from the corresponding estimates of the entire sector obtained through the Population Census and employment and
unemployment surveys (EUSs) of the National Sample Survey Organization (NSSO). On the other hand VAPW are estimated from the enterprise survey of NSSO. The estimates of GVA are prepared separately for rural and urban areas in the base year and for the corresponding years the base year estimate is extrapolated by the annual growth rate observed in consumer expenditure on medical and health services by households.

**Method of Estimating GVA at constant prices**

To estimate the GVA at constant prices in all the three sectors the GVA at nominal prices is deflated by the consumer price index (CPI). For rural areas CPI of agricultural workers and for urban areas CPI of industrial workers is used for the deflation.

**IV. Basic drawbacks inherent in the existing methods of estimation of GDP in Health Care Service in India and some possible suggestions**

1) The existing methods i.e. input cost method, expenditure method and labour input method, which are presently used to estimate the output of health service sector, provides only approximation of the expenditure on the health service sector but not the actual health output in quality and quantitative terms. The fundamental objective of measuring output of the health care services should be to estimate the level of health recovery (or gain) of the diseased persons by curative treatment both in quantitative and qualitative terms and in reality how many people who are living at this vulnerable state are successfully guarded against attack of diseases by precautionary health care services.
2) The existing methods fail to capture the nature and quality of the services that the patients receive from the service providing units. Assured quality service should be the legitimate demand of the sick. Again, the chance of wrong estimation of GVA of the health care services by the existing methods is always there. Let us consider a situation when the value of intermediate consumption remains constant in both the public and private health care service provider units. Now, an increase in cost of the production of the service due to increase in the prices of factors or by increasing the amount of inputs engaged in that service. (hike in wages, increasing employee number etc.). This increase in cost implies that the GVA for that service has increased (as GVA is estimated by the input cost method) which in turn implies an increase in output of health services, but in reality no change has occurred in terms of service provided. Thus, one of the important drawbacks of the existing method is that it fails to reflect the change in the performance of health service due to the change in input cost entailed for the service. Therefore, estimation of health care output should be imbibe some performance indicators of service provided, which in turn would give us a better estimate of GVA of health care service.

3) The non-market output provided free of charge or at economically insignificant prices to the individuals and community by the government are estimated through the input cost approach i.e. total cost incurred for the production of service output (including intermediate consumption, compensation of employees, consumption of fixed capital and other taxes less subsidies on production) (SNA, 2008). Thus, GVA of health sector will consider only those input costs which are involved in the production of health services provided to
individuals and the community. In India, for the health care service, the GVA of the public sector is estimated through budget documents, which includes expenditure on medical care and allied activities - the expenditure on preventive, curative and clinical/hospital services; medical education, training and research; rehabilitation; and construction. But, medical education, training and research; rehabilitation; construction and allied activities do not bear any economic justification for the inclusion as input costs of given medical service of such service providers, which leads to an over estimation of GVA of health care services.

4) While calculating the gross value added per worker (GVAPW) from the enterprise survey, equal weight is given to different type of workers (not according to the work classification) involved in the same service providing unit. This is over simplification and a biased estimation of GVA. This implies that the services of specialist doctors and the supporting staffs engaged in the health service provider units are of equal status. In order to make a reliable estimate of GVA it is necessary to consider different age weight according to the different working class in a service providing unit. One may calculate different weights for different categories of workers engaged in health service provider units according to the remuneration for their services.

5) GVA of the health service sector in private organized sector is obtained from RBI’s Company Finance Statistics where sampling procedure is followed. But, the sample size is very small (the sampling fraction is about one percent) and sometimes random sampling technique also cannot be applied. As a result, how
far the estimated GVA of health service activities of that sector is reliable remains questionable.

V. Concluding Remarks

Health service sector which falls under Medical care services is a crucial element of social welfare. In developed countries a significant portion of their GDP is being spent on health care services. But the basic question i.e. what one obtains for this expenditure, remains unanswered because the answer requires measuring the output of the health service sector. Hence, measuring the output of the health care services has become a long standing policy concern of both developed and developing countries. Generally, national income accounts divide nominal spending growth into changes in prices and changes in quantities. But neither prices nor quantities can be estimated without an accurate measure of the output of health care service sector. At the conceptual level, health care output is clear, i.e. health gain. But in practice, measuring health status is difficult and attributing changes in health status to health care services is even more challenging. Thus, productivity estimation for health care service sector has been tentative.

Measurement of health services output in India relies largely on the use of volume of inputs as a proxy for volume of outputs and so it fails to reflect the change in productivity and that implies zero productivity. But the developed countries like UK, Canada, and EU are now adopting the output approach in their national accounting system. One can therefore argue that the existing method of national accounting in India will not be internationally comparable.
The methods followed by the European countries (Euro-stat Handbook, 2001) have some limitations (CSLS research report, 2007), e.g.

(i) It considers output to be measured as a whole course of treatment rather than a measure of activities which requires the identification of activities delivered to a patient with a particular condition. One major problem of following this method is that when various institutions are needed to be involved in a single treatment, that will create the problem of co-ordination of activities of different institutions;

(ii) It recommends to weight the outputs by cost of production, which may or may not equal the marginal valuation of output; and

(iii) For making quality adjustments, it is assumed that higher cost treatments indicate higher quality and it focuses mainly on measuring quality adjusted life expectancy. Again, like Euro-stat Handbook, 2001, the System of Health Accounts by OECD (2000) also recommended the method of measuring the volume of output by complete treatments.

In principle, there are some difficulties to implement complete treatment in the national accounts, e.g.

(i) Complete treatment would entail collecting data on outputs from a number of health care providers and aggregating them in a meaningful way. Assembling the data required for aggregating health volume output by disease approach is very challenging;
(ii) In the SNA, total output of an industry is based on summing up outputs of various service providers (establishments), and therefore the principle of a complete treatment is directly applicable only if the service provider is the same during the whole treatment. There is no easy way to allocate the overall service to the different participating units;

(iii) Most data retrieval systems do not have the capacity to link the treatment of an individual across institutions to enable measurement of the complete treatment;

(iv) The beginning and end point of a treatment pathway is observable in the case of acute health conditions but unclear for chronic health problems or for medical conditions that give rise to long-term care and services provided in nursing homes.

The methods followed to measure the output of health care service in UK are also not applicable in India due to

(i) In UK, health care is completely in the domain of public service whereas in India it is a combination of both public (20%) and private (80%) services;

(ii) In India the private health care market is monopolistic in nature and prices of the private health care service are influenced by the three factors – experience of the treating physician, technology and location; and

(iii) To apply output approach in India necessitates a type of data not available at present.

Irrespective of differences in perceptions, health remains to be the key factor for human capital formation. Quantifying the output of health services in terms of health
gain remains a major challenge in all countries of the world. It is to be borne in mind while dealing with health service activities that the patient should be the centre of attention. In India, fair and effective polices are needed to enforce both curative and precautionary health services and continuous monitoring is deemed necessary for effective implementation. Special efforts are necessary for generating reliable data on treatment specific health recovery, patient’s satisfaction etc. which are directly related to the estimation of health care service output for proper evaluation of the performance of health service sector. This can be treated as a crucial task for the human capital formation as well as human development.