Exposure Draft

Technical Guide on Cost Management in Healthcare Services

Cost Accounting Standards Board

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Chapter-1

Introduction

Cost management in healthcare involves more than reducing costs. Healthcare organizations must balance expenditures with their top priority, that is, patient health. Healthcare organizations that carefully and strategically reduce spending can avoid negatively impacting their ability to deliver an excellent patient experience. Participants in the health care system do not even agree on what they mean by costs. When government and policy makers talk about cost reduction and reducing the cost, they are typically referring to how much the government or insurers pay to service-providers, not to the costs incurred by providers to deliver health care services. Most healthcare organisations continue to struggle with identifying the costs of products and services provided by them, capturing the full cost of products and services including inter-entity and department costs as part of full costs.

The difficulties are further exacerbated in allocation and absorption of costs due to the integration of various inter-related processes and inter-dependence of the processes flowing from various service cost centres at the same time. The hospital usually feels difficulties to allocate the cost of stand-by facilities such as generators and their maintenance, back-up operation theatres and extra trained staff. They charge all these different costs to each patient which results in overloading of the price per patient. Deployment of poor costing system have adverse influence not just on healthcare pricing but on the provider's own sustainability and quality of services rendered.

It is a well-known management axiom that what is not measured, cannot be managed or improved. This holds true to a certain extent that without a correct understanding of cost, it is difficult to establish sound pricing system as the service-providers are unable to link cost to process improvements or outcomes, thereby preventing them from making systemic and sustainable cost reductions and related services. Hence, it becomes imperative to develop sound cost management strategies and techniques so as to achieve the true objective of making quality healthcare affordable and accessible to all.

This revised technical guide is a step towards better understanding of the healthcare practices and different facets of the care delivery process. Compared to erstwhile note that came in 2015, this new version takes into account the importance of healthcare pricing, its determination by healthcare industry, the role of robust costing methodologies that have a bearing upon better price discovery for medical procedures and practices and the best practices that global healthcare players use while fixing the pricing of healthcare products. This includes those of DRG-based costing practices in Poland or PLICS system in UK.

Attempt has also been made to cover the contemporary aspects of healthcare services such as competitive strategies that hospitals can exploit, capacity measurement of factors (beds/wards, medical equipment) deployed within healthcare facility, mechanism behind allocation of different costs to underlying cost centres and costing templates that can be used by the industry for better price determination. It is expected that this revised guidance note will be of immense value for different stakeholders who are working towards application of costing tools in the healthcare industry. Efficient healthcare costing can be a useful tool for hospital managers to:

- Estimate the reasonable cost of health care resources used in patient care,
- Performance measurement of all the cost and revenue drivers,
- Lower health care cost without compromising on quality of services rendered or extended,
- Define the health care delivery value chain,
- Determine the fees or tariffs for goods and services,
- Estimate the capacity of available resources and comparison with actual utilization,
- Authorise, modify or discontinue a programme or activity and
- Manage materials and its storage and other associated costs in terms of consumables, drugs etc.

Costing data: Government Perspective

Availability of accurate and timely costing data from the hospitals can prove to be a big help for government functionaries. Since government is the regulator and provider of essential and affordable healthcare services to the masses, it is necessary that proper mechanisms are devised so as to extract necessary costing information from the hospitals. Further, calls for hospitals to be more transparent in their pricing have increased in recent times. **Healthcare margins are razor-thin, thus, requiring service providers to acknowledge the crucial role costing data plays in various aspects of financial analysis and decision-making**. Costing data is instrumental in generating profitability analysis, service line profit and loss accounting and risk payment model analysis. Cost data in healthcare is important because it can help the government in multiple ways like:

- Cost data can help in setting fair reimbursement rates for healthcare services.
- Costing data can help government to allocate resources efficiently.
- It can help in identifying areas for improvement.
- Cost data can help in enhancing transparency of healthcare services towards patients.
- Cost data can help in informed policy decisions about public and private budgets, insurance benefits and reimbursement rates such as those under PM-JAY.

Stakeholders for this guidance note

This updated guidance note is prepared considering the day-to-day requirements of cost management for hospital managers as well as those who wish to deploy strategic management in their hospitals and make policy frameworks more practical and contemporary in hospitals functioning at the national, state, regional or district level. The objective of this revised guidance note is to enable users such as doctors, entrepreneurs, finance executives and cost and management professionals to understand the entire process of cost management with special reference to healthcare and to service the users of such healthcare practices. Several stakeholders in the healthcare sector will benefit from this document as it addresses key areas that impact financial sustainability, operational efficiency and the quality-of-care delivery. Below is a list of stakeholders who will find value in the document:

- **Healthcare administrators and executives-** Hospital CEOs, CFOs and other senior management teams will gain insights into cost-saving strategies and performance optimization practices that can help them streamline operations, allocate resources more efficiently and make informed financial decisions. The document offers actionable steps for balancing financial pressures while maintaining high standards of patient care.
- **Financial managers and cost controllers-** Financial professionals in healthcare organizations including financial analysts and budget managers will benefit from the document's focus on cost containment strategies, revenue cycle management and financial planning. It will help them identify key areas to reduce unnecessary spending and improve cash flow management.
- **Healthcare service providers (doctors, clinicians)-** can benefit by understanding how cost management initiatives can be aligned with clinical practices. For instance, improving efficiency in patient care delivery and adopting cost-effective technologies can help clinicians deliver higher-quality care without compromising patient outcomes.
- **IT and technology specialists-** Healthcare IT teams will find the document valuable as it highlights the role of technology in driving cost management. With an emphasis on electronic health records (EHRs), telemedicine, AI and data analytics, IT professionals can leverage these tools to improve operational efficiency, reduce administrative costs and enhance decision-making.
- **Policy makers and government agencies-** Policymakers including regulators and government officials will gain insight into the economic pressures faced by healthcare systems and how cost management practices align with public health goals. This can inform the development of policies related to reimbursement, value-based care and healthcare spending.

- **Patients and patient advocacy groups-** While patients may not be directly involved in cost management, they will indirectly benefit from cost containment measures that lead to improved care quality, better access to services and potentially lower healthcare costs. Patient advocacy groups can also use the document to advocate for cost-effective, high-quality healthcare solutions.
- **Insurance companies and payers-** Insurance providers and payers will benefit from an improved understanding of cost management practices that help healthcare providers optimize billing and reimbursement processes. Efficient cost management within healthcare organizations can lead to better negotiated rates, more accurate claims processing and reduced waste in the system.
- **Academic researchers and healthcare consultants-** Academics and consultants specializing in healthcare management will find the document useful as a source of research and case studies on effective cost management techniques. It can support their work in advising healthcare organizations, conducting studies and developing new models for cost-effective healthcare delivery.

By addressing the needs and interests of these stakeholders, the document provides a broad, multi-faceted approach to cost management, ensuring that all parties involved in healthcare delivery are equipped with the knowledge to contribute to a more sustainable and efficient healthcare system.

Chapter-2

Overview of Global Healthcare Sector

The founding charter of the World Health Organization (WHO) acknowledged that health is a condition of total physical, mental and social well-being rather than merely the absence of sickness. This definition also encompasses the concept of spirituality which integrates all dimensions of health namely, physical, emotional, mental and social. The term "spiritual health" tends to create meaning in life, cultivates altruism and ethics and is based upon the individual beliefs that help us to survive and live happily. It acts as a glue that brings all the pieces of life together.

The global health care industry is still dealing with fundamental changes, problems and unparalleled transformation post Covid-19 pandemic. Providers worldwide continue to confront the lingering effects of the COVID-19 pandemic, which has led to widespread labour shortages and rising costs of quality care. Health disparities continue to exist, which may increase the difficulties and expenses in the years to come. According to a Deloitte's Global Health Care Sector Outlook research, if health disparities are not addressed, their costs might triple to USD 1 trillion by 2040 or around USD 3,000 annually per person.

However, the industry is also benefitting from the wider use of technologies like artificial intelligence (AI) which can tackle some of these enduring problems. The integration of AI and Machine Learning (ML) technologies can play a key role in addressing these inequities. Few years from now, AI is expected to play a pivotal role in streamlining administration, diagnosis, treatment and patient care. From predictive analytics to automating electronic health records, AI can further enhance the precision and efficiency of health care delivery.

In order to ensure responsible resource usage and lessen their carbon footprint, healthcare institutions are also implementing sustainable practices. From green hospital designs to sustainable supply chain management. modern standards worldwide emphasize the influence of sustainability on health care operations and the potential cost savings that may be realized for both the supply and demand sides of the sector. The use of remote technologies and telemedicine adopted during the pandemic are helping to define not just the delivery of care but also the nature of it.

As health care costs continue to escalate globally, the ***affordability*** of care remains a critical concern not just domestically but globally. Cost-cutting efforts are being taken by governments, payers and providers while preserving the standard and accessibility of healthcare. Simultaneously, the health care workforce is changing dramatically due to shifting care delivery methods, demographic shifts, patient needs and technology breakthroughs.

Providers worldwide face deep shortages of clinicians and are taking innovative approaches to increase compensation, reduce stress and foster trust in the healthcare

workplace. Telehealth, remote monitoring and the gig economy are all changing the dynamics of the health care workforce as providers strive to draw in, develop and keep a talented and more flexible worker pool. The NHS in the UK has started a system-wide savings and efficiency campaign that includes cutting expenses in agency nursing shifts, centralizing procurement and back-office operations and utilizing technology more aggressively.

From this discussion, it can be argued that the global health care sector stands at a crossroads in 2025, poised for profound changes. The future of global health care is likely to be shaped by innovation, sustainability, social care integration, cost management and workforce adaptation. In 2025, several key trends are poised to shape the future of health care delivery. How can sector leaders and stakeholders prepare themselves for this profound change? is the question that demands careful deliberation and analysis.

2.1 Addressing costs and affordability

While higher costs reduce affordability of care, affordability can also reflect the level of investment in health and health systems. As public debt has increased, hitting a record USD 92 trillion in 2022, developing nations are progressively paying more on their interest obligations than on education and health care. About 3.3 billion people or nearly half of the world's population, currently reside in nations where debt servicing has trumped investments in health care and the number of nations with high debt levels increased from 22 in 2011 to 59 in 2022. This is true for a few developing countries in Asia, Latin America and Africa (but not China).

As few as one in seven people in several low-income nations received complete doses of the COVID-19 vaccine. In high-income countries, that is comparable to roughly three out of four. International organizations such as Google are increasing their efforts to increase access to medical supplies and treatments in impoverished nations. For instance, Viebeg Technologies, a health technology company, is collaborating with the Asian Development Bank (ADB) through the Rwanda Innovation Fund to increase access to reasonably priced healthcare in Central and East Africa. Through the use of AI, the program enables healthcare facilities to manage inventory control, shipping, warehousing, and distribution of medical goods. Using the platform, health care providers can connect directly with manufacturers, eliminating brokers and middlemen and generating savings of as much as 40 percent for customers.

The consequences of the COVID-19 pandemic led to higher expenses in sectors like staffing. As the cost of medications, consumables and other commodities rises due to inflation, nations are facing increased expenses. Since 2020, the average cost of health care per person has increased for the majority of nations. The US had the highest health expenditure per capita, rising 6 percent to more than USD 12,500 in 2022, equivalent to 17 percent of the country’s GDP. Compared to other nations such as Belgium, Denmark or Finland which spend roughly 2% of their GDP on health care, the US spends a

disproportionately higher percentage of its GDP on medical care expenses. By 2027, health care expenses in the US are predicted to increase by an additional 36%, reaching $17,000 per person. While countries such as Italy and Egypt saw per-capita costs fall as the pandemic subsides, their health expenditures resumed an upward trajectory beginning this year. This is evident from Figure 2.1 given below:

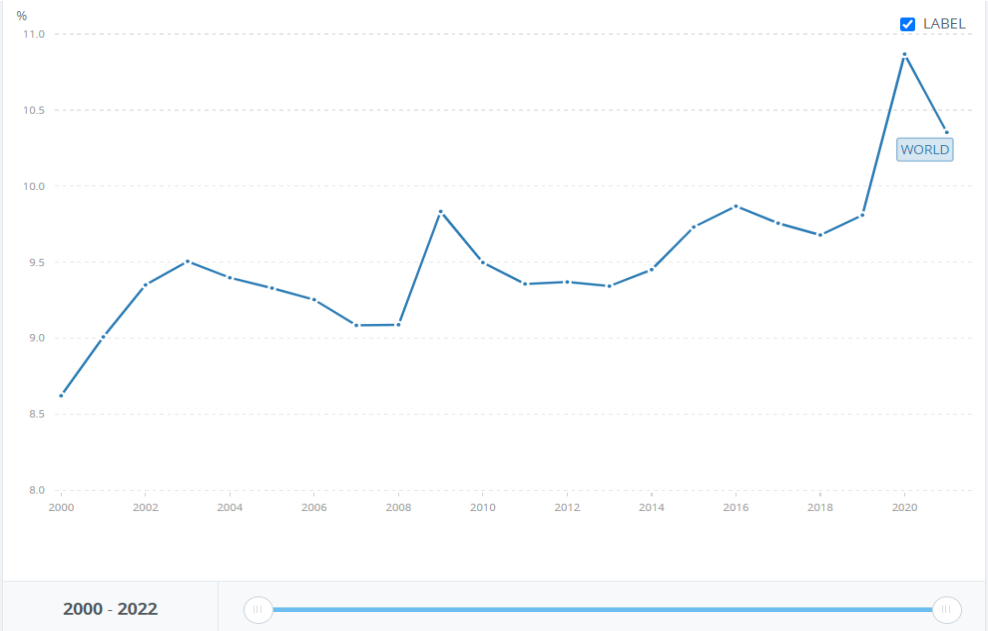

Figure 2.1 Global healthcare expenditure (World Bank, 2024).

A nation's overall health can be gauged by its infant mortality rate. According to the figures, infant mortality falls by 0.2 to 1.5 percent for every 1 percent rise in health spending. For instance, South Africa has an infant mortality rate of 24 per 1000 births and spends USD 524 per capita on health care. Japan, on the other hand, has 1.9 infant deaths per 1000 births and USD 3,951 in health expenditures per capita. With infant mortality at 5.1 deaths per 1000 births and health spending of almost USD 12,500 per capita, the US is the exception.

2.2 What factors are driving the healthcare costs?

2.2.1 Reliance on contract staffing companies, which frequently boost prices in response to rising demand and worker shortages, are contributing factors to the ***rising health labour/staff expenses*** in certain industrialized nations including the US, Canada and the UK. This is particularly the case with US which relies on private healthcare providers.

- According to a **US** hospital association, the accompanying labour expenses are the primary source of the 22.5 percent increase in hospital costs per patient in the US. During the pandemic, almost 5 million medical professionals in the US quit their employment, which led to a scarcity of personnel in the industry and increased the strain on those who stayed.

- The ***increased demand*** has led to higher costs as providers compete for a smaller number of qualified professionals. Skilled nursing facilities offer an example of how this affects the cost of care. Full-time employees in skilled nursing facilities decreased by 18 percent but labour costs still increased 30.8 percent.
- **Canada**, for example, saw physician spending rise by almost 11 percent and 6.5 percent in 2021 and 2022 respectively. Physician costs are now the second-largest portion of all health spending in Canada. Among the nurses who faced ***burnout*** and left Canada's health care sector in large numbers, many are coming back through private firms. This is costing the public system millions of dollars annually.
- In the UK, health care staff costs were £66.2 billion or 45.2 percent of the total National Health Service (NHS) budget. Since 2019, NHS has increased its reliance on ***staffing companies***, which have seen their earnings increase tenfold. Medacs Healthcare, a leading health care staffing agency, recorded an 80 percent increase in sales to £160.9 million between 2019 and 2021.
- **Pay increases for clinicians** has not kept up with inflation and productivity remains below pre-pandemic levels.

2.2.2 While higher labour costs are a major factor in rising health care costs, widespread ***inflation*** has also played a role.

- Health care costs in the US were exacerbated by the highest inflation in 40 years. The question of how many consumers will now be able to afford health care is raised by the fact that health insurance premiums increased by 28% in 2022 compared to the previous year, more than tripling the rate of inflation at the time. According to a 2022 survey, 72 million US individuals or 28% of consumers, feel less equipped to cover unforeseen medical expenses than they were the year before.
- **Europe** has traditionally seen smaller increases in healthcare costs but it is not immune to the global trends. The cost of care across the continent rose to 8.6 percent in 2023 compared with 5.6 percent in 2021.
- In **Latin America**, inflation contributed to an estimated 18.9 percent increase in 2023 while health care costs rose 11.5 percent in the **Middle East** and **Africa** and 10.2 percent in **Asia**.

2.2.3 **Intermediaries** including insurers, medicine distributors and pharmacy managers also have an impact on healthcare expenses. Compared to 25% in 2013, the total revenue from the nine largest intermediaries contributed for about 45% of US health care spending in 2022. Furthermore, government restrictions on the amount of money insurers can make from premiums have prompted them to purchase health care providers in areas where these restrictions are not applicable.

2.2.4 The cost of ***maintaining*** care facilities is a major driver of rising health costs.

2.2.5 The need for long-term care is rising due to an ***aging population*** and because the younger generation and the government must share the expense, healthcare costs are rising. With an average life expectancy of almost 80 years, Belgium, Denmark, the Netherlands and other European nations are facing an increasing demand for long-term care to treat chronic illnesses. They are one of the few nations in the OECD that spend roughly 2% of their GDP on long-term care. Countries are implementing various funding mechanisms to meet these one-sided expenditures as long-term care prices rise. Whereas the UK, Canada and Australia employ a means-tested system, Germany and Japan use social insurance to pay for long-term care. France employs a hybrid approach that combines income-adjusted universal coverage and private insurance. The US relies on a combination of public and private funding including out-of-pocket expenses paid by the patient.

1. **Healthcare system in Australia**

All Australians have access to high-quality, secure and reasonably priced healthcare thanks to one of the greatest health systems in the world. Even when compared to other affluent nations, Australia boasts some of the finest health outcomes in the world, with low infant mortality rates and high life expectancy. Approximately 10 percent of Australia's GDP or $241 billion, was spent on health care in the fiscal year 2022. ***Medicare***, Australia's universal public health insurance and the ***Pharmaceutical Benefits Scheme*** (PBS) which lowers the cost of necessary medications, are also included in the country's health spending. All tiers of Australian government, that is, federal, state, territory and local jointly manage this sector. Medicare and/or the public hospital system provide free or low-cost access for all Australians for most of the healthcare services. Private health insurance gives choice outside the public system. It is a key reason why Australians enjoy one of the longest life expectancies in the world.

Medicare Scheme (1984)

Since 1984, Medicare has served as Australia's universal health care program. Medical services, public hospitals and medications make up its three main components. Citizens of Australia and New Zealand, permanent residents of Australia and those from nations with reciprocal arrangements are all eligible for this. All medical services that are subsidized by the federal government are listed in the Medicare Benefits Schedule (MBS). The list is kept up-to-date, secure and in accordance with best practices by a group of medical specialists. There is a safety net at the MBS. It can assist by ensuring that, after a specific level of out-of-pocket expenses is reached, you pay less for services.

PBS, which significantly lowers the cost of several prescription drugs, is another significant component of Medicare. The cost of medications would increase in the absence of the PBS. They would cost tens of thousands of dollars more in some situations. Brand-name, generic, biologic and biosimilar medications are listed by the PBS. The PBS offers more than 5,200 products. Before being offered for sale in Australia,

every product is proven to be both safe and effective. On what is to be included to the PBS, independent medical experts offer their opinions. If enrolled in Medicare, a patient only has to pay a portion of the cost of the majority of PBS medications. The remainder is covered by the Australian Government.

Australian health system challenges include:

- an ageing population and increasing demand on health services
- increasing rates of chronic diseases and other health issues
- inequity in accessing healthcare services
- long waiting times
- costs of medical research and innovations
- making the best use of emerging health technologies
- making better use of health data
- rising costs of healthcare services

Australia's health system is complex and so are its funding arrangements. It is funded by all levels of government, non-government organisations, private health insurers and individuals when they pay out-of-pocket costs for products and services that aren't fully subsidised or reimbursed. Health spending is about 10.54 percent of GDP meaning $1 in every $10 spent in Australia went to health. The Australian Government usually funds most of the spending for medical services and subsidised medicines including health research.

2. Healthcare system in USA

The United States continues to spend significantly more on health care than other high-income nations, both per capita and as a percentage of GDP. These expenses are funded by a complex combination of private insurance, individual contributions, and public payers (federal, state, and municipal governments). However, the only nation without universal health coverage is the United States. Employers in the US are largely responsible for voluntarily offering their workers and dependents health insurance coverage. Only the aged, the disabled, and some of the poorest people are eligible for government assistance. The following points needs special attention:

- The US government does not provide health benefits to citizens or visitors. Any time you get medical care, someone has to pay for it.
- Healthcare is very expensive- If you break your leg, you could end up with a bill for $7,500. If you need to stay in the hospital for three days, it would probably cost about $30,000.
- You will get most of your care from your Primary Care Provider (PCP)- After you buy health insurance, you can choose a PCP who is part of your insurance company's network. Your PCP could be a nurse practitioner or a physician.

Some people have both public and private insurance while others have neither. According to recent Deloitte US research, the United States loses over USD 320 billion a

year as a result of health care disparities. By 2040, the sum might rise to USD 1 trillion or more if these gaps are not filled. However, those without health insurance do not completely lack access to medical care. Many of these uninsured people receive health care services through public clinics and hospitals, state and local health programs or private providers who finance the care through charity and by shifting costs to other payers, even though they receive fewer and less coordinated services than those with insurance.

Medicaid, the Children's Health Insurance Program (CHIP), Medicare and military coverage are examples of public programs in the United States. Depending on community resources and desires, hospitals may open or close. Additionally, doctors are allowed to open their offices wherever they like. The United States' health reform movement in recent years has concentrated on expanding financial access to healthcare and reducing the country's sharply rising health care expenses. 74 percent of Americans have private health insurance. Individuals under 65 and their dependents either directly acquire non-group health insurance (13 percent of the population) or obtain private health insurance through their jobs (61 percent of the population). A small proportion of the population, 13 percent, has multiple health insurance coverage (both private and public health insurance) and 14 percent have no insurance.

Despite being optional, employer-sponsored health insurance is promoted by tax law. The share of health benefits in total pay increased from 2.4% in 1970 to 5.8% in 1989, and from 23% of total benefits in 1970 to 36% in 1989. Employers are exempt from both the Social Security and personal income taxes when they provide health benefits as part of their salaries. In 1990, federal revenues would have grown by an estimated $56 billion if such wages had been subject to income tax. Additionally, people may be eligible to deduct out-of-pocket medical expenses from their federal income taxes if their medical costs exceed 7.5 percent of their taxable income.

For the elderly and disabled, Medicare is a standardized national health insurance program. It is the nation's largest health insurance program, administered by the federal government and covers roughly 13 percent of the population including nearly all those over the age of 65 or 31 million people and some people with disabilities including 3 million people. Payroll taxes, other federal resources and premiums are used to fund the program. However, because costs are rising more quickly than income, this financing strategy is not actuarially sound. Each beneficiary will be supported by fewer workers as the population ages. In 1960, each recipient had five workers; by 2000, that number had increased to three and by 2040, it would reach 1.9.

3. Healthcare system in UK

All 58 million permanent inhabitants of the United Kingdom are covered by public healthcare. General taxes are used to fund healthcare coverage which is provided free of charge when needed. Approximately 4.5 percent of the average citizen's income or 18 percent of their income tax, is allocated to healthcare. The total amount spent on

healthcare in the UK is approximately 8.4% of GDP. The private healthcare industry in the UK is expanding, although it is still far smaller than the public sector. Usually, the client pays for this directly or as part of an employer-sponsored healthcare plan.

The National Health Service (NHS), established in 1946, is a government-sponsored universal healthcare program in the United Kingdom. This NHS is made up of several publicly financed healthcare systems like Health and Social Care in Northern Ireland, NHS Scotland, NHS Wales and NHS England. Under this system, citizens are entitled to healthcare, but they also have the choice to purchase private health insurance as well. More hospitals and beds, more physicians and nurses, far lower appointment wait times, better care for elderly patients, greater power and information for patients and stricter guidelines for NHS organizations are all part of the NHS Plan.

Only a very small portion of health insurance products are supplied by commercial insurance companies; the majority are distributed by the NHS. 85 percent of UK healthcare spending is funded by the government, according to WHO. The private sector covers the remaining 15%. Although the majority of the population's healthcare is provided by the NHS, which is entirely tax-funded, numerous well-known commercial health insurance providers still offer coverage to UK citizens like:

- **BUPA**- The single largest British health insurance company in UK. It is a private healthcare company, making it an alternative to the tax-funded coverage provided to all residents by the NHS. It provides extensive coverage and is affiliated with more than 400 accredited hospitals.
- **AVIVA**: The sixth largest insurance company in the world, with over 53 million customers in 28 countries. AVIVA is based in Great Britain.

One of the main priorities of the NHS is care quality. The Department of Health or its regional organizations which are made up of 10 Strategic Health Authorities, regularly examine the quality of care provided. The Quality and Outcome Framework, which is used in the UK, evaluates the standard of care provided by general practitioners. Practices are given points based on how well they are organized, how patients perceive their surgical experiences and how well they treat common chronic diseases like diabetes and asthma. This framework offers incentives for improving quality. GPs are then paid fees based on their earned points. Participation is voluntary but most GPs opt in due to the opportunity for increased income.

4. Healthcare system in Netherlands

The philosophy underpinning the Dutch health care system is based on several more or less universal principles like access to care for all, solidarity through medical insurance (which is compulsory for all and available to all) and high-quality health care services. The Dutch health care system is governed by 4 basic healthcare-related acts:

- Health Insurance Act (Zorgverzekeringswet)
- Long-Term Care Act (Wet langdurige zorg)

- Social Support Act (Wet maatschappelijke ondersteuning)
- Youth Act (Jeugdwet)

The 4 healthcare-related acts form the foundation of the Dutch healthcare system. The Health Insurance Act (which provides for hospital care) and the Long-Term Care Act (which focuses on other types of care) account for the bulk of the healthcare budget available in the country. The Social Support Act and the Youth Act provide for other forms of care and support. The roughly 400 municipalities in the Netherlands are primarily responsible for enforcing these 2 acts.

The best way to understand the Dutch healthcare system today is to examine some recent developments. The new Health Insurance Act went into effect in 2006, granting all Dutch citizens the right to a basic and comprehensive health insurance plan. Healthcare providers and private, competing health insurers carry out this act. It should be mentioned that almost majority of the Netherlands' health insurance providers are cooperatives that operate for free. Any profits they make are either reinvested in the reserves they must maintain or given back in the form of reduced premiums. More recently, in 2015, the additional three acts were introduced. Opportunities to enhance the quality of treatment given, encourage an integrated approach, and maintain access to affordable healthcare in an aging society with a high prevalence of chronic illnesses are the driving forces behind these legislations.

5. Healthcare system in Singapore

Because of its outstanding results, Singapore's healthcare system is often regarded as one of the best in the world and is respected by many other countries. For Singaporean citizens and permanent residents (PRs), primary care at government hospitals is significantly subsidized and occasionally even provided for free. In Singapore, the government regulates both public and private healthcare. Singaporeans have access to universal healthcare, which means that the government pays for both the public health system and required health insurance. Only over one-fourth of Singapore's total medical expenses are covered by taxes, which are used to sustain the country's public healthcare system. The remainder is covered by required life insurance plans that are paid for by both individuals and their employers. The foundation of the public health insurance system in Lion City is comprised of Medishield, Medisave and Medifund.

- **Medishield**- For big expenses, Singaporeans can access their Medishield Life, a basic health insurance scheme that all permanent residents and citizens can use to pay for large bills as well as costly outpatient treatments like kidney dialysis.
- **Medisave-** This is a mandatory savings plan that consumes between 10 percent of an employee's monthly salary. Singaporeans can use their Medisave accounts to pay for some types of routine care and those of their immediate family members.

The foundation of Singapore's health insurance program is Medishield and Medisave. Singaporeans are unable to stroll into a clinic or hospital and receive free treatment, in

contrast to the healthcare systems in many socialist countries. In order to curb the abuse of unnecessary medical services, Singapore instead charges **user fees** for all healthcare services. Compared to government-run hospitals in other nations, Singapore's public hospitals enjoy greater autonomy, which fosters competition in the public market and in general, improves patient satisfaction because public facilities maintain low costs and good service quality. Since private clinics and hospitals must compete with already excellent and less expensive state institutions, this also encourages them to provide top-notch healthcare.

Due to changes made in the 1980s that allowed hospital administration more autonomy from governmental oversight, public hospitals in Singapore are operated similarly to private facilities in other nations. In contrast to public hospitals in other nations, Singapore's public patients benefit from amenities including comfortable surroundings, low wait times and the option to see the same doctor for all of their appointments.

6. Healthcare system in Brazil

Brazil's present Constitution, which established health as a universal right and a state responsibility, celebrated its 35th anniversary in 2023. The Health Reform Movement has been fighting the military dictatorship since the middle of the 1970s and has been essential in the nation's democratization. The Health Reform Movement, which brought together grassroots activists, trade unions and public health specialists, promoted the public nature of the health system and established plans for reforming Brazil's healthcare system.

Approved in 1990, the Health Care Law addresses health inequalities and ensures universal health care coverage through the Unified Health System (Sistema Único de Saúde, or SUS). Every level of government, that is, federal, state and local has administrative duties under the decentralized style of administration. The Family Health Strategy (FHS), UHS's main health model, coordinates secondary and tertiary coverage and offers complete medical treatment. About 60% of Brazil's population or 131.2 million people, receive primary care through this largest community-based PHC program in the world.

Even though differences between geographic areas and socioeconomic classes still exist, SUS was successful in enhancing health equity and granting access to all. Between 1990 and 2015, life expectancy rose from 66 to 74 years while infant mortality significantly decreased by two-thirds. Brazil has a stellar record when it comes to immunization coverage. Measles vaccination increased from 78 percent to 96 percent, polio vaccination increased from 58 percent to 98 percent and TB vaccination (through BCG (Bacillus Calmette Guerin) vaccine) increased from 79 percent in 1990 to 99 percent in 2015. The Brazilian AIDS program, also embedded in the SUS system, has been lauded internationally for its notable progress in granting access to affordable antiretrovirals and introducing innovative grassroots prevention programmes.

The World Bank's neoliberal reforms, which opposed the constitutional promise of universal health care for all Brazilians and promoted the involvement of the private sector in service delivery, had considerable impact on SUS in recent years. Indicators of health have also been worse in recent years. In 2021, 71.5 percent of children were vaccinated, down from 93.1 percent in 2019. In 2021, there were 107 maternal fatalities for every 100,000 live births, up from 58 in 2019, while hospitalizations for child malnutrition climbed by 11%. The sluggish COVID-19 vaccination process and the high number of deaths during the pandemic (about 700,000) were directly caused by the replacement of technical staff by military troops and scientific evidence by religious and ideological views. Rebuilding SUS following significant failures is a top priority and a formidable task for the Brazilian government.

7. Healthcare system in China

The healthcare system in China has advanced significantly in last many years. Citizens and permanent residents are entitled to free healthcare in China. Through a variety of government-sponsored or required health insurance programs such as the New Cooperative Medical Scheme and Urban Employee Basic Medical Insurance, Chinese residents can obtain universal health care. Numerous private healthcare choices are also available. However, some people still have to pay for their medical bills out of pocket because coverage is optional and outside of the UEMBI program.

The amount of money the government spends on hospital treatment and public health varies by region with rural and low-income communities receiving extra government assistance. Individual insurance rates are typically kept low to enable as many persons as possible to participate in these programs. However, there are co-pay requirements when seeking care, even if you have public insurance. To make care accessible to as many individuals as possible, these expenses are highly subsidized.

The type of public insurance a person has, their healthcare needs, the hospital they attend and a number of other factors all affect the co-pay for care and medication. There may be restrictions on the amount that patients can claim for certain prescriptions or not all medications are reimbursed. To give both foreigners and Chinese citizens with higher incomes more options for health care, the Chinese government is promoting the growth of the private health insurance sector. There are private hospitals all around the nation, however, the presence is greater in major cities and provincial capitals. Excluding community and village private facilities, there are an estimated 21,000 private hospitals in China.

8. Healthcare system in South Africa

Positively, South Africa boasts the region's best medical facilities and hospitals. South Africa's healthcare system is ranked 49th out of 89 nations in the 2020 Global Healthcare Index. Furthermore, there are times when specific medical services are provided without charge. For example, pregnant women and children under six can receive free medical care at about 3,500 clinics. However, there are issues keeping

doctors in the public system, and access to healthcare is still limited in rural areas. Nevertheless, overall, South Africa's healthcare system is gradually getting better. There is no universal healthcare system in place in South Africa. Instead, it has two parallel systems. A private healthcare system and a public healthcare system that operate in tandem with one another.

Up to 80 percent of the population depends on the public system for their medical needs. The government provides up to 40% of the subsidies for the public system. It is generally poorly managed, understaffed, and underfunded. Serious overcrowding, a lack of privacy and lengthy wait periods irritate patients. The lack of proper funding for public hospitals is a major contributing factor to such issues. As a result, they are unable to stock their pharmacies, maintain excellent doctors in the area by paying competitive wages or even upgrade their equipment. It would be an understatement to suggest that public hospital employees are overworked. Corruption and poor management make the issue even more difficult. In South Africa, there are about 400 public hospitals. Furthermore, only around 20% of the population is served by the private system, which employs an estimated 80% of doctors. These patients are mostly middle-class and upper-class families as well as foreigners. As a result, the private system is extremely strong while the public system is continuously lacking in resources.

Public healthcare in South Africa is financed by both government taxes and patient point-of-care expenditures. The Uniform Patient Fee Schedule, or UPFS, is used by the system to control physician compensation and patient billing. The UPFS uses three patient groups to calculate the cost of various visits and procedures and patient charges are based on family size and income.

- **Full-paying patients** are either non-citizens, are receiving treatment from a private practitioner, or are receiving outside funding.
- Patients who qualify for **partial subsidies** can have a portion of the cost of their care paid for based on their income.
- Lastly, patients who are sent to a hospital by the Primary Healthcare Services are totally funded or **fully subsidised**.

Both Cape Town and Johannesburg are renowned for having first-rate public hospitals. High-quality care is also provided by public hospitals connected to large institutions. Thankfully, there is first-rate private healthcare in South Africa. Modern facilities and quick wait times are what patients using the private healthcare system can anticipate. Hospital stays are more comfortable and there is more privacy. The constitution of South Africa ensures that everyone has access to medical care. This covers refugees, asylum seekers, and foreign nationals. Therefore, foreigners can get public healthcare just by residing in South Africa. Free anti-retroviral treatment for HIV/AIDS is available to refugees and asylum seekers without a permit or South African identifying documents. However, all foreign nationals must subscribe to a health insurance plan in order to access public or private health care services in order to demonstrate that they won't be a drain on the public system.

9. Healthcare system in Japan

Perhaps as a result of Japan's first-rate healthcare system, Japanese people live longer than people from other countries. In contrast to most healthcare systems worldwide, the system places a strong emphasis on preventative treatment rather than reactive care. Additionally, the Japanese Healthcare System provides excellent prenatal programs and free screening testing for specific diseases. Since most doctors have a subspecialty, there are relatively few general practitioners. You go straight to the expert you require for your condition. There is an urban-rural difference in many other nations, with doctors preferring to work in cities rather than rural areas. However, the converse is true in Japan. Rural communities gain more from the unequal distribution of doctors compared to urban areas. Physicians prefer being assigned to rural areas saying they experience a higher quality of life outside of metropolitan areas and a less stressful work environment.

Social Health Insurance, or SHI, is the name of the public healthcare system in Japan. Everyone who works full-time for a medium-sized or big corporation is covered by SHI. To pay for SHI, about 5% of salaries are withheld, and employers contribute the same amount. The Japan National Health Insurance (NHI) plan provides coverage to all individuals who are not eligible under SHI. It also includes unemployed people and those who work for small enterprises. The amount that you contribute to the NHI is determined by your income.

In Japan, a government council of physicians decides how much medical appointments and hospital stays cost. Fees are modified every two years in accordance with the committee's recommendations. This enables the government to react to economic shifts in a way that keeps healthcare costs low. Accessing healthcare in Japan is rather simple if you work full-time for a medium-sized or big company and are so qualified for coverage through SHI. Your employers also handle the paperwork! In Japan, hospitals and clinics cannot be operated by for-profit companies. Japanese hospitals are regarded as non-profit by legislation. Approximately 90 percent of eligible citizens and residents are enrolled in the public healthcare system. The majority of people also have secondary private health insurance in Japan. In general, private insurance plays a **supplementary** role, offering additional life and critical illness benefits.

Further, the country’s healthcare system is constantly looking at ways to serve its large and aging population better. By 2050, 40 percent of the Japanese people will be over 65 years old. Thus, the government must establish a better healthcare system. Language barriers are a significant problem for patients who are non-native Japanese speakers. While many hospitals often have English language staff, this is not always the case in Japan. In light of this, Table 2.1 gives a comparative analysis of above-mentioned countries in per capita USD terms as of 2022:

Table 2.1 Global healthcare Indicators (World Bank, 2024)

Countries	National Programme	Healthcare expenditure as %age of GDP	Healthcare expenditure per capita in USD terms	Out of pocket expenditure in %age terms	Government expenditure as %age of overall health expenditure
Australia	Medicare/ Medicad	10.54%	6488	14%	76%
Brazil	SUS	9.89%	1625	22%	45%
China	Co-pay system	5.38%	1032	34%	54%
India	NHM, PMJAY	2.1%		47%	41%
Japan	SHI/NHI plan	10.82%	5251	12%	84%
Netherlands	Multiple acts	11.29%	7179	9%	70%
Singapore	Medishield and Medisave	5.57%	6352	22%	63%
South Africa	UPFS	8.27%	1209	5%	60%
United Kingdom	NHS	11.34%	6265	13%	83%
USA	CMS	16.57%	12555	11%	55%

2.3 Medical Tourism

The practice of visiting outside one's home nation to obtain medical treatment is known as medical tourism. As a way to reduce health care expenses, medical tourism has grown in popularity among insurance companies and corporations. Patients in the US and other affluent economies are most affected by this. In 2022 alone, it was projected that over 787,000 people travelled outside of the US for medical treatment. The most important aspect is cost. Turkey, Thailand, India, and Asia have become some of the most popular places for medical tourists. This rise has been aided by cost and the abundance of accredited hospitals, but governments have also stepped up their efforts to market the nations as medical centres.

2.3.1 Medical tourism in India

The medical tourism industry in India was estimated to be worth USD 2.89 billion in 2020, USD 7.69 billion in 2024 and is expected to reach USD 13.42 billion in 2026. The availability of cutting-edge therapies at comparatively cheaper costs, the availability of qualified physicians and skilled medical specialists/professionals, the use of advanced technology in private institutions and a favourable historical reputation have all helped India grow as a popular travel destination. Further, the Government of India is expanding the e-medical facility to foreign nationals from 156 countries in an effort to increase medical tourism. Additionally, to encourage medical and wellness travel in India, the Ministry of Tourism founded the National Medical and Wellness Tourism Board (IBEF, 2023).

Others factors contributing to India's growing medical tourism industry include cost-effective treatment, alternative medicine advocacy, English language proficiency amongst clinical staff and ease of travel. According to India Tourism Statistics at a Glance 2020 report, close to 697,300 foreign tourists came for medical treatment in India in 2019 which is nearly 6.87 % of the total international patients. India has been ranked 10th in the Medical Tourism Index (MTI) for 2020-21 out of 46 destinations by the Medical Tourism Association. With USD 5 billion size of medical value travel (MVT) and 5,00,000 international patients annually, India is among the global leader destinations for international patients seeking advanced treatment. This is evident from Table 2.2 given below:

Table 2.2 Medical Tourism Index based on 41 indicators.

Countries	Number of patients	Popular treatments	MTI ranking
Australia	15,000	Cosmetic surgery, fertility and ophthalmology	NA
Brazil	2,50,000	Bariatric surgery	28
Canada	60,000	Fertility and oncology	1
India	7,00,000	Cancer and cardiology	10
Japan	50,000	Fertility treatment	3
Malaysia	12,00,000	Cosmetic surgery, fertility and cardiology	NA
Singapore	4,50,000	Oncology	2
South Africa	5,00,000	Cosmetic surgery, fertility and cardiology	22
Spain	1,20,000	Fertility and cosmetics surgery	4
Thailand	25,00,000	Cosmetic surgery, fertility and orthopaedics	17
Turkey	7,00,000	Cosmetic surgery	30
UK	1,50,000	Cardiology and cancer treatment	5
USA	10,00,000	Cosmetic surgery, dentistry and orthopaedics	9

2.3.2 Medical tourism across globe

Globally, about 11 million people travel to other countries for medical care and the value of the medical tourism market is projected to reach USD 43.7 billion by 2030 and grow at CAGR of around 33 percent annually between 2023 and 2030. Cross-border patients pay approximately between USD 3,500 to USD 5,000 for a single consultation. The current global healthcare landscape is going through an evolution. This is driven by various factors like need for digitisation of an outdated infrastructure, workflow inefficiencies, lack of access and clinician burnout.

Policymakers, scholars and the media have taken notice of the rise in medical tourism's appeal. The phrase was first used to describe patients traveling to developed countries from less developed ones in order to receive treatments that are unavailable in their native country. Today, the reverse is getting witnesses as people are moving from more developed to less developed nations to obtain healthcare, which is causing both qualitative and quantitative changes in patient mobility. The relative affordability of medical care in less developed countries, the availability of low-cost flights and more marketing and online consumer information on medical service availability are the main factors driving this change. The fact that patients frequently remain in the other nation following a medical operation is what truly makes the term "tourism" in the context of medical tourism. Travelers can thus take advantage of their visit by sightseeing, taking day trips or participating in any other traditional tourism activities.

2.3.3 Factors in Medical tourism

Medical tourism represents a worldwide, multibillion-dollar phenomenon that is expected to grow considerably in the next decade.

2.3.3.1 Cost is the primary consideration for the person when deciding whether to seek treatment elsewhere. Due to the unreasonably high costs of healthcare in the US and other countries, many insurance companies and employers have begun to consider medical tourism as a means of reducing these expenses. More and more countries around the globe start to see the financial benefits from this emerging market, so they offer premium medical services at notably lower prices. The primary reason that clinics and hospitals in the developing countries are able to lower their prices is directly related to the nation's economic status. As a consequence, surgery prices are 30 to 70 percent lower in the countries that are promoting medical tourism when compared to the US.

2.3.3.2 There are two major components of the service quality in the health care sector, namely,

- technical or mechanical quality and
- serviceable or functional quality.

While functional quality is determined by the services provided in healthcare facilities (like the services of staff, nurses and most significantly, the doctors towards the patient), technical equipment is at the heart of the patient's diagnostic algorithm. In the medical tourism sector, providing high-quality services is essential to drawing clients. The idea that medical tourism is of poor quality is one of the main obstacles to its acceptance. Using effective marketing techniques and evaluating quality through accreditation from a globally renowned organization are two ways to get over it. This kind of accreditation is essential for boosting trust in the caliber of medical service. This confidence can be even stronger if accreditation is followed by an affiliation with reputable hospitals or health care systems in industrialized countries. Once healthcare

providers are accredited and become a part of international referral networks, they can be appropriately rated for risks.

2.3.3.3 Categories of different treatments and their availability also represent an important factor in decision to engage in medical tourism. The most common types of procedures that patients pursue during medical tourism trips are elective cosmetic surgery, dentistry, organ transplantation, cardiac surgery and orthopaedic surgery. However, a wide variety of services can be obtained through medical tourism, ranging from various essential treatments to different kinds of traditional and alternative treatments.

2.3.3.4 Reproductive tourism and reproductive outsourcing are growing in popularity, which is the practice of traveling abroad to engage in surrogate pregnancy, *in vitro* fertilization and other assisted reproductive technology methods.

2.3.3.5 In addition to cost, other major factor responsible for the increase of medical tourism is **access**. The lack of it, either due to the unavailability of the technology or the prohibition in the home country, can subsequently lead to medical tourism. The common examples are cytoplasmic transfer or stem cell therapy.

2.4 Conclusion

In conclusion, quality, accessibility and affordability are all threatened by the global surge in health care prices. Costs were further increased by the COVID-19 pandemic, which exacerbated demand backlogs, inflation and staffing shortages. Potential options for providing more effective and economical care are provided by technology-enabled models. Countries should investigate creative solutions that use technology to improve care delivery models in order to meet the growing expense of health care and increase accessibility and affordability. This includes optimizing resource allocation, streamlining procedures and customizing patient care through the use of telemedicine, remote monitoring and artificial intelligence. Rising health expenditures are largely caused by worker costs but there are other factors at play as well. One factor is the cost of upkeep for care facilities. To lower the costs of age-related care, healthcare institutions throughout the world are starting to use cutting-edge technologies like virtual wards and AI-enabled diagnostic tools. In order to speed up diagnosis and lower the cost of treating chronic illnesses, providers are also investing in technology. As a way to reduce health care expenses, medical tourism has grown in popularity among insurance companies and corporations. Patients in the US are especially affected by this. Thus, the industry is facing unprecedented challenges and opportunities and this will continue to drive the functioning of healthcare systems in years to come.

Chapter-3

Overview of Healthcare Sector in India

The healthcare sector is a global pillar of societal well-being and economic progress. Given the size and diversity of India's population, the importance of healthcare is greatly increased. A strong healthcare system supports social harmony, economic progress and national productivity in addition to ensuring people's physical and emotional well-being. In terms of income and job creation, the healthcare industry has grown to be one of India's biggest service sectors. Due to improved coverage, services and rising public and private sector spending, the Indian healthcare industry is expanding quickly. From health care perspective, it is geographically divided into rural, semi-urban and urban areas. This healthcare comprises the following:

- hospitals
- medical devices
- clinical trials
- outsourcing
- telemedicine
- medical tourism
- health insurance and
- medical equipment.

India has a huge pool of highly qualified medical experts which gives it a competitive edge. In comparison to its Asian and Western counterparts, India healthcare is reasonably priced. Surgery in India costs roughly a tenth of what it does in the United States or Western Europe. Medical tourism in the nation has increased as a result of the low cost of medical services. Furthermore, because clinical research in India is relatively inexpensive, it has become a centre for R&D activity for global players.

3.1 History of healthcare industry in India

3.1.1 **Phase** I: Ancient and medieval period

- **Atharva Veda** is full of hymns and prayers indicating ways and means to protect people against many kinds of diseases and natural disasters. Physical and mental ingredients of positive health were a genuine concern of people in the Vedic period as is evident from **Yajur Veda**, meaning that the world should be free from diseases and everybody should have a healthy mind.

- The Ayur Veda (flourished in North India), in which, Ayu means life and Veda means knowledge, means science of life. Traditional medicine is based on Ayur Veda which is part of Vedangas.

- **Siddha (popular for its extensive use of minerals, metals and herbs),** rooted in Ancient Tamil Nadu, is 2500 years old and shares certain things from Ayurveda.
- **Charaka (father of medicine)**, a court physician of King Kanishka of Kusha dynasty, further developed aspects of medicine like anatomy, pathology and therapeutics.
- **Sushruta (father of surgery),** provide remarkable advancements and insightful knowledge in Sushruta Samhita.
- **Bodhisattva Nagarjuna (father of chemotherapy),** was associated with Madhyamik School of Buddhism and visited Srisailam in Andhra Pradesh.
- **Vagbhatta,** lived during the era of King Samudragupta (325-375 AD).
- **Satavahanas, Cheras, Pandyas and Pallavas all patronised the study of Vedas and Vedangas.**
- **Kaveripatna and Kanchi in the South were centres where people sought relief from different ailments.**
- **Tanjavur was a flourishing city under Cholas. The most important medical inscription is the Tirmukkudal belonging to the Chola King, Rajikesari Veerarajendra (1063-1069).**
- **Dhanvantari**, the patron god of Indian Medicine, also initiated many methods of healing and passed it to **Sushruta**, who was the celebrated surgeon of his time.
- **Lord Buddha** himself took very keen interest in supporting the science of medicine. Lord Buddha used to attend to the sick himself. During the course of his travel for propagating Buddhism, Buddha created Buddhist Viharas (**monasteries**) in different places and in all the Viharas, care of the sick and medical education was given special attention.
- **Emperor Ashoka** established many hospitals throughout the country.
- With the advent of Muslim rule from the 10th century onwards, middle east physicians trained in the **Unani** system created their impact. The main impact was curative approach.
- Emperor **Akbar** (1555–1605), during his period, encouraged the amalgamation of the Unani and Ayurvedic systems.

3.1.2 **Phase** II: European and British period (1600-1947)

The history of western medicine in India dates back to 1600, when the first medical officers arrived in India along with the British East India Company's first fleet as ship's surgeons. The use of the Allopathic system of medicine commenced in the 16th century

with the arrival of European missionaries. In 1757, the EIC established its rule in India and a medical department was established in Bengal as far back as 1764, for rendering medical services to the troops and servants of the Company.

- The first hospital in India was the Madras General Hospital in 1679.
- In 1775, Hospital Boards were formed to administer European hospitals.
- In 1785, medical departments were set up in Bengal, Madras and Bombay presidencies with 234 surgeons. The medical departments involved both military and civil medical services.
- In 1796, hospital boards were renamed as medical boards to look after the affairs of the civil part of the medical departments.
- It wasn't until 1868 that a separate civil medical department was formed in Bengal.
- In 1896, with the abolition of the presidential system, all three presidential medical departments were amalgamated to form the Indian Medical Services (IMS). The officers of the Indian Medical Services were mostly military surgeons of European origin who were selected in England. With the opening of Calcutta Medical College, IMS was opened to the natives of India trained in Calcutta.
- The total number of public hospitals and dispensaries under the control of the Imperial government of India was about 1200 in 1880 and in 1902, the figure raised to approximately 2500. There was one hospital for every 330 square miles in 1902. The income of public health facilities was 3.6 million rupees in 1880 and about 8.1 million rupees in 1902. Patient turnover was 7.4 million in 1880; that increased to about 22 million in 1902.
- Medical departments were under the control of the central government until 1919. The Montgomery-Chelmsford Constitutional Reforms of 1919 led to the transfer of public health, sanitation and vital statistics to the provinces.
- In 1937, the Central Advisory Board of Health was set up with the Public Health Commissioner as secretary to coordinate the public health activities in the country.
- In 1939, the Madras Public Health Act was passed, which was the first of its kind in India.
- In 1946, the Health Survey and Development Committee, popularly known as the Bhore Committee was appointed by the Government of India to survey the existing health structure in the country and make recommendations for future developments.

3.1.3 Phase III: Post-independence

In order to create a strategy for the most efficient and equitable use of the nation's resources, the Indian government established the Planning Commission in 1950. Health had a separate allocation during every plan era but it was never given high priority. Since health is a state matter, each state has its own plan. The concept of democratic decentralization adopted by the government theoretically shifted the responsibility for

health to the people themselves, through the Panchayat raj system. In actual practice it was a failure, except for the opening of 725 Primary Health Centres and some effect on control of communicable diseases.

- In course of time, when the government found that recommendations of **Bhore** Committee of 1946 were too ambitious, it set up the Health Survey and Planning Committee, popularly known as **Mudaliar Committee** in 1959. The result of this systematic approach towards health care development programme has paid dividends in the field of control of epidemic diseases such as plague, cholera, malaria and eradication of smallpox.
- Ministry of Health and Family Planning, GOI established the study group on hospitals in August, 1966. The study group was required to take into consideration the findings of previous committees that had examined different aspects of hospital administration, shift the material already available in those reports and demarcate the fields to be further strengthened.
- During the second half of the twentieth century, many more concerted efforts have been made to improve the health care delivery system in India. To further improve the working of hospitals, K. N. Rao Committee (1968) and Dr Siddhu Committee (1979) were formed.
- India was also one of the signatories of **Alma Ata declaration** for achieving the global goal of ***"Health for All"***.

Health is fundamental to national progress. Health programmes contribute directly to the socio-economic growth of the nation. There has been progressive increase in the outlay of health plans. Through the plans, specific programmes were formulated, health care institutions were built, health professionals were trained and logistics were provided. Though health is largely the responsibility of states, the Central Government is responsible for higher education, research and national health programmes like family welfare, primary health care and prevention, control and eradication of major diseases which form the main plank of development efforts.

The **National Health Policy (2017)** affirmed that the effective delivery of health care services depends largely on the nature of education, training and appropriate orientation towards community health. The Constitution of India envisages the establishment of a new social order based on equality, freedom, justice and dignity of the individual. It aims at the elimination of poverty, ignorance and ill-health and directs the state to regard the raising of the level of nutrition and the standard of living of its people and the strength of its people, specifically ensuring that children are given opportunities and facilities to develop in a healthy manner.

3.2 Current scenario

The Indian healthcare industry continued its healthy growth in 2023 and reached a value of US$ 372 billion driven by both the private sector and the government. As of 2024, the Indian healthcare sector is one of India's largest employers as it employs a

total of 7.5 million people. Progress in telemedicine, virtual assistants and data analytics is expected to create new tech jobs in coming years. The following shows some basic facts about the Indian healthcare sector:

- India's public expenditure on healthcare touched 2.1 % of GDP in FY23 against 1.6% in 2021.
- As of 2023, the number medical colleges in India stood at 706.
- Life expectancy at birth has risen from 33 years in 1947 to 47.7 years in 1970s to 70.4 years in 2023.
- As of February 20, 2023, more than 220.63 crore COVID-19 vaccine doses have been administered across the country.
- As of August 1, 2023, a total of 24.33 crore Ayushman cards have been created.
- India's hospital market was valued at US$ 98.98 billion in 2023, projected to grow at a CAGR of 8.0% from 2024 to 2032, reaching an estimated value of US$ 193.59 billion by 2032.
- In FY24 (Till February 2024), premiums underwritten by health insurance companies grew to Rs. 2,63,082 crore (US$ 31.84 billion).
- The e-health market size is estimated to reach US$ 10.6 billion by 2025.
- The doctor population ratio in the country is 1:854
- Between April 2000-March 2024, the FDI inflow for the drugs and pharmaceuticals sector stood at US$ 22.57 billion.
- The number of policies issued to women in FY21 stood at 93 lakhs, with one out of every three life insurance policies in FY21 sold to a woman.
- In December 2021, Eka Care became the first CoWIN-approved organization in India, through which users could book their vaccination slot, download their certificate and even create their Health IDs.
- As of November 18, 2021, 80,136 Ayushman Bharat Health and Wellness Centres (AB-HWCs) are operational in India.

This positive transformation of the Indian healthcare system is a multifaceted and ongoing process that involved many different changes and initiatives. The statistical data also shows that the average life expectancy at birth in India has increased by approximately three years in the last ten years. The government has been working to improve the healthcare system through various initiatives to strengthen primary, secondary and tertiary healthcare services. Some of the key elements of this positive transformation of India's healthcare system are:

- The **National Health Mission** (NHM) was launched in 2013 and comprises the National Rural Health Mission (NRHM) and the National Urban Health Mission (NUHM). The NHM aims to strengthen primary healthcare infrastructure and services by upgrading existing facilities, building new ones and improving the availability of medical equipment and supplies. The NHM also aims to improve maternal, neonatal and child health by expanding access to essential services such as antenatal care, skilled birth attendance and immunization programs.

Finally, it targets communicable and non-communicable diseases through targeted interventions and public health campaigns.

- **Ayushman Bharat** is another flagship healthcare initiative launched in 2018. This scheme provides financial protection and health coverage to India's vulnerable populations through Health and Wellness Centres (HWCs) and the Pradhan Mantri Jan Arogya Yojana (PMJAY). The PMJAY is a health insurance scheme that provides coverage of up to INR 5 lakhs per family per year for secondary and tertiary care hospitalization. As of December 2022, there were about 117,000 Ayushman Bharath Health and Wellness Centres (AB-HWCs) across India. This initiative targets approximately 100 million economically disadvantaged families, covering around 500 million beneficiaries and covers a range of medical procedures and treatments at empanelled hospitals. PMJAY aims to reduce out-of-pocket expenses and improve access to quality healthcare for India's poorest and most vulnerable populations.
- **PM Surakshit Matritva Abhiyan-** is another initiative to improve maternal health by providing assured, comprehensive and quality antenatal care to all pregnant women on the 9th of every month.
- Similarly, the **National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS)** aims to promote health and prevent these chronic diseases through early diagnosis and affordable treatment.
- **Digital healthcare-** The Government is also focusing on the digital transformation of healthcare through the **National Digital Health Mission (NDHM).** The shift towards digital healthcare in India is transforming the way healthcare services are delivered, particularly in remote areas. Telemedicine, digital health records and mobile health apps are all being used to improve healthcare service quality and efficiency.

By implementing these programs, the Indian Government has strived to reduce the financial barriers to healthcare, improve the quality of care and ensure equitable access for all citizens.

3.3 Healthcare delivery in India

India’s healthcare delivery system is categorised into two major components, that is, public and private.

3.3.1 The government or the public healthcare system comprises limited secondary and tertiary care institutions in key cities and focuses on providing basic healthcare facilities in the form of Primary Healthcare Centres (PHCs) in rural areas. Further, funds required for day-to-day operations are obtained through state treasury or grants. These hospitals are mainly run to cater to the poorer sections of the society who seek specialized treatment at subsidized rates from the government.

3.3.2 Most secondary, tertiary and quaternary care facilities are run by the private sector with a significant concentration in tier-I and tier-II cities and metropolitan areas. These hospitals frequently draw people looking for high-quality healthcare services because of their cutting-edge facilities, cutting-edge medical equipment and excellent clinical care standards. The difference between public and private hospital lies in the nature of motive. That is to say, profit generation is essential for smooth functioning of these hospitals. Government helps private players to set up these hospitals in the form of necessary resources like land allotment. The private healthcare sector is characterized by its efficiency, flexibility and innovation, offering patients a choice of healthcare providers and services tailored to their needs. However, concerns about affordability, transparency and quality of care have been raised, highlighting the need for effective regulation and oversight to ensure patient safety and ethical practices.

3.3.3 Charitable hospitals: These hospitals are usually formed by philanthropists, societies and groups of people with charity as the primary motive. Charity indicates that some patients are treated on a concessional or subsidized basis, while a specific percentage of cases are treated for free. The majority of these hospitals are non-profit institutions. If there is any excess, money is reinvested in the hospitals' operations to improve and upgrade its technological foundation. These hospitals are exempt from income tax on their earnings but they must demonstrate that the money they make is used to help the less fortunate members of society. To raise community awareness, some hospitals run promotional campaigns. These hospitals are typically linked to research institutes. Such hospitals look towards the trust/society for capital requirements and funding daily operations. Examples include Mission Charitable hospital and Guru Harkishan hospital in New Delhi, Shrimad Rajchandra hospital in Gujarat.

The overall models of doing healthcare business in India is showcased in Figure 3.1 given below:

Broad Business Model of Hospitals in India

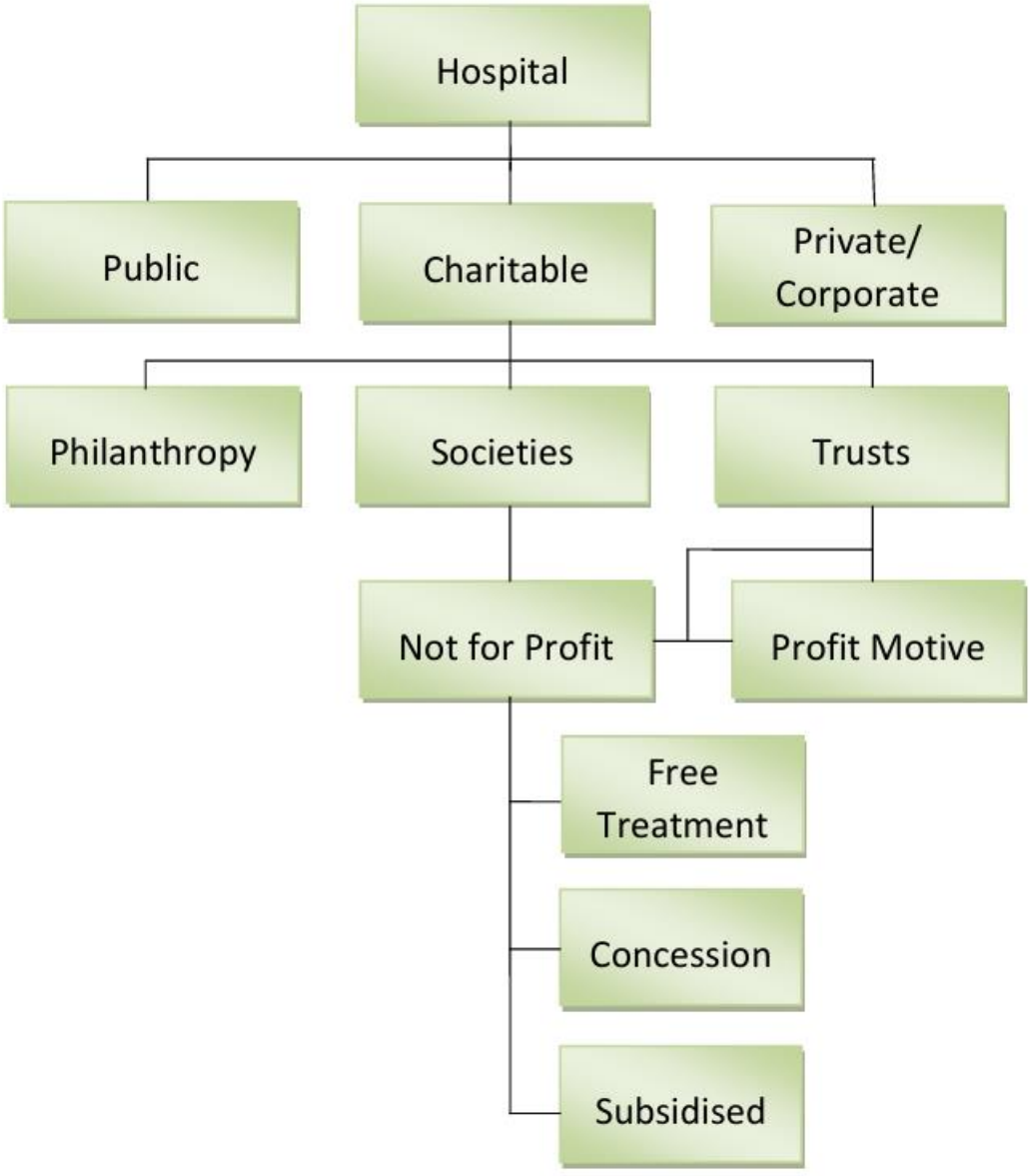

Figure 3.1 Business models of hospitals in India.

3.4 Initiatives by the government:

There are many examples of healthcare innovation happening in India, from low-cost medical devices to innovative healthcare delivery models. These innovations have the potential to improve healthcare outcomes and reduce costs in the long term. India's healthcare regulatory system is evolving to ensure patient safety, promote high-quality care and control costs. Some of the major initiatives taken by the Government of India to promote the Indian healthcare industry are as follows:

- Union Ministry of Health and Family Welfare virtually launched '***MedTech Mitra***', a platform designed to support young Indian innovators in the MedTech sector by aiding in their research, development and regulatory approvals, aiming to reduce import dependence and transform India into a leading US$ 50 billion MedTech industry by 2030, while fostering indigenous development of affordable, quality medical devices and diagnostics, in line with the vision of Viksit Bharat and Atmanirbhar Bharat.
- ***Poshan Abhiyan*** is a Centrally Sponsored Scheme with the implementation of the scheme being done by States/UTs. To ensure that all Anganwadi Centres are equipped with Smartphones and Growth Monitoring devices (GMDs) such as Infantometer, Stadiometers and Weighing Scale for Mothers and Infant, the Ministry has released revised guidelines for technical specifications and replacement of GMDs by the States.
- In the Union Budget 2023-24, Prime Minister Narendra Modi marked a significant stride in India's healthcare landscape by inaugurating five new All India Institute of Medical Sciences (**AIIMS**) across different states. These AIIMS facilities, situated in Rajkot of Gujarat, Bathinda of Punjab, Raebareli of Uttar Pradesh, Kalyani of West Bengal and Mangalagiri of Andhra Pradesh, signify a transformative step towards bolstering tertiary healthcare infrastructure.
- The government has encouraged public-private partnerships to enhance healthcare access and infrastructure, particularly in underserved areas. Private healthcare providers have invested in modern hospitals, clinics and diagnostic centres equipped with advanced medical technology. They have embraced digital innovations such as electronic medical records, telemedicine, health apps and remote monitoring systems to improve patient care.

3.5 Challenges ahead

Despite undergoing significant changes over the years, the Indian healthcare system continues to face multiple challenges. India is also grappling with a growing burden of non-communicable diseases, which poses a significant challenge to its healthcare system. This is evident from the following:

3.5.1 Inadequate infrastructure- India has a shortage of healthcare facilities, especially in rural areas, where the majority of the population resides. The problem also persists with respect to residents living in remote or inaccessible areas. Many primary health centres and sub-centres lack essential infrastructure, medical equipment and resources, making it difficult to provide even basic healthcare services to the population.

3.5.2 Shortage of healthcare professionals- India has a significant shortage of healthcare professionals including doctors, nurses and paramedical staff. This is a critical challenge facing the Indian healthcare system affecting the quality and accessibility of healthcare services across the country. This is particularly evident in rural areas where the majority of the population resides but has limited access to

trained medical professionals. The limited capacity of medical and nursing schools to train healthcare professionals is a contributing factor to the shortage of skilled staff.

3.5.3 Urban-rural disparities- There is a marked disparity in the quality and accessibility of healthcare services between urban and rural areas. Urban areas tend to have better infrastructure, access to skilled professionals and availability of specialized care while rural areas often struggle with inadequate facilities and limited human resources. There is even dearth of essential amenities like clean water, sanitation and electricity thus comprising the overall quality of care. Such inadequacies force rural residents to migrate to urban centres thereby putting additional financial burdens and logistic challenges for everyone involved.

3.5.4 Financial constraints and health insurance- The Indian healthcare system is in a dilapidated state. The cost of medical care in private hospitals rises day by day and it seems there is no control by government on these hospitals. One of the main reasons for rising healthcare costs in India is use of latest sophisticated technology and equipment by the doctors and hospitals. Much of these costs can be attributed to the diagnosis and treatment of chronic diseases and conditions such as diabetes, obesity, cardiovascular disease and asthmatic. The high out-of-pocket expenses for healthcare services can be a major burden for many Indians. Health insurance in India is not as widespread as in some other countries. This can lead to delayed or avoided treatments, causing further complications and health issues. Even though there are several reasons for rising health care costs as said above, there are equally overweighing benefits that are available which are worth mentioning here such as:

- Secured and safe life even after operations
- End to end hospitalization time reduced
- Most of operations take very less time due to advancement in technology
- All activities/procedures under one roof
- Improved hygiene
- Opportunities for employment & public service

3.5.5 Insufficient public healthcare funding- The Indian government's expenditure on healthcare has historically been low compared to other countries, which contributes to the inadequacy of public healthcare facilities and the high reliance on private healthcare services, which may not be affordable for all citizens.

3.5.6 Fragmented healthcare system and inequity in access to care- Socio-economic disparities and regional differences in access to healthcare services result in unequal healthcare outcomes for different population groups, with poorer communities and those living in remote areas often facing greater challenges in accessing quality healthcare.

3.5.7 Quality of Care- Variations in healthcare services across different healthcare facilities pose a significant challenge to the Indian healthcare system. While some

hospitals and clinics maintain high standards of care, others need help with issues such as inadequate infrastructure, outdated medical equipment and a shortage of skilled healthcare professionals. Substandard quality of care undermines patient outcomes and erodes public trust in the healthcare system.

3.5.8 Growing burden of non-communicable and communicable diseases- non-communicable diseases such as diabetes, cardiovascular diseases and cancer have been on the rise in India, putting additional strain on the healthcare system. Despite progress in recent years, India still faces challenges in controlling communicable diseases like tuberculosis, malaria and HIV/AIDS, which continue to pose significant public health risks.

3.6 Final words

Despite the challenges, the Indian healthcare system has made significant positive progress in recent years, particularly in terms of expanding access to healthcare services and improving health outcomes. These government initiatives, programs and policies address the various challenges faced by the Indian healthcare system and improve access to quality healthcare services for all citizens. While there are still significant challenges to overcome, such as healthcare access disparities and the burden of disease, the continued investment in healthcare and innovation in the sector are reasons to be optimistic about the future of healthcare in India.

India's healthcare sector is extremely diversified and is full of opportunities in every segment which includes providers, payers and medical technology. The country has also become one of the leading destinations for high-end diagnostic services with tremendous capital investment for advanced diagnostic facilities, thus catering to a greater proportion of the population. Additionally, Indian patients are now more aware of the need of maintaining their health. By 2025, the government intends to raise public health spending to 2.5 percent of GDP in order to establish India as a global centre for healthcare. The demand for healthcare services is anticipated to increase in the future due to factors such as rising income levels, an aging population, increased health awareness and shifting attitudes toward preventive healthcare.

Chapter-4

Industry trends in Hospital Services

The trajectory of India's development in health and well-being from 1947 to 2024 showcases a remarkable evolution. With 1.4 billion residents, the Indian healthcare system is a vast and intricate network of public and private sectors that offer a variety of medical services. To enhance the healthcare system, the Indian government has launched a number of initiatives. The Indian healthcare system is also witnessing multiple healthcare innovations, ranging from low-cost medical devices to innovative healthcare delivery models. Infrastructure, technology, specialized services and healthcare access have all advanced significantly in the private healthcare industry. Private healthcare providers have made investments in state-of-the-art medical facilities including clinics, diagnostic centres and hospitals. To enhance patient care, they have embraced digital advances including telemedicine, health apps, electronic medical records and remote monitoring systems.

The country's efforts to combat some of the most fatal diseases and improve the lives of its people tell a tale of growth and evolution. Since gaining independence, India has launched several national programmes to curb the menace of communicable diseases like malaria, Tuberculosis and AIDS among others. More than three years after the COVID-19 pandemic, many health care systems globally are still struggling with its lingering effects. The need to reduce costs and improve access to care while still confronting a shortage of skilled workers and clinicians has driven some health care systems to adopt emerging technology to fill the gaps. India of 2024 and India in 1947 are stark reminders of how a country evolves and survives the test of time. India has developed significantly over the past 77 years in a number of areas including the economy, healthcare, education, space and technology, among others. Following gaining independence from British domination, India made significant progress in the following decades in expanding access to and provision of healthcare. The decline in death and mortality rates since independence has been India's most notable public health accomplishment. Let's examine some of the significant advancements made by India's healthcare system in recent decades:

1. Improved life expectancy

India's life expectancy has significantly increased. The average Indian citizen's life expectancy rose from 32 years in 1947 to 70.19 years in 2022. Over the past 75 years, life expectancy has increased by more than 100 percent. According to the United Nations-World Population Perspective (UN-WPP), the average life expectancy worldwide is 72.98 years. The WHO claims that India has made tremendous progress in improving the health of its citizens. Experts say that one of the most significant and often used measures of human advancement is life expectancy. According to numerous studies, India's life expectancy has increased as a result of improved access to medical care, pharmaceuticals and advancements in technologies.

2. Decline in Child and maternal Mortality Rate

India's Infant Mortality Rate (IMR) was estimated by the UN to be 27.695 deaths per 1000 live births in 2022, a 3.74 percent decrease from 2021. According to the National Health Family Survey-5 (NHFS-5), IMR has slightly decreased in almost every state, with Assam experiencing one of the biggest declines, going from 48 to 32 fatalities per 1000 live births. The Maternal Mortality Ratio (MMR) was 2000/100,000 live births in the 1940s, but it seems to have decreased to 1000 in the decades that followed. Furthermore, the UN Sustainable Development Goals (SDGs), which set a global MMR target of fewer than 70 deaths per 100,000 live births by 2030, are also signed by India. The Registrar General of India announced in a special bulletin in March of this year that the MMR had dropped by 10 points. There has been a decrease of 8.8%, from 113 in 2016 to 103 in 2019.

3. Control of communicable diseases

India has started a number of governmental initiatives since achieving independence to combat the spread of infectious diseases including AIDS, malaria and tuberculosis. In 1947, there were an estimated 75 million cases of **malaria** in India, out of 330 million people, according to a report published in the American Journal of Tropical Medicine and Hygiene. A remarkable accomplishment was made in the eradication of malaria during this time, with incidences drastically falling to less than 10 million in 1964. Malaria cases have drastically decreased over time, notwithstanding the reversal that resulted in almost 6.4 million cases in 1976. Only India made progress against malaria out of the 11 nations with the highest burden, according to the WHO's most recent World Malaria Report 2021.

Meanwhile, India's success in **Polio** has been acclaimed around the globe. Until the early 1990s, Polio was hyperendemic in India, with an average of 500 to 1000 children getting paralysed daily. India was declared Polio free in 2014 and no new case of Polio has been reported in the country since January 2011. The National Leprosy Eradication Program (NLEP), one of the biggest **leprosy** eradication initiatives in the world, is being carried out in India. India has also done a commendable job in eliminating **smallpox**. In 1979, the nation declared itself smallpox-free after years of ranking among the nations with the greatest number of smallpox cases. Similarly, India has made significant progress in controlling diseases like Tuberculosis, Cholera, Kala Azhar and **HIV**. With right initiatives like National AIDS Control Organisation (**NACO**), Project Sunrise by MoHFW and access to affordable and accessible Antiretroviral Therapy (ART), India has achieved successes in preventing this disease and the prevalence rate has fallen from 0.55 percent in 2000 to 0.21 percent in 2021 (Financial Express, 2023).

Public health experts are growing more hopeful that **COVID-19** is becoming endemic, similar to other diseases like malaria or tuberculosis, which means that although the virus is still present, it is becoming more controllable and predictable much like the seasonal flu. Stakeholders in the health care system should, however, continue to be

vigilant, agile, adaptable and ready for fluctuations in the number of COVID-19 cases and other infectious diseases like the recent HMPV (Human Metapneumovirus) outbreak. In fact, the long-term effects of COVID-19 might present the health industry with an opportunity to reimagine itself and take advantage of pre-pandemic trends including changing patient behaviours, shifting customer tastes and quickly advancing technology.

However, India is still registering a high number of cancer cases with detection rate of merely 29% and this is one of the top 5 reasons for untimely death. As per EY report, the economic burden or productivity loss of this disease amounts to 0.4% of national GDP. The major reasons for this are the changing lifestyle of citizens, poor dietary habits, tobacco consumption, poor air quality and limited physical activity. Of these, tobacco-based (oral, lung and brain) cases rank the highest with 35% of almost 800,000 cases detected every year in the country. With new treatments now available like the magnetic hyperthermia-based therapy (MHT), establishment of separate cancer care facilities and government interventions like the National Cancer Control Programme and waiving off custom duty on three essential cancer prevention medicines (Trastuzumab Deruxtecan, Osimertinib and Durvalumab), it is expected by stakeholders that this disease will become more manageable and preventative.

4. Healthcare policies and government schemes

The government of India has implemented a number of programs and initiatives to enhance the nation's healthcare infrastructure since gaining independence in 1947. To enhance maternal and child health, the government has implemented programs like the National Health Mission (NHM). As part of these missions, other programs are introduced such as the Janani Suraksha Yojana (JSY) which allows pregnant women to receive direct cash transfers; the Janani Shishu Suraksha Karyakram (JSSK) which permits free delivery in government hospitals and the Pradhan Mantri Surakshit Matrutva Abhiyan (PMSMA) which focuses on providing quality prenatal care, with a particular emphasis on identifying and managing high-risk pregnant women.

The world's largest government-funded health assurance and insurance program, the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY), was introduced in 2018. Through this program, the government offers financial risk protection against catastrophic health expenses that cause an estimated 6 crore individuals to fall into poverty annually. In addition, the government has implemented a number of additional programs such as the Pradhan Mantri Swasthya Suraksha Yojana (PMSSY) to strengthen the nation's medical education standards and the vastly improved healthcare system since independence. India today has 612 medical colleges with approximately 92,000 seats, up from 28 in the 1950s.

5. Installation of health ATMs

The first health ATM, which can screen for 23 ailments in 15 minutes, was put in place in the Mathura region of Uttar Pradesh. A Mumbai-based health technology company

called ***Yolohealth*** provides ATMs to various state governments. Yolohealth had already installed 400 health ATMs in India by July 2021. It is an advanced, contemporary, easy-to-use, precise and automated health screening device. In addition to performing fundamental studies, this equipment may treat patients right away. Like an ATM in a bank, a health ATM is a touch-screen kiosk device designed to manage health-related data such as blood pressure, blood sugar, haemoglobin, height, weight and more. Customers can now view their personal health information from any web browser that is connected to this Kiosk and internet.

Patients are empowered and given the opportunity to take an active role in managing their medical needs. A one-stop digital touch-point integrated equipment developed to diagnose all chronic diseases while also providing primary care and diagnostics in rural places. The cloud-connected platform also enables telemedicine so that doctors can see patients in rural areas and can check and access the patient's past health records during a video call. ATMs for healthcare are outfitted with cutting-edge diagnostic equipment for basic vitals, cardiology, neurology, pulmonary tests, gynaecology, clinical diagnostic and life-saving equipment and emergency services. In addition, the walk-in medical kiosks have built-in medical equipment that enables them to provide free medication, generate real-time health reports and suggest prescription medications.

In light of above discussion, the focus of this chapter is to equip readers with the emerging use of technology and other non-conventional trends that demands attention in the current healthcare sector. The COVID-19 pandemic permanently changed global health care, from accelerating the adoption of new technology and care delivery models to increasing the focus on sustainability and resiliency. At the same time, it accentuated existing workforce challenges and the global disparities of health equity. With more than 70 percent of the world's population having received at least one COVID-19 vaccine, the sector now faces critical questions that will shape its future in 2025 and beyond.

4.1 Overview of trends

Real-time and continuous data on our surroundings and health is being made available by emerging technologies like blockchain, telemedicine, artificial intelligence and other tools like sensors, wearables and ingestible. These advancements can help health care providers make more precise diagnoses, provide individualized care, anticipate danger or decline and take early action. In 2021, it is estimated that over 50 percent of customers globally attended at least one virtual medical appointment. Many people adopted the technology primarily to avoid COVID-19 but they also found it more convenient because they could select an appointment time that worked better with their own routine schedules.

However, the quality of the experience can be hampered by poor data quality, low data point counts and lack of trained personnel for handling these technologies. Moreover, these channels must be synchronous so patients can move freely between them with

one record being continuously updated and maintained. The risk is that often, when new technologies are added, they are implemented in a piecemeal manner rather than integrated throughout an organization or across a patient journey. Health care providers who use wearable technology to monitor chronic health conditions and to track vitals, sleep quality and medications are finding the technology helpful. However, for large-scale adoption, clinicians must agree on the parameters for alerts, appropriate clinical governance arrangements and efficient work flows alongside effective reimbursement models for devices and data. Data accuracy and privacy as well as cyberthreats, will also act as headwinds to adoption.

The need for more affordable care and better health outcomes, the emergence of transformative technologies with applications across the healthcare spectrum, the longer lifespan of the population and ongoing economic uncertainty around the world are all contributing factors to the rapid transformation of the healthcare sector. These are the main social forces influencing healthcare in 21st century. In terms of technology, AI has the potential to fundamentally alter everything including how we create medications, manage patients and do business in the healthcare industry. Its emergence is the driving force behind many of the trends outlined below. To steer healthcare systems toward an inclusive future, it will be essential to comprehend and get ready for the following major areas of change. To start with:

4.1.1 Rise of Telemedicine and Virtual Healthcare Services

One important development to keep an eye on is the growing usage of virtual healthcare services and telemedicine. The transition to cloud-based technologies which are intended to improve business operations and push more customer interactions online was sped up by COVID-19. The COVID-19 pandemic made telehealth a vital tool for remote patient care and its use is only predicted to increase, especially in developing countries where advanced medical technology is being rapidly adopted. Large EHR providers are being forced by this trend to move their services and products to the cloud and form alliances with suppliers of Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM).

According to a new report by market research firm Mordor Intelligence, the global telemedicine market was valued at an estimated USD 104.44 billion in 2021 and is expected to reach USD 272.76 billion in 2027, expanding at a strong compound annual growth rate (CAGR) of 20.5 percent during the forecast period. The research goes on to say that telehealth solutions have proven to be effective in improving health outcomes and cutting expenses. Through better chronic illness management, shorter hospital stays, pooled health professional staffing and shorter travel times, telemedicine has been lowering healthcare costs while enhancing efficiency.

Clinicians can benefit from the guidance that chatbots and virtual assistants can offer on diagnosis, treatment and medication. They will increasingly be utilized for appointment scheduling and integration with electronic health record (EHR) systems. Additionally,

they can assist patients in maintaining compliance by reminding them to exercise or take their medications. They can even help patients who live alone or in isolated places by offering them company which can help them feel better mentally!

In India, telemedicine has the potential to revolutionize the healthcare system, particularly in underserved and isolated regions where access to medical care is restricted. Patients can communicate with medical professionals from a distance, get advice from doctors and even see specialists without having to travel in person thanks to teleconsultations. Patients can monitor their health parameters, track medication adherence and obtain personalized health recommendations with the use these digital health solutions. These technologies improve patient access to healthcare and promote early intervention, chronic disease management and preventive care, ultimately leading to better health outcomes.

4.1.2 Growth of AI and Machine Learning

Another trend is the increasing use of AI and ML tools in healthcare. AI and ML can be used to analyse patient data, detect patterns and improve clinical decision-making. They can also be utilized to enhance patient outcomes and customize treatment regimens. One study, conducted in an urgent care setting in Sao Paulo, Brazil, during the pandemic, found that the implementation of an AI registration system cut down wait times by an average of 12 minutes and saved more than 2,500 hours a year in employee time. AI is already being utilized to increase the accuracy of predictive medicine and enhance diagnostics. Whilst these new channels of advice and treatment have the potential to expand patient access, operate around the clock and lower the workload on already stressed healthcare teams, rigorous testing and implementation is necessary.

The China Medical University Hospital in Taiwan deployed an **intelligent microbial system** into clinical practice in 2022. The AI tool identified a disease-causing pathogen in lab samples in as little as one hour compared with 72 hours for standard tests. The tool reduced antibiotic costs by 25 percent and patient mortality to a certain extent. The Sheba Medical Centre in Tel Aviv is using an AI tool that quickly **diagnoses heart-related issues**. Using a portable ultrasound probe and a computer tablet, treatment costs between USD 2,500 to USD 6,000, far less than the cost of an echocardiography machine and reducing the need for specialty consultation only for extremely complicated cases.

The global market for AI-based healthcare is anticipated to grow quickly as long as technology like these continue to progress. According to a recent analysis by Global Industry Analysts, the AI in healthcare market was valued at USD 14 billion in 2020 and is expected to grow at a compound annual growth rate (CAGR) of 35.9 percent to reach USD 119.8 billion by 2027. In this dynamic market, the US, China, Japan, Canada and Germany are anticipated to set the trend. AI is quickly emerging as a competitive requirement in the medical field. However, a lot of firms are still learning what AI can do for them. AI can help this vital industry in a number of important areas including:

A. Enhancing patient engagement- Many patients struggle to book appointments, access medical records, determine which services are available to them and get answers to simple logistical questions. AI can improve interactions between patients and providers by:

- Simplifying complex medical information: Natural language processing can make medical data more understandable to patients, increasing health literacy. Chatbots can assist with patient questions, appointment scheduling and referrals.
- Streamlining communication among health care workers: AI and machine learning can filter and share relevant information efficiently.

B. Automating claims management- Traditional claims management is costly, slow and error-prone, often relying on manual data input. AI can assist by:

- Automating claims data extraction and input: Robotic process automation tools extract data without manual intervention.
- Providing real-time updates and monitoring
- Automating follow-ups and denials

C. Efficient, intelligent and accurate diagnoses- Diagnosis often depends on complex factors including patient history and genetics. AI can improve them by:

- Analysing extensive medical data: AI can uncover complex patterns and characteristics that might be overlooked by humans.
- AI-enabled solutions could support clinicians in making precise diagnoses using inputs from in-vitro diagnostics, imaging, EHRs, patient conversations, biometrics, images, sensors, wearables and genomics.

D. Personalized and adaptive health care plans- Precision medicine considers an individual's genetics, environment and lifestyle to provide tailored treatments. AI can deliver more personalized diagnoses, prevention and treatment by:

- Connecting various datasets: Machine learning algorithms link treatment outcomes to diverse health datasets.
- AI could interpret biomarker data from smart devices and wearables to generate treatment plans such as sleep analysis, dietary suggestions and even AI-generated music for stress management. Moreover, if a patient faces challenges in adhering to a regimen, generative AI-enabled digital avatars could empathetically interact with patients to understand their barriers and offer potential solutions or alternatives.

E. Optimizing hospital staffing and resources- Demand for health care rises and falls in response to a complex range of factors, making it difficult for hospitals to optimally allocate their supply of critical resources such as medical equipment and staff.

Predictive AI can forecast patient volumes and help hospitals adjust staffing and resources accordingly by:

- Predicting future resource needs: Data mining, modelling and AI provide insights for resource allocation.

F. Population health management- large datasets might be analysed by AI, which could identify patterns that are essential for identifying population health trends. For instance, AI could find risk factors and predictors of diseases like cervical cancer by analysing genomic, socioeconomic and EHR data. Customized textual or audio-visual invitations for screening services might then be produced by AI-enabled marketing and communications. After that, responses, visits and outcomes might be saved and utilized to create more reliable models.

Health care companies can use technology to customize patient interactions and care, relieving clinicians of regular care duties and allowing them to concentrate on treatments that call for their knowledge and skills. For healthcare professionals, AI and other cutting-edge technologies offer the potential to simplify care and administrative procedures. Health care AI received USD 31.5 billion in equity capital from investors between 2019 and 2022 and the sector has continuously led AI mergers and acquisitions. Additionally, half of the 1,500 health care AI businesses were established during the last seven years.

There are essentially endless uses for generative AI in the medical field. Broadly speaking, this phrase describes the process of developing individualized treatment programs for each patient. In reality, technology and data are being used more and more for this. The most cutting-edge uses are in genomics, where AI is being used to analyse patient DNA for illness diagnosis and treatment as well as to develop medications that are molecularly tailored to individual patients (also referred to as precision medicine). A tailored approach to healthcare, according to many academics, improves patient outcomes and makes better use of medical resources. It will also become more and more crucial in tackling the healthcare issues of the future.

4.1.3 Robotics Surgery

Doctors can execute a variety of intricate procedures with greater control, flexibility and precision thanks to robotic surgery, often known as robot-assisted surgery. Minimally invasive surgery or operations carried out through tiny incisions, is typically linked to robotic surgery. A camera arm and multiple mechanical arms with surgical instruments attached are components of the most popular clinical robotic surgical system. Sitting at a computer console close to the operating table, the surgeon manipulates these arms. The surgeon can view an enlarged, high-definition 3D image of the surgical site from the same console. The surgeon leads other team members who assist during the operation. At the moment, robotic surgery is performed using the ***da Vinci surgical system (trademarked medical equipment)***, which consists of a particular collection of

technologies that include a console, a magnified screen, specialized arms for holding instruments and a camera.

These types of non-conventional surgeries mean shorter hospitalization and faster recovery for patients. Other benefits may be:

- Less blood
- Less scarring
- Reduced risk of infection
- Faster return to usual life

The surgeon puts miniature equipment and a high-definition three-dimensional camera into the body through tiny incisions in order to use the robotic system. The surgeon then performs the operation by manipulating that equipment from a nearby console. Consider the robotic system as a kind of supercomputer that translates the surgeon's movements into action in real time, enabling increased precision. The surgeon utilizes master controls during a robotic-assisted procedure and the computer converts/provides the surgeon's actions into movements for the instruments within the body that move precisely in tandem with the surgeon. It should be mentioned that the robotic system is incapable of independent thought. Without the surgeon's supervision, it cannot function!

Robotic surgery has been a part of medical practice for over two decades now but the adoption has been rather slow when compared to the application of this technology in the manufacturing industry. The initial use of robots for procedures like brain biopsies dates back almost four decades. Approval for robotic surgery from the US FDA was received nearly 24 years ago. According to Dr Raj Nagarkar, around 50 lakh surgeries have been performed globally using robotics. Robotics surgery shows promising outcomes in emergency procedures as per reports compiled from 829 healthcare facilities established across USA and published in JAMA Surgery journal of international repute. This was done in specific domains of cholecystectomy, colectomy, inguinal hernia repair and ventral hernia repair. The reduced length of stay suggests a potential improvement in recovery times and resource utilisation, thus, marking a positive development for both patients and healthcare systems (Medical Dialogues, 2024).

In India, Clinical Robotic Surgery Association (CRSA) has made recommendations to Director General of Health Services (DGHS) for incorporation of robotics surgery in the medical curriculum through the National Medical Council (NMC). Robotics Assisted Surgery has come up in a big way in specialties such as gynaecology, oncology and gastrointestinal surgeries. However, to make this technology available for all eligible patients, more surgeons need to get trained in robotic-assisted surgery. As of now, RAS training is currently being given at 35 centres of excellence across the country in partnership with private entities.

4.1.4 Value-based care

Healthcare professionals are compensated according to patient outcomes under value-based care, not the quantity of services rendered! This is seen as the new paradigm for the delivery of patient care. Unsustainable levels of healthcare spending in nations, particularly the Asian economies and other developing European nations, may be addressed with the aid of this novel concept. According to the Frost & Sullivan research, this VBC model seeks to provide patients with higher-quality care at a lower cost. Following the United States as a leader in VBC adoption are Western European nations including Germany, France and Spain.

4.1.5 New wearables and Remote monitoring devices

Wearable technology can monitor a patient's blood pressure, heart rate and level of physical activity. In addition to giving healthcare professionals real-time data, remote monitoring devices can be used to help manage long-term health issues like diabetes or hypertension. Patients can benefit from wearable technology in a variety of settings including their homes, hospital wards and assisted living facilities. According to Frost & Sullivan, a number of consumer-grade wearable device companies including Fitbit and Apple are venturing into the medical-grade wearables industry in response to the growing demand.

In the UK, the Medway NHS Foundation Trust, which operates a hospital in Gillingham, uses remote monitoring technology for an elastomeric pump, a device for administering chemotherapy drugs. The pump allowed patients to receive treatment at home, saving approximately 496 hospital bed days in the first 10 months of use, saving almost USD 200,000. Providers also are investing in technology to accelerate diagnoses and reduce treatment costs for chronic diseases.

According to survey, the need for continuous ECG monitoring has made cardiac wearables the fastest-growing market area. Blood pressure monitoring is another function that will proliferate. The wearable technology market is currently largest in North America, but in the upcoming years, Asia-Pacific is predicted to grow at the fastest rate. Healthcare is greatly impacted by additive manufacturing, which builds things using techniques like 3D printing. It can be used to print tools and devices on demand such as surgical instruments, orthopaedic or dental implants and prostheses, in regions of the world where medical equipment is scarce.

4.1.6 Importance of Healthcare Cybersecurity

The urgent need for cybersecurity in healthcare is the last trend. Healthcare providers are dealing with escalating security threats as a result of the expanding volume of patient data being electronically stored and sent. Cyberattacks can harm a provider's reputation, interfere with healthcare services and compromise patient data. Cybercriminals attempted to take advantage of a vulnerable time for already overburdened health systems, as evidenced by the 42 percent increase in healthcare hacking incidents reported in North America in 2020 alone. Healthcare providers are investing in cybersecurity solutions to avoid these kinds of terrifying security breaches,

which will accelerate the growth of the healthcare cybersecurity industry. The healthcare cybersecurity market is projected to grow at a compound annual growth rate (CAGR) of 16.7 percent, from its estimated 2020 value of USD 9.52 billion to USD 24.1 billion by 2026.

4.2 Current global scenario

Financial strains are a double-edged sword in the digital revolution of the healthcare industry across the globe. On the one hand, technology may lower expenses and increase efficiency. But, on the other, cloud-based solutions adoption may be slowed by the cost of migrating systems to new digital platforms. However, the majority of health executives are aware of the long-term advantages of digitization. Operations, particularly the management and provision of care, have received a lot of attention when it comes to digitization. Further, technology, particularly automation, is also lowering costs and enhancing back-office procedures like clinical coding, billing, scheduling, payroll and procurement.

Telemedicine and online portals for acute and wellness care have gained more attention as a result of the pandemic. However, providers should continue to invest in technology, just as hospital systems and operators did in the past with regard to equipment and offices, if the industry and patients are to continue to profit from it. Three main business issues confront hospital CEOs namely, pressure on margins, hiring, retaining employees and employee fatigue. In the second quarter of 2023, global funding for digital health fell 3% to USD 3 billion, the lowest level in six years. In 2022, venture capital funding, which is frequently used as a gauge of technology investment in the sector dropped by around 30% to USD 27.5 billion from USD 39.3 billion.

Many providers may be reluctant to be early adopters of new technology, particularly for clinical purposes, which could be one factor contributing to the decreasing rate of investment. Many people question if the technological advancements of the last few years will last as demand for telemedicine and other digital solutions declines. However, renewed interest in AI is being fuelled by the possibility of monetary gains, better healthcare delivery and more economical use of resources. For instance, broader implementation in the US might result in yearly savings of up to USD 360 billion or around 10% of the nation's health care expenditures over the next five years. Improvements in clinical operations, quality and safety would account for the majority of the savings for hospitals; continuity of care would benefit doctors and better claims and provider relationship management would benefit payers.

4.2.1 Electronic Health Records (EHRs)

AI could oversee pre-operation routines, reduce documentation requirements and streamline insurance claims. Incoming claims can be better classified and errors can be reduced with AI, which lowers backlogs and possible payment issues. Clinicians can spend more time with patients if they are relieved of such administrative duties. In the United States, doctors devote almost two-thirds of their time to administrative tasks. In-

basket management and AI-managed EHRs allow clinicians to lessen the administrative burden on doctors, which is a major contributor to burnout.

The adoption of EHRs is progressing in several nations. For instance, the NHS intends to implement EHRs in all UK hospitals and community practices by 2025. Although this offers a robust digital foundation, interoperability, that is, connecting linked hospital systems to one another and expanding those connections to outside services like primary care centres is a problem in many nations. Furthermore, there are discrepancies in the data's quality and comparability. A patient's health may not be fully represented by unstructured or unclean data. The majority of businesses are using standard data sets, creating data lakes to aggregate data and utilizing the newest AI techniques to produce insightful analysis. Despite this, in many countries, vital medical information is still stored on paper. Health information exchanges (HIEs), which allow medical institutions to share electronic health records, are expanding quickly. HIEs, for instance, can assist physicians in reducing duplicate testing, improving diagnosis and preventing needless readmissions and prescription errors.

By standardizing technology, the exchanges are facilitating better communication between patients and clinicians and expanding the distribution of care across various care routes, venues and geographic areas. For instance, **Finland** has already set up a procedure for regional EHR exchange. But **Estonia** is the gold standard for digital health. Over 99 percent of the data produced by physicians and hospitals in Estonia is electronic and the country's health system has been fully digital for 12 years now. Video consultations and e-prescriptions are standard procedures and residents have access to their medical records through internet portals. Not only do patients renew their prescriptions without visiting a doctor in person but they also don’t have to go to the pharmacy, either. Most prescriptions are delivered to patients’ homes. In the meanwhile, by 2030, the US Department of Health and Human Services is aiming for a national, interoperable health IT ecosystem that would give health data across businesses and products in a form that users could use more effectively. Customers would be able to safely share information with their preferred providers through the system, which would be updated on a regular basis. It is designed to lower costs, improve population health, drive innovation and empower consumers.

4.2.2 Accessibility

With a focus on preventative treatment, Finland, which started a significant revamp of its health care system in 2023, is creating a digitalized system that promises to provide individualized and cost-effective services, perhaps keeping 80 percent of the population healthy by 2030. For the 20% of patients who require illness treatment or other, more intensive care, that can mean more support. By the end of the decade, Finland hopes that 80 percent of its people will be utilizing digital identity, and all of them will have access to e-health services and digital medical data.

AI can help anticipate patient outcomes based on their individual health profiles, suggest treatment alternatives to patients and providers and notify professionals of issues like allergies or contraindicated medications, in addition to simplifying services. In the meanwhile, generative AI may make use of the different datasets such as wearable technology, sensors and electronic health records that go into medical diagnosis and treatment. Early sickness identification, radiological result interpretation and selecting individuals who require treatment the most urgently can all be greatly aided by this technique.

4.2.3 Collaboration

In order to improve radiological imaging, optimize sleep monitoring and better anticipate clinical outcomes, health care practitioners are collaborating with tech companies to develop AI technologies. A significant language model called **NYUTron** forecasts a number of clinical outcomes, including duration of stay, co-morbidity index, 30-day readmission rates and in-hospital mortality rates. The algorithm outperformed traditional approaches by 12%, predicting patients' length of stay with an accuracy of 79 percent. **Subtle** Medical, meantime, has created solutions to improve radiological imaging data generation and streamline radiology operations. Up to 60% faster PET and MRI scan times are made possible by the company's in-house deep learning algorithms, which improve imaging effectiveness and patient satisfaction.

The Zepp Aura sleep and relaxation platform, created by **Zepp** Health, integrates with its smart wearables. In order to enhance sleep patterns, the tool provides AI-generated sleep music compositions based on the user's heart rate, individualized sleep coaching and sleep quality analysis. The management of increasing data volumes presents another difficulty for health systems. In 2020, the global health care industry produced about 2.3 zettabytes of data. It can make better use of this information with AI's assistance. Providers can lower costs, produce more consistent outcomes and develop a more complete picture of the patient by utilizing centralized clinical data.

AI will soon be able to comprehend and react to inquiries more efficiently, enhancing patient involvement from initial consultations to follow-ups after discharge. Furthermore, in fields like social services, AI's real-time translation capabilities can enhance accessibility and promote health equity. For instance, following Russia's invasion of Ukraine, Deloitte Czech Republic created **IRENA** (Immediate Refugee Need Assistance), a cloud-based virtual contact centre built on Amazon Connect that allowed patients to speak with a virtual assistant in any language they desired using artificial intelligence. In the early days of the conflict, IRENA handled 10,000 calls a day as refugees fled throughout Europe, with up to 80% of those calls being handled automatically.

4.2.4 Trust and Human-AI interaction

Even though AI has the potential to revolutionize healthcare, adoption will probably rely on providers, practitioners and customers' approval and trust. Providers of

technology and healthcare should place a high priority on using this technology responsibly and safely. The technology must be devoid of bias, errors and data breaches in order to gain the trust of patients. That is to say, there should be:

- **Data transparency-** enabling end-users about why data is collected and how it will be used.
- **Non-embeddedness nature-** to shed light upon how decisions were made by the AI systems for users, providers and others.
- **Reliability-** to help people understand the bar for accuracy so that they can hold AI accountable for meeting established standards.

AI is currently better at administrative work than it is at making predictions about diagnosis or providing care. Generative AI has a tendency to fill in knowledge gaps with material that sounds plausible but may not be correct. These outcomes are frequently referred to as confabulations or hallucinations caused by AI. Finding high-quality health care data and the appropriate foundation models are necessary to expand the body of knowledge in generative AI and both may involve significant financial outlays. These expenditures may be crucial to fostering public confidence. The Coalition for Health AI which consists of organizations, university health systems and skilled data scientists and AI practitioners has listed the following characteristics of reliable AI:

- **Safety**- AI systems should not endanger the environment, property, human health or life. This is essentially an extension of the Hippocratic Oath to "do no harm" in the medical field. A number of factors such as insufficient control for bias, accountability or justice might make AI models perilous.
- **Accountability and transparency-** AI ought to be auditable. Data entered into the system should be accessible to individuals and the source of information should be identifiable.
- **Explainable and interpretable-** Physicians should be aware of how the systems generate outputs based on the context in which the information is requested and how the underlying programs gather information. To put it another way, health care AI cannot be enigmatic, that is, it cannot be devoid of information about how its outcomes are generated.
- **Fair and equitable-** AI should not increase a specific group's risk for experiencing bias or adverse outcomes.

4.2.5 Regulating AI in healthcare

In general, the regulatory environment surrounding AI is rapidly evolving. All throughout the world, governments are trying to create efficient regulations. The **EU** is in the forefront. A legislative framework for AI was created by the European Commission in 2021 and final regulations may be put into effect as early as 2025. In order to promote adaptability and autonomy, the UK government released regulations for generative AI in March 2023. These regulations cover data reporting, life cycle accountability and industry cooperation.

However, it has proven more challenging to reach an agreement among legal professionals, scholars, business executives and regulators in **Brazil** and the nation has not yet embraced a unified framework for governing the wide range of generative AI applications. Guidelines focusing on citizen rights, risk classification and governance measures were released in November 2022 by a group of legal, academic and industry experts who collaborated with the nation's National Data Protection Authority. However, the document is currently being discussed at different levels of the Brazilian government. In contrast, the **US** has not enacted comprehensive national regulatory legislation which has led to a disjointed set of state regulations. Health care providers may face more difficulties as a result of the differences in methods for regulating and overseeing AI.

AI has the potential to revolutionize healthcare by streamlining administrative processes and improving the quality of care. It will help the global health system both financially and non-financially, as evidenced by increased clinician satisfaction, better patient experiences and higher-quality care. In the upcoming years, businesses who make early investments in AI and spot chances to use it throughout the value chain stand to benefit from a competitive edge and the ability to provide patients with more individualized treatment. Companies must, however, take action to guarantee that AI is used properly and that its procedures and use are open, auditable and transparent. Companies run the danger of harming patients and other stakeholders if they don't incorporate this into their AI strategy. In order for AI to be successful in healthcare, patients and medical professionals alike must trust the results, comprehend how they are obtained and feel secure knowing that their private data will be safeguarded. Providers that want to foster trust around their use of AI should:

- Adopt strong governance practices around AI to help ensure the organization can innovate with confidence while reducing the risks that come with complex technology.
- Prioritize patient data privacy and protection from cyber threats by addressing external, physical and digital risks. Organizations must decide whether the risks are greater than the possible rewards after the hazards have been evaluated.
- Establish responsibility and accountability for AI in the organization, review rules and regulations that might determine legal obligations and ensure that AI systems are auditable.
- Encourage openness by telling customers how AI is making decisions based on their medical data. The techniques, characteristics and correlations of AI should be transparent and its judgments should be completely explicable.

It has frequently been said that the health sector is slow to adapt and, in many situations, this is accurate. However, if one examines the past few decades, numerous significant changes have taken place. In addition to lowering disparities and increasing resilience, the health sector may revolutionize care delivery, the patient experience and hospital and other facility operations, if it seizes these opportunities. More sophisticated

electronic health records, sharp drops in hospital stays, flexible workforces with a wider range of skill sets (such as physician assistants and specialized nursing cadres) and a greater emphasis on work being done at the highest level of practice have all replaced the paternalistic medical culture. But there is now a real chance that healthcare institutions may go back to "business as usual," implementing change gradually and cautiously. For a variety of reasons, including the fact that healthcare workers are worn out, finances are tight and a lot of change has already occurred in recent years, this may even seem like the correct thing to do, at least temporarily. However, this tendency must be challenged!

Rapid change should be accepted as the "new normal" in healthcare due to waves of crises sweeping the industry. In order to create a sophisticated, modern health care system, policies should be put in place to invest in the health care sector, give priority to rural areas, upgrade hospitals to modern standards, make all technological advancements available and easily accessible and, lastly, establish public-private partnerships.

Chapter-5

Competitive strategies of hospitals

The healthcare industry is a vibrant, diverse field with a wide range of participants. Every kind of healthcare provider has different advantages and disadvantages which add to the complexity of the market environment. Specialty clinics, for example, concentrate on particular medical specialties like cardiology, oncology or orthopaedics. They frequently hire highly skilled medical personnel and draw patients looking for specialized care in these areas. Conversely, outpatient centres offer affordable and easily accessible substitutes for hospital-based medical services. These facilities serve individuals who want prompt care without having to spend the night in a hospital. The growth of specialty clinics and outpatient centres has intensified competition by offering patients more choices. Hospitals are under pressure to improve their service offerings and operational efficiencies since these institutions frequently place an emphasis on patient experience, convenience and shorter wait times. Hospitals are under more and more pressure to provide high-quality care while continuing to be financially sustainable in the quickly changing healthcare sector. Several factors including

- rising patient expectations
- advancements in medical technology
- regulatory changes and
- economic constraints

drive this dual mandate. In order to give the best possible care for patients and efficiently control expenses, hospitals have to negotiate a challenging environment. Hospitals are competing more and more for funding, expertise and patients in the increasingly competitive healthcare market. Therefore, it is essential that they employ strategic tactics in order to set themselves apart and keep a competitive edge. As was previously mentioned, hospitals must strike a balance between cost and quality. Patients' demands for improved results and services are frequently fuelled by the industry's growing transparency and availability of information.

There are no immediate signs of a downturn in the rapidly expanding healthcare business. Healthcare spending growth is accompanied by both possibilities and problems for the sector. If a multispecialty hospital consistently enhances its performance, consistently provides patients with exceptional value and high-quality care and its sources of competitive advantage are rare, valuable, distinctive, non-substitutable or unexplained in terms of causality, then it has a sustainable competitive advantage. Hospitals operate in a dynamic, turbulent and disruptive environment and the term ‘sustainable competitive advantage’ is itself vague and ambiguous. As a result, sources of competitive advantage need to adapt and alter throughout time. This may include:

- **Safety:** In order to gain credibility in the community and guarantee that patients are being returned to better health, healthcare companies must put their patients' safety first. Reducing infection and mortality rates within an institution and encouraging safe pharmaceutical usage are two possible goals related to the safety category. Organizations may make sure they are treating patients safely and fostering community trust by keeping these objectives at the forefront of their thinking.
- **Effectiveness:** Healthcare companies make sure they are creating healthy communities by monitoring the efficacy of their treatments. Reducing readmission rates and enhancing patient information communication during discharge are common objectives in the effectiveness category. Concurrently, value-based care compensation models are replacing volume-based care reimbursement models, where payment is based on patient outcomes rather than the volume of services rendered. This change calls for a concentration on efficacy and efficiency in the provision of healthcare. Therefore, hospitals need to come up with plans that will both improve patient care and guarantee their financial stability. Healthcare companies can enhance their quality of care and strengthen their communities by keeping track of these aims.
- **Access:** It is imperative for healthcare institutions to consistently enhance their accessibility to a wider range of patients. Organizations are able to assist and serve a greater segment of the population by doing this. This promotes inclusion among locals and a healthier community as a whole.
- **Patient-centeredness:** To raise their ratings and ensure that patients are at the centre of all operations, healthcare companies must continuously prioritize the needs of their patients. Gaining more positive feedback from patients and becoming more patient-centred in how you respond to their questions are two significant objectives that could go under this category. In the end, both the patient and the healthcare organization will benefit more from a more personalized and enjoyable experience provided by a patient-centred business.

5.1 Competitive areas within healthcare

5.1.1 Digital health

Many obstacles are frequently considered when considering the state of the Indian healthcare system. These include, among other things, increased service costs, social inequality, a lack of medical professionals, poor medical research and an excessive reliance on for-profit businesses. Since the beginning of time, there have been these bottlenecks, which are hard to get beyond given the population of over 1.35 billion. Given its potential for sustainable economic growth and the impending enhancement of public service delivery, India need tools to raise sectoral productivity. In the era of rapid technology development, digital intervention is a must to improve the efficacy of healthcare.

The competitive landscape of healthcare sector is made more complex by the quick speed at which technology is advancing. It is clear from the industry's outlook that digital health, in all of its manifestations, will revolutionize healthcare. On top of this, the digital record keeping (Electronic Health Record) of the millions of users would be of immense importance in defining the fate of future research and development, user-specific medication and effective disposal of healthcare services. Improved care delivery, more operational efficiency and lower costs are possible with innovations like telemedicine, EHRs and advanced diagnostic tools like virtual consultation and home-based care (covered in chapter 6). However, these innovations also come with a hefty price tag. Hospitals can obtain a competitive edge by successfully integrating these technologies into their daily operations. But these technologies come at a significant cost, which is a problem, especially for smaller institutions with tighter budgets. For instance, telemedicine has transformed patient care by enabling remote consultations, eliminating the need for in-person appointments and increasing access to medical services, particularly in underserved or rural areas. By providing easy and adaptable care alternatives, hospitals that invest in telemedicine can draw in a larger patient population and increase patient satisfaction.

Adopting a universal EHR and supporting it with a carefully thought-out data protection plan might potentially be a game-changer in giving Indians better access to healthcare. Better healthcare services can be provided to the public with the use of insights from integrated data collected from many sources including hospitals, clinics and diagnostic centres.

5.1.2 Integrated costing system

Inadequate costing systems negatively impact pricing, profitability, and ultimately the long-term viability of businesses. These days, the following issues can arise with the costing system

- Invoicing is done for the patient which may be identifiable with the specialties but in the case of bundling, it loses its identity.
- Accounting packages and also finance modules in ERP focus on transaction and report expenses to suit the requirement of Accounting Standards. Unless at the time of implementing ERP, if costing requirements are not defined according to business requirements, integration becomes difficult.
- Information is available in silos and implementing a costing system becomes difficult. Therefore, most of the hospitals struggle with computing the cost of products and services provided by them.
- The inter-related and inter-dependency of processes makes cost management difficult.
- The expense of additional stand-by facilities such as backup operating rooms, generators and staff with additional training raises the complexity of the cost management system.

As a result, an integrated costing system is required. Having an integrated costing system is the best way to get past the present problems. The goal is to analyse, compile, and assess cost data so that management may assess profitability by activity or product, decide on price, compare it to budgets, and put cost-control measures in place. Only when the three most important aspects listed below are combined, will hospitals be able to manage costs effectively:

- **Medical information on patients:** The medical Information on patients is provided by the EMR (Electronic Medical Record) which is capable of providing minute information of a patient, the history and the treatment to the patient.
- **Financial and accounting system:** A financial and accounting system, which may be a finance module in an ERP or a standalone accounting package, fulfils all the requirements of financial reporting for management and statutory.
- **Costing System:** to have an effective and efficient cost management, it has to be integrated with MIS and also FAS as discussed above.

5.1.3 Employee wellness programs

are run by employers. Employers manage employee wellness initiatives with the dual goals of enhancing worker health and assisting each worker in resolving personal health issues. Under this, an employer can offer compulsory employee training, organize health seminars or can execute health program with the third party providing such wellness services or can offer any such programs for the benefit of employees' health. An organization without physically and mentally fit employees is like a body without soul. The notion of wellness is generally associated with the physical well-being only. But, in reality, it is associated with the quality of life of the employees and covers the following:

- Emotional wellness
- financial wellness and
- social wellness

Such programs reduce operating cost by improving productivity of the employees, decreasing sick days, leave of absence and may be able to reduce organization's health insurance cost. They also benefit the employees by reducing their out-of-pocket medical costs, health insurance premiums and overall sense of wellbeing. By lowering medical costs, these initiatives benefit employers and employees in an indirect way. Employers may provide different programs based on criteria. Following are some of the examples:

- biometric testing
- disease management program
- flexible work schedule
- fitness classes
- cafeteria with healthy food
- tobacco/smoking cessation program
- weight management

- health education
- reimbursement system

From the above discussion, it is quite clear that employee wellness programs are very helpful to the organization in several manners. It is no doubt that the companies have to spent a huge amount on such programs and it is needless to say that the benefits of such programs are long lasting and outweigh the cost involved.

5.1.4 Value chain analysis

Products that are lost, damaged or delayed can be extremely dangerous in the healthcare industry since patients may not receive the necessary medications on time. The supply chain and value chain are not interchangeable terms. The flow of things from suppliers to consumers is referred to as the supply chain whereas the creation, delivery and improvement of a good or service are all included in the value chain. Therefore, by guaranteeing that patients receive the materials and treatments they require at the appropriate time, the healthcare value chain enables medical facilities to give patients the best care possible. In the healthcare industry, the following should be monitored:

- **Inbound logistics**: speaks about the standard of inventory and how it is managed. Value-driven inbound logistics guarantees the greatest quality and completeness of inventory. This involves verifying that the products fit all standards such as internal quality control or standard operating procedures (SOPs) and are not damaged or otherwise expired.
- **Operations**: The real product or service is created during the operations stage. Product operations and/or manufacturing strive for waste reduction and efficiency creation in this value-driven situation. This could entail altering production techniques, automating procedures and raising raw material quality standards. Streamlining the production of medications or medical equipment may be the aim of operations in the healthcare industry.
- **Outbound logistics**: similar to incoming logistics, outbound logistics should aim to guarantee that a good or service gets to the client promptly and in optimal shape. In the context of healthcare, this entails ensuring that medications and supplies are given to patients on time and that the goods are genuine and safe. It also has to do with internal supply distribution in medical facilities.

For a hospital to be truly competitive, an efficient value chain creates benefits beyond improving quality of care and securing patient safety and satisfaction. It creates business benefits including:

- **Improved profitability:** an effective healthcare value chain can increase profits by improving supply systems, reducing waste and creating efficiencies across healthcare divisions.

- **Promoting innovation**: less waste and more efficient systems mean resource savvy organisations can devote more resources to R&D that can lead to innovation across the organization including the development of new treatments or therapies and better manufacturing and distribution schemes.
- **Helping meet business goals:** by way of connecting with customers and building brand loyalty.

Hospitals can create long-lasting business models if they comprehend the healthcare value chain, all of its intricacies, and how to most utilize it for patient safety, client happiness and commercial achievement. Together, the integrated systems have the power to synchronize, optimize, automate and oversee nearly every facet of supply chains and value chains, from the procurement of raw materials through production to the delivery of completed commodities to end users. This can result in a completely transparent and traceable system that offers real commercial benefit while protecting goods, people and the environment.

5.1.5 Other best practices

In addition to using technology to streamline processes and make tasks simpler, hospitals must remember patients' fundamental needs while interacting with them. It is common knowledge that patients assess businesses based on a variety of factors, and healthcare facilities are no different. The availability of high-quality healthcare is but one of many factors. But it's also crucial to pay attention to other small details, like the cleanliness and sanitation of the hospital grounds, the housekeeping staff's work, the upkeep of linens, and, last but not least, the contamination or preventive measures the medical facility is taking to stop the spread of infectious diseases. This later aspect held significance during the covid pandemic. Therefore, it is crucial that hospitals pay attention to these supplementary aspects of overall health management as this can go a long way in ensuring the sustainability of the healthcare enterprise and helps in achieving the competitive edge.

5.2 Michael Porter's generic competitive strategies framework

Creating a winning strategy is essential for success in the cutthroat business world of today. In order to surpass competitors, competitive strategy requires making well-informed decisions that necessitate a thorough examination of market dynamics, consumer insights and differentiation opportunities. Hospitals can create a durable competitive advantage, a crucial element of Porter's competitive strategy model by developing and putting into practice efficient strategies. This model offers a useful prism through which to look at these various methods. Porter suggests that companies can aim for the following in order to gain a competitive edge. These various strategies have different effects on hospitals' market positions. This is explained with the help of Figure 5.1 below:

		Competitive advantage	
		Cost	*Differentiation*
Competitive scope	*Total market*	**Cost leadership like Fortis healthcare**	**Differentiation like Amrita Hospital**
	Niche market	**Cost focus like treatment of HIV or cancer**	**Differentiation focus like robotic surgery**

Figure 5.1 Michael Porter's competitive advantage landscape

5.2.1 Cost leadership- Taking the lead in terms of cost reduction means becoming the industry's lowest-cost producer. Hospitals that use this tactic try to draw in patients who are price conscious by offering services at a cheaper cost than their rivals. To save costs without sacrificing quality, this calls for an emphasis on economies of scale, technology integration, and operational efficiency. This is relevant in case of speciality hospitals like fortis healthcare, Christian Medical College in Vellore and Narayana hospital in Bengaluru.

5.2.2 Conversely, offering distinctive services or exceptional quality that distinguishes the hospital from its rivals is the essence of **differentiation**. This approach aims to draw individuals who are prepared to shell out more and who value unique qualities. Important elements of a strategy for differentiation include:

- clinical excellence in terms of highly skilled medical professionals & cutting-edge medical equipment, innovative capabilities.
- patient experience in terms of personalised care, quality, customer service/support and
- specialized services like advanced cancer treatment procedures.

5.2.3 Targeting a particular patient population or market niche is part of the **focus** approach. Either a differentiation focus or a cost focus can do this. While a differentiation-focused approach provides services that are specifically tailored to fit the needs of a niche market, a cost-focused strategy targets a specific demographic or geographic market with requirement of lower-cost services.

Implementing these competitive strategies requires careful planning and execution. Strategic planning involves conducting thorough market analysis, evaluating internal strengths and weaknesses and setting clear, measurable objectives.

5.3 Competitive strategies: Challenges

Hospitals that implement such competitive strategies may also face a number of obstacles. It will take both strategic adaptability and a dedication to innovation to overcome these obstacles. Adopting competitive strategies in the healthcare sector is crucial for hospitals aiming to achieve sustainable growth and high-quality care delivery. Nevertheless, hospitals frequently face a number of noteworthy obstacles that may prevent these tactics from being successfully implemented. Among these difficulties are:

5.3.1 Regulatory Constraints- The competitive landscape is significantly shaped by changes in regulations as well. Among the industries with the most regulations is the healthcare sector. Policies are often updated by governments and regulatory agencies to enhance healthcare quality and accessibility while keeping costs under control. Hospital operations may be greatly impacted by regulatory changes, necessitating modifications to reporting, compliance and care delivery procedures. Compliance with these regulations is mandatory and failure to do so can result in penalties and loss of accreditation. This regulatory pressure adds another layer of complexity to hospital management and strategy formulation. Hospitals need to use strategic techniques to set themselves apart in this competitive market.

One of the industries with the highest levels of regulation is healthcare, with strict laws in place to protect patients, uphold the standard of service and keep costs under control. These include safety regulations of OSHA in the EU, recommendations for patient privacy by HIPAA in the USA and and criteria for quality reporting such as those by CMS. Resources that could be used for strategic initiatives may be diverted by the administrative cost of compliance. These regulations can significantly impact the ability of hospitals to implement specific competitive strategies.

Hospitals may find it more difficult to implement cutting-edge procedures and technologies due to regulatory restrictions. For instance, obtaining regulatory permission for new telehealth services or medical devices may involve drawn-out procedures, which would delay rollout and raise expenses. Non-compliance with regulations can result in severe financial penalties and loss of accreditation. Hospitals are wary of introducing novel tactics that could unintentionally result in violations of regulations due to this danger. Hospitals must invest in comprehensive compliance processes, conduct ongoing staff training and frequently consult with legal counsel to ensure that new plans comply with regulatory standards in order to navigate this regulatory complexity.

5.3.2 Financial Limitations- Competitive strategy implementation frequently necessitates a large financial outlay, which can be extremely difficult for hospitals, particularly those with tight resources. Significant capital expenditure is needed for growing service offerings, implementing new technologies and upgrading

infrastructure. For example, there are significant upfront expenses associated with installing electronic health records (EHRs) or buying cutting-edge medical equipment.

Moreover, upkeep of new services and technologies raises operating expenses. Hospitals need to set aside money for recurring costs including staff training, software licenses, maintenance and technical support. Getting the money needed for these ventures may need some time and work. Due to a lack of government support, public hospitals might have budgetary restrictions whilst private hospitals would require assistance to draw in investors or obtain loans. Financial planning may also become more difficult due to the unpredictable payment environment brought about by the transition from fee-for-service to value-based care models. Hospitals need to create strong financial plans that include efficient cost-control tactics, budgeting and looking into alternate funding options including grants, partnerships and charitable donations.

5.3.3 Resistance to Change- Hospitals are no different from any other organization when it comes to facing resistance to change. A range of stakeholders including patients, administrative personnel, and medical professionals, may exhibit this resistance. Staff members are accustomed to the established cultures and routines seen in hospitals. These habits might be upset by introducing new procedures or technology which can cause resistance. Employee resistance may result from their fear that emerging technologies like automation and artificial intelligence would result in job losses or role shifts. Employee discomfort with new systems might result from inadequate training and support which makes them reluctant to accept them. Overcoming resistance to change requires effective change management strategies. To ease concerns and foster buy-in, this entails including stakeholders early in the process, offering thorough training and assistance, and outlining the advantages of the new tactics.

5.3.4 Market Volatility- Frequent and erratic developments in the healthcare industry can have an impact on hospitals' strategic planning and execution. Rapid changes in the population, breakthroughs in medical understanding, and easier access to health information can all have an impact on patient preferences and expectations. Hospitals have to keep changing to satisfy these new needs. Governments and individuals may decide to spend less on healthcare during economic downturns. Hospital income streams may be impacted during these periods by a decrease in elective treatments and an increase in uncompensated care.

Unexpected health emergencies like pandemics can cause resource pressure, interfere with hospital operations and call for quick changes in strategy. For example, the COVID-19 epidemic compelled hospitals to reorganize their resource allocation, alter the way they provide services and hasten the implementation of telehealth. Hospitals must be resilient and flexible in order to handle market volatility. This entails creating adaptable plans, making investments in predictive analytics to foresee adjustments and keeping up-to-date emergency preparations.

5.4 Competitive strategy of GE healthcare (developed by IIM Ahmedabad)

In early 2000s, GE India directed its focus on healthcare sector in India, particularly medical devices market so as to gain competitive advantage in this burgeoning sector. This was because of the following

- Inflating middle class segment of the population
- Rising disposable income
- Growing health awareness
- Increasing government focus and spending towards socio-economic inclusion of the BoP segment (this BoP market is characterised by presence of large unserved or underserved population).
- Growing participation of the private sector
- Large scale investments for developing and manufacturing affordable devices and equipment.

To them, Bottom of Pyramid (BoP) markets offered vital opportunities in light of the fact that access to high quality healthcare services at an affordable price to the low-income population was the biggest challenge that the healthcare industry was facing in India. The company also felt the need for innovation rather than following the conventional model of developing high end products for western markets and later making changes to adapt them for other developing markets around the world. Further, despite efforts from the government in the form of "***Make in India***" campaign, medical devices equipment industry still witnessed 70% of domestic demand being imported. Through its initiatives, GE India aims to provide improved and better healthcare to more people through innovations, by reducing the cost substantially without compromising on clinical efficacy and thereby increasing the access and quality of health care.

While evaluating different available opportunities, GE focused on innovations that could make an impact in the market rather than just developing super value products. With this approach in mind, GE carefully shortlisted the following critical healthcare areas to make significant impact within the domestic industry

- cardiology
- oncology
- maternal and infant care
- anaesthesia
- intensive care
- post operative care.

GE also created a new organisation model to facilitate developing of super value products. It replaced its existing **glocalization model** by a new India "***profit and loss structure***" that changed the overall accountability structure, that is to say, earlier, GE had a local country head where the business was mostly reported which was further

conveyed to vertical head around the world but now GE flipped that model for its India business. The accountability, empowerment, where to spend the money and how to shape the business were decided in India in contrast to what they had elsewhere. This structure provided a high degree of flexibility to GE India team. It allowed the team members to take decisions regarding where to move and this was one of the strategies of GE to reach out to the masses and serve the needs of the local customer. GE India's team was well aware that to be a market leader and to have sustainable avenues of growth, it needed to focus on the local customer needs, continuously innovate and develop super value products while having strict control over costs. They focussed not just on price but across a set of dimensions like

- Ease of use
- reliability
- protective power
- serviceability
- avoidance of consumables
- proper packaging

The team was well aware of the fact that the equipment manufactured would be used by semi-skilled or even untrained persons. The customers might be intimidated by the complex equipment and end up not using it. Therefore, it was essential to make these products user friendly and easy to use.

For one of their products, "***Lullaby LED phototherapy system for treating jaundice"*** which was a huge success, the company team commented that "the reason it developed/happened here is because the team took the time to understand the real user and environmental constraints and embrace them. Furthermore, the **India P&L structure** empowered the team to adopt crystal clear strategy, that is, to be disruptive and bold rather than incremental in their thinking". This innovation not only provided a solution to the environmental and clinical challenges in health care but also provided customers a compelling, overall value proposition both in terms of up-front cost and operating costs of the product.

GE had been on a learning curve with the launch of every super value product. The focus of the company was on business process innovation and not just product innovation. This included go to market strategy, service strategy, building local distribution channels and sourcing from local suppliers. Beginning with ECG and X-ray devices and moving on to baby warmers and phototherapy devices, GE had continuously repeated success stories of disruptive innovations in India. The campaign "***In India for India***" had proved to be successful strategy resulting in the launch of 25 products. BoP focus helped them to create an innovation ecosystem that made competent team. This team had the necessary expertise which allowed them to respond to the overall macro environment and cope with it in the best manner possible. Lastly, the traditional model of innovating

for developed markets and later selling the modified version in emerging or developing markets gradually started reversing!

Final words

Patients nowadays have greater knowledge and power than in the past. Through social media and the internet, they can get a plethora of information on healthcare providers, treatments and patient testimonials. Patients now expect more individualized care, better services and higher quality care as a result of this transparency thereby, changing the power dynamics. Nowadays, hospitals have to compete on the basis of overall patient satisfaction and care quality. This entails cutting down on wait times, communicating in a clear and timely manner, providing hospitable and pleasant facilities and guaranteeing kind and considerate service. In a competitive market, hospitals that thrive in these areas can set themselves apart.

CHAPTER-6

Types of healthcare services

The healthcare market is split into various downstream and upstream segments as shown in Figure 6.1 given below. Further, based on different procedures and terminologies involved, following types of healthcare services can be found, namely

- Common healthcare services
- Clinical healthcare services
- Healthcare support services

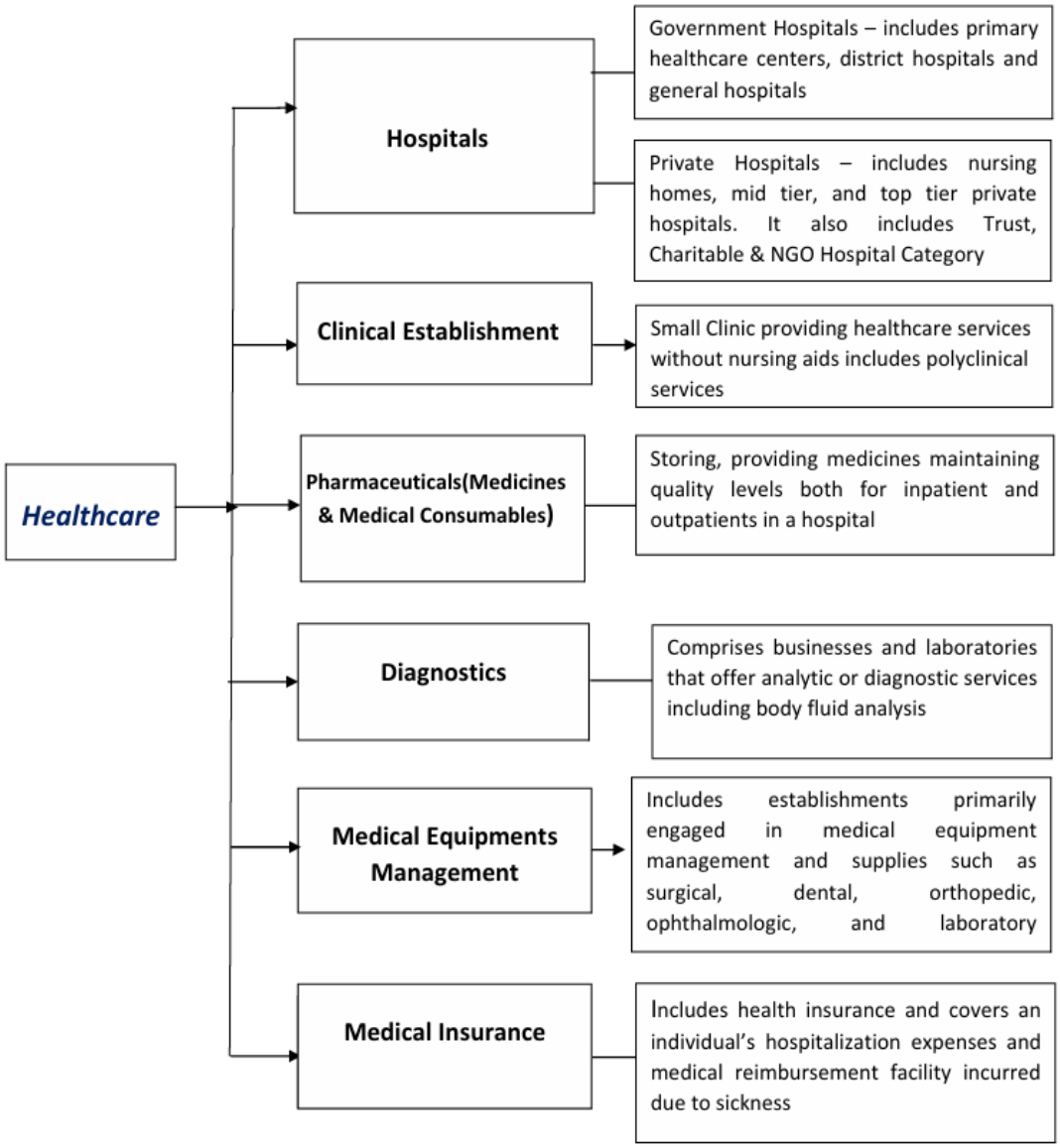

Figure 6.1 Structure of common healthcare services/market.

6.1 Hospitals

A hospital is an intricate organisation which provides healthcare to people through proper scientific equipment and group of skilled and knowledgeable staff. The hospital acts as a healthcare centre to analyse and treat the problems of the patients by providing services for hospitalisation, operating as a vaccination centre for prevention of diseases and at times, act as a teaching medium for professionals like doctors, nurses and pharmacists. There are many types of hospitals found around the world. Some operate as stand-alone facilities while others may be associated with an institution or university. Some types of hospitals offer a broad range of healthcare services while others provide specialized care. For instance, hospitals could be categorised into the following:

6.1.1 Size of the hospital

This is evaluated in terms of numbers of beds. In other words, the complexity of managing a hospital increases with increase in size. As per latest estimates published, India currently has a bed to patients' ratio of 1.3/1000 while the recommended number is 3/1000 thus reflecting an acute shortage of nearly 2.4 million hospital beds in the country. This could further be comprehended from the following table:

- **Small hospital-** is one with approximately 30 beds, has limited resources and lacks high end-care services. This is the most prevalent in India and spans across rural and semi-urban areas. Further, patients find it convenient to approach these hospitals due to their visibility, low-cost services and quick response time.
- **Mid-sized hospital-** has between 30-100 beds and are better equipped to provide complex range of healthcare services.
- **Large hospital-** has more than 100 beds and offers both speciality and super speciality services. They offer intensive care by providing the facility of full-fledged ICU, OT complex, emergency care units and other supportive services like radiology, laboratory etc. However, these hospitals are costly to establish and are typically found in Tier I or metropolitan cities of India. Example, Medanta hospital in Gurugram is equipped with a bed capacity of 1250.

6.1.2 Level of care

This is defined as the amount of care or facilities provided within a particular segment of hospital. This may include:

- **Primary care-** provides basic medical care such as consultation, vaccination, seasonal infections, normal deliveries and treatment of ailment. Such centres working at the grassroot level usually have limited resources.
- **Secondary care-** offer general surgery, non-complex speciality surgery, basic intensive care. This includes community health centres and divisional or district hospitals which are better resourced than primary care centres.

- **Tertiary care-** they offer advanced level of care in fields like cardiac, neuro, nephron or cancer treatment. They have advanced equipment and doctors with highest level of expertise, knowledge and qualification. Government medical colleges are example of this. Example: JIPMER in Puducherry and VS hospital in Chennai.
- **Quaternary care-** Considered as an extension of tertiary care. Such hospitals are engaged in providing the highest level of medicine and specialised services. They look after very rare health conditions experienced by global patients. Example includes medicine experimentation and uncommon diagnostic or surgical procedures.

6.1.3 Majority shareholder

Such categorisation is done as per the ownership pattern of the hospital undertaking. This includes:

Public hospitals run by different levels of government like

- **Central government-** Example: AIIMS, PGIs, Safdarjung hospital in Delhi.
- **State government-** Example: City hospitals like Aruna Asaf Ali hospital under the administrative control of Government of NCT of Delhi.
- **Municipal government-** Managed by district administration.
- **PSU hospital-** Managed by PSUs like CPSEs such as Coal India Limited or Bharat Heavy Electrical Limited

Private hospitals run by private individuals or organisations like

- **For profit motive-** Run as businesses by individuals or partners or corporate entity. Example, Apollo Hospitals across India.
- **Not for profit motive-** Run by NGOs or charitable institutions with no business purpose linked to running the hospital. Example: Meenakshi Mission Hospital, Madurai.

The features and characteristics that a hospital exhibit can vary significantly on the basis of ownership. For example, government hospitals, will typically provide free or heavily subsidized treatment to all but generally, the service quality of government hospital is considered to be below acceptable quality standards. Within government sector, central government hospitals are usually large and provide high-end tertiary care. Similarly, PSU hospital may give special facility/benefit to the employee of that PSU. In private hospital category, whether the hospital is for-profit or not-for-profit can make significant difference. It is typically seen that for-profit hospitals are more focused on providing good customer services. These hospitals also generally offer services that are business friendly. As per estimates, the private sector occupies nearly 63 percent market share of India's healthcare sector. Not-for-profit hospitals generally offer services as per the need of the society.

6.1.4 Length of stay

- **Short-stay hospitals-** Patients in short-stay hospitals are required to be admitted for a relatively shorter duration such as 1 or 2 days to up to 5 days. Most hospitals that we observe in our vicinity are short-stay hospitals.
- **Long-stay hospitals-** These hospitals offer care that generally require its patients to stay for a long-term such as months or years in the hospital. Typically, such hospitals will be metal hospital, rehabilitation centres, geriatric care centres, palliative care units etc. Due to long-term residential requirements, these hospitals are built in a manner that gives it a feel of a home like environment rather than a hospital.

Besides above bifurcation, hospitals around the world can further be categorised into the following:

6.1.5 Specialised hospitals

Specialized hospitals appeal to physicians who entered the medical field with plans to treat people with a specific condition. Example, Gleneagles Global hospital in Chennai is recognised for providing best treatment for lung related disease or ailment. Similarly, BLK Max Super Speciality hospital in New Delhi is famous for bone marrow transplant procedure and other oncology related treatment. Most physicians choose specializations due to personal reasons, an area of intense interest or a desire to provide a comfortable life for themselves and their families. While a primary care clinic offers a broad range of services, a specialized clinic focuses on a specific area of medicine. The providers in a specialized clinic will have specific training that focuses on medical fields such as:

Speciality	Related domain
Cardiology	Heart disorders
Dermatology	Skin disorders
Endocrinology	Hormonal and metabolic disorders
Gastroenterology	Digestive system disorders
Gynaecology and Obstetrics	Pregnancy and women's reproductive disorders
Haematology	Blood disorders
Immunology	Immune system disorders
Oncology	Cancer treatment
Ophthalmology	Eye disorders and surgery
Orthopaedics	Bone and connective tissue disorders
Otorhinolaryngology	Ear, Nose and Throat (ENT)
Nephrology	Kidney disorders
Neurology	Nervous system disorders
Psychiatry	Emotional or mental disorders
Pulmonary	Respiratory or lung tract disorders
Urology	Disorders of the male reproductive system and urinary tract and the female urinary tract

Specialized clinics are often associated with a healthcare system or hospital group but they can also be operated as stand-alone practices. If someone needs care that only a specialist can provide, primary care providers give a referral.

6.1.6 Addiction services or Drug therapy hospitals

These types of care hospitals provide outpatient services to individuals who are recovering from a substance use disorder. A key focus of an addiction services centre is group counselling. Other services that may be provided include:

- drug and alcohol education
- treatment of other medical or mental health conditions
- help with growing your support/social network or returning to the workforce

In India, the Union Ministry of Social Justice and Empowerment has been proactive and has taken measures in the form of implementing of Nasha Mukti Bharat Abhiyan which is operational in all the districts of India. The initiative aims to raise awareness about the ill effects of substance abuse. A key component of this initiative has been the establishment of Addiction Treatment Facilities (ATFs) in all government hospitals. Apart from this, there is in place National Action Plan for Drug Demand Reduction (NAPDDR) under which financial assistance has been provided to state/UT governments to deal with this menace.

6.1.7 Mental health hospitals

The healthcare providers who work at a mental healthcare are focused on helping diagnose and treat many types of mental health conditions. Some examples of these conditions include but aren't limited to:

- anxiety disorders such as generalized anxiety disorder (GAD), panic disorder or post-traumatic stress disorder.
- depression
- bipolar disorder
- schizophrenia
- substance use disorders
- eating disorders

In India, National Institute of Mental Health and Neurosciences in Bengaluru, Central Institute of Psychiatry in Ranchi and Institute of Human Behaviour and Allied Sciences in Delhi are some of the famous examples. Some healthcare providers at a mental health hospital include psychiatrists, psychologists and social workers. The services they provide may include:

- diagnosis of mental health conditions

- outpatient counselling which can take place in an individual, group or family setting
- prescription medications to help manage mental health conditions

6.1.8 Palliative care centres or hospice centres

These are centres that provide care to those patients whose diseases are incurable or terminal in nature. In palliative care centres, the aim is to provide symptomatic relief from patients (such as relief from pain and swelling) while helping the patient to carry out his/her daily routine. Example: Ganga Prem Hospice in Rishikesh offers care for cancer patients.

6.2 Clinical Establishment

These are small clinics providing primary healthcare. This is the first contact a person has with the health system when they have a health problem or issue that is not an emergency. The doctors people often see at a primary care clinic, practice general medicine in their field. Your general practitioner (GP) or local doctor is a primary healthcare provider and so are nurses, pharmacists and allied health providers like dentists. In India, the concept has different names like Mohalla Clinics in Delhi, Basti Dawa Khana in Telangana and Apala Dawa Khana in Mumbai. As per Bhore Committee of 1946 which recommended PHC for every 30,000 population, these clinics form the base of healthcare system by providing services which are of preventive, curative and promotive nature.

Primary healthcare includes seeing health professionals to help you maintain good health, with regular health checks, health advice when you have concerns and support for ongoing care. It is the part of the health system that people use most and may be provided, for example, by allied health professionals like a GP, physiotherapist or pharmacist. Primary care clinics cover a wide range of routine and preventive healthcare services such as:

- annual physicals check-ups
- diagnosis, laboratory testing such as blood tests and urine tests
- vaccinations
- screening and treatment for conditions like high cholesterol, high blood pressure or diabetes
- care for minor symptoms such as sore throat, cold, cough, flu or nasal congestion
- treatment of some injuries such as minor cuts or burns
- promoting good health and early intervention

Your primary healthcare practitioner is usually your regular GP who provides comprehensive and ongoing general medical care but you may have several primary health professionals you see regularly. A primary healthcare service may diagnose and treat common health conditions within their area of expertise. They can also assess the

urgency of your medical problems and direct you to the best place for that care. The following aspects are important part of clinical establishment:

6.2.1 Community health centres is a type of clinic that's community-directed and supported by government funding. They're aimed at serving communities that may not have access to affordable healthcare. To receive funding, a community health centre must meet certain criteria like:

- offer healthcare services within an area or community that's classified as medically underserved
- adjust the costs of services based on an individual's ability to pay

6.2.2 Sexual health clinics has a specific focus on sexual and reproductive health for both women and men. They provide different types of services such as:

- access to contraceptive methods such as condoms, oral contraceptives (birth control pills) or intrauterine devices (IUDs)
- screening and treatment for sexually transmitted infections (STIs)
- pelvic exams
- screening for some types of cancers such as cervical cancer, breast cancer and testicular cancer
- vaccinations for diseases like HPV or hepatitis B
- HIV services including testing, treatment and access to preventive medications
- help with men's health conditions like erectile dysfunction or premature ejaculation. Dr. SK Jain's Burlington Clinic was awarded with best and successful treatment in this category last year.
- infertility counselling or referrals
- abortion services or referrals
- counselling following sexual assault

6.2.3 Rural health clinics are at the frontline of healthcare delivery in rural areas. They serve as a vital link between the community and the broader healthcare system, facilitating health promotion and disease prevention activities. Rural health clinics provide necessary primary or preventive care. A service is considered medically necessary if it's required to either diagnose or treat an illness or condition.

6.2.4 Mobile clinics are customized vehicles that travel to different areas to provide medical services. It's estimated that there are currently around 2000 Trusted Source mobile health clinics in the United States. Such concept has emerged lately in different parts of Uttarakhand through joint efforts from both public and private intermediaries. This initiative is part of World Bank's Uttarakhand Health Systems Development Project (Chabbra and Anand, 2024). Mobile clinics are a valuable tool for providing vital services to communities with barriers to healthcare access such as:

- lack of reliable transportation
- financial concerns regarding healthcare

- little or no health insurance
- limited healthcare providers in the area

6.3 Pharmaceuticals (Medicines and Medical consumables)

The Indian pharmaceutical industry is considered as the beacon of light across the globe. With valuation of nearly USD 50 billion, Indian pharmacies supply nearly a quarter of all medicines demanded in UK, 40 percent of the generic medicines demand in the USA and commands 20 percent share in global supply chain of medicines. The industry benefits from cost competitiveness driven by factors such as lower labour costs, economies of scale and efficient manufacturing processes. Further, new companies are entering the industry like Mankind Pharma and MedPlus offering affordable healthcare to vast majority of the population.

In modern world, allopathy as a system of medicine is pre-dominantly used, however, in India Ayurveda, Homeopathy, Siddha and Unani are also recognized system of medicine and preferred by many people. Thus, hospitals do provide these systems of medicine also. Depending upon their dominant system of medicine, a hospital can be classified as Homeopathy hospital, Ayurveda hospital or Unani hospital. While such hospitals are few in numbers, there is an increasing interest of people in availing treatment from these systems of medicine.

This also encompasses the establishment of Jan Aushadhi Kendras by Government of India so as to provide essential medicines at low cost to the citizens. To quote, the number of such entities has risen from 80 to 10000 in past 10 years saving roughly INR 26,000 crores for the poor segment of the population. Recently, JIPMER in Puducherry has opened an outlet of Jan Aushadhi Kendra to provide 1759 generic medicines at affordable prices covering therapeutic groups such as cardiovascular, anticancer, anti-infectives, anti-allergic and gastrointestinal medicines. Lately, government through NMC also announced new regulations for hospitals and medical practitioners regarding prescription of generic medicine for patients instead of branded names so as to further contribute towards affordable healthcare in the country.

6.4 Diagnostic centres

In this type of care hospitals, special equipment/techniques are used to find the nature of disease. Such techniques are used to determine the cause of illness or disorder. Example, Dr. Lal Path Labs in India is a classic example of this type. The equipment provides healthcare practitioner with information about the presence, severity and causes of diseases in patient. Following methods are used in this type of hospitals

- X rays
- Blood tests
- ECG
- Echocardiography
- Liver function tests

- Urine and stool routine

6.5 Medical Equipment Management

A dialysis equipment provides a specific type of service that provides dialysis to people with kidney failure. Dialysis is a procedure that helps filter waste and other potentially harmful substances from your blood. While some people may choose to have dialysis at home, there are some advantages of going to a dialysis clinic. For instance, when dialysis is done at a clinic:

- the procedure is supervised by trained medical professionals.
- you don't need to keep dialysis equipment in your home.
- you get the chance to interact with others who are undergoing the same procedure.

There are also downsides to going to a dialysis clinic. Some of the drawbacks include:

- less flexible scheduling
- having to travel to the clinic
- more time between treatments

In India, an estimated 2,00,000 people await kidney donations. Prime Minister Narendra Modi launched Pradhan Mantri National Dialysis Programme (PMNDP) as part of National Health Mission (NHM) for eligible beneficiaries suffering from chronic kidney disease (CKD) free of cost in all the district hospitals of the country. As per latest statistics, some 19.58 lakh beneficiaries have availed dialysis services through 9,477 hemo-dialysis machines installed across 1,403 centres of nearly 686 districts of the country.

6.6 Medical Insurance

Health insurance is a financial tool that provides financial coverage for medical expenses. A health insurance policy is a contract between the insurance company and an individual. The individual pays a premium to the insurer and the insurer offers financial protection against healthcare expenses to the individual in return. Health insurance covers wide-ranging medical expenses like the cost of medicines, surgery, doctor's consultations, room rent, ambulance charges and more. Subject to the terms of insurance coverage, either the insured pays costs out-of-pocket and is subsequently reimbursed or the insurance company reimburses costs directly. Purchasing health insurance is crucial for a number of reasons like

- Helps deal with rising medical costs
- Critical illness covered
- Added protection
- Easy cashless claims
- Tax savings: under section 80D of the Income Tax Act, 1961, premiums paid towards the upkeep of health insurance policies are eligible for tax deductions.

For a policy for yourself, your spouse, your children and parents below the age of 60, you can claim a deduction of up to INR 25,000 per year from your taxable income. If you've also purchased a policy for a parent who is over the age of 60, you can claim an additional deduction of INR 50,000.

Ayushman Bharat, is a national public health insurance scheme of the Government of India that aims to provide free access to health insurance coverage for low-income earners in the country. It is a flagship scheme launched under the National Health Policy to achieve the vision of Universal Health Coverage (UHC). This initiative has been designed to meet Sustainable Development Goals (SDGs) and its underlining commitment, which is to "leave no one behind." Ayushman Bharat is an attempt to move from sectoral and segmented approach of health service delivery to a comprehensive need-based health care service.

6.7 Clinical healthcare services

A clinical procedure is a course of action intended to achieve a result in case of people facing health problems. A clinical procedure is done with the intention of determining, measuring or diagnosing a patient condition or parameter and it is also called as medical test/procedure. In other words, a clinical procedure can be defined as any practice of a health practitioner that involves a combination of special skills or abilities and may require drugs, devices or both. To start with, Figure 6.2 given below gives a summarised view of what comprises clinical health practices.

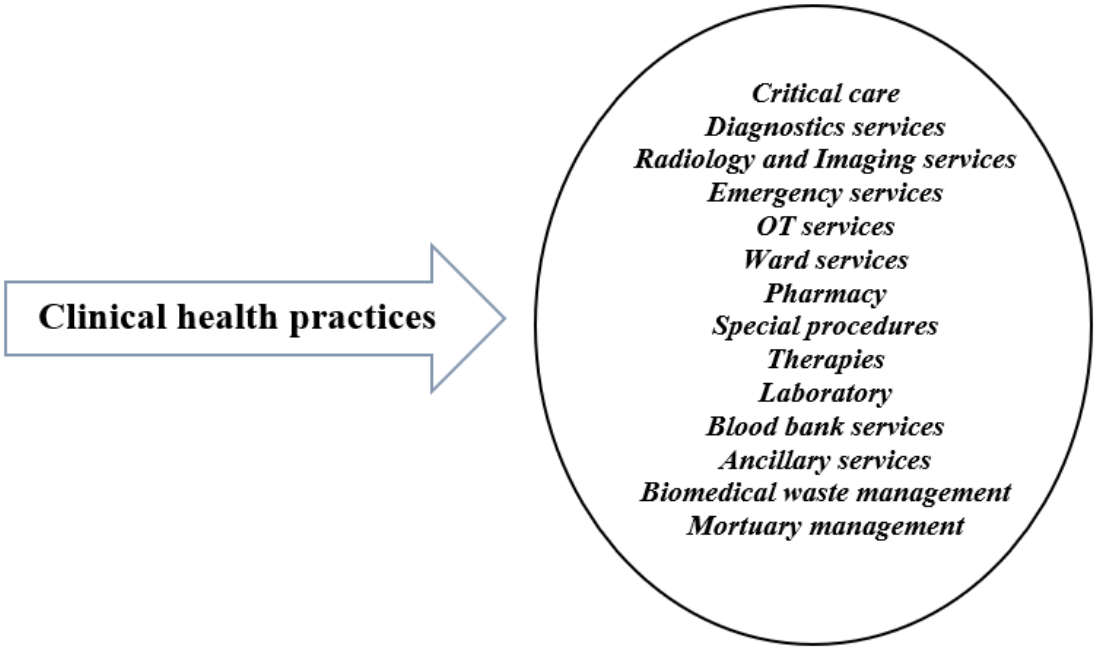

Figure 6.2 Clinical activities in healthcare.

6.7.1 Critical care- Critical activities in a hospital means any activity that is very fundamental and vital for the treatment of a patient and will run in sequence as depicted pictorially in a flow chart given above. This includes the following:

1. Intensive Critical Care Unit (ICCU) handles severe and life-threatening health cases like cardiac arrest, respiratory arrest, pulse rate less than 40 or greater than 140 beats per minute and repeated seizures.
2. Intensive care Unit (ICU)
3. Coronary care Unit (CCU) for patients who need constant care especially patients suffering from heart related problems.
4. Neo Natal Intensive care unit (NICU) to deal with ill or premature new born babies or infants.
5. Paediatric Intensive care Unit (PICU) provides sick children with highest level of medical care along with nursing care.
6. Special care baby unit (SCBU)
7. Other specialist such as Intensive therapy /treatment Unit

Patients with potential or current organ failure are prime candidates for ICU or other specialty care. Other factors that will determine who is or is not admitted to the ICU include:

- Diagnosis
- Illness severity
- Prognosis and anticipated quality of life
- Treatment availability
- Response to treatment so far

An ICU doctor will also consider the patient's age, coexisting conditions, physiological reserve and personal wishes. Procedure done in critical care unit are as follows:

1. Arterial line or intra-arterial catheter or Art line.
2. Intra-Aortic Balloon (Counter pulsation) Pump or IABP or Balloon Pump.
3. Bi-level Positive Airways Pressure (BiPAP)
4. Non-invasive ventilation (NIV) to help patients breathe, that is, use of breathing support administered through face mask, nasal mask or helmet.
5. Continuous Positive Airways Pressure (CPAP)
6. Bronchoscopy for lung disorders
7. Central Venous Catheter (CVC)
8. Haemodialysis- process by which a machine filters out waste, salts and fluids from the blood when a person's kidneys are not healthy enough to perform it adequately.
9. Extra Corporeal Membrane Oxygenation (ECMO)
10. Nasogastric or NG Feeding / Orogastric or OG Feeding

11. External Ventricular Drain (EVD)
12. Intercostals catheter (ICC)
13. Inotropes, whether positive or negative, strengthens or weakens muscular contractions respectively.
14. Intravenous Cannula / IV Cannula / Drip to provide fluid, nutrition or medication
15. Intubation / Insertion of a breathing tube (an endo-tracheal tube, ET-tube or ETT)
16. Lumbar Puncture (LP)
17. Swan Ganz catheter / Pulmonary artery catheter
18. Trans-Esophageal Echo (TOE)
19. Tracheotomy, a medical surgery or procedure intended to help reach air or oxygen to lungs by opening trachea or windpipe from outside the neck.
20. Urinary Catheter to drain urine

6.7.2 Diagnostic services- This includes the following

1. Gait Laboratory undertakes a comprehensive evaluation of muscle activity by examining postural and walking related problems. Gait Analysis Laboratory in Shoe and Product Development Centre (SPDC) is an initiative taken by CSIR under Ministry of Science and Technology, to strengthen gait analysis in the country by focussing on cutting edge research and development in Orthotics and Prosthetics so as to improve the ambulation of disabled.
2. Medical photography
3. Neurophysiology, that is, performing electrophysiology or EEGs
4. Physiological measurement tests, that is, ECGs, Echo cardiograph tests, BP monitoring
5. Others, that is, lung function tests

6.7.3 Radiology and Imaging services- It goes without saying that the technical aspects of hospitals are of immense value. Without its aid, the whole healthcare system will be on the road to ruin. Thus, services like Radiology and Imaging holds especial place in the scheme of healthcare. The modern drug can't be prescribed without certain insights. Radiology or Radiodiagnosis is one such vital division of the hospital which clearly contributes to the patient's care. It gives, alongside pathology, an essential demonstrative reinforcement to every one of the specialities which can't work successfully without its help. Radiology has immensely expanded in the recent decades. This includes the following

1. Computerized Tomography (CT)
2. Fluoroscopy is done to capture real time movements occurring inside the body parts.
3. General radiology

4. Magnetic Resonance Imaging (MRI) or medical imaging test that produces detailed images of every organ inside the human body including bones, muscles and blood vessels.
5. Mammography is an X-ray picture of breast to check for any signs of breast cancer.
6. Nuclear medicine
7. Positron Emission Tomography (PET)
8. Ultrasound
9. Digital Subtraction Angiography (DSA)

6.7.4 Emergency Procedure- Emergency medical care is that care which is accessible to the patients in the first few hours of serious medical complications, injuries and onset of an acute medical or obstetric problem. They deal with various kinds of diseases like communicable infections, non-communicable conditions and injuries of various levels. Emergency care unit as a whole, is interdependent and includes pre-hospital care, hospital care and the transportation. These three components should work together to make the working situation of the hospital effective. Generally, these three components are different in different countries. Due to the lack of good pre hospital transportation or absence of transportation altogether, death of the patients can occur like maternal death. Pre-hospital care consists of providing the care to the communities (injuries or illness at home, school or other location) until patients receive proper treatment from the hospital. In places with no formal set up of the pre-hospital system, any layman can be trained and any drivers having the basic knowledge, can get involve in giving care to the patients. This includes the following:

1. Emergency department/minor injuries units/walk-in patients
2. Maternity services
3. Birthing operations
4. Delivery room/labour ward
5. Obstetric operating theatres

6.7.5 Operating theatres services- This includes the following

1. Operating theatres including sterile service department
2. Operations preparations and emergency activity during operations

6.7.6 Wards services- A hospital ward can be defined as a suite of rooms or a block, forming a division of hospitals, which is shared by patients who need similar kind of care. The objective is to provide best quality nursing care to patients and to ensure sanitation and cleanliness so as to protect patients from potential hazards, infections or diseases. This includes the following

1. Admission /discharge facilities

2. Home care
3. General patient care wards

6.7.7 Pharmacy- Purchasing medicines and keeping up an excellent stock of medications, manufactured substances and chemicals render a considerable amount of cash, next to compensations and wages. Accessibility to the correct medication at the required place at the critical moment is the means to the hospital's existence. Delays are deplorable in this regard, as the impact of no availability of the right medication at the right time can be frightening. It can be a question of life and death. There ought to be a legitimately build drug store department under the supervision of an expertly skilled and qualified pharmacist. The components of the pharmacy are as follows:

- Provisioning, acquiring, putting away and distributing drugs, chemicals and pharmaceutical sundry things.
- Ensuring the effectiveness and quality of medications along with prescribing medicines to inpatients and outpatients.
- Maintaining data with respect to quality, cost and sources of supply.
- Researching pharmaceutical issues emerging in the utilisation of the drugs.
- Guaranteeing adherence to the laws, rules and controls appropriate to pharmacy.
- Promoting thriftiness in the utilisation of medications and building up accounting methods for pharmacy's costs and supplies.

6.7.8 Special procedures (Operations)- This includes the following

1. Angioplasty- a medical procedure to open blocked coronary arteries or veins so as to restore blood flow to the heart muscles without undertaking open heart surgery. It is usually performed when there is an emergency case of heart attack.
2. Angiography
3. Endoscopy
4. Interventional imaging
5. Lithotripsy- a procedure that involves physical destruction of hardened mass like kidney stones.
6. Renal dialysis
7. Dental operations of higher order
8. Coronary

6.7.9 Special treatment rooms- This includes the following

1. Dressing rooms
2. Hyperbaric chamber
3. Plaster rooms

6.7.10 Therapies- This includes the following

1. Radiotherapy treatment (external beam and brachytherapy)
2. Diabetic educator- Dieticians are responsible for recording nutritional history of patients particularly of those with allergic reactions to certain food. Dieticians are also concerned with counselling patients and their families with regards to their diet. Skilled dieticians and nutritionists offer professional recommendation on diet for hospital wards and outpatient clinics, forming part of a multidisciplinary team.
3. Dietetics
4. Neuropsychology
5. Occupational therapy
6. Orthotics
7. Physiotherapy
8. Play therapy
9. Podiatry (including therapy services)
10. Psychology
11. Speech and language therapy

6.7.11 Laboratory- Similar to the radiology and imaging department, laboratory services too are indispensable part of the hospitals. The whole healthcare system relies on it to diagnose the patients' ailments correctly and treat them successfully. The significance of medical laboratories can't be overestimated in light of the fact that the effect of medicine, today, requires more laboratory tests and doctors have the requirement for such space, regardless of whether they are private specialists or hospital-based specialists. Without a doubt, one explanation behind the concentration of doctors in urban areas and towns is the accessibility of such services in comparison to the rural and less densely populated areas. A medical laboratory can be a source of high revenue for the hospital. An effective laboratory for outpatients can diminish the quantity of patients admitted exclusively for laboratory tests, hence, decreasing burden on hospital beds. A proficient lab additionally helps to diminish the normal period of rest of the admitted patients. This includes the following:

1. Autopsy- A surgical procedure that consists of a thorough examination of a corpse by dissection to determine the cause, mode and manner of death or to evaluate any disease or injury that may be present for research or educational purposes.
2. Clinical biochemistry
3. Clinical microbiology
4. Clinical pharmacology
5. Cytogenetic
6. Cytology or cell biology is the study of structure, function and behaviour of cells
7. General pathology

8. Haematology (laboratory)
9. Histopathology
10. Immunology (laboratory)
11. Phlebotomy- process by which a puncture is done in the vein, usually in the arm, to draw blood.
12. Serology- scientific study of serum and bodily fluids.
13. Toxicology
14. Virology

6.7.12 Blood bank- Blood bank is a unit, where blood is received from the donors. Donated blood undergoes processing, stored in a hygienic place and finally issued to a needy patient, on the recommendation of a doctor. A blood bank should be situated in the hospital itself. It should have its own department in the hospital so that it would not be disturbed by the patient's attendants. It should be designed in such a manner that the reception room, donation room and rest room are easily accessible to a person. The functions of a blood bank are:

- Collection of blood, its products and their distribution.
- Clinical utilisation of blood and its products.
- Lab procedures such as blood grouping, cross matching.
- Research work
- Promoting training and teaching for safer transfusion and best use of donor blood.

6.7.13 Others- This includes the following

1. Audiology
2. Dental
3. Interpreters
4. Optometry
5. Orthotics
6. Outpatient clinics, including outreach (extended) clinics
7. Palliative care unit
8. Social work

6.7.14 Ancillary activities that are incidental to the above-mentioned clinical activities- This includes the following:

1. Patient Catering
2. Clinical coding
3. Clinical safety, quality and audit
4. Clinical Equipment maintenance

5. Medical records-is the summary of notes, forms, reports and summaries of the patient during the treatment of illness. It is a document of facts discovered, conditions found by the observer and result of examinations and therapy. Such records should be adequate, comprehensive, accurate and properly planned.
6. Specimen collection
7. Sterile services
8. Clinical Training for nurses, OT supporting staffs

6.7.15 Bio medical waste management- Waste management is necessary for pathology laboratories because of prevailing regulations that control and restrict the disposal of waste generated by all medical facilities. There are some rules, which are to be followed in the disposal of waste in the laboratories:

- Medical wastes should be collected, separated and segregated carefully.
- Medical wastes should include infectious wastes such as human blood, body fluids and discarded microbiological cultures.
- Sharp and broken glasses should be discarded.
- Blood collection materials such as syringes, giving and taking sets and ESR tubes should be disposed of carefully.
- Garbage and trash should include everything except hazardous and medical wastes.
- Corrosive, toxic, carcinogens, ignitable and other chemicals such as explosive should be included in hazardous wastes.
- Recycling and Disposals

6.7.16 Mortuary Management- This includes the following

1. Records management in mortuary
2. Storage management in mortuary
3. Disposal management in mortuary
4. Compliance on regulatory requirements of all above

The following figure 6.3 provides a clear description of various common and clinical healthcare services that might be availed by a patient visiting the hospital. For brevity, the diagram provides flow of services for both inpatients and outpatients.


Arrival
Reception
Initial Payment and Registration
Diagnosis
Testing and Special Procedures
Out Patient
In Patient
Payment
Advance Payment
Doctor Services and Nurse Services
Testing and Special Procedures
Admission in the Hospital
Referrals to other Departments
Normal Admission
Admission in ICU
Check Out
Contd...
Pre – Surgery tests
Any Complications
Referrals to other Departments
No
Surgery
Post Surgery or Recovery Rooms
Tests and special Procedures
Balance Payment and Check Out

Figure 6.3 Patient flowchart.

6.8 Support activities in healthcare services

All those activities that are fundamental in a typical hospital and that are unique in health care sector are classified as technical activity. On the other hand, all those activities that are fundamental to the business purpose of the same hospital are classified as non-technical. Again, technical activities shall fall under medical department and medical support department of the hospital whereas non-technical activities shall fall under the non-medical services department of the hospital. Medical and medical support departments can be termed as profit centres and semi-profit centres. The former has already been discussed in section 6.8 above. However, non-medical service departments can be termed as cost centres. The same is graphically represented in Figure 6.4 given below.

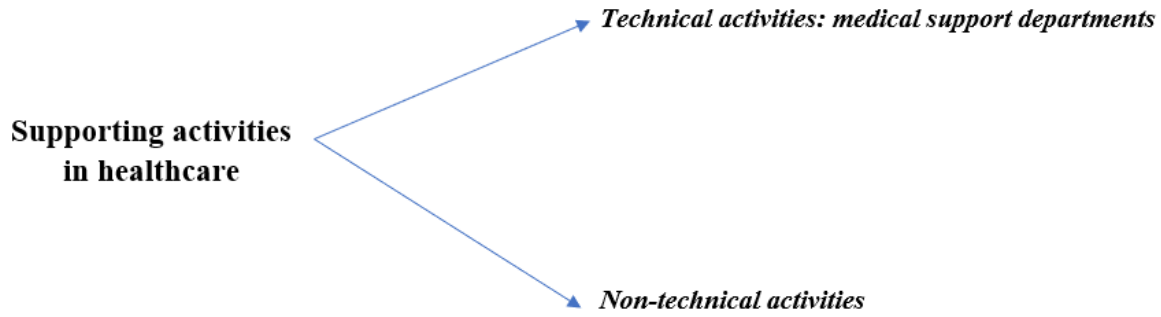

Figure 6.4 Healthcare support services.

All technical services' costs can be attributable/traceable to the medical service/medical procedures and hence can be called as direct costs. All non-technical activities shall fall under non-medical common services and called as ancillary cost centres. The costs incurred in these service costs centres are to be collected/pooled as much as possible to the medical and medical support departments and the balance can only be apportioned to non-medical services departments depending on the type of activity on a quantifiable basis. The best way is to identify the activity rendered to which user department. The following are the various technical and non-technical activities associated with a medical care facility:

6.8.1 Technical Activities: Medical Support departments

They are indispensable pillars of the healthcare ecosystem. They streamline operations, enhance patient experiences and optimize resource allocation, enabling healthcare professionals to focus on delivering exceptional patient care. Analytical imaging, pharmacy and laboratory tests, although not openly concerned with patient care, are all significant for the accurate as well as appropriate analysis. Provided by every hospital,

clinical support services are the mechanism that keeps the hospitals working. It is necessary to keep these services updated with the latest technology. As healthcare evolves, the role of support services will only grow, ensuring that patients receive comprehensive and efficient care in a rapidly changing landscape. This includes the following:

- Diagnosis activities- facilitates the provision of timely, cost-effective and high-quality diagnostic care in safe and secure environments. It includes the clinical services of pathology and laboratory medicine, radiology and nuclear medicine. These services function in the settings of ambulatory care, acute care, mental health, geriatric and rehabilitative care. Facility based diagnostic service employees include physicians, nurses, technicians, technologists, administrators as well as program assistants and analysts.
- Pharmacy and medical support services management
- Treatment of inpatients or outpatients
- Operation Theatre (OT) management
- Ward management
- ICU management
- Laboratories and research activities
- Rehabilitation activities
- Statistics on treatment practices and bio behaviour statistics
- Mortuary and disposal management- While studying the support and utility services of a hospital, the role and importance of mortuary services cannot be under emphasized. The subject of disposing off the dead is hedged around by religious, social and cultural beliefs and practices. Whatever these may be, however, it is necessary to provide within the hospital or its precincts, a place to which a dead body can be moved quietly and discretely, in order that other patients are not upset. It is also necessary to see that the body can later be removed from the hospital, for burial or cremation, by some exit screened out from the view of patients and others in the hospital. When death occurs in wards, the body is immediately shifted to mortuary until other formalities of the hospital are completed. The hospital morgue unit is a facility for the viewing and/or identification of a body and the temporary holding/storage of bodies prior to transfer to a mortuary. Thus, a need for a proper cold storage is important. The added responsibility of hospital authorities is to see that no mix up occurs and the particular body is handed over to its rightful heir/relatives for the last rites.
- Ancillary medical services like ambulance services- An ambulance is a transporter for carrying the sick or injured people to the hospital from patients' homes or any spot, for treating an illness or injury. The term ambulance does not

only mean the vehicle with the flashing lights and sirens. The term also includes a large number of non-urgent ambulances, which are for the transport of patients without an urgent acute condition.

- Other allied services incidental to main technical department.

6.8.2 Non-Technical Activities

The non-technical services or non-medical shall consist of those entire departments that render service to the main technical department and the hospital as a whole. A few illustrative departments are listed below:

- Accounts & Finance
- MIS and Costing- enable streamlined operations, cost reduction and waste minimization, thus contributing to financial stability and operational excellence. Healthcare professionals are also increasingly embracing Electronic Health Record (EHR) systems, which transform the quality of care, improve clinician satisfaction and facilitate patient decision-making. Accurate information from EHR empowers physicians, improves patient care and benefits medical and legal practices. Decision-support features such as standardized checklists, alert signals and predictive tools encourage the utilization of best practice alerts (BPAs) for more effective and efficient care. Notification signals and BPAs prompt the sharing of relevant information and help prevent potential adverse events.
- HR department- in healthcare organizations are responsible for typical HR functions such as recruiting, hiring and advising senior management on the pay and benefits packages needed to attract and retain the best talent. They're responsible for communicating and tracking numerous government regulations covering certifications, safety, privacy and other areas. They're hiring in an industry where competition for talent is particularly fierce and candidates have many other options. They oversee a workforce that faces stressful situations on a daily basis and requires physical safeguards and mental health support. They collaborate with IT to protect the privacy of patient and employee records. They work with managers to adjust staff scheduling processes to reduce burnout and they develop programs that improve patient satisfaction and deliver positive patient outcomes, for example, by designing compensation and bonus systems that align pay with performance improvements and patient outcomes.
- Information Technology (IT) department- Smooth communication and coordination among healthcare professionals are vital for patient safety. Healthcare support services facilitate efficient communication channels, ensuring that information flows seamlessly between different care providers, departments and healthcare settings. This promotes collaboration, reduces the risk of miscommunication and enhances patient safety through accurate and timely exchange of critical information.

- Administration department specific to hospitals- Efficient management of administrative tasks is a crucial component of healthcare support services. Today, healthcare providers spend a significant portion of their time on administrative duties. By entrusting dedicated support staff with tasks like appointment scheduling, medical billing and insurance claims, healthcare professionals can allocate more time to delivering quality patient care. This leads to improved patient outcomes and enhanced operational efficiency. This includes the following:

a) Reception activities- look after the daily interactions between the patients coming to the hospital and the staff accommodating them. This is routine exercise and is omnipresent across different sectors of different industries. This may include daily register maintenance, record-making, schedule arrangement between doctors and patients and keeping track of ongoing practices.

b) Patient admissions- Non-technical extend beyond administrative tasks to encompass patient assistance and engagement. Research shows that patients who receive attention from healthcare-support staff exhibit higher levels of engagement in their healthcare decisions. This involvement leads to improved patient compliance, reduced risk of re-admissions and overall better health outcomes.

c) Office management- Efficient workflow management and optimal resource allocation are vital for healthcare organizations.

d) Procurement cum stores- Supply chain management plays a crucial role in this regard, ensuring the availability of essential medical equipment, medications and supplies. Inefficient supply chain practices can lead to substantial financial losses.

e) Central Sterile Services Division (CSSD)

f) Medical records management- Accurate documentation is crucial for ensuring patient safety and continuity of care. Healthcare support services provide comprehensive documentation support, ensuring that medical records are complete, up-to-date and error-free. By maintaining accurate and detailed patient records, healthcare professionals can make informed decisions, reduce the risk of medical errors and enhance patient safety.

g) Bio Medical waste management which consists of human anatomical waste like tissues, organs and body parts, microbiology and biotechnology waste, waste sharps like hypodermic syringes, needles and scalpels; discarded medicines and cytotoxic drugs; soiled waste like bandages, plaster casts, materials contaminated with blood, tubes and catheters; liquid waste from any infected areas of the human body and other chemical waste. All such waste may be dangerous and needs safe disposal as per Bio Medical Waste Management Rules, 2016.

h) Medical furniture maintenance and Equipment's maintenance department
i) Security department
j) Transport department including ambulance vehicle management
k) Safety department- One must remember that hospital acquired infections is way much dangerous than the naturally acquired one. Safety workshop, fire drills and certain other methods should keep everyone in the hospital informed about the threats involved. The medical laboratory is one of those places where the risk of catching infections and the chances of laboratory accidents are quite high. Therefore, the laboratory must maintain rigid rules and regulations for safety of the staff. Both the employees and the management are accountable for the safety of the hospital or clinical premises. The staff must be aware of their role in their own safety and also the safety of their fellow colleagues. Establishing a safe zone for working staff including the supplies of proper safety apparatus and the personal protective equipment, wherever required, is necessary.
l) Hospital and estate main
m) Tenancy department
n) Canteen
o) Utilities

Chapter-7

Hospital Management Information & Performance Appraisal System

Automation and management of data have made rapid advances all over the world. Almost every field of human endeavour has been invaded by computers. Application of computers in health sector has increased phenomenally all over the world for many reasons including labour saving, improved monitoring or functioning of hospitals and enhanced patient care and better planning.

Hospitals form key centres for delivering satisfactory medical care to the clientele and in recent years, both the technology of medical care and the organisation of health care delivery systems has changed. There is an increased stress on checking quality of the service based on consumer feedback. Accessibility, patient satisfaction and scientific effectiveness are parts of quality of medical care. In order to deliver a satisfactory Medicare, quick and scientific decision making is essential which is directly dependent on reliable, valid and relevant information available within a specified time frame. For this, one has to make use of computer-based methods of information storage, handling, processing and retrieval. This is possible with the help of efficient MIS in place.

7.1 Management Information Systems or Hospital MIS (HMIS)

It involves the study of people, technology, organizations and the relationships among them. MIS professionals help firms realize maximum benefit from investment in personnel, equipment and business processes. MIS is a **people-oriented** field with an emphasis on service through technology. In other words, the term HMIS refers to the part of health informatics that focuses significantly on hospital management's administrative, clinical and financial needs. Businesses use information systems at all levels of operation to collect, process and store data. Management aggregates and disseminates this data in the form of information needed to carry out the daily operations of business. Everyone who works in business, from someone who pays the bills to the person who makes employment decisions, uses information systems. In fact, many (if not most) businesses concentrate on the alignment of MIS with business goals to achieve competitive advantage over other businesses.

An adaptable and proficient HMIS plays an essential part in every hospital. In our case, HMIS collects, stores, analyses and evaluates health-related data from health facility to district, regional and national administrative levels. It provides analytical reports and visualisations that facilitate decision making at all these levels. Healthcare professionals are adjusting to the latest technology improvements to keep their IT infrastructure high. A HMIS derives much of its information from patient-provider interactions in health facilities. Hospitals, health centres and community outreach services provide health care across preventive, promotive, medical and surgical, rehabilitation and palliative

care interventions. HMIS helps healthcare associations to conquer any complicated difficulties they face in the current healthcare industry. So, fundamentally, HMIS is intended to oversee patients and their related data in an incorporated manner utilizing electronic data processing and anticipate health status within the hospital environment. Presumably, it aims to provide better healthcare service with preciseness along with the following:

- Delivery of excellent quality patient care.
- Elevated integrity of data.
- Improved financial management system.
- Decrease in re-testing since normal data shows what has been analysed and diagnosed.
- No duplication of data sections.
- Easy to use and user-friendly interface
- Further improved turnaround time required for results and reports
- Reliable storage and quick retrieval of shared data.
- Limit admittance to patient healthcare information to only authorized personnel and the workforce.
- Decreased transcription errors

HMIS facilities collect data and reporting of the data which, in turn, helps monitoring health services performance in terms of access, coverage, quality and equity at all levels of the health system. The information generated show the range and volume of services delivered to the population including prevention such as immunisation, antenatal, delivery and postnatal care, treatment of acute conditions such as malaria, diarrhoea and upper respiratory tract infections, chronic conditions such as HIV, tuberculosis, high blood pressure and management of surgery and trauma. In addition to generating information on interventions like admissions, treatments administered and health outcomes, a HMIS also produces data on the availability of services, infrastructure, equipment and supplies needed to deliver such interventions. The HMIS provides information for local planning. It also contributes to country level monitoring and evaluation, research, policy and planning and generates indicators about outputs, outcomes and impact. Database/cloud servers are utilized to store data on the medicines and drugs expected to cure significant diseases. The HMIS works online and covers the hospital network through the intranet. It likewise plans online appointments for specialists and it deals with the payment records of patients. The essential utilization of the HMIS is to oversee and deal with healthcare management. The HMIS has brought up hospital staff, patients, nurses, attendants and doctors to add all resources and data anywhere and anytime.

It is an important discipline that combines business and computing to assist organizations in digitizing work and managing an increasingly remote workforce. MIS professionals have specialized knowledge in areas such as data analytics, software development and project management, allowing them to assess and adopt new technologies to enhance business processes. To start with, all information systems in a hospital can be grouped under the following three broad categories namely,

1. Administrative information system
2. Technical information system
3. Financial information system

Let's discuss each one of these components separately.

7.1.1 Administrative information system: This encompasses all those information that are required to manage day to day administration of the hospital. Further, statistical reports of all these administrative information are maintained in every hospital on a daily basis and integrated with various other information management aspects as well as with legal and compliance related aspects. An illustrative list of administrative information systems is as follows:

- Patient registration details like gender, age among other particulars.
- Inpatient and Outpatient registration
- Medical alerts details
- Appointment scheduling (Patient/Doctor wise)
- Doctor's schedule summary
- Doctors daily schedule list
- Patient visit history
- Medical record movements
- Appointments for radiology tests and Operation Theatre (OT) visits
- Patient visit slip
- Sponsorship details
- Patient related enquiries
- Bed allotment
- Admission details
- Demographic details
- Payment details
- Discharge details
- Doctor related enquiries
- Availability details
- OP clinic details
- Operation schedules

7.1.2 Technical or Bio-management information system: This information system can be broadly classified into the following-

- Doctors' Management Information System
- Patient related bio-management information system
- OPD and IPD management information system
- Medicine stock management information system
- Medical equipment performance measurement management
- Utility information management system

In addition to above classification, this system encompasses all those information that are required for a patient and patient related bio-management such as

1. Patient search with various search strings
2. Patient demographic viewing
3. Previous visit details
4. Medical history of the patient
5. Billing details of patient
6. Medical alerts details
7. Consultation duty roster
8. Diagnosis details
9. Patient's appointments
10. Daily/Weekly schedule summary
11. Appointment Scheduling/Rescheduling facility
12. Outpatient medical observation details
13. Investigation/treatment history
14. Clinical service details
15. Doctor's diagnosis statistics

7.1.3 Financial information system: This deals with all those information that are relevant for revenue streams and expense streams that are applicable to a hospital. In addition, this financial information system covers all those information that enable the management the best use of all resources such as fixed assets, inventory, employees, debtors and creditors and all other medical resources such as pharmacy or medical services departments. In addition to above, other illustrative list of the accounting information and day to day operating MIS reports would be as follows:

1. Department wise revenue for the period and variance.
2. Doctor wise revenue and professional fees earned by them.
3. Class wise revenue and occupancy

4. Diagnostic departments, sub department wise test and studies count
5. Patient count in OPD and IPD
6. Conversion ratio of OP patient to IP patient
7. Operation theatre wise number of surgeries
8. Investment in medical equipment and its ROI
9. Credit party wise revenue and their outstanding/ageing analysis
10. Daily revenue and daily collection of all divisions
11. Department wise profitability
12. Department wise charity and concession given
13. Patient wise charity and concession given
14. Contribution on trading activity (Surgical, Pharma and Drugs)
15. ABC analysis of inventory, particularly in drugs where there is expiry and near expiry dates.
16. Adequacy of variance insurance and claim settlement
17. Number of hospital and corporate health check-up packages and conversion ratio

7.2 Inventory information system

covers all financial data on such inventory that enable the management to minimize the inventory without affecting the quality of stocks such as medicines or other consumables. Each main medical procedure function is dependent on medical support and, in turn, each of the above are dependent on the infrastructure services being provided by the service department. Thus, almost all the functions in a hospital are completely interwoven and remain integrated in the overall output/services of the hospital.

The data flow remains seamless and hence capturing the data remains a big challenge to accountant in a hospital. Data availability and integrity plays a key role in finding the sustainability of a hospital. Hence, there is a necessity for a hospital to have a robust data collection centre such as accounts and statistics department. Normally, the accounting system provides the information. However, each information has to be read/interpreted in conjunction with the activities rendered and along with the cost implication and hence, there arises a necessity for an integrated approach to the accounting function in a hospital.

Hospitals need very good accounting practices to address multi-disciplined angles related to hospital management and services, doctors and patients. Speed and efficiency with quality delivery is the motto in each and every hospital. The hospital management system integrates different sub systems used in hospitals such as financial management, inventory management and other important systems. The integration of all systems

leads to availability of updated information at one desk. Information about appointments, bed availability and schedules of doctor, specialized services and treatments is easily available to the person sitting in the front desk.

There are many software companies who design the "**Hospital Management Information System**" integrated with **Activity Based Costing** with a view to reduce operational costs of serving patients by removing operational inefficiencies and improving the quality of health care. Hospital MIS also reduces the workload of hospital employees and improves their efficiency. Further, if majority of the clinical processes are automated, then it would make available to hospital staff more time to devote in providing quality patient care. It would also streamline personnel management of nurses, clinical specialists, physicians and other health care professionals to provide highest quality care and that too, 24x7. ERP also gives complete insights of project related data in a structured manner. The ERP system integrates projects with procurement, fixed assets and stocks. Further, the ERP system plays an important role in creating centralized storage of data and its easy access helps the management to take timely informed decisions. There are many standalone modules, as listed below, relating to healthcare industry and which are available in the market.

- **Administration**: This module may have several sub-modules covering the services such as OPD Master, IPD Master, Investigation Master, Package Master, Doctor Master, User Master, Announcement Master (ticker running continuously giving announcements, any major changes), OT Master and Ward Master.
- **Billing**: this system is designed to function in conjunction with treatment, laboratories and radiology procedures. This can provide flexibility for a convenient billing experience. This module covers services such as payment module (tracking of cash/credit card/corporate credit/TPA credit), patient billing details, automatic room charges, provision for pre-billing, posting of charges for services, insurance module/TPA (interlinking of corporate with respective insurance/TPA), maker checker module (provision for checking of bills generated by cashier), billing scroll summary (details of daily/weekly/monthly collections for cash/credit card) and advance/refund management.
- **Dietician**: This module may have several sub-modules covering the services such as Diet Management, BMI (immediate calculation of body mass index as per patient), Calorie Management, Food Ordering, Raw Material Indenting, Diet Sheet, Quality Check and Cost of Services and Billing of Special Services.
- **Electronic Medical Records (EMR):** This module may have several sub-modules covering the services such as patient information retrieval, instant information (data available for both online and offline instantly), analysis (analysis of various record of similar diseases available to doctor), evaluation

(tracking of different types of treatment on various diseases), accuracy of information, treatment analysis, Drug Taken, History Availability and ancillary services.

- **Engineering Services:** This module may have several sub-modules covering the services such as asset management, AMC Services, Spares Management, Contract labour management, Vendor Management, Stores, Consumable Tracking, Scrap Management and Repair & Maintenance.
- **IPD Consulting:** This module may have several sub-modules covering the services such as Cost Estimation (initial estimate prepared for patient depending on ward/surgery chosen), Admission Request, Transfer Details (transfer from ICU/shifting across wards can be done), Doctor Notes (updating of status of patient during every doctor visit), Nursing Notes (updating of status of patient by nurses tracking different patient parameters), Drug Request (indenting of drugs by nurses patient-wise as per advice by doctor), Discharge Summary, Refund Management, Scroll Management (daily cash/credit card/ corporate/ insurance/ TPA tracking).
- **Insurance**: This module may have several sub-modules covering the services such as initial estimate, insurance master, TPA master, package master, outstanding report (tracking of outstanding of corporate/ insurance/TPA), advance/refund management, actual cost and billing.
- **Investigation**: This module may have several sub-modules covering the services such as Investigation Master, Package Master, Respective Doctor Master, Investigation Service Billing, Investigation Dashboard, Investigation Reference, Sample Collection and Investigation Reporting.
- **Laboratory Information System:** This module may have several sub-modules covering the services such as equipment integration, sample management, electronic data exchange, patient data management, patient data analysis, report generation, barcode generation, equipment maintenance and quality assurance.
- **Nursing**: This module may have several sub-modules covering the services such as patient record updation (updation of status of patient parameters), Physical Examination Module, Drug Indent, Drug Returns, Drug Transfer (drug transferred across wards/location depend), Drug Re-Order (automatic reorder depending on nursing indent requirement), Investigation Management, Procedure Management and Diagnostics Management.
- **OPD Consulting**: This module may have several sub-modules covering the services such as appointments, patient history and doctor corner, prescription, investigation, follow-up appointments, symptoms, diagnosis tracking and last visit details.
- **Operation Theatre** (**OT**): This module may have several sub-modules covering the services such as OT Allocation (booking of OT on particular date/time with

OT team), OT Master (different type of surgeries with class/ speciality/grade/ ward/price master), Surgery Master, Surgery Class Type (different types of class to be included), Doctor/Anaesthetist Booking, OT Status (utilization of OT daily/ weekly/monthly/ annual), OT Tool Details (booking of OT tools for particular operation), OT Reports, OT Inventory Management (charging of consumables/ special services during an operation).

- **Pharmacy**: This module may have several sub-modules covering the services such as Billing (billing for both OPD and IPD), Drug Inventory, Supplier Information (tracking of vendor information, delivery, and turnaround time), and Drug Issue to patient, Manage Expired Items, Goods Receipt & Stock, Minimum Stock Levels and Re-order Quantity.
- **Reception/Cashier**: This module may have several sub-modules enabling staff to provide the information relating to appointments (showing dash board for information relating to today appointment, scheduling, re-scheduling appointments, history of earlier appointments), doctor directory, cash desk of collection of payments, reports, billing, refund etc.
- **Wards**: This module may have several sub-modules covering the services such as ward allocation, ward shifting, ward master, occupancy dashboard, consent form, record management, label generation (automated label generation for patient as well as patient files), inpatient registration, payee/company/insurance (input details of self-paying/corporate/ insurance/TPA/package).

As technology advances, HMIS must be adaptable and flexible in development. Moreover, the hospital management software helps information to be accurately and securely stored, decreases the cost of dependability in its use and gives quick and easy admittance to data while confining unauthorized access in specific circumstances.

7.3 Performance appraisal system in a hospital

The British Association of Medical Managers has defined appraisal as "the process of periodically reviewing one's performance against the various elements of one's job". The way health systems are designed, managed and financed affects people's lives and livelihoods. Hospital industry is a service industry, where patient (customer) is the most important person. The challenge is to gain a better understanding of factors that makes a difference and encompass all actions with primary intent to improve health. This is no denial to the fact that there should be formal mechanisms for evaluating performance but, rather, it should be viewed as only one of a number of mechanisms for improving the quality of clinical care. Performance appraisal is an educational intervention. It is an important indicator for both employees as well as the organisation in order to understand their productivity and to improve performance. Some of the objectives of performance appraisal system includes

- Performance appraisal can help the hospital organization to decide ways to manage and distribute funds.
- Performance appraisal gives a way for hospitals to determine which personnel and department have contributed the most to the intended progress so that organisation can reward their top-performing units consequently.
- Performance appraisals also help employees and their executives to build a plan for employee improvement through additional training and better accountability.
- It also helps to detect weaknesses prevailing within the structure so that the employee could work to resolve it.

A hospital renders services that are both tangible and intangible and hence the performance of a hospital can be measured both in qualitative and quantitative factors.

- ***Qualitative*** factors are more medical oriented and
- ***Quantitative*** factors are more business/commercial oriented.

This guidance note covers the quantitative aspects of the performance only. The performance of a hospital can be done by analysing the income streams and expenditure streams separately and also in comparison to each other, that is, the performance of each medical and medical support services is related to each other and hence performance of a hospital is dependent on several interdependent variables. This chapter discusses the uses of cost data within a hospital and therefore, aims to show managers and hospital administrators how costing can help improve their performance. This chapter is structured around profitability level, strategic level and efficiency levels performance.

7.3.1 Profitability level:

1. ***Departmental profitability-*** cost and revenue should be split by different departments like labs, radiology, OT, Blood bank, wards, emergency, gastro, cardio among others. Profitability should be calculated for each department and reconciled with Profit and Loss statement. This report will help in budgeting for the expenses and fixing the responsibility for achieving budgets on the Heads of different departments.
2. ***Service level profitability-*** cost should be ascertained for each lab test, radiology investigation, room type and the departmental costs should be further split for each service. The revenue from each service should be compared with such costs and profitability for each tariff code should be ascertained. This report will guide in reviewing, rationalizing the tariff.
3. ***Patient level profitability***- The revenue from each patient should be broken down to the service elements like individual lab tests and the costs of each service should be matched and aggregated at the patient level. This will help us arrive at the profitability at the patient level.

4. ***Customer segment wise profitability-*** The profitability of each patient segment like cash, insurance, corporate can be analysed, once the hospital is ready with patient level costing. Other grouping of customers like based on geography and age is also possible at this stage. This will help in focusing on marketing efforts on those segments where the profitability is good. Also, the areas where the margins are low can be targeted for corrective action like re-pricing, hiving off, downsizing and cross-selling.
5. ***Specialty wise, doctor wise profitability***- The patient level profitability can be summed up by primary consultant and then by the medical specialty. This will help us in understanding the profit generated by each specialty and the relative performance of each doctor.
6. ***Disease wise profitability or analysis using Diagnosis Related Group (DRG)-*** each IP patient is assigned a disease/treatment code. The patient level cost data should be summarized by this DRG code. This will help in arriving at the actual treatment cost of treating a patient for a given medical condition with associated complications.
7. ***Measurement using current cost accounting and imputed costs*** (***Beyond P&L)-*** Though the costs are captured from the reported financials on actual basis, there should be a provision to enable factoring the historical costs to current market value. Especially the real estate which is not revalued in the books and which is worth many times that of the historical costs. Similarly, the cost of equity which is not reflected in books owing to established accounting conventions, should be imputed as a notional cost, for arriving at the profitability.
8. ***Cost reduction (Kaizen, lean Six Sigma)-*** Comparing best practices across locations, implementing uniform protocols to optimize costs are other few cost reduction and performance measurement areas. For example, common procedures like CABG, TKR, the standard material requirements can be formalized by comparing the procedure material requirement of various leading consultants and their clinical outcomes regarding theatre consumables, pharmacy, pre and post operation, diagnostic tests, stay duration etc.

7.3.2 Strategic level:

1. ***Budgeting perspective-*** The cost to the patient should be measured in full, which includes the doctors' fees and pharmacy supplies. This will help in quoting for insurance, corporate customers as well as offering package products for common diseases to cash patients.
2. ***Standard vs actual perspective or Variance Assessment perspective-*** Developing clinical pathways for all the DRG codes will help in determining the standard treatment costs for a given disease, severity and associated complications or co-morbidities. This data can be used to compare the actual cost of treatment done for patients falling into the corresponding DRG code.

Variances can be analysed and controlled, wherever there is a significant deviation.

3. ***Cost of entire care cycle-*** Normally, system captures the cost of the patient per admission/episode. It should be extended to data capturing for every in-patient to the OP visits prior to and after the admission(s) using the ID reference for a span of say 1 year, so that the full cost of treatment spanning across the entire cycle can be correctly understood for each DRG type.
4. ***Cost control perspective-***
   - identifying areas of waste/rework that can be corrected, periodic replacement of consumables, expansion or contraction of services, grouping or regrouping of services;
   - rendering in-house service or sub-contracting (as outsourced one) the same;
   - enhancing cost-effectiveness in hospitals (such as comparing alternative approaches like engaging a resident doctor on full time employment or engaging doctors on call, in-house ambulatory vs. outsourced ones).

7.3.3 Efficiency level:

Performances are measured not only in terms of money but also to be measured in terms of effectiveness of resources utilised.

1. ***Measuring effectiveness of treatment***- The effectiveness can be measured using suitable parameters like patient survival rate, treatment effectiveness, back to normal life, re-admission for same disease. The cost of treatment of a particular patient or disease should be read along with effectiveness measure to ascertain the true cost and value.
2. ***Cost of Quality***- The patient value proposition includes the quality as perceived by patient. Quality is contributed by two factors
   - **Clinical efficiency** This is measured by various parameters such as Hospital acquired infections, patient fall, wrong medication, wrong diagnosis are examples of factors affecting clinical efficiency. Actions are taken for correcting low scoring parameters. The cost of such actions can be summed up as a cost of quality.
   - **Operational efficiency** This is measured by patient satisfaction index. Delay in discharges, billing disputes, food quality, nursing attention, noise level, room ambience, mal-functioning ACs are examples of factors affecting operational efficiency.

7.3.4 Other suggested indices for measuring the effectiveness of a hospital are as follows:

1. **Referral Index**:
   - Proportion of referred cases verses total patients.
   - Time lag between initial diagnosis and referral to various level of set up.

- Proportion of referrals- where adequate two-way referral information is made available.

2. **Bed occupancy ratio** = $\frac{\text{Number of patient days during the year}}{\text{Number of bed days during the year}}$ x 100

   This ratio indicates as to how far the available bed capacity has been utilised. A value equal to 100 would be ideal. A value less than 100 shows the unutilised capacity and a value more than 100 show overcrowding.

3. **Turn over Interval** = $\frac{\text{The total vacant bed days during the year}}{\text{The number of inpatient admission during the year}}$ x 100

   The index shows the number of days on an average per patient for which a bed has remained vacant. In case of a large hospital, it will be worthwhile to work out this index for individual departments or wards.

4. **Average duration of illness** = $\frac{\text{Total number of new inpatient days during the year}}{\text{Total number of inpatients admission during the year}}$

   The index is complementary to the above-mentioned index "average turnover interval." This is more useful if computed for individual diseases.

5. **Average daily out - Patient admissions =**
   $$\frac{\text{Total number of new outpatient attendance during the year}}{\text{Total number of working days during the year}}$$

6. **The average outpatient attendances per patient** =
   $$\frac{\text{Total number of new outpatient attendance during the year}}{\text{Total number of new outpatient admission during the year}}$$

7. **Average cost of medicines for a patient** = $\frac{\text{Total cost of medicines for in-patients for the year}}{\text{Total number of in-patient admissions}}$

The index should be computed separately for individual diseases.

8. **Cost of daily diet** = $\frac{\text{Total expenditure on diet during the year}}{\text{Total number of inpatient days}}$

9. **Fatality rate** = $\frac{\text{Number of inpatients deaths during a specific year}}{\text{Number of discharges during the same period}}$ x 100

10. **Anaesthesia death rate** = $\frac{\text{Number of deaths due to Anaesthesia}}{\text{Number of patients anaesthetised during the period}}$ x 100

11. **Post operative death rate** = $\frac{\text{Post Operative Deaths}}{\text{Total Operation during a given period}}$ x 100

7.3.5 Costing MIS and P&L analysis

The following costing annexures provides description of profit and loss statement in ABC hospital. These annexures provide detailed information regarding the costing practices and maintenance of other financial records within the purview of MIS. Moreover, such records are kept at various levels, that is,

- **Sponsor** level, that is, who and how the patient/consumer is paying for the treatment. For instance, whether the hospital is receiving funds in the form of cash, whether it is corporate/employer sponsored or whether it is provided by TPA mechanism.
- **Speciality** level, that is, which medical services are contributing to the revenue generation and in what proportion. For instance, the amount of contribution hospital is generating from emergency services, dermatology services, gastronology, nephrology, neurology, cardiac surgery, ENT surgery, plastic surgery, physiotherapy and other home care services. All these services are denoted by different medical codes within the hospital.
- **Ward** level, that is, whether the wards or ICUs or OT rooms are running at full capacity or above normal capacity or below normal capacity including the revenue generated by each of the wards/ICUs. The occupancy in these OT rooms or wards (whether in hours or bad days) indicates the performance of hospital during the year.

All this is evident form the following tables. For instance, Table 7.1 showcase the maintenance of revenue and expenses based on the type of patient, that is, whether the amount is received by the hospital in cash or through the company the patient is working for or whether the patient is a TPA client.

Table 7.1 Sponsor-wise profitability analysis (in lakhs).

Particulars	Cash	Corporate	EWS	International	PSU	Research	TPA	Total
(A) Gross revenue	4,112	1,330	219	1,767	1,256	1	4,079	12,764
(-) allowance for deduction	-	- 7	-	- 8	- 36	-	- 31	- 81
(-) package discount/premium	- 97	11	3	- 110	- 59	-	- 80	- 332
(-) Discount allowed	- 139	- 3	- 225	- 28	- 3	- 0	- 167	- 565
(B) Net operating income	**3,876**	1,332	**- 3**	**1,620**	**1,159**	**1**	**3,802**	**11,787**
Drugs & Consumables	600	108	12	206	533	-	648	2,106

Particulars	Cash	Corporate	EWS	International	PSU	Research	TPA	Total
Equipment hiring charges	21	5	1	10	3	-	22	61
Patient diet cost	17	5	2	7	11	-	31	72
OTHERS	414	45	0	613	22	0	328	1,422
(-) Total variable costs	**1,051**	**162**	**16**	**835**	**568**	**0**	**1,028**	**3,660**
Anesthesia								
Radiology services	- 1	- 0	- 0	- 0	- 1	- 0	- 2	- 5
Ambulance services	2	0	-	0	0	-	1	3
OTHERS	102	18	9	41	42	0	78	290
(-) Total direct costs	**102**	**18**	**9**	**41**	**41**	**0**	**77**	**289**
(C) Gross margin	**2,723**	**1,152**	**-28**	**744**	**549**	**1**	**2,697**	**7,837**
(-) Total clinician pay-out	570	91	45	282	48	0	628	1,665
(-) Total direct fixed cost like front Office	194	38	11	77	56	0	224	601
(D) Operating margin	**1,958**	**1,022**	**-84**	**384**	**445**	**1**	**1,845**	**5,571**
(-) Total indirect fixed costs	828	154	56	327	278	2	668	2,313
(E) EBITDA	**1,130**	**868**	**-140**	**57**	**167**	**- 1**	**1,176**	**3,258**

Table 7.2 given below describes the details of revenue and expenses across speciality services availed by the patients visiting the hospital. Since, hospitals today provide a wide range of services, it is necessary to keep a record for the same individually so as to portray a true picture of the services which were most used by the patients during a particular year. In other words, costs and revenue should be split among different departments like radiology, emergency, cardiology and others. Then, profitability should be calculated for each of these departments and reconciled with the P&L account. Such department level or specialty-wise profitability report will help in budgeting for the expenses and fixing the responsibility upon the respective HODs for achieving those budgets. This also includes splitting the departmental costs into

different services provided like room type availed, laboratory test. This will help in better comparison of the costs and will guide in reviewing and rationalising of the tariff.

Table 7.2 Specialty-wise profitability analysis (in lakhs).

Package name	Emergency	Dermatology	Internal Medicine	Neurology	Plastic surgery	PHP	Radio therapy
(A) Gross revenue	67	1	476	774	88	29	313
(-) allowance for deduction	-0	-0	-3	-4	-0	-0	-4
(-) package discount/premium	-	-	-1	-3	-	-	-1
(-) Discount allowed	-30	-	-36	-24	-2	-1	2
(B) Net operating income	**37**	**1**	**436**	**743**	**85**	**27**	**310**
Drugs & Consumables	4	-	33	82	4	-	12
Equipment hiring charges	-	-	3	8	0	-	0
Patient diet cost	-	-	6	5	0	0	0
OTHERS	1	1	17	71	34	1	19
(-) Total variable costs	**4**	**1**	**60**	**165**	**39**	**1**	**32**
Anesthesia							
Radiology services	**-0**	**-0**	**-1**	**-1**	**-0**	**-0**	**-0**
Ambulance services	**0**		**0**	**0**			**0**
OTHERS	2	0	3	11	0	0	12
(-) Total direct costs	**3**	**0**	**3**	**11**	**0**	**0**	**12**
(C) Gross margin	**30**	**0**	**373**	**567**	**46**	**26**	**266**
(-) Total clinician pay-out	**30**	**-**	**128**	**113**	**9**	**-**	**3**
(-) Total direct fixed cost like front Office	**6**	**0**	**20**	**48**	**4**	**1**	**7**
(D) Operating margin	**-5**	**0**	**224**	**405**	**34**	**25**	**256**
(-) Total indirect fixed costs	**56**	**0**	**103**	**161**	**7**	**4**	**45**
(E) EBITDA	**-61**	**0**	**121**	**244**	**26**	**22**	**211**

The concerned hospital also prepares the flow of revenue and expenses to determine EBITDA on the basis of package provided to the patients. This is reflected in Table 7.3 given below. Besides the ones covered in the following table, there are multiple packages offered by the hospital for treating different cases like double valve replacement (82), renal angioplasty (307) among others.

Table 7.3 Package-wise profitability analysis (in lakhs).

Package ID	**72**	**2775**	**5954**	**7286**
Particulars	**Coronary angiography**	**Cochlear implant surgery**	**Spinal instrumentation**	**Cerebral angiogram**
(A) Gross revenue	**18**	**0**	**5**	**2**
(-) allowance for deduction	**-0**	**-**	**-**	**-0**
(-) package discount/premium	**-12**	-	**-0**	**-0**
(-) Discount allowed	-	-	-	-
(B) Net operating income	**6**	**0**	**5**	**1**
Drugs & Consumables	**3**	**0**	**1**	**0**
Equipment hiring charges	**1**	**-**	**0**	**0**
Patient diet cost	**1**	**0**	**0**	**0**
OTHERS	11	0	1	8
(-) Total variable costs	**17**	**0**	**2**	**8**
(-) Total clinician pay-out	**31**	**0**	**5**	**6**
Anesthesia				
Radiology services	-0	-0	-0	-0
Ambulance services	-	-	-	-
OTHERS	4	0	0	0
(-)Total direct costs	**4**	**0**	**0**	**0**
(C) Gross margin	**-45**	**-0**	**-2**	**-14**
(-) Total direct fixed cost like front Office	8	0	1	2
(D) Operating margin	**-53**	**-1**	**-2**	**-16**
(-) Total indirect fixed costs	**26**	**0**	**2**	**7**
(E) EBITDA	**- 79**	**- 1**	**- 5**	**-23**

The hospital provides the incentive of providing discounts under each of the healthcare packages discussed above. However, this discount depends upon the types of sponsors and the speciality services availed by the patients. Further, it is the discretion of the healthcare service provider to forward such discounts to the patients. This is evident from Table 7.4 given below:

Table 7.4 Package wise discount across different sponsors.

Package ID	Particulars	Cash	Corporate	EWS	International	PSU	TPA	Total
72	**Coronary angiography**	Discount applicable	Discount applicable	Discount applicable	Not applicable	Not applicable	Discount applicable	
2775	**Cochlear implant surgery**	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	
5954	**Spinal instrumentation**	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	
7286	**Cerebral angiogram**	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	

ABC also keeps track of its capacity installed across various domains like wards, OTs, ICUs and also in terms of specialities offered. For instance, in neurology, the total hours available with the hospital is 600 while the actual usage turns out to be 231 which indicates that only 39% of the capacity is utilised. This is reflected in Table 7.5, 7.5.1 and 7.5,2 given below:

Table 7.5 Key performance based on capacity utilisation (in hours)

OT-wise capacity utilization	Normal capacity	Actual capacity	Percentage utilization
Neurology	600	231	39%
Urology	900	386	43%
Oncology	1,500	688	46%
MAMBS	1,500	485	32%
Total	**4,500**	**1,791**	**160%**

Table 7.5.1 Key performance based on capacity utilisation (in bed days)

Ward-wise capacity utilization	Normal capacity	Actual capacity	Percentage utilization
Rooms & Wards on different floors	9,672	5,591	58%
Emergency ward	2,697	3,565	132%
Cath-Lab	527	270	51%
Total	**12,896**	**9,427**	**2.41**

Table 7.5.2 Key performance based on capacity utilisation (in bed days)

ICU-wise capacity utilization	Normal capacity	Actual capacity	Percentage utilization
Liver transplant ICU	682	474	69%
Bone marrow transplant unit	124	111	89%
Surgical ICU	341	121	36%
Total	**1,147**	**706**	**1.94**

There are also arrangements for determining the profitability at ward level and ICU level. For this, revenue generated across different wards/ICUs and expenses incurred in each of these wards/ICUs is determined. This is provided in Table 7.6 given below:

Table 7.6 Ward and ICU profitability (in lakhs).

Particulars	Room/ward/ ICU 1	Room/ward/ ICU 2	Room/ward/ ICU 3	Room/ward/ ICU 4
Floor	**1**	**2**	**3**	**4**
Revenue from room rent	**123**	**234**	**227**	**178**
(-) discount allowed	7	24	9	5
Net operating income	**116**	**210**	**219**	**172**
(-) total direct costs like material consumption	5	6	4	5
(-) total direct fixed costs like personnel cost	10	9	4	7
Gross margin (absolute or as percentage of revenue)	**101**	**195**	**211**	**161**
Hospital services	24	62	45	46
Maintenance cost	2	3	0	1
Infrastructure services	20	12	11	11
(-) Indirect fixed costs	**46**	**77**	**56**	**57**
(-) Other indirect allocated overheads like IT, department support costs	16	17	16	17
EBITDA (absolute or as percentage of revenue)	**39**	**100**	**138**	**86**

There is also preparation of financial records customer-wise to determine the profitability at customer level. And this is calculated as follows in Table 7.7

Table 7.7 Customer-wise profitability (in lakhs).

Customer code/name	Tata AIG General Insurance Company	Bajaj Allianz General Insurance Company	Aligarh Muslim University MSSH	HDFC Bank Ltd MSSH
(A) Gross revenue	**65**	**73**	**12**	**0**
(-) allowance for deduction	-1	-1	-0	-0
(-) package discount/premium	3	0	-0	-
(-) Discount allowed	-2	-3	-	-0
(B) Net operating income	**66**	**70**	**11**	**0**
Drugs & Consumables	-	-	-	-
Equipment hiring charges	-	-	-	-
Patient diet cost	-	-	-	-
Others Variable Cost	12	16	2	0
(-) Total variable costs	12	16	2	0
Contribution	**54**	**54**	**9**	**0**
Anesthesia	-	-	-	-
Radiology services	-	-	-	-
Ambulance services	-	-	-	-
(-) Total direct costs	2	1	1	0
OTHERS	16	15	2	0
(C) Gross margin	**36**	**38**	**7**	**0**
(-) Total clinician pay-out	-	-	-	-
(-) Total direct fixed cost like front Office	-	-	-	-
(D) Operating margin	36	38	7	0
(-) Total indirect fixed costs	11	12	4	0
(E) EBITDA	**25**	**26**	**3**	**0**

Chapter-8

Capacity measurement in Hospitals

Most hospitals often have long patient lines and overcrowded emergency departments. While on the surface, it may appear that hospitals are working beyond full capacity, there may just be a symptom of poor capacity measurement. Paradoxically, ineffective capacity management can also lead to imbalances that result in the underutilization of other resources. All of the following have an impact on how a hospital uses and manages its capacity:

- Crowding in Emergency department
- Time scheduling
- Daily appointments
- Patient flow management
- Discharge co-ordination
- Bed days

Hospital management relies heavily on capacity measurement to make sure resources are used effectively to satisfy patient demand. Efficient capacity measurement facilitates supply and demand management, maximizes medical equipment utilization, and enhances overall patient care in hospitals. With a specific focus on medical equipment, this chapter examines hospital capacity determination methods and practices. In order to guarantee the provision of high-quality care and operational effectiveness, it offers a thorough examination of how hospitals may gauge, control and maximize the capacity of their medical equipment.

The healthcare sector is increasingly bombarded with new medical equipment. Maintaining equipment efficiency is critical to delivering high-quality treatment while reducing expenses. To better serve patients, the healthcare sector uses a wide range of specialized tools, devices and pharmaceuticals in labs, clinics and hospitals. Hospital workers will find themselves spending a lot of time looking for the appropriate equipment rather than attending to patients if they don't maintain and monitor these pieces of equipment. This also entails endangering the patient's life only because the medical equipment they possess cannot be located when they needed it. Effective equipment management becomes essential when hospitals are faced with ongoing challenges such as rising expenses, understaffing and greater patient expectations!

Efficiency in equipment not only results in cost savings but also in high-quality patient care. In other words, healthcare facilities must provide high-quality care at a lower cost while utilizing fewer resources. It's crucial to remember that cutting costs shouldn't come at the expense of care quality. Rethinking aspects of medical equipment management, asset procurement, and distribution can be advantageous for healthcare organizations of all sizes. They can improve their overall capacity, quality of care, workflow and productivity by maintaining the efficiency of their equipment.

In the context of a hospital, ***capacity*** refers to the highest production the healthcare facility can accomplish with its current staff, facilities and medical equipment. It entails figuring out how to handle patient volume without sacrificing the standard of care. When calculating capacity, there are a number of factors to take into account including:

- physical space
- medical equipment availability
- staffing levels
- patient throughput
- Bed days

8.1 **Any** tool, material or other item that can be used alone or in combination with other tools to diagnose, treat, prevent, monitor or minimize the effects of an illness is considered as a medical equipment. Medical equipment is used in the provision of healthcare services for a variety of purposes such as illness diagnosis and treatment as well as post-accident rehabilitation. These devices can be used alone or in combination with additional medical equipment, supplies and accessories. Capacity measurement for all of these medical devices entails evaluating the availability and use of different therapeutic, support and diagnostic tools that are essential for patient care. This comprises:

- MRI machines
- Binocular research microscope
- PCR machine with microfuge
- CT scanners
- Embedding console system
- surgical instruments
- ventilators
- infusion pumps

The availability and efficient usage of these varied medical equipment in healthcare facilities can have an impact on the delivery of clinical patient management and high-quality diagnostic services. Furthermore, the importance of using medical equipment effectively has been widely highlighted in the modern healthcare system. The relationship between hospital attributes and the use of advanced medical technology has also garnered a lot of interest because of its intricate implications for health-care costs.

Healthcare facilities may be able to assist the relevant organization in achieving its planned realistic performance if they make the most of the medical equipment now available. Making the best use of the available resources could lead to efficient patient management, quick turnover, lowest possible cost, high-quality care, and satisfied patients. Every piece of equipment placed in healthcare facilities needs to be used completely and correctly in the current age of expensive medical treatment in order to guarantee uninterrupted/unhindered care. Health institutions ranging from a small

rural clinic to a major specialized hospital require medical equipment ranging from a simple scissor to more complicated and advanced ones. Nonetheless, the bulk of healthcare facilities operating in developed and developing countries continue to lack knowledge about this essential medical equipment and how they specifically function. This is a prevalent problem, particularly in developing countries where health technology evaluations are not common.

Prioritizing high-quality, cost-effective care and conducting more investigations are essential for the effective utilization of medical equipment. According to global health experiences, sophisticated medical devices are a crucial part of medical care in the processes of acute diagnosis, treatment and illness prevention. Medical equipment, a part of health technologies, provides healthcare workers with the instruments they need to do their jobs effectively and successfully. Although the use of medical equipment has the potential to improve health services, the lack of a regulated framework for its selection, procurement, administration and use could drive up the cost of healthcare unnecessarily.

Due to worldwide resource constraints, health systems in both developed and developing countries are finding it difficult to oversee the provision of medical care. It is estimated that over 50,000 different kinds of devices are used by medical facilities every day worldwide. Although a few are complex and include multiple technologies, most of the gadgets are quite simple. The World Health Organization (WHO) claims that between 50 and 60 percent of medical equipment in developing countries is broken, not used to its maximum capacity or not maintained at all!

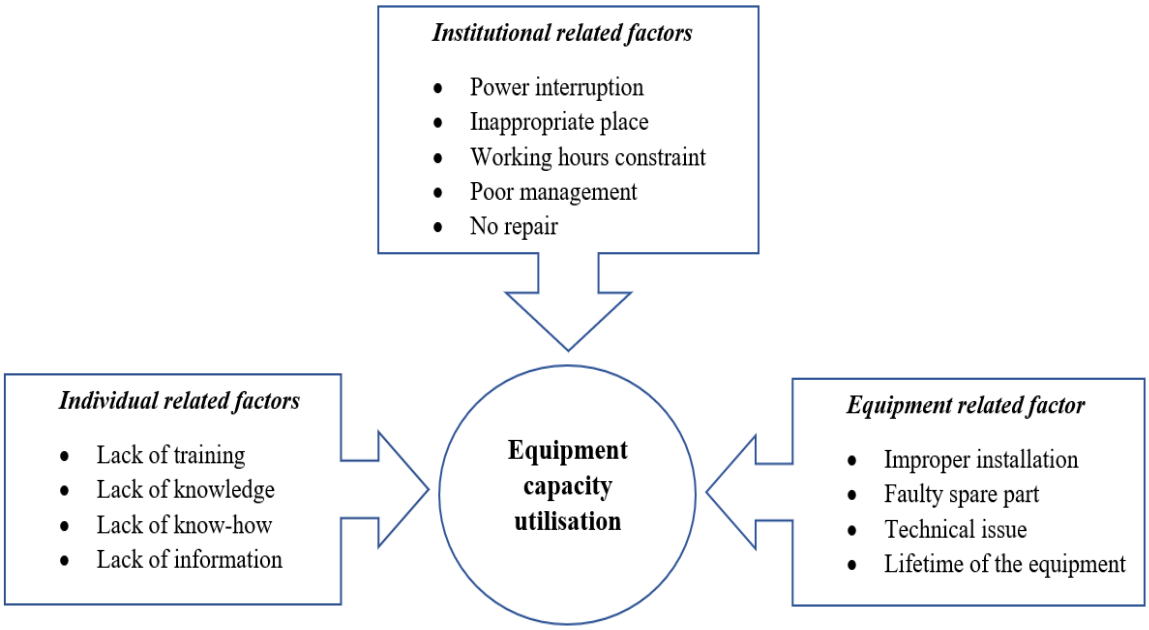

Figure 8.1 Factors affecting capacity of medical equipment.

One factor that management in the healthcare delivery system frequently ignores is the efficiency of medical equipment, which can lead to losses through decreased output. Inadequate preventive maintenance of the equipment will result in subpar diagnosis and treatment, which will also increase the cost of equipment maintenance. The provision of healthcare suffers greatly when there is a shortage of operating equipment in locations with limited resources. Statistics show that up to 50% of laboratory and medical equipment and up to 95% of medical equipment are said to be inoperable in the poor world. Further, high-quality, life-saving medical equipment is largely unattainable or inaccessible in Tier-II and Tier-III healthcare institutions of India and a very high percentage of physical equipment that low-resource hospitals throughout the world owns is either outdated or inoperable!

8.2 Methods and metrics of measuring capacity utilisation

When it comes to measuring capacity utilization in a hospital, there is no single method or metric that fits all purposes, scopes and perspectives. Different approaches and indicators can be used to assess capacity utilization such as the bed occupancy rate, the operating room utilization, the equipment utilization, the staff utilization and the time utilization.

- The ***bed occupancy*** rate is the percentage of occupied beds out of total available beds in a hospital or a unit, that is,

$$\frac{\textit{Occupied beds}}{\textit{Total beds available}}$$

- ***Operating room utilization*** is the percentage of time that operating rooms are being used for surgical procedures out of total available time, that is,

$$\frac{\textit{Usage of time in operting room}}{\textit{Total time available in operating room}}$$

- ***Equipment utilization*** is the percentage of time that equipment is being used for diagnostic or therapeutic purposes out of total available time, that is,

$$\frac{\textit{Time spent on equipment}}{\textit{Total equipment time available}}$$

- ***Staff utilization*** is the percentage of time that staff people are performing for direct patient care activities out of total available time, that is,

$$\frac{\textit{Time spent by staff on patient care}}{\textit{Total staff time available}}$$

- Finally, ***time utilization*** is the percentage of time that patients spend in a hospital or a unit out of total expected time, that is,

$$\frac{\textit{Time spent by patient}}{\textit{Expected time}}$$

8.3 Benefits of capacity measurement

By identifying and addressing the gaps and bottlenecks in the hospital's processes, the healthcare organization may improve patient happiness, financial sustainability and operational performance through the measurement of capacity utilization. A hospital can optimize resource allocation and scheduling, synchronizing supply and demand while keeping an eye on efficiency and quality by tracking and analysing capacity usage. They are also able to recognize and rank prospects for improvement, concentrating on areas that require more care or attention. By doing this, waste, expenses and delays will be decreased and patient flow and throughput will be balanced to prevent over or under capacity situations. Benchmarking progress can be aided by comparing performance to objectives, benchmarks or peers.

8.4 Challenges involved

It is not simple to measure capacity use in a hospital. The variability of patient demand, acuity and length of stay, the interdependence of multiple units, departments and disciplines, the trade-offs between various objectives including cost, quality, access and safety and the availability of data, systems and tools to gather, store, process and report capacity utilization information are just a few of the many complexities and uncertainties involved. Measuring capacity utilization in a hospital context requires taking into account each of these parameters and dealing with them in an amicable manner.

8.5 Best practices and tips to optimise capacity utilisation

The 1968 Rao Committee Report brought attention to the state of hospital equipment and appliances, which were neglected in the absence of competent maintenance services. It had advised that, in order to reduce the amount of hospital equipment that is misused or neglected, all hospitals should have a well-planned maintenance program. The Government of India commissioned the Varma Committee in 1971 to examine the emergency setup of hospitals. The committee noted that breakdowns requiring costly and complex repairs are the norm rather than the exception in the lack of a systematic maintenance program. Another report from 1978 said that for several years, medical equipment valued at INR 100 crores had been left idle in several hospitals across the nation. The issue of damaged and non-functional equipment in hospitals and other healthcare facilities is a massive one.

8.5.1 All technical and administrative procedures, including supervisory actions, are merged in equipment maintenance, with the goal of keeping an item in or restoring it to a state where it can fulfil a necessary function. According to Chaudhary and Kaul (2015), maintenance can also be defined as an action or series of acts performed to keep equipment in or return it to an acceptable condition. As a result, cooperation across

various hospital departments is preferred in order to maximize the utilization of common equipment. Joint planning sessions could be useful in resolving issues and coordinating schedules for this.

8.5.2 In essence, utilization refers to making the most out of the equipment. Realistic performance can only be set with clear vision and careful consideration of equipment usage. To get the most return on investment, hospital management and other concerned staff members should make an effort to optimize equipment utilization.

8.5.3 Every healthcare institution needs to create a strategic plan for managing medical equipment and take the initiative to buy the appropriate medical equipment at the appropriate time, outfitted with the appropriate technology and at the appropriate workspace. When purchasing equipment, care must be taken to ensure that a plan for technology upgrades will be in place after a few years of operation.

8.5.4 The organization must adopt the practices of regular equipment **auditing**. There is a need for periodic evaluation of the quality of performance of equipment in the hospital. It will be advantageous to all the concerned namely hospital, professionals, government and the management so that better utilization of the resources is ensured.

8.5.6 Continuous **staff training and development** ensures they are proficient in using and maintaining medical equipment. This enhances efficiency and reduces the risk of errors and downtime.

8.5.7 Predictive analytics can help to forecast equipment demand based on historical data and trends. This helps in proactive planning and resource allocation.

Planning, monitoring, analysing and improving capacity management in a systematic and ongoing manner is necessary to maximize capacity utilization at a hospital. Setting and sharing capacity goals and targets that are in line with an organization's strategic vision, mission and core values is crucial. The hospital should also make an effort to gather and evaluate capacity data using trustworthy and pertinent sources, techniques and metrics. Identifying and eliminating root causes of capacity issues is essential for success. This includes redesigning workflows, streamlining admissions and discharges or expanding services or facilities. Finally, engaging and empowering stakeholders is key to soliciting their feedback, input and support.

8.6 Final words

Advancements in medical technology are playing a positive role in saving lives. Its positive impact is not only limited to the upper crust of society but also helped the poorer a lot by reduction in infant mortality rate and maternal mortality rate due to usage of right technology, for instance, incubators, warmers, better OT equipment. The significance of effectively using medical equipment has received widespread public attention. The relationship between hospital features and medical equipment use has garnered considerable attention due to its complex consequences on healthcare quality and costs.

Medical equipment utilization is critical for providers because it reflects the necessity, appropriateness, and efficiency of the equipment in diagnosing or treating patients at a specific facility. Ideally, providers want equipment that is readily available and consistently used because it effectively accomplishes its intended tasks. Analysing current utilization helps ensure this, preventing the purchase of equipment that remains idle. A hospital can also make better judgments about equipment acquisitions and budget allocation by better understanding the conditions and demands of its patients through the analysis of medical equipment consumption. In an ever-evolving healthcare landscape, effective capacity management remains critical to hospital operations, driving financial sustainability and quality outcomes.

Chapter-9

Revenue streams in hospital sector

The money a medical centre makes from its activities is known as hospital income. Patient care services, such as surgeries or diagnostic imaging as well as billing for doctor visits and services, account for the majority of hospital revenue. Additional funding for healthcare may come from donations, food sales at stores or investments. Hospital expenses including staff salaries and other maintenance needs are partially covered by the money a hospital makes. The likelihood of the hospital's financial success depends in part on the administration's capacity to balance income and costs.

Hospital revenue is an important metric in healthcare because it can help healthcare organizations understand their financial health and performance. Theoretically, hospital management can invest in new services and assets when revenue surpasses expenses. Reimbursement from health insurance payors for services and procedures rendered to patients or insurance company clients is another source of healthcare revenue. Some of the factors that have the biggest effects on a hospital's revenue are its size and the services it offers. More beds enable hospitals to treat more patients and consequently, make more money. The type of procedure can affect insurance reimbursement which can also affect hospital revenue. For instance, a complex heart surgery is paid for more than a non-invasive diagnostic procedure. In addition, some government reimbursement programs may be based on the hospital's quality performance such as re-admission rate penalties or value-based care initiatives. The source of income in a typical hospital would be from

- Direct medical services and
- Medical support services such as from blood bank, radiology department and pharmacy department.

Each of the above source is further classified into the outpatient channel or serving inpatient channel. Whatever be the source, each source is influenced by a variety of complex qualitative and quantitative factors as follows:

9.1 Qualitative factors

a) Usage of advanced medical equipment
b) Complexities or handling of critical cases
c) Types of services hospitals offers
d) Frequency or availability of services
e) Quality of employees such as doctors, nurses and other medical staff
f) Management policies on patient handling
g) Other associated services like hygiene

9.2 Quantitative factors

a) Number of patients

b) Number of beds
c) Capacity occupancy level
d) Infrastructure availability
e) Accessibility to the hospital like location
f) Number of back-up facilities
g) Doctor patient ratio

Revenue generation stream chart

OP Revenue	IP Revenue	Pharmacy and other income
Medical services	***Medical services***	***OP Pharmacy***
Ambulatory care	Anaesthesia charges	IP Pharmacy
Consultation fee	Baby cradle charges	Trauma centre pharmacy
Cardiology services	Doctor fees	Rehabilitation centre Pharmacy
Casualty	Nursing charges	
Colonoscopy	Room rent charges	
Day care	Implant charges	
Dialysis	Surgeon charges	
Diabetology	Neurology service charges	
Endoscopy	ICU charges	
ENT services	Special nursing charges	
Injection & Immunization charges	OT charges	
Neurology		
Master health check-up		
Medical support services	***Medical support services***	***Other operational income***
OP registration charges	Admission & Documentation	Admission charges
Lab service charges	Lab services	Outsourced pharmacy
Radiology services	Radiology services	Outsourced lab
Blood bank services	Medical counselling	Infrastructure charges
Diet counselling	Medical legal charges	Telemedicine consultancy
Physiotherapy	Blood bank charges	R&D income on assignment basis
Ambulance services	Mortuary charges	
	Surgery procedure charges	
	Oxygen charges	

Even while hospitals, clinics and bigger healthcare systems are renowned for their ability to treat patients and save lives, all healthcare organizations must create effective procedures and guidelines in order to maintain their financial stability. Healthcare

revenue cycle management can help with it. It is a financial procedure used to oversee the clinical and administrative tasks related to processing claims, making payments and generating income. The process consists of identifying, managing and collecting patient service revenue.

In order for healthcare institutions to continue treating patients, this financial process is essential. Healthcare revenue cycle management is a tool used by healthcare organizations to earn profits and then pay for their expenses. Typically, it starts when a patient schedules an appointment to receive medical care. When organizations have gathered all patient payments and claims, the procedure is complete. However, the life of a patient's account is not as straightforward as it seems. Initially, administrative personnel are responsible for scheduling, verifying insurance eligibility and creating patient accounts when a patient makes an appointment. In order to optimize revenue cycle management procedures, registration is essential. Because consumers don't always have the money to pay medical bills right away, revenue cycle management can sometimes be a time-consuming procedure. All this is showcased in Figure 9.1 below:

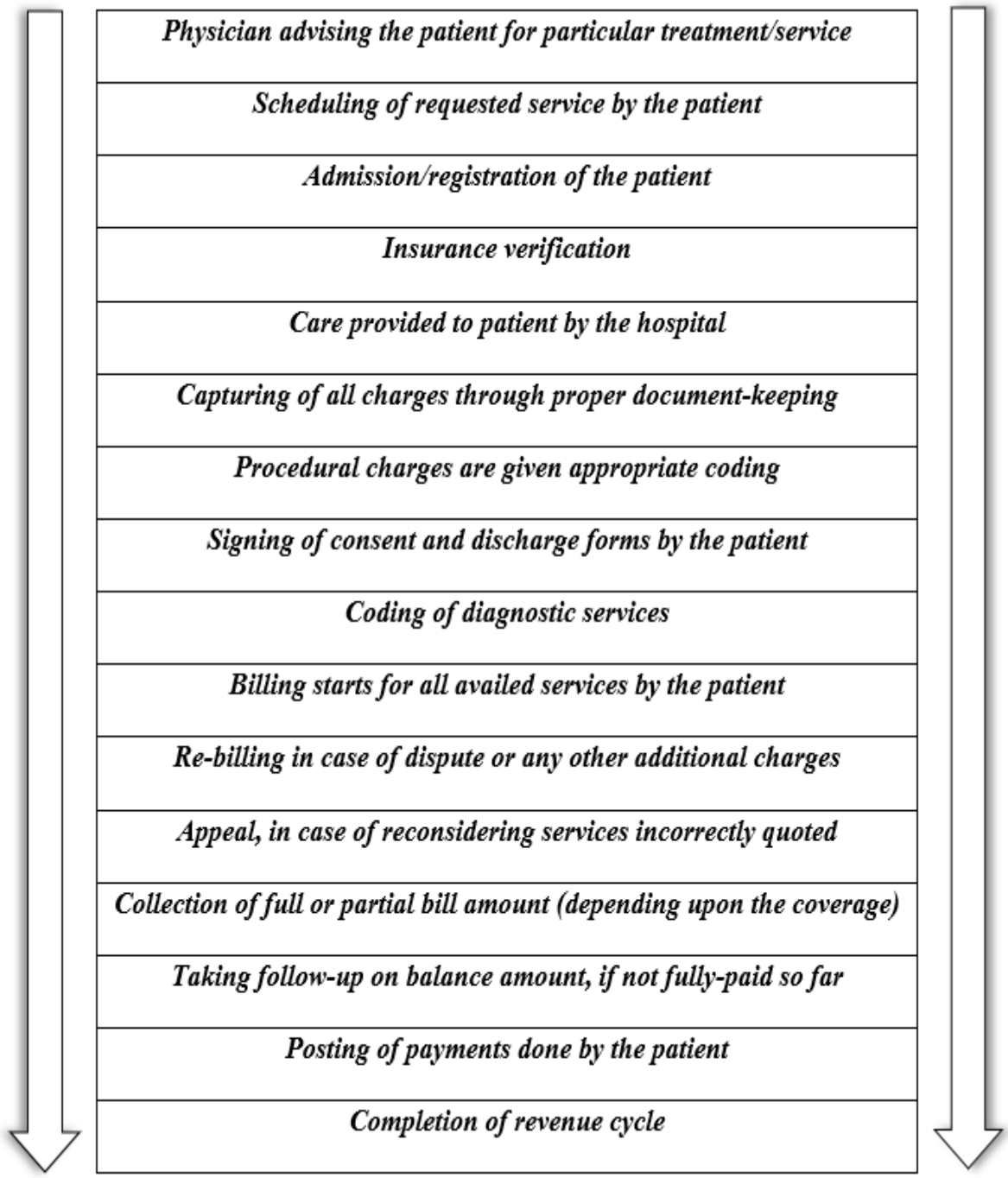

Figure 9.1 Billing process or flow of revenue cycle within hospital.

The goal of healthcare revenue cycle management is to create a procedure that enables businesses to get paid in full for services as soon as possible. Revenue management must continue to improve and adapt to the healthcare ecosystem's rapid changes including value-based care, the emergence of new technologies and worldwide pandemics. In order to treat patients appropriately and get paid for their services, healthcare providers always need to be aware of their revenue cycle status.

9.3 Step by Step Billing process flow

1. Patient is admitted on advice of particular doctor or doctors linked to speciality.
2. Each IP/OP patient needs to register first for a unique number to be generated and fill necessary details like name, address, admitting doctor, self-payee or corporate or TPA patient or indigent or weaker section patient.
3. When the patient is admitted as per the class of his choice, an IP number is generated and throughout his/her stay, all the documentation & reports will be based on this IP number. So is the case with OP registration.
4. Without generation of this unique number request, none of the services can be availed- be it medical or non-medical in nature.
5. In OP, the patient has to pay first for services.
6. There is existence of detailed rate master for all medical services for IP & OP separately. Each service has charge code and it appears in detail in patient bill.
7. There is a fixed discharge time and if patient is advised to take discharge, the maximum time by which he/she can stay in the hospital is the stipulated day. After that, bed charges will be levied accordingly.
8. The final bill is not raised till all the request are not posted.
9. Once bill is ready, patient is informed to settle the bill and surrender the visiting card issued.
10. Once the patient is satisfied with the details of the bill and settled the amount, discharge slip is given.
11. On presenting discharge slip at the ward, patient can take physical discharge.
12. On leaving the hospital, he/she gives one copy to security personnel confirming he is advised to discharge out of the hospital.

9.4 Some of the terminologies used in above revenue streams:

a) **Admission charges** are applied when a patient is admitted as in-patient (IPD) for further course of treatment. Such charges are nominal in nature.
b) **Ambulatory care service** is a personal health care consultation, treatment or intervention using advanced medical technology or procedures usually delivered on outpatient basis. Many medical investigations and treatment for acute illness and preventive health care can be performed on an ambulatory basis including minor surgical and medical procedures.
c) **Anaesthesia** means losing power to sense. Medication that causes anaesthesia are called anaesthetics. It is used during tests and surgical operations to induce sleep, which prevents pain and discomfort and enables a wide range of medical procedures to be performed. Local anaesthetics and general anaesthetics are two commonly used types of anaesthetics.
d) **Casualty** is the part of hospital where people who are hurt in accidents or suddenly become ill are taken for urgent treatment. It is commonly known as "**emergency care**".

e) **Diagnostic services** are a broad range of tests that are essential to the management of patient care, allowing physicians to detect disease earlier, make opinions, prescribe therapies and monitor patient result. Examples include ultrasound, biopsy and tonometry.

f) **Dialysis services** is a form of treatment that replicates the functions of a kidney. It is often used to treat advanced chronic kidney disease or kidney failure, where the kidney has lost most or all of their abilities. There are two types of dialysis, namely, Haemodialysis and Peritoneal Dialysis.

g) **Infrastructure** (IFS) **charges** are levied by certain hospitals. They are charged on percentage basis of the doctor fee payable to the visiting consultants towards the cost of providing infrastructure for consultation.

h) **Inpatient** means that the procedure requires the patient to be admitted to the hospital, primarily so that he or she can be closely monitored during the procedures and afterwards during recovery. Physician and hospital follow a specific set of clinical criteria (severity of illness and intensity of services needed to diagnose and treatment) that assist in determining whether a patient meets medical necessity for an "inpatient" status in hospital.

i) **Medical Counselling** is a process of interaction by which a patient or a person either layman or formally trained ones, who helps one or more other persons help themselves and pro-actively or reactively changes their lives, often through introspective dialogues. Common types of medical counselling are genetic counselling, lactation counselling, nutritional counselling, sexual counselling, pre-conception counselling.

j) **Medical and surgical consumables** are used for therapeutic treatment and cure purpose in a hospital. These are not pharmaceuticals and hence not re-usable.

k) **Medical legal charge** is a nominal amount charged to the patients coming under medical legal cases like road accident, suicide, murder/attempt to murder, bitten by poisonous animal in order to meet the court expenses.

l) **Medical record and documentation charge** is a nominal amount charged by hospital for maintenance of medical record and case history of the patient.

m) **OP registration charges** are levied when a new patient comes to a hospital for the first time. He/she has to register his/her name with address and other basic particulars in the hospital. This process is called as registration whereby a unique registration number (Hospital ID/UHID) is allotted to the patient. This registration number is required for easy retrieval of medical records of the patient in future. For this registration process, the hospital will charge a nominal amount as OP Registration charges.

n) **Outpatient** means that the procedures does not require hospital admission and may also be performed outside the premises of hospital. It is commonly referred to patients who typically go to an outpatient department such as laboratory, radiology or the emergency department for diagnostic services.

o) **Radiology services** are the medical specialty that uses imaging to diagnose and treat diseases seen within the body. Radiologists use a variety of imaging

techniques such as X-ray, radiography, magnetic resonance imaging (MRI), computed tomography (CT scan).

p) **Rehabilitation services** are designed to facilitate the process of recovery from injury, illness or disease to normal condition as soon as possible. The purpose of rehabilitation is to restore some or all of the patient's physical, sensory, mental capabilities that were lost. It includes assisting the patient to compensate for deficit that cannot be reversed medically.

q) **Trauma centre services** are equipped within hospitals and staffed to provide comprehensive emergency medical services to patients suffering from traumatic injuries. Traumatic injury is a disease process in itself which requires specialized and experienced multidisciplinary treatment and specialized resources.

Chapter-10

Expenditure streams in hospital sector

A health expenditure is a consumption of a resource with the primary objective of promoting, restoring, and maintaining health. Hospitals need to manage expenses and revenues to remain operationally efficient. The expenditure streams refer to charging of expenses as soon as resources are consumed. By doing so, a hospital uses the matching principal to link the expenses incurred to revenue generated in the same period. In hospitals, expenses are incurred in the following departments:

I. Medical departments
II. Medical support department
III. Medical services department

Expenditure stream classification chart

Operational expenditure			***Non-operational expenditure***		
Medical department expenses	***Medical support service department***	***Services department***	***Administrative***	***Others***	***CAPEX***
Doctor's fees	Pharmacy expenses	Help desk	Staff salary	Finance expenses	Copyright
Surgeon's fees	General lab expenses	Stores	Other maintenance expenses	Legal expenses	Trademark
Clinical expenses	Referral lab charges	Food & Beverage	Transportation expenses	Advertisement expenses	Surgical equipment
OT	Radiology expenses	House Keeping	Travelling expenses	Sales promotion	Medical tools
Implants expenses	Pathology expenses	Medical record expenses	Telecommunication expenses	Insurance	Medical furniture
Nursing expenses	Blood bank expenses	Equipment maintenance	Office expenses	Audit fees	
Emergency expenses	Ambulance services expenses	Training expenses	Books & Periodicals expenses		
Casualty	Mortuary	Call centre	Rent charges		

expenses	expenses	expenses			
	R&D expenses	Oxygen & Gas charges			
	CSSD	Power & Fuel expenses			
		Bio-medical wastage			

Some of the terminologies used in above expenditure stream

a) **Ambulance expenses** are incurred in running of ambulance or providing ambulatory care to out-patients.
b) **Blood Bank charges** are incurred in purchase of blood from outside bank or in house blood bank running expenses and billed the patient as per protocols.
c) **Call Centre services** are provided as a one stop solution to patient and generally call centre diagnoses and consult patient through telecommunication. Such services are also known as "***Telemedicine***" in modern science. The expenses involved in providing such services are call centre Expenses.
d) **Central Sterile Services Division (CSSD)** takes care of used and contaminated articles or equipment. They are sent from various departments to this singular department. These are collected at one place, cleaned, sterilised and stored in sterile condition till it is supplied to other user departments. In this division, all medical devices or instruments and other usable shall undergo sterile treatment. This is one of the vital departments in hospital. It caters to the sterilisation needs of wards, operation theatres and a host of other units. This CSSD is equipped with auto claves, gas sterilisers, hot air ovens and other sterilising equipment. Steam from central boiler section is supplied to this CSSD for sterilisation purposes. One fourth of steam generated in a hospital will be consumed in this CSSD and also the steam cost is the major cost element of this department.
e) **Consumables** include
    - ***General store*** which is used by the hospital staff and ward and various departments. It also includes material common to all patients but not billable (used quantity are generally negligible or not measurable).
    - ***Surgical consumables*** are used and billed to the patient. This does not include any material received on consignment basis like stents, catheters and implants.
f) **House Keeping expenses** relating to entire departments are booked under the respective accounts such as cleaning materials, consumables, depreciation, electricity and utility of the hospitals. Retainer Fees is paid to the outsourced agency depending on the agreement to manage the department. However, if entire activity of the department is outsourced including labour, investments (inside the hospital premises) to the contractor, then house-keeping department costs are reimbursed to such outside contractor and the entire expenses

incurred for house-keeping are booked under respective outsourcing account head.

g) **Implants charges** are the charges incurred for the purchase of Implant or Implants material for the in-house production. An implant is a medical device manufactured to replace a missing biological structure, support a damaged biological structure or enhance an existing biological structure. Medical implants are man-made devices.

h) **Medical record and Scanning charges** are incurred to take soft copy of medical reports and other related documents of the patients as part of maintaining Electronic Medical Records (EMR) or medical case histories.

i) **Mortuary** is a very important component of hospital. It temporarily preserves the dead bodies for a period. Post mortem and Autopsy, to identify the cause of death, are the major functions of mortuary in a hospital. It involves altogether different sources of expenses which are specifically for incurred inside mortuary.

j) **Oxygen, lifesaving and other medical gases** expenses including expenses incurred in purchase of such gases used for patients in OT or wards.

k) **R&D expenses** are spent by hospital in either medical science or engineering or the social sciences for humanities development with primarily "patient care" objectives.

l) **Referral laboratory charges** are incurred in few lab tests (which are not available in the hospital. Confirmation may be sent to outside labs or as per the Doctor's instruction. Lab charges paid to such lab as per agreement are called Referral Lab Charges.

m) **Repair & Maintenance** of building, plant and machinery, medical equipment, vehicles, non-medical assets. This includes amount paid for annual maintenance contract (AMC) for any or all assets mentioned above.

n) Technology costs: An emerging cost area is technology with hospitals needing to constantly invest in newer digital health technology to ensure their patients get the most adequate care, especially with the new norm being virtual check-ups and an increased demand for telehealth. Beyond that, while technology investments could be expensive, long-term efficiencies could help control costs. Emergent technologies such as robotic automation could help innovate and manage costs.

10.1 Healthcare budgeting

A healthcare or hospital budget is an estimation of revenue and expenses over a specified timeframe. Through the healthcare budgeting process, health systems come to an understanding of how much funding must be planned in certain areas including operating costs and capital equipment. A health system may include hospitals, physician groups, skilled nursing facilities, home care services, foundations and a variety of other business types. During the budgeting process, leaders must account for key components of planning in healthcare including volume growth assumptions, feedback and input from key stakeholders and the ability to adjust when inputs and circumstances change.

Ultimately, a well-planned budget allows health systems to plan appropriately for the future in order to provide quality care.

10.2 Final words

In conclusion, expenses will continue to exert pressure on hospital margins. Hospital administrations have a challenging decade ahead of them and they will need to consider strategies to optimize labour costs, reduce fixed costs and invest in new technologies to gain efficiencies.

Chapter-11

Costing approach in healthcare sector

11.1 Overview of cost management in hospitals

For bringing healthcare of ideal standards within the reach of every individual, there is a need to provide healthcare services at affordable costs, so that individuals, irrespective of their economic status, are able to avail medical treatment. Healthcare or hospital cost accounting means *identifying* the costs of any product, service or activity, at a specific time, in a healthcare organization. In a healthcare context, cost accounting prescribes how a hospital, medical facility, rehabilitation centre or other similar organization determines its costs. On the surface, cost accounting works the same in healthcare as it does in other sectors.

Cost accounting is the process of classifying, estimating and allocating costs incurred by an organization to different drivers of cost. These costs can be analysed at the organizational or departmental level. In healthcare sector, this means cost estimation or costing for the services rendered to each patient at the individual level. It is important to acknowledge the increasingly important role, cost accounting is likely to play in the healthcare market. **There could be numerous techniques for estimating costs at the product or service level.** As different industries have evolved over time, so have cost accounting methods and the management accounting research analysing these methods.

For decades, policymakers have beckoned/encouraged hospitals and other healthcare organizations to be more ***transparent*** in their pricing so that patients know the cost of a product or service before getting it. Cost accounting in healthcare is the crux of price transparency. However, healthcare leaders have been ***reluctant*** to make pricing information transparent because it might increase price or market competition among healthcare providers thereby lowering revenues for hospitals and other medical facilities. ***This chapter tends to offer an overview of several cost accounting systems currently in use and identifying strengths and weaknesses of each.***

To provide affordable services while maintaining the quality and financial viability, effective cost management and optimum utilization of resources is the only way to provide services to a larger section of society, thereby increasing volumes and further saving on costs. In recent times, accounting experts have gone so far as to say that there is an almost complete lack of understanding of how much it costs to deliver patient care. Instead of focusing on the costs of treating individual patients with specific medical conditions over their full cycle of care, providers aggregate and analyse costs at the specialty or service department level. This begs the question, why have hospitals been slow to adopt systems that hold a great deal of theoretical promise? The answer is that, for hospitals, the ***costs*** of implementing

sophisticated cost accounting systems are relatively large while traditionally the ***benefits*** of doing so have been modest.

As per estimates, **most hospitals in the country have not adopted cost accounting systems because characteristics of the hospital industry make the costs of doing so high and the benefits of service-level cost information relatively low.** However, frequent changes in ***insurance benefit designs*** are creating incentives for patients to compare hospital prices. If these changes continue, hospitals' patient volumes and revenues may increasingly be dictated by the decisions of individual patients shopping for low-cost services and as a result of this, health care service providers could face increasing pressure to set prices at levels that reflect the costs of providing care and if anyhow these changes happen or take place, **cost accounting information** will become a much more important part of **hospital management.**

The pricing of services must be done on the basis of costing. Only then can the hospital provide the most competitive price to the patient as well as maintain its financial sustainability. Price and quality competition can motivate and force the management of the hospitals to reduce their operating costs. **Hospitals will have to set prices that relate to the cost of providing individual services.** In this respect, Total Cost Management (**TCM**) in hospitals will help in fixing right pricing of services provided by hospitals. This will also enable to achieve sustainable savings in the cost of operations. However, achieving such requires the following:

- To evolve a detailed *methodology* for performing costing function uniformly across different hospitals under the same management.
- To evolve a *software* solution which is built around a well-defined costing algorithm and to generate hospital specific cost reports, incorporating healthcare key performance indicators like average realization per patient, bed occupancy rate, survival rate etc.
- To evolve a *system* which will consolidate the cost reports across various hospital locations and helps the management accounting team to draw inferences on cost comparisons across locations, trends and relative profitability.

The purpose of establishing a total cost management system in a hospital would also be able to serve the following:

a) To comply with cost accounting record and audit rules (CARR), 2014 and to submit product-wise cost sheets to Ministry of Corporate Affairs (MCA).
b) To use cost data for internal management such as calculation of cost/profit, centre wise conversion cost based on direct cost and total cost approach.
c) Calculation of procedure-wise cost based on direct cost and total cost.
d) To prepare product/activity-wise cost statement showing total cost, sales realization and margin for submission to MCA and for internal management decision making.

e) In health care sector, product cost statements can be prepared in two ways, that is, patient-wise and procedure-wise or ward-wise (separately for IPD & OPD).
f) In case of first alternative above, number of cost sheets will be equal to number of patient bills raised during the year. It may run into thousands of bills (IPD & OPD) depending upon patient beds capacity. Hence, it may not be practicable to prepare patient-wise actual cost sheets. However, a standard operating cost for each activity for a patient can be established based on past data and the same can be compared to the billing price to arrive at estimated cost for a bill.

Therefore, it is suggested that the costing system should be developed leading to calculation of procedure-wise, ward-wise, activity-wise cost as per cost template provided in subsequent chapters of this guidance note. Further, it may be used for calculation of patient-wise cost, as and when required. Therefore, accounting of resources used and computing costs plays a key role in cost management in a health care industry.

11.2 Why cost accounting is important in the healthcare industry?

Management scholars have identified several cost accounting methods that provide organizations with accurate estimates of the costs they incur in producing output. However, little is known about which of these methods are most commonly used by hospitals. By implementing effective cost accounting systems and processes, healthcare practices can make informed decisions, optimize costs and improve their financial performance. These are some of the top benefits of cost accounting for healthcare:

11.2.1 Showcases the true cost of providing healthcare services

Cost accounting goes beyond simply tracking revenue and expenses and allows you to understand the direct and indirect costs associated with every service rendered. This offers great insights into whether your services are truly profitable, allowing you to make informed decisions around the business side of your practice. This includes providing tangible data regarding pricing, resource allocation and strategic planning.

11.2.2 Allows for more informed decisions

Because effective cost accounting provides healthcare organizations with the necessary financial data, hospitals can take more informed decisions when it comes to the services they offer. The data may suggest that the pricing may need to be tweaked or that it may not make financial sense to continue providing a particular medical service. With accurate cost information, organizations can assess the areas for cost reduction or efficiency improvement. This information can help medical practices balance financial viability and quality patient care.

11.2.3 Encourages viable contract negotiations with stakeholders

In the healthcare industry, reimbursement rates from payers and negotiations with insurance providers significantly impact revenue streams. Cost accounting enables

healthcare providers to show detailed costs associated with treatments. This allows for better reimbursement negotiations with the healthcare insurance sector. Accurate cost information helps to ensure financial sustainability and profitability for healthcare providers.

11.2.4 Encourages operational efficiency

Cost accounting allows you to scrutinize the ins and outs of the services your healthcare practice offers. This can help you identify opportunities for cost reduction. By analysing cost data, organizations can identify areas of waste, inefficiency or unnecessary expenses. This information enables management to implement strategies to encourage better operational efficiency.

11.2.5 Assists regulatory compliance

Cost accounting ensures compliance with cost reporting and financial transparency by providing accurate and auditable cost data. By having a comprehensive cost accounting system in place, healthcare organizations can meet regulatory requirements and avoid potential penalties or legal issues.

11.3 Designing costing system in hospitals

Effective procedure of costing and cost management techniques and their proper implementation can play very large and vital roles in changing the scope and dynamics for stakeholders of the healthcare industry. Efficient cost management is beneficial for both, the service provider as well as those who avail the services. For patients, accurate costing of procedures and services will lead to competitive pricing, which will make high-end and quality healthcare services affordable to large sections of the masses. This is more relevant in India due to low piercing of medical insurance.

What is happening at the moment, is that, most of the healthcare organization are using **traditional costing methods**, that is, a cost accounting methodology that allocates organizational overhead to a specific output based on a predetermined cost driver or by using a pre-determined percentage rate. **Traditional costing techniques** are easy to understand and apply because it requires minimal financial and/or managerial investment which helps explain its wider use and acceptance. However, these costing methods have been criticized for failing to account for differences in product/service lines and marketing channels and for producing inaccurate and unrealistic representations of a product or service's true cost.

Services in health care set-ups is quite complex and it consist of so many activities either for out-patient or for in-patient. For example, if a patient along with the attendant visited the hospital, this is what they have to do:

1. Get the patient registered.
2. If opted for OPD, consult the doctor in OPD.
3. Doctor's prescription without test.

4. Billing and then patient and attendant walks out from hospital.
5. If, in doctor's prescription, tests are recommended, then go for tests.
6. Billing with test and then patient and attendant walks out from hospital.

Another case could be, in case, patient condition is very critical, then

1. Emergency & trauma care or direct admission of patient.
2. Get the patient registered.
3. If patient is in very critical condition, then patient is transferred to ICCU or ICU or patient is admitted to specialized/individual ward.
4. Then to operation theatre.
5. Post-operation back to ward.
6. Depending on post-operation condition shifted to ICU or ICCU.
7. After treatment, billing process gets started.
8. Patient get discharged and walks out of the hospital.

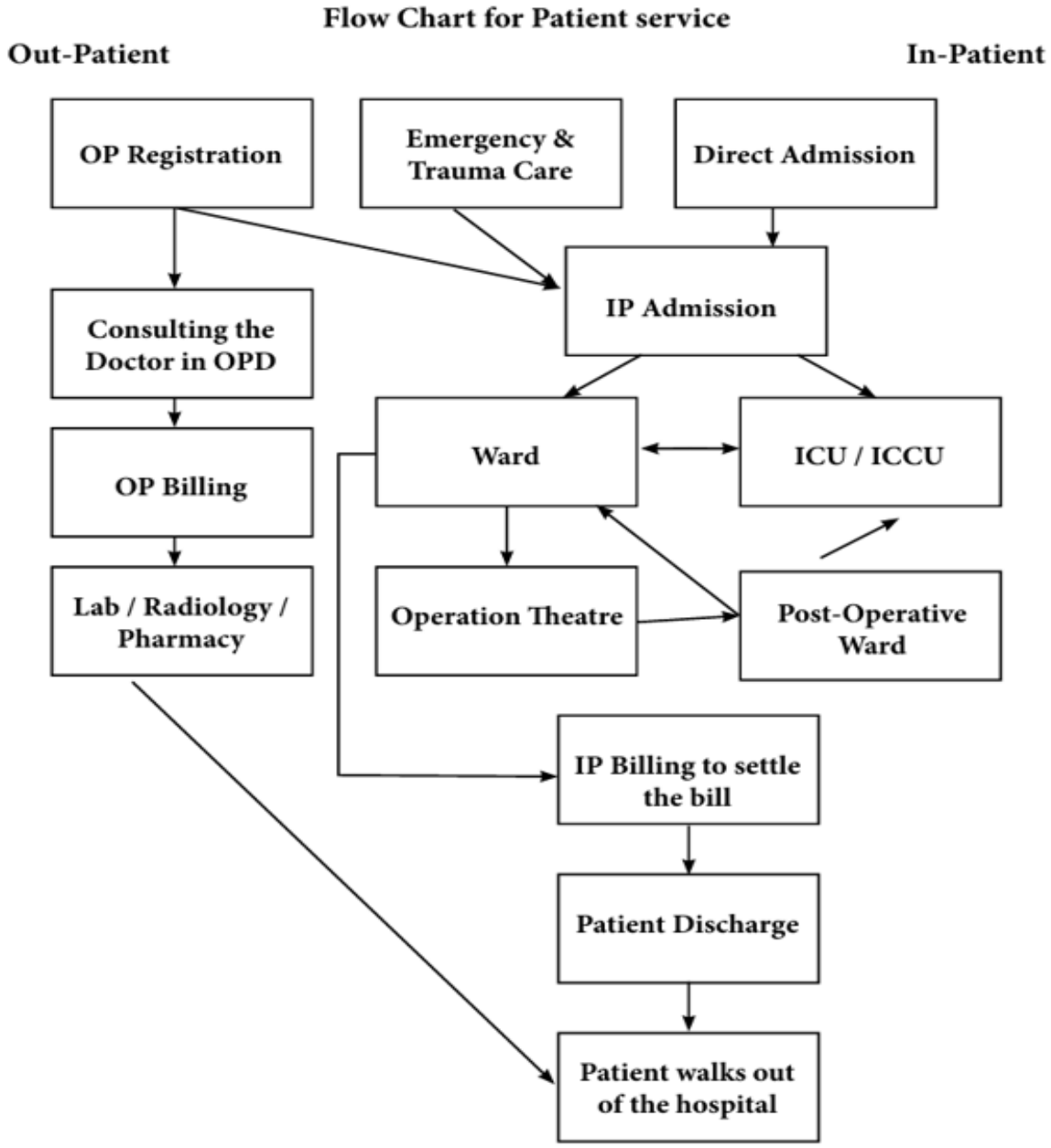

Figure 11.1 Flow chart for patient services.

So, it means if one patient gets registered for his/her treatment, number of activities taking place would vary for different patients, even when the underlying disease remains the same or above-mentioned procedure is the same. This is because patients have different body response rate, such that treatment and use of medicine and their care will be entirely different. So, what is suggested in that case is, calculation of cost of treatment for individual patient or we can say a separate cost sheet is required to be prepared for each and every patient. It is quite difficult or a herculean task for the hospital management to calculate separate cost for each patient and if there is foot fall of 3000 patient in a month, then it becomes almost impossible. Therefore, **this type of**

costing requires detailed knowledge of the treatment and services provided to individual patients. For example, calculating the micro-costs for an intensive care unit (ICU) stay requires identifying values for medicine and services rendered in treating the patient, identification and calculation of the nursing costs involved, cost of physician services provided, cost of equipment and any other costs that can be attributed to the individual ICU stay. In this approach, the cost of similar cases may vary because of a small difference in the treatment and/or services provided. Hence, it may not be practicable to prepare patient-wise actual cost sheets.

To come up with the difficulties of the above discussed method of calculating the cost, **it is advisable to develop a standard costing system to calculate the cost for each activity which is to be performed for a patient from registration process till the discharge activity and which can be very well established, based on data available and the same can be compared to the billing price to arrive at estimated cost for a bill. In this regard, the National Council for Clinical Establishments, a national body established under the Clinical Establishment Act, 2010,** has approved a list of medical treatment procedures and a standard template of costing of procedures and services. State/UT Governments have been advised to use these for determining the standard cost of any procedure taking into consideration all pertinent factors.

Hospital cost accounting includes a sequence of processes for determining cost value. Primarily, healthcare leaders work out fixed and variable costs of products and services to identify profitability. Cost accountants and healthcare financial managers typically:

- Liaise with healthcare service providers to manage the costs of products and services.
- Communicate those costs to patients and insurance companies.
- Use digital tools to allocate costs to products and services.
- Analyse cost drivers that increase profitability.

Before moving forward, first we have to understand the heads of expenses, types of departments, activities or services performed, depending on the source data and the specific objectives of the health care industry. **Different types of expenditure data can be included in the total cost of providing health services and this cost is incurred in three different categories of department, that is,**

- *Medical Services* department like cardiology, gynecology or general medicine.
- *Medical Support Services* department like pharmacy, blood bank or laboratory.
- *Non-Medical Services* department like administration, IT department.

Costs incurred in these departments, if we add them up, is also known as total cost but in layman's language. But this total cost is of no use to answer this question "How much cost is incurred on individual patient keeping in mind his disease and treatment facility". This department wise total cost is further classified as

- **Direct** costs are those that are directly attributable to patient care. Examples of direct costs include: nursing services, drugs, medical supplies, diagnostic imaging, rehabilitation and food services.
- **Indirect/overheads** costs are those that are not directly related to patient care. Examples of indirect costs include general administration, health records, information technology, human resources, volunteer services and other regional services.

The patients are billed on the basis of treatment, activities performed, medical facilities used, procedures followed but the bill which is usually created is not correct until we have proper costing system, that is, hospital industry must have proper cost of each activity performed upon the patient. So, it is therefore very important to identify the cost of each activity/procedure to reach at exact cost of treatment of every patient and for this, one has to develop an efficient cost accounting and profitability analysis systems in a hospital.

11.3.1 Steps of costing process

- Disintegrate the revenue on the basis of services or activities performed.
- Disintegrate the costs on the basis of department wise, cost centers and service center.
- Classify the department wise costs into direct and indirect costs.
- Identify the cost activity wise or services rendered.
- Identify non cost items and non-operating revenues.
- Identify cost drivers in each cost center.
- Create cost pools.
- Use scientific allocation and apportionment basis.
- Compare service wise revenue and cost.
- Classify the cost into fixed and variable content.

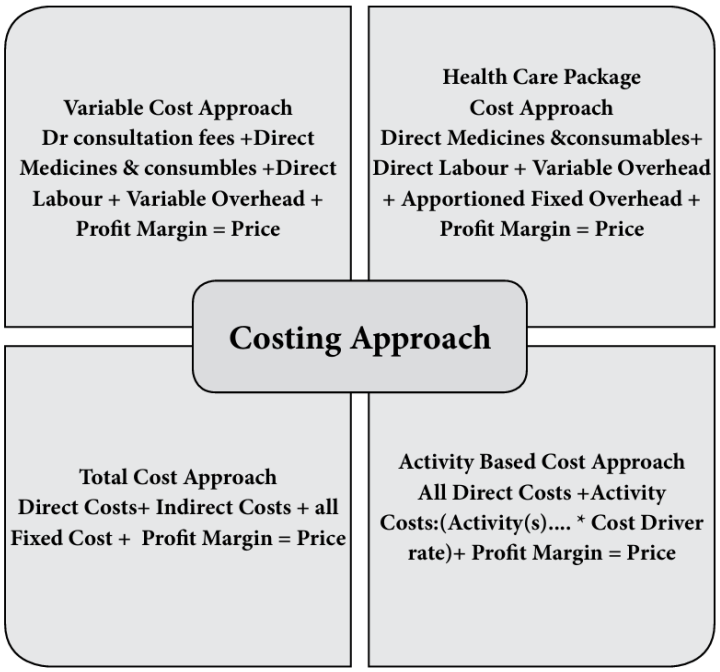

Figure 11.2 Approaches to healthcare costing

11.3.2 Cost models in practice

As given in Figure 11.2 above, to reach at the scientific cost, we have to implement the following cost model/methods which are used depending on the size, foot falls, resources and types of services. Using various costing methods, cost accounting can show a healthcare operator how much it costs to provide a specific procedure or treatment. Like other industries, these cost accounting methods can also be applied in healthcare. Each method aims to provide a rational and systematic way to determine the true costs of products and services.

- **Variable cost approach**- In variable cost approach, we have to take only variable cost which is incurred on the treatment of the patient such as consultation fees, medicine provided from the hospital, nursing staff deputed separately for his care and other variable overheads. Accordingly, one can ascertain a price by simply adding the profit margin to the variable cost.
- **Standard Cost Accounting-** As its name implies, the standard cost method uses an average value for each element in the direct cost of a product or service to develop a total standard cost. This means that an average amount of labour, materials and overhead are used to determine the cost of an item, regardless of the actual costs of those components. It is a simple method that is commonly used by organizations that have limited resources available to devote to cost accounting. The advantages of standard costing are its simplicity and ease of use for building healthcare budgets and forecasts. The primary disadvantage is that the standards may not perfectly reflect actual costs. For this reason,

organizations that use standard costing have to regularly analyse variances between standards and actual costs and update the standards accordingly. This analysis can be a particular challenge for healthcare companies because individual patient needs can drive significant cost variances.

- **Total cost approach**- In case of total cost approach, we have to reach or calculate total direct cost and indirect costs along with total fixed cost. Accordingly, one can ascertain a price by simply adding the profit margin to the total cost.
- **Health care package approach**- In case of health care packages, we have to ascertain direct cost of medicines and consumables, nursing staff deputed separately for his care (if any), variable overheads and also the portion of fixed overheads. Accordingly, one can ascertain a price by simply adding the profit margin to the total cost. Example includes cardiac treatment, dialysis package, corporate customized package or specific organ transplantation package.
- **Activity Based Cost approach**- ABC method would be the most appropriate method of identifying the cost to respective departments. We have to calculate the cost of each and every activity involved based on cost drivers and cost pools. Cost of each activity is accumulated according to the cost drivers. ABC takes a rational approach to product and service costing since it begins with an effort to identify the fundamental activities and resources involved in producing an output. The indirect expenses are then allocated to the activities using cost drivers that are carefully selected to reflect the use of each particular resource pool. This methodology has been found to produce accurate and rational financial management information and helps managers make accurate product price calculations and consumer profitability analyses. The basis for ABC is a belief that all indirect costs can be traced and allocated to individual products and services. The main advantages of ABC are that it is more accurate and aligns the costing with how the organization actually works. Activity based costing provides managers a more accurate view of the 'true' cost of their products and services. However, ABC is not without its drawbacks. The ABC process has been criticized as being resource intensive for complex organizations. Identifying the appropriate cost drivers, an essential step in the ABC process, requires significant managerial time and financial investment. Moreover, significant investments are required to maintain an ABC system as the organization's processes change. ABC systems can become outdated very quickly if the assumptions regarding the cost drivers are not updated to reflect organizational changes. The selection of cost drivers is also subjective. Activity based costing may allow managers to select cost drivers that reflect their personal preferences. With the assistance of technology, two versions of ABC have become common for healthcare providers:
- **Performance-focused activity-based costing (PFABC)** starts with the fundamentals of ABC, that is, identifying all the activities involved in patient care, assigning costs to each activity and then deriving a standard cost such as the cost

per patient of each activity. Then PFABC introduces several factors to determine activity usage, rather than the pre-set drivers in traditional ABC. In healthcare, these factors include consumption data such as quantity and price of resources consumed and performance measures such as customer satisfaction, patient outcomes and efficiency metrics. Healthcare providers can use the data from PFABC to make strategic decisions about service offerings, resource allocation and process improvements. PFABC is similar to ABC in that it requires the identification of major cost activities but dissimilar in the ways that activities' resource use is also determined.

- **Time-driven activity-based costing (TDABC)** is a simplified version of ABC that assumes all costs are driven by time. TDABC calculates the total cost for each stage of patient care and then derives a standard per-minute cost for each stage. The total cost for an episode of care is calculated by adding the cost of each stage based on the minutes consumed in that stage. For example, costs for a typical X-ray might be accumulated by applying a per-minute rate for each stage in the process, such as patient time in the waiting room and exam room, the administrative check-in and checkout processes and the time it takes the technician to perform the X-ray and the radiologist to read it.
- **Micro costing** is a bottom-up technique for developing cost estimates. Micro costing uses actual cost information from an organization's general ledger to determine a cost per unit for every resource used in every step of a patient's care. It requires collecting data on the quantity of resources actually used for each procedure. Micro costing is one of the most accurate costing techniques, but it is extremely tedious and resource-intensive. It requires significant integration of financial data with clinical data.
- **Direct-to-encounter costing** is the most detailed method of costing in the healthcare industry because it is performed on a patient-by-patient basis. This bottom-up approach accumulates all the individual direct resources used for a specific patient's particular encounter. Its goal is to identify and attribute as many direct costs to the specific encounter as possible such as physician or specialist time and any medications, services and supplies consumed. This costing approach is similar to standard costing, except that standard costing aggregates average costs while direct-to-encounter costing tracks specific costs. Direct-to-encounter costing is the most accurate but also demands the most effort. Additionally, in order to calculate the total true cost of an encounter, any indirect costs must be allocated separately using another method.
- **Throughput accounting**: Whereas other cost accounting methods aim to identify the full costs per unit produced so that those costs can be managed or reduced to increase profitability, throughput accounting focuses on raising profit by maximizing volume. In healthcare, throughput is the number of patient services provided over a period of time. The aim of TA is to maximize that throughput. Investments costs such as spending on diagnostic equipment or inventories of supplies, are evaluated separately based on how they improve the

quantity and quality of patient care or reduce bottlenecks in the stream of care to increase throughput. TA's advantage is its focus on maximizing revenue by eliminating or reducing bottlenecks that slow down throughput, rather than getting caught up in cost accounting calculations. If not thoughtfully administered, it could negatively affect patient care as a side effect of the race to increase quantity served.

- **Relative Value Unit (RVU)** is another top-down costing approach. RVUs are standardized measures meant to objectively represent the amount of resources including physician time, staff time, equipment and liability insurance, used for a particular procedure. More RVUs associated with a procedure indicate greater amounts of resources and work involved in performing the procedure. A simplified example of how to develop a cost per RVU would be to divide total organizational expenses for a period by the total number of RVUs for all the procedures performed during that period. The cost per RVU could be multiplied by the number of RVUs for a particular procedure to estimate that procedure's total cost.
- **Ratio of cost to charges** *(RCCs)* is a costing method specific to the health care industry. The RCC creates a ratio of overall departmental costs to the aggregate revenue charged to patients. The cost report uses traditional costing methods to allocate overhead costs to clinical departments, allowing hospitals to estimate the full cost of each revenue-producing department. Hospitals can pair these estimates with information about the total charges for all services provided by a clinical department to compute a department-level ratio of cost to charges (RCC). The RCC, when multiplied by the hospital's charge for a specific service can be used to estimate the cost of providing an individual. For example, if the obstetrics department has a total annual cost of $40 million and bills $100 million in charges to patients each year, the ratio is $40/$100, or 40%. Using this ratio, the cost of a specific obstetric procedure with a $15,000 charge would be estimated at $6,000 ($15,000 x 40%). Service-level costing using RCCs is a simple exercise and used by management to directionally monitor the profitability of the department. Using RCCs requires virtually no additional investment of managerial time or financial resources because of availability of department level costs.

For implementing or calculating the cost, the management of the hospital has to monitor whether the following records are being maintained by the hospital or not. Few are the following cost records which are essentially required to be maintained.

- Register of pharmacy supply, department wise
- Register of surgical items supply, department wise
- Register of pharmacy consumption, department wise
- Register of surgical items consumption, department wise
- Register to record number of hours of doctors, consultant doctors, resident medical officer etc.

- Register of fixed assets such as medical equipment, department wise, specialty wise
- Register of utilities and number of hours utility used.
- Register of in and out patients.
- Register of bed occupancy (private room & general ward)
- Register of surgeries done.
- Register of different tests done.

11.3.3 Steps for cost models

Step 1: to identify the main medical department, medical support department and non-medical service department.

Step 2: Each of the above department is assigned a cost centre name. Each cost centre shall have many work centres such as diagnosis work centre, investigative work centre, preparatory work, pre-operative ward work centre and each of these work centre shall have a sequence of activities such as inspection, counselling for further procedures, difference medical activities till the completion.

Step 3: As and when the activities happen, the costs are captured in respective cost centres. Once captured, the cost for respective centres can be pooled to get the total cost of that cost centre.

Step 4: This could be to find out the total quantum of services rendered in respective cost centre/work centre and the total costs are divided by the number of activity/services rendered to arrive at cost per service or cost per activity.

Step 5: The next course of action is to identify the resources used in the main cost centre (medical department) and in the services department, that is, medical support department and non-medical service department and the costs are then absorbed to that cost centre based on the number of units of services rendered.

The final cost object decides the matrix of cost collection and final costs. Following are a few suggested cost objects that can be used as final cost object:

- Cost per bed/day
- Cost per patient
- Cost of each department (cost collectible from respective cost centre bookings)
- Cost per standard procedure/treatment/package (sample cost sheet displayed in subsequent pages)
- Cost for a service activity (cost workable based on ABC method)

The module on financial accounting information system deals with cash/bank, receipt/payments, journal, vouchers and generation of general ledger and books like cashbook and bankbook. This module generates reports like

- Trial balance

- Profit and Loss statement
- Balance Sheet

The Financial Accounting screens describe about the account payable, account receivable and general ledger. Also, it describes the activities related to IP, OP, bank related activities and provision to clearing the supplier invoice and keep track of the account receivable and revenue related activities. The services that are covered by the sponsor companies, insurance agencies, family accounts, individual accounts, sponsorship details of the patient, health care insurance are recorded in the system.

In a hospital, the data flows are seamless and shall remain connected in a criss-cross way among all departments. Hence, the design of books of accounts shall be in such a way that the data shall be made available in all directions for an individual cost object or group of cost object and cost centres. Two fundamental items of financial data needed by a hospital manager are

- allocated costs by cost centre (a program or department within a hospital) and
- the unit cost of hospital services. A unit of hospital services may be as small as one meal or as broad as an entire inpatient stay.

A well-designed integrated accounting pack should enable the users and explains how to allocate costs by cost centre and how to compute unit costs. To perform these calculations precisely, the hospital needs an accurate and comprehensive financial and cost accounting system. In many hospitals, however, existing accounting systems have gaps such as excluding some costs or lacking the data to relate the costs to specific cost centres. In such cases, estimates are needed. The best way to make this happen is the integration of data via ERP module.

Accounting system in a hospital captures all those costs that are directly related to the medical and medical support services and non-medical services. These costs are directly billable to the service users. The data capturing mechanism would be through cost centres, work centres and activities. The costs so collected shall become the total costs for a billable service. However, when the entire costs are summed and compared with that of financial statements, they may not get equated in total. Hence, there always lies a gap between the two. Some of the reasons that are identifiable for the gap are listed below:

- Litigation expenses of the hospital-not captured in costing.
- Mortuary department management costs
- Abnormal expenses for repeated activities. This may happen due to incompletion and insufficient service levels
- Unabsorbed expenses in costs /billed services
- Unabsorbed Financing costs
- Abnormal items that are not part of billable services
- Prior period costs

- Provisions that are not captured under cost heading such as provision for litigation contingencies
- Loss on sale or purchase of assets
- Bad debts

11.4 Salient features in the costing process

- Identification of departments into primary cost centre/medical, secondary cost centre- medical support and non-medical, that is, service departments/tertiary cost centres. It will be prudent to follow the principle of case mix groups wherein homogeneity is the criteria for classifying the medical departments.
- Maintaining the number of departments to the minimum levels is desirable.
- Fixing primary, secondary and tertiary cost centres among the departments. *Primary* cost centres are those wherein cost can be segregated directly and the revenues are identifiable. *Secondary* cost centres play a dual role of both a profit centre as well as cost centre. This is because medical support department renders services both for inpatients as well as outpatients and also for walk in patients. *Tertiary* cost centres are those wherein costs have to be accumulated and distributed among the primary and secondary cost centres.
- Identifying the cost drivers within each cost centre. This is important in accumulating the costs though respective cost drivers. For example, while OT complex is a cost centre, the operation hours is a cost driver.
- Identify within medical and clinical departments, services which generate revenues as well as support other revenue generating department (secondary department). For example, lab generates direct income as well as supports other medical departments as part of various packaged products.
- The costs of non-medical service departments are to be apportioned among the medical and clinical departments. For example, costs of housekeeping, laundry, boiler, AC maintenance etc.
- Analysing and arriving at appropriate basis for allocation and absorption of costs of medical and non-medical service departments is to be done.
- Patient is taken as the unit of costing.
- Resources consumed by the patient are identified for every procedure. It could be from average length of stay (for cost of room, nursing care, laundry expenses and diet food wherever applicable), medicines, materials and doctors fee etc.

Cost accounting lets you determine the value of the products and services that flow through healthcare supply chains. You can collect, record and analyse the value of those products and services for quality, compliance and healthcare management outcomes. The process involves financial reports, balance sheets, invoices, cash flow analyses and records from patients and insurance companies. This documentation, either in digital or physical form, occupies various locations like ERP systems, hospital accounting software or paper filing cabinets. However, the most successful healthcare leaders use dedicated cost accounting tools.

11.5 Issues involved with costing methods

Systems that can't correctly cost products and services might cause healthcare organizations to overcharge patients and insurance companies and undercharge suppliers and service providers for products and services. Outdated and incapable systems do significant financial damage to healthcare organizations and render it impossible for cost accountants and healthcare financial managers to do their jobs. Basic accounting tools and rudimentary ERP systems aren't capable of advanced cost accounting, especially in the healthcare sector, where cost and pricing decisions intertwine with patient care.

11.5.1 Apportionment/allocation of indirect cost

Most of the service departments are interdependent on each other. It is difficult to arrive at basis of apportionment of costs accurately since multiple departments are involved and cross use of resources will be there and hence data capturing will be relatively challenging. For example, when a ward is used by multiple specialties, the costs accumulated at the ward level are apportioned among the user departments based on patient service days. However, the intensity of cost incurred by a patient who may stay for lesser days than another is not captured. Hence, we try to use Resource Intensity Weightages (RIWs) to each type of specialty for the length of stay of the patient. Assigning RIWs to the basis will even out the differences during apportionment process.

11.5.2 Selection of time horizon

Selection of time horizon for costing can have impact on cost of services in different ways:

- The behaviour of certain costs could change with time.
- The time horizon will also decide which cost should be included or not. The costs which remain fixed will change over a longer period.
- The costs which are measured should be incurred in the same time period.

11.5.3 Difficulty in estimating and identifying costs where multiple services are rendered to a patient- Many times, when multiple procedures are performed on a patient, the data is known by the major procedure. This poses difficulty in identifying and allocating costs.

11.5.4 On medical package costing and costing procedures- Medical package costing has to take in to account the costs of different procedures from different departments involved in a medical package. This again involves costing of each department under which these procedures are covered.

11.5.5 Important aspects in micro costing to be considered

- Define standard procedures under OP, IP and day care with all components of services like stay (for IP and day care), materials, medicines, doctors' fee and investigations etc.
- Determine the unit of service mostly per intervention or per patient.
- Patient specific consumption of resources or such units of services have to be captured.
- Trace indirect cost applicable to the respective department under which the procedures are covered and apportioning these to procedures.
- Trace patient specific direct costs.
- Measuring all costs in terms of units of services defined earlier.
- Finding capacity utilisation for following indicative areas:
    - ***a)*** Labs and diagnostic divisions
    - ***b)*** OT complex
    - ***c)*** Wards
    - ***d)*** Utilities like laundry and air-conditioning etc.
    - ***e)*** All other medical equipment

There are also challenges when healthcare leaders can't analyse cost data in systems correctly. That typically happens when a cost accounting system is too complex and users lack the knowledge to interpret the data contained with it. Other times, antiquated or inferior systems don't display cost data efficiently, leaving healthcare leaders unable to execute cost accounting processes. In these scenarios, an advanced healthcare ERP system might just be the ideal solution.

Cost accounting is an ongoing challenge but the technology created to simplify it can be just as problematic. Most healthcare leaders have outgrown basic accounting tools and traditional ERP systems. Others have invested in specialized cost accounting software but find these systems too complex for data analysis. So, leaders need to find a solution that balances the ease-of-use of a conventional ERP with the functionality and integration that only comes from a dedicated cost accounting system.

The mechanism of capturing the entire cost data is shown in a flow chart which is graphically represented in Figure 11.4 below. This includes:

- **Posting screen** in the accounting IT package has to capture each of the expenses identified to several variables parameters as mentioned below in a separate field. As and when the expenses are incurred, the same is to be identified or traced to the following fields and then posted in books of accounts in respective field on the screen. This includes
    a) Location
    b) Account/code or description
    c) Cost centre identification (either medical including medical procedure grouping or medical support or non-medical services). This is required to find which department has incurred how much cost

d) Work centre like front office, day care or OP or IP
e) Activity like consultation, diagnosis, dressing, testing or counselling
f) Patient (if identifiable to a patient and for patient level costing)
g) Job or activity like dressing, consultancy, diagnosis, curing, observation
h) Employee, employee gr, vendor, vendor gr, location
i) Work order like procedure or procedure gr
j) OP or IP like Out-patient, inpatient, nursing, ward (For activity costing)
k) Ward name, for instance, general, single, double, multiple, duplex or luxury

Above are only a few examples in a typical hospital. However, depending on the size, complexity and information need of the hospital, the list could be extended.

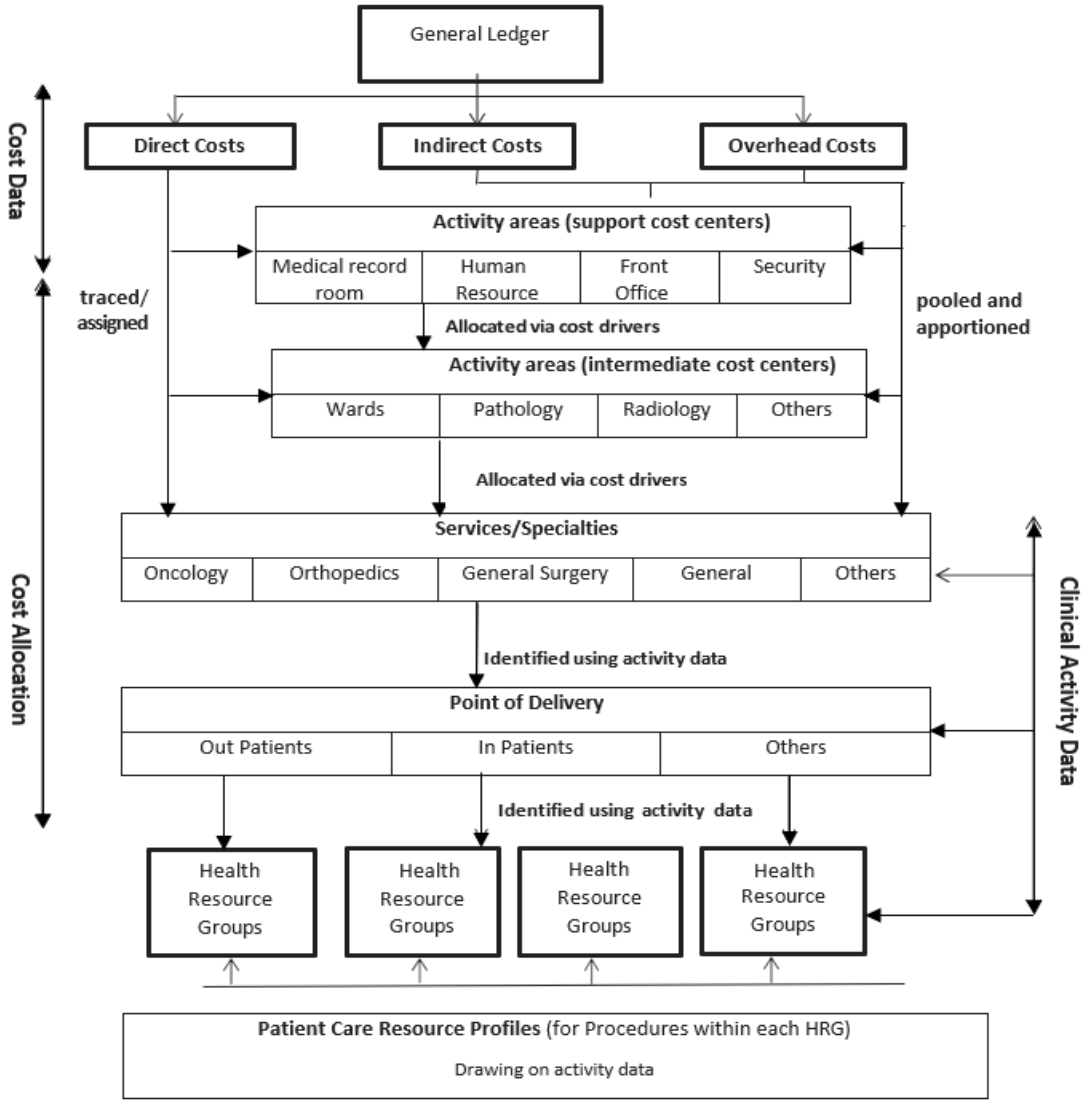

Figure 11.3 Flow chart of cost data.

- **Account heads (General ledger):** The following account heads can be opened for respective cost elements and can be grouped as direct costs and indirect costs groups.
    a) Medicines, further classified as imported, indigenous or subsidised
    b) Medical consumables and implants
    c) Direct utilities such as
        1. Oxygen
        2. Nitrogen
        3. Nitrous oxide gas
        4. Other life-saving gases
    d) Power and fuel
    e) Salaries, further categorised amongst surgeons, doctors, nurses, para-medical staff members, workers and helpers
    f) All other direct cost elements (one account head for each cost element, these costs can be directly allocable to respective cost centre)
    g) All indirect costs/overheads (one account head for each cost element). After posting to respective cost centre, these costs are apportionable to other cost centre/activities
- **Cost centre or profit centre identification:** Once an expense item is identified for account head as above, then, it is to be identified for which cost centre it is expended and to be posted in that cost centre as follows:
    a) For **medical department** (one cost centre for each medical department called as **primary** cost centres)
        1. Cardiology department
        2. ENT department
        3. Coronary care department
        4. Paediatric department
        5. Neuro department
        6. Gynaecology
        7. Pathology
    b) For **medical support department** (also known as **secondary** cost centres), here revenue bookings also happen due to dual role of such cost centre
        1) Pharmacy
        2) Laboratory
        3) Wards
        4) Imaging
        5) Blood bank
        6) Operation theatre with various categories of OTs
        7) CSSD (Central Sterile services department)
        8) Nursing (day care, OP, IP, others)
    c) For **medical service department** (tertiary cost centres or service cost centres), after the costs are collected, then it is apportioned to respective

cost centre on suitable basis. Illustrative basis is explained in allocation practices table given in this guidance note elsewhere. Following service cost centres are illustrative below:

1) Investigation
2) Transport (patient/non-patient)
3) Laundry
4) Patient catering
5) Records management
6) Mortuary
7) Charity services
8) Purchase Stores
9) Costing/Accounts/IT

- The data captured in (a) above is to be identified to one of the following procedures in primary cost centre. Examples of few procedures for various departments (medical primary and secondary cost centres) are as follows:
  a) Cardiology medical department (as one cost centre)
  b) Aortic endarterectomy
  c) Insertion of automatic implantable cardioverter
  d) Insertion/replacement of pacemaker
  e) Coronary artery bypass grafts and angiogram
  f) Valve surgery
  g) Valve replacement
  h) Open heart surgery
  i) Neurology department (another medical cost centre)
  j) Cervical procedure
  k) Thoracic procedure
  l) Lumbar procedure
  m) Imaging (as medical support cost centre)
  n) Scanning procedures
  o) Ultra sound procedures
  p) Intravenous treatment cum scanning procedures
- **Final stage after all above process**: Once all the costs are captured as above, then it is grouped, assembled, collected and summarised. It can also be tabulated in a matrix format with several dimensions such as cost centre wise/job wise/patient wise/activity wise/work centre wise and then considered for apportionment on suitable basis for respective cost object. In addition, from the above data base, information can be arrived at from other various dimensions for control perspective also.

  The above stages are summarised as follows:

  a) **Direct costs** such as medicines, pharmacy stores, consumables, oxygen incurred are collected in respective ***primary cost centres*** such as medical department and also to ***secondary cost centres*** namely medical services department.

b) **Indirect cost elements** such as power, salaries are also collected in respective primary, secondary and tertiary cost centres such as medical, medical support department and medical service department.
c) **Service cost centre** cost elements are apportioned to medical and medical support cost centres on suitable or applicable basis (Illustrated basis is given in this guidance note elsewhere).
d) **Other fixed costs** are charged to each medical procedure based on the number of hours for respective procedure.

The procedures conducted in each medical and medical support department are listed out and each procedure is assigned with the work content in terms of number of hours work (this is because each procedure will involve different skills and resource contents). In addition to above, weightage is given for each procedure so that all procedures can be equated for arriving at total equivalent procedures conducted in a given period. The work content of the procedures (after giving due weightage) is summed up and such summed up hours is taken as denominator for arriving at cost per equivalent unit procedure. This cost per equivalent procedure is then applied to respective procedures gross hours to arrive the gross cost per procedure.

- **Illustrative list of cost records to be maintained**
  a) Surgical/Pharmacy supply consumption-department wise (from surgical material ledger)
  b) Hospital will have main stores, many sub-stores and each store to record surgical supply/consumption, department wise.
  c) Separate ledger for items consumed on consignment basis, department wise (surgical non-storing)
  d) Each above ledger will have items billable and non-billable. So, separate ledger to be maintained at all the stores level.
  e) Non-surgical material ledger, material which is generally one main store
  f) Pharmacy ledger in same fashion as above
  g) Engineering items consumption ledger- For major projects, job cards to be prepared so that consumption can be properly classified as revenue and capital nature cost.
  h) Food material consumption ledger, if hospital is procuring to patient & staff
  i) Record of utilisation of doctors' hours, full-time retainer doctor hours, consultant doctor hours, resident medical officer hours to be maintained
  j) Department and sub-department wise manpower deployed and cost of salaries, manpower utilisation hours to be maintained.
  k) Utilisation of fixed assets, in particular medical equipment's department wise and speciality wise
  l) Records of outsourcing services like medical test, house-keeping, food, laundry
  m) Cost centre wise expenses booking

n) Patient count and number of studies and tests done in all medical departments and sub-departments
o) Record of number of surgeries, grade-wise, specialty-wise, OT-wise, surgeon-wise
p) Charity and concession register showing patient-wise, department-wise.
q) Department wise area, technical estimates of medical gas consumption and power
r) Record of bed occupancy patient class wise (single bed, double bed, common ward, special ward, deluxe room)
s) Record of Cath lab and operation theatre wise occupancy
t) Record of inventory valuation to be obtained from all the ledger and valuation to be based on the investor policy such as LIFO, FIFO or weighted average.

11.7 Future ahead

Increasing price transparency will likely create market pressure that push hospitals to alter their pricing processes so that prices reflect the costs of providing individual services. In present context, it will be important that hospitals adopt new cost accounting systems so that they can better-understand their service-level costs. However, predictions about the future of the health care industry are extremely difficult to make and there are other plausible views of the future in which cost accounting efforts continue to play a minor role in hospital management. Attempts to increase revenues by expanding the population being managed and to reduce costs by improving care management efforts may be preferred to strategies that emphasize operating cost reductions.

The widespread adoption of narrow networks is another scenario in which cost accounting could continue to play a minor role in hospital markets. Narrow networks plans are insurance benefits that offer relatively low premiums but drastically limit beneficiaries' provider choice. These plans employ a very different strategy of cost reduction. Plans that choose to increases coinsurance or deductible amounts encourage beneficiaries to compare the prices offered by providers within their networks (utilization effects). This puts more pressure on providers to offer rational pricing for individual services. On the other hand, to reduce costs, narrow network plans must rely on insurers' ability to negotiate lower-cost contracts with providers. If narrow network plans dominate the marketplace, the provider contract and not the individual service will continue to be the primary level at which prices are negotiated. In this scenario, hospitals may avoid the need to reform their cost accounting efforts.

Recently, calls for hospitals to be more transparent in their pricing have increased. Policymakers and health care professionals have focused a great deal of attention on finding ways to present price and quality information to consumers in an accessible and comprehensible manner, so that the consumer can make better informed decisions. Hospitals' efforts to prepare for price transparency have focused on developing systems

and processes required to calculate patient and insurance-benefit-specific prices and communicating these prices to patients. Ultimately, the hope is that value (price and quality) will become the basis of competition and hospitals will be incentivized to reduce their prices by cutting their underlying costs.

Hospital efforts to provide patients with understandable, usable price information will go a long way towards establishing a more transparent market for hospital services. Unfortunately, these efforts will not be sufficient to create the kind of price competition that reduces hospital costs. As patients gain better information about hospital service prices, they are likely to find wide, inexplicable variation in the costs of similar services. The prices that these newly-informed patients face will, in many cases, bear little relation to the underlying cost of delivering care.

As a result, it is difficult to anticipate how prepared hospitals are for market changes that could make service-level prices and cost information more important bases of competition. It is, moreover, suggested that for most hospitals, cost accounting capabilities are rather limited. It is advocated that the adoption of more sophisticated cost accounting systems has been hindered by pricing processes that emphasize price negotiations at the contract, rather than the individual service level. Under these pricing processes, the benefits hospitals realize by implementing systems that provide detailed cost information are relatively modest. Organizational and environmental factors specific to the hospital industry may also make the cost of implementing sophisticated cost accounting systems prohibitively high, reducing the likelihood of adoption.

CHAPTER-12

Cost pool and allocation practices in healthcare services

Cost pooling means classification, collection of costs and resources used in respective departments and then allocating, apportioning it to respective activities. Healthcare services are broadly classified into the following groups and hence cost pools are also classified in the same manner:

1. **Medical departments:** are those which generates income directly from the patients. These are also called as profit centres and include general medicine, gynaecology, cardiology, orthopaedic, neurology and nephrology. For example, income from Coronary Artery Bypass Graft (**CABG**) surgery did to a patient will be the income of Cardiology department. Income from Lower Segment Caesarean Section (LSCS) surgery to a patient will be an example of gynaecology department. Medical departments are further classified into-
    - Out-patient (OP)
    - In-patient (IP)
    - Of course, Day Care Unit is considered as a separate medical department.
2. **Medical support departments:** These departments generally exist to support the above-mentioned medical departments. They also generate revenue from patients directly and hence these are also called as profit centres. However, in addition to their nature of revenue generation, resources are also expended in these departments and hence they will also be treated as cost centres. Example, Operation Theatre (OT), laboratory, radiology, physiotherapy, blood bank, pharmacy and wards. By doing X-ray for a walk-in patient, radiology department is generating income. At the same time, radiology department is also contributing revenue to cardiology department by doing X-ray for CABG patient under package.
3. **Non-medical service departments:** are those departments which do not generate income directly but supports the medical and medical support departments to do their services effectively. This includes medical records department, business operations & administration department, Finance & Accounts department, IT department, Bio-medical engineering department, maintenance department, house-keeping, admission department, HR department, purchase & stores department, to name a few!

12.1 Methodology of allocation/apportionment of major expenses (due weightage to be given wherever applicable)

	Type of expenses	**Basis of allocation/apportionment of expenses to respective profit and ancillary centres**
1.	Medicines	Actual basis
2.	Doctor consultation fees	Procedure-wise, ward-wise, actual/standard rate chart

3.	Direct medical consumables	Actual basis
4.	Direct staff wages and salaries	Cost centre-wise, category-wise
5.	Indirect medical consumables	Technical estimates
6.	Pathological testing material	Directly to pathological department
7.	Air conditioning and power	Technical estimates
8.	Steam	Technical estimates
9.	Repairs and maintenance	Cost centre-wise
10.	Property tax	Floor area
11.	Depreciation	Cost centre-wise, asset-wise depreciation

12.2 Below table shows an illustrative list of profit centres and its cost drivers (due weightage to be given wherever applicable)

	Profit centres		**Cost drivers**
1	**Wards**		
1.1		ICU	Patient days
1.2		Suite class	Patient days
1.3		Deluxe room	Patient days
1.4		Semi private (twin sharing room)	Patient days
1.5		Common class	Patient days
2	**Operation theatre**		
2.1		Cardiac	Total hours utilised and standard hours required for each procedure
2.2		Diabetology	Total hours utilised and standard hours required for each procedure
2.3		Orthopaedic	Total hours utilised and standard hours required for each procedure
2.4		Others	Total hours utilised and standard hours required for each procedure
3	**Cath Lab, procedure-wise**		Total hours utilised and standard hours required for each procedure
4	**Robot assisted surgery**		Total hours utilised and standard hours required for

			each procedure
5	**Physiotherapy**		Total hours utilised and standard hours required for each procedure
6	**Radiology/imaging**		
6.1		CT scan	Number of tests done
6.2		MRI	Number of tests done
6.3		2D echo	Number of tests done
6.4		Stress test	Number of tests done
6.5		Sonography	Number of tests done
6.6		X-ray	Number of tests done
6.7		ECG	Number of tests done
7	**Health check-ups**		
7.1		Basic	Number of patients
7.2		Cardiac	Number of patients
7.3		Gold	Number of patients
7.4		Deluxe	Number of patients
7.5		Platinum	Number of patients
8	**Preventive cardiology and rehabilitation**		Number of patients/patient hours
9	**Children's health centre**		Number of patients
10	**Pathology (major test-wise)**		Major tests-wise, number of patients and standard costs per test (material and staff costs)
11	**Casualty/day care**		Number of patients (IPD and OPD separately)
12	**OPD consultation, category-wise**		Number of patients

12.3 Below table shows an Illustrative list of cost centres and its cost drivers (due weightage to be given wherever applicable)

	Non-medical service cost centres	**Cost driver for reallocation to profit centres only**
1.	Admission	Number of patients
2.	Kitchen	Patient days
3.	Cafeteria	Patient days
4.	Laundry and linen	Patient days
5.	Pharmacy	In the ration of cost of medicine
6.	Blood bank	Actual number of blood bottles used
7.	House-keeping	Floor area
8.	Maintenance	Asset value

9.	AC	Technical estimates
10.	Power	Technical estimates
11.	Steam	Technical estimates
12.	Security	Floor area
13.	Residential rooms	Manpower employment
14.	Administrative department	Number of IP and OP visits and admissions (with due weightage)
15.	Marketing department	Number of IP and OP visits and admissions (with due weightage)

12.4 Illustrative: Sample cost sheet for a medical package

Name of the medical package	**Description of the pack (as per standard description)**
Details of cost elements	Amount/pack (Rs.)
Pharmacy costs	xx
Consumables costs	xx
Implants costs	xx
Investigation costs (with details)	xx
Doctor and nurses' fees (with details)	xx
Other employee costs	xx
Accommodation costs	xx
Medical equipment usage costs	xx
Maintenance costs	xx
Other direct expenses	xx
Total direct costs	xxxx
Administrative costs	x
Management costs	x
Total cost of the package	xxxxx

12.5 Illustrative: Sample cost sheet for a patient (patient level costing)

Patient-level costs are calculated by tracing expenses actually incurred to a patient and other costs associated on such a patient incurred by the organisation in providing the required services. This patient level costing measures the costs of delivering care at the level of individual patient. In this method, each patient is assigned with an identification code (similar to accounts code). Whatever expense such as medicines, consumables, doctor consultation fees, amortised cost of other resources such as other consumables and all those costs that are directly incurred on the patient is charged/collected to that identification code. The sum up will be direct costs and indirect costs that are attributable to that patient. In addition to above, each patient is charged with general overhead costs such as administrative costs based on Activity-Based Costing (ABC) method. A sample cost sheet (at patient level) is provided at the end of this guidance note.

Chapter-13

Current perspectives in Indian healthcare cost system

Cost accounting is a specific type of accounting that focuses on accumulating, analysing and controlling the costs incurred to develop a product or deliver a service. It's a form of managerial accounting, meaning it is intended to help an organization's internal managers make better-informed business decisions. However, many hospitals in India do not have a dedicated costing team. This is especially relevant in case of small hospitals or single speciality clinic. Hence, their respective top management is unaware of the cost incurred at patient or service level. In addition to this, failure to maintain cost records is due to the following:

- lack of **software support** adds to poor cost determination.
- The massive number of **care steps** and **variations** are a primary challenge to cost accounting in healthcare along with resource constraints, resistance to change and regulatory compliance burdens.
- Non-availability of customised and cost-effective healthcare costing software with poor external support hinders its **implementation** in India.
- In addition, sheer variety of disease codes (the **DRG methodology**) and associated complexity level poses challenge for standardising the cost workings in a typical single speciality or standalone hospital.

In order to establish standard unit costs for each service provided, cost accounting for healthcare organizations begins with the organization of direct costs such as the cost of medical supplies utilized and labour for doctors and nurses. It also entails determining and allocating the indirect expenses such as operating room time and equipment costs that underpin patient care services. Potential savings and chances to increase productivity, efficiency and profitability can be found by analysing service costs and cost drivers. Last but not least, a full cost accounting procedure must logically and methodically assign a portion of the organization's overhead expenses such as administrative salaries, facility fees and insurance to each service. Ideally, implementation of cost accounting enables a hospital to say that it costs a specific amount to do an X-ray or surgery.

Additionally, cost accounting helps business executives better manage their resources by providing them with insights into expenses and the underlying cost drivers. Usually, cost-accounting procedures also pinpoint areas where expenses can be cut and productivity raised, both of which boost profitability. Healthcare accountants must first ascertain the actual cost of each step in the treatment process before calculating the cost per episode. Given the numerous stages required for each of the numerous, diverse services that healthcare organizations offer, this is no minor task. Furthermore, there may be significant cost fluctuations because healthcare services are tailored to each patient's unique situation, unlike mass-market manufacturers.

Nonetheless, healthcare cost accounting is possible with the help of the appropriate accounting software. Finding every potential individual care step, from minor services like applying a bandage to major ones like intricate surgeries is the first step. After that, accountants need to identify the factors that influence each care step's costs and establish a system for measuring and classifying them. This entails tracking and allocating indirect resources in addition to collecting the direct costs such as prescription drugs and doctor visits. To get an average or standard cost per episode of care, they then add up the prices and volume of comparable services. Beyond these initial calculations, cost accounting also includes regularly comparing these standard costs to actual costs and analysing the cause of any variance, usually via automated reports and dashboards. Depending on the circumstances, the standard costs can be updated as a result of the findings and/or healthcare managers can take action to bring the actual costs back in line with the standards. To achieve this,

- Detailed operating manual for a good costing system tailored for healthcare setting in India is required.
- A healthcare organization must be financially stable to deliver quality care. Cost accounting helps healthcare leaders manage costs and set fees that achieve their desired level of profitability.
- Cost effective software which is customised for healthcare, with facilities to extract data from the native hospital information system (the MIS system) is very much needed.
- Integrated technology can help make healthcare cost accounting feasible.
- Management of the hospitals should be setting the tone by dedicating resources in capacity building.
- Cost accounting benefits extend to improvements in financial forecasting.
- We can learn from mature markets like NHS of UK where DRG-wise costing is implemented decades ago.

13.1 Impact of Cost Accounting on Healthcare Pricing

Healthcare providers have not always required cost accounting but this may be beginning to change. In the past, contract negotiations with payers, the government and private insurers have determined healthcare prices at predetermined reimbursements. Because the costs of providing the services were usually not taken into account, providers were not incentivized to create efficient cost accounting systems. However, two dynamics are in the process of changing that, both of which increase the need for better cost accounting.

- ***First***, healthcare prices have continued to a rapid ascent, thus, intensifying patients' price sensitivity. This pushes healthcare organizations to think of their pricing in the context of competitors. They may need to decide whether to be the low or high-priced provider, taking into account the impact that decision may have on volume. Such decisions require accurate, timely cost information.

- The ***second*** dynamic is a shift by payers such as Medicare in USA toward value-based pricing for healthcare services. That means including factors such as quality of service, patient satisfaction, performance and outcomes when calculating the price, they are willing to pay for services. Healthcare organizations must be able to support the quality of care delivered together with the costs in order to justify their value to payers. This requires comprehensive costing methods that can be connected to other performance metrics as well as the ability to measure, monitor and act on all the data. Customarily, requirements like these point to an integrated ERP solution.

13.2 Costing issues/challenges in healthcare

The adoption of cost accounting in the healthcare sector has advanced but it is still far from being widely used because of the numerous obstacles such as the heavy accounting burden, the intricacy of cost data and the issues of effectively recording and maintaining such data. Additionally, there is a wide variety of healthcare institutions including hospitals, physician practices and laboratories. These organizations vary in size, sophistication and resource availability. Because of the resources needed, cost accounting has proved unaffordable for many of these suppliers. However, providers can catch up, improve and go past the following typical obstacles in healthcare cost accounting with the use of emerging technology, particularly integrated financial and clinical software.

- **Data Complexity**

In healthcare, there is a plethora of terminology codes used to identify medical procedures and this keeps evolving so as to match the rapid pace of innovation in medical science and health technology. Within each procedural terminology, there may be multiple care steps or bundled services like X-raying and casting a broken bone. Each care step must be costed individually to properly estimate a patient's encounter costs and to account for individualized patient care. Developing a cost for every step of care involves significant volume and complexity of data.

- **Indirect Costs**

Both direct and indirect costs must be included in order to determine the actual cost of a good or service. Indirect costs like maintenance of medical equipment and overhead costs (administrative staff, utilities, maintenance and many others) provide two major hurdles in contrast to direct costs, which are easier to explain. ***First***, these expenses must be meaningfully tracked and gathered. ***Second***, they must be judiciously and consistently distributed among all care steps. If done manually, each of these challenges would be quite labour-intensive and challenging to administer. To effectively capture and allocate indirect cost data, even well-designed, automated accounting software would need to be carefully set up, configured and updated on a regular basis.

- **Updating Cost Data**

Because healthcare is always changing and advancing, it's essential that cost data be continually updated. New methods, medications and research create a constant need to revise cost data in conjunction with clinical expertise. In addition, routine changes in vendor pricing from a wide array of suppliers need to be captured from disparate systems such as supply chain management and inventory systems. Add to that mix changing payroll data, all of which compound the challenge of maintaining accurate, up-to-date cost data.

- **Resistance to Change**

Realizing the benefits of a robust cost accounting approach may require a shift in organizational culture to increase collaboration between financial and healthcare professionals. A disciplined change management program would likely be necessary to complement a healthcare system's adoption of cost accounting.

- **Lack of Transparency**

Since the majority of Indian healthcare providers' payments are sponsored by or originate from insurers, they currently have little to no motivation to invest in the personnel, procedures and technology needed for cost accounting. That includes central and state governments, which set their prices through contract negotiations that are largely disconnected from the cost of delivering services. Healthcare providers have been reluctant to commit substantial resources to creating and maintaining cost accounting systems since this procedure does not incentivize cost transparency. Consequently, providers lack visibility into their own costs, which makes it challenging to monitor, control or reduce those costs.

- **Regulatory Compliance**

The plethora of regulatory guidelines, policies and reporting requirements from multiple agencies is a daunting burden for healthcare organizations and it multiplies the complexity of cost accounting especially in the field of healthcare. For example, an organization needs to make sure that its method of allocating indirect costs makes sense and is useful for business analysis but that it also adheres to various regulatory provisions. Cost accounting systems must also have robust controls for data privacy, security and encryption in order to meet regulatory obligations for patient health information and electronic data records.

- **Resource Constraints**

Healthcare providers frequently face severe resource restrictions for non-patient tasks like cost accounting since they are under constant pressure to provide improved quality at reduced costs. Both technology and human resources are subject to these limitations. Investing in contemporary technology such as financial software, ERP systems, business intelligence and analytics tools, hiring superior personnel and training and educating that talent are all necessary to overcome outdated or insufficient financial software,

overworked accounting teams and undertrained employees. The resources to make these investments are, sometimes, simply unavailable.

- **Patient Complexity**

Cost accounting works especially well in industries that create standardized products such as manufacturing. But healthcare patients aren't widgets; they have individual medical histories and distinct treatment needs. This broad diversity causes virtually every patient encounter to be unique, creating inherent variances between the actual cost and any standard cost developed through cost accounting. The more sophisticated cost accounting methods do a better job at overcoming this challenge but that comes at the expense of being more complex and requiring more robust processes. In other words, the challenge can be addressed but it costs a lot to do so.

- **Poor costing practices**

In small health care facilities, price determination is often arbitrary and lacks practical sense. This is due to adoption of convenient price-setting systems namely, ***Markup pricing,*** a familiar term in many industries and representing the difference between the selling price of a product and its cost. In the healthcare industry, markup is the amount charged to patients or insurers over the cost to perform the procedure. Markup is typically referenced as a percentage of cost, so the difference between the amount charged and the cost is then divided by the cost. For example, a knee replacement surgery that costs Rs. 30,000 and is charged to the patient at Rs. 80,000 has a 167% markup [(Rs. 80,000 - Rs. 30,000)/ Rs. 30,000].

13.3 How to start with costing within a hospital?

First and foremost, a hospital must acquire two fundamental pieces of information before beginning the costing process, that is, the **cost** of each hospital service and the **cost distribution** among various cost centres (departments). Hospital services can range in scope from a single meal to a full inpatient stay. Understanding how to divide these expenses and calculate the cost per unit is essential. According to current procedures, certain costs are occasionally left out of the unit cost calculation and in other situations, the allocation to cost centres is illogical due to a lack of data. A first-time hospital entity can accomplish this in a suitable way by following these steps:

13.3.1 Define the final product of the cost analysis

Under this, few things have to kept in mind like:

What are the services or departments for which you are interested in computing unit costs? For example, do you want to know the unit cost for all in-patient services or a separate unit cost figure for each ward or service?

- **Purpose of the analysis:** If you want to do a comparison of costs of certain hospital departments, you will want to compute unit costs for each department

separately. If you wish to compare multiple hospitals, it may be sufficient to compute a single unit cost for all inpatient care for each hospital. In some cases, it may be unclear whether to compute a separate unit cost for a certain activity, or allocate its costs to some other output. For example, some studies have computed separate unit costs for lab and radiology departments, thereby excluding those costs from the cost per inpatient day or discharge. Others have treated lab and radiology as intermediate outputs, and fully allocated their costs to the inpatient cost centres. Again, the desirability of each approach depends on the purpose of the analysis, but it is important to be consistent. It may even be desirable to report results in both forms.

- **Type of data available:** whether the available data is aggregate or disaggregate also decides the computation of unit costs. For example, in order to compute unit costs by ward, you would need to have a minimum utilization data by ward (like actual total patient days for each ward for a particular budget year).
- **Units of output:** For each cost centre, one must define the unit of output (like inpatient day, admission or visit). For inpatient care, the usual choices are **inpatient days** or **admissions**. For outpatient care, number of **visits** is the unit of output. A variety of other output units have been used for other cost centres. Examples include the number of **tests** or exams by laboratory or X-ray department, the number of **operations** for OTs and the number of **prescriptions** for pharmacy departments.
- **Data period:** One can analyse unit cost based on data for a single month, a quarter or a year. Sometimes important data such as utility costs are only available on an annual basis, and to do a quarterly analysis, one would have to make assumptions about use patterns within the year. In such situations, it may make more sense to analyse data for a whole year rather than for each quarter. If managers are trying to understand a rapid recent change in costs, then quarterly or monthly analysis may be appropriate. However, if the aim is to compare a particular hospital's costs to other hospitals or fees paid by patients treated at similar health care settings, it may make more sense to use a longer time-period. Using annual data may help to "equalize seasonal variations" since each hospital is affected by these factors differently.

13.3.2 Define cost centres

The next step for computing unit costs is to determine and define the centres of activity in the hospital to which direct and/or indirect costs will be assigned. The rationale for choosing centres of activity that correspond with the hospital's organizational and/or accounting structure is managerial. Hospitals are organized into departments and since we want to strengthen the management of these departments, it is useful to have cost centres that correspond to the existing organizational structure of the hospital. This provides:

- the road map by which costs can be routed through the process of cost finding to final cost centres and
- a framework for costing the distinct functions of each centre.

From an administrative standpoint, cost centres can be classified into the following groups:

- **Medical departments (represents patient-centred activities)**
- **Medical support departments**
- **Non-medical service departments**

All these three departments are explained in chapter-12 of this technical guide. Within each of these above groups, there are also decisions about how many cost centres to define. This identification is necessary when it is desirable to allocate all direct or indirect expenses incurred by the general cost centre (non-revenue-producing centres) to revenue-producing centres which could be the final cost centres.

The aim of unit cost analysis is to allocate hospital costs (direct and indirect) to centres whose costs are to be measured. Typically, you will be computing the unit cost mainly for medical department. However, in some instances, you may need to know the cost per lab test or drug prescription, in which case unit costs are computed for medical support departments such as laboratory and pharmacy. On occasion, you may even need to know the unit cost of a non-medical department like dietetics, if, for example, you are considering opening a competitive bidding process to contract food services rather than keeping it in-house or you wish to compare the performance of dietetic departments across different hospitals.

13.3.3 Identify the full cost for each input

An important part of computing unit costs is to make sure that you have cost data which is as complete as possible. However, two issues are involved:

- the conceptual issue of determining which expenditures should be counted as costs based on an economic sense of resources used up during production of health care and
- the actual measurement of true costs using available data (which may be incomplete or untrustworthy)

13.3.4 Assign inputs to cost centres

At this point, you have presumably gathered information about the hospital's total costs, whatever the source of payment. This information alone may provide useful insights even before you start computing unit costs. For example, in identifying which line items account for most of cost and whether this is changing over time. However, to compute unit costs one must proceed to the next step, that is, assigning costs from each line item to the relevant cost centres.

Some inputs can be assigned directly to certain cost centres. For example, if dietician is a cost centre, then the line item 'food' could all be assigned to that cost centre. More often, inputs are used by several cost centres and the analyst must seek to assign spending for an input across those centres. Correct assignment is most important for those inputs which account for a larger share of costs such as staff and pharmaceutical drugs. If you are hoping to compute a unit cost per prescription, then you will definitely need to create a separate cost centre for drugs say, pharmacy. If you are not treating drugs as an 'output', then you can choose between two approaches:

- Create a separate 'pharmacy' cost centre but allocate its costs to final cost centres during the step-down process
- Assign drug costs to the cost centres (intermediate and final) before the step-down process.

The pharmacy manager will be better able to manage resources if the pharmacy is treated as a separate cost centre. In addition, identifying pharmacy as a separate cost centre in all hospitals would help regional and national managers to monitor and compare the relative performance of pharmacy departments in different hospitals.

13.3.5 Allocation of all costs to final cost centres

The next step is to reallocate all indirect costs to the final cost centres. In this way, the unit cost will include not just direct costs but also overhead costs incurred in producing an admission, day or visit. Indirect costs will include all costs which could not be allocated directly to final cost centres at an earlier stage. In some hospitals, this will only comprise services such as administration and laundry. In others, medical support services such as pharmacy and radiology may also need allocating at this point, with little or no information about how much of their workload was generated by each of the medical departments.

- **Allocation basis:** One must devise some rules to allocate the indirect costs across departments. Different factors determine each department's use of the indirect cost centre and these factors may differ depending on the centre. For example, most studies allocate laundry costs among wards based on the percentage distribution of total patient-days in each ward since patients who stay longer use more laundry services. On the other hand, cleaning services are often allocated according to each department's floor area since more spacious departments cost more to clean.
- **Allocation using direct cost:** A more rough-and-ready approach is to allocate all indirect costs based on a department's percentage share of direct costs.
- **Step-Down sequence:** The order in which centres are allocated may affect final results, and therefore deserves some consideration. Below table illustrates this by showing flows among overhead cost centres. The first row shows that the administration cost centre serves all others, so it should be allocated first. The next two rows show that the cleaning cost centre serves the kitchen but does not

receive food in return. The cleaning cost centre should therefore be allocated before the pharmacy cost centre.

Department providing service	Department receiving service		
	Administration	Cleaning	Kitchen
Administration		X	X
Cleaning			X
Kitchen			

Note: X denotes flow of resources from 'provider' to 'recipient' department.

Cost centre for allocation and methodology of allocation/apportionment of major expenses are also provided in chapter-12 of this technical guide.

13.3.6 Computing unit cost for each cost centre

At this point you know the total costs that were incurred at each of the final cost centres. What is the output of each centre in days or discharges or lab tests etc.? This requires incorporating utilization data into the analysis. In reality, you will have used the utilization data already by this point, for example in order to allocate laundry costs across wards in proportion to bed-days. However, this is the point at which any problems with the utilization data become particularly important because they directly alter the unit costs.

Several studies encountered problems with utilization data. In some cases, the number of admissions seemed accurate but admission and discharge dates had not been carefully recorded, causing measurement of bed-days to be inaccurate. Correct measurement of bed-days requires that staff count how many beds are occupied in every ward, every 24 hours at the same time of day. Once you have obtained the utilization data, the unit cost can be computed. For each of the final cost centres, divide its fully allocated cost by its units of service.

13.4 Application of Maturity Model

In light of this, a good understanding of the Maturity Model for a cost management system in the context of healthcare is imperative. It has been noted that organizations with high maturity are able to consistently turn threats or challenges into opportunities. For instance, a medium-sized hospital or single location may be able to get by with a costing system that can calculate at least the direct costs for each patient with an estimated charging of indirect costs without the need for sophisticated costing software. In contrast, a multiple location, super-specialty hospital may need a DRG-based costing system with defined clinical pathways which also requires a dedicated team of costing specialists and other medical coding experts.

Organizational maturity is a measure of an organization's readiness to grow, adapt and perform effectively. The concept is rooted in the understanding that, organizations, like individuals, evolve and grow over time. They start from an initial stage of learning and

experimentation, gradually developing more sophisticated and effective ways of operating. In the context of the healthcare industry, organizational maturity takes on a critical role. Healthcare is a complex, dynamic field that is constantly evolving. New technologies, changing patient demographics, regulatory shifts and emerging health threats all contribute to an environment that demands adaptability and resilience. Mature organizations are better equipped to provide high-quality care, respond to changes in the industry and achieve their strategic objectives.

You can apply maturity models to any size or type of organization, from large financial organizations to small healthcare entities. Mature organizations have robust processes and have a clear strategic direction and the ability to adapt their strategies in response to changes in the industry. They can more effectively coordinate care, manage patient health data and use technology to improve patient outcomes.

13.4.1 Carnegie Mellon's Organizational Maturity Model

Also known as the Capability Maturity Model Integration (CMMI), it provides a set of best practices that guide organizations in improving their processes and capabilities. The model is structured around five maturity levels each representing a different stage of organizational development:

- **Level 1:** The practice is absent from the business.
- **Level 2:** The practice is being performed at bare minimum as a reaction to need.
- **Level 3:** The practice is being performed because the business knows it should be but does not reflect best practice.
- **Level 4:** The practice is integrated into the business but may lack critical components for sustainability and scalability.
- **Level 5:** The practice is repeatable, scalable and consistently producing positive outcomes.

In the context of healthcare, the model can be used to improve processes related to patient care, data management, regulatory compliance and more. MMs have been proposed in the health care domain with the purpose of assessing and improving the maturity of health care practices, operations and infrastructure. Some MMs focus on the specific sub-areas such as telemedicine, care pathways, digital imaging, picture archiving and communication systems and facilities management while other focuses on more complicated financial management and cost accounting systems. For healthcare sector, the five-stage maturity model is outlined below:

1. **Level 1: Minimal**
    - Foremost, costs are to be captured and accounted using various cost centres like medical, medical support and non-medical services department. To start with, the following annexure in table 13.1 provides a comprehensive picture about healthcare accounting through a model chart of accounts.

Table 13.1 Healthcare Accounting: Model Chart of Accounts

GL description	Relevant cost centres			
Revenue				
IP Revenue				
Pharmacy	Cardiology	Orthopaedics	General medicine	Oncology
Room rent	General ward	Private room	ICU	Deluxe room
Nursing charges	General ward	Private room	ICU	Deluxe room
Dialysis charges	Nephrology			
Registration charges	Cardiology	Orthopaedics	General medicine	Oncology
OP Revenue				
Radiology investigations	X-ray	CT scan	MRI	PET scan
Ambulance charges	Emergency			
Blood products	Cardiology	Orthopaedics	General medicine	Oncology
Pharmacy consumption				
Pharmacy-IP	Cardiology	Orthopaedics	General medicine	Oncology
Pharmacy-OP	Cardiology	Orthopaedics	General medicine	Oncology
Doctor fees				
Surgeon fee	Cardiology	Orthopaedics	General medicine	Oncology
Anaesthetist fee	Cardiology	Orthopaedics	General medicine	Oncology
Material consumption-IP patients				
Materials consumed in Cath Lab	Cardiology	Neurology		
Materials consumed in wards				
Materials consumed in OTs	Cardiology	Orthopaedics	General medicine	Oncology
Materials consumed in OP patients				

OP patients in Cath Lab	Cardiology	Neurology		
Materials consumed in medical departments				
Radiology	X-ray	CT scan	MRI	PET scan
Blood bank	Blood bank			
Materials consumed in support departments				
Housekeeping	Wards	OT	Cath	
Power & Fuel	Wards	OT	Cath	
Salaries				
Lab doctors	Biochemistry	Haematology	Microbiology	
Nurses	Wards	Emergency	ICU	OT
Administration	Materials	Finance	IT	
Overheads				
Rent	Materials	Finance	IT	Operations
Communication	Materials	Finance	IT	Operations
Insurance	Materials	Finance	IT	Operations
Legal fees	Materials	Finance	IT	Operations
Security	Materials	Finance	IT	Operations

- Integrated books work using interfaces from finance to materials and HR systems
- Operational parameters are to be linked to financial performance with the help of various Key Performance Indicators (KPIs) and monitored using online dashboards.

2. **Level 2: Functional**
   - Measurement of costs of services at direct and indirect cost levels take place separately. The hospital is now in a position to differentiate these two costs and charge them accordingly.
   - Fixing of fair prices based on cost plus model
   - Reporting of profitability by service groups, departments and SBUs
   - Performance Budgeting is taken into account
   - Executive bonus is forwarded based on performance estimates.
3. **Level 3: Operational Excellence**
   - Enables cost control and reduction
   - Standard cost and variance analysis
   - Benchmarking best in class cost level
   - Documenting best practices to achieve cost savings across organisation.

4. **Level 4: Strategic Cost Management Enabled**
    - Strategic pricing for customer groups like corporates, government schemes
    - Geographical expansion
    - Mergers, Spin offs of specific divisions/businesses
    - Strategic outsourcing
    - Investment decisions for specific business segment, medical specialty
5. **Level 5: Exemplary**

- Measuring clinical outcomes in terms of
    - Patient survival rate
    - Back to normal
    - No readmission (First Time Right)
    - Avoiding medication errors, surgical errors
    - Reduced hospital acquired infections
    - Eliminating patient falls
- Assessing the cost of quality through
    - higher costs of training the nurses, staff
    - Stringent infection control through housekeeping and hygiene
- Cost impact of severity of diseases and Comorbid conditions
    - DRG coding
    - Standard Treatment Protocols and clinical pathways
- Value Based Pricing
    - Innovative service offering to address customer pain points & value creation

This model can be particularly useful in the healthcare sector, where the ability to adapt to change and continuously improve processes is crucial for delivering high-quality patient care. Many organizations have found success in applying maturity models. For instance, some have used these models to streamline their processes, reduce errors and improve patient outcomes. Others have used them to enhance their change-readiness, enabling them to adapt more effectively to industry changes and advancements. In the ever-evolving landscape of healthcare, organizational maturity is not just a nice-to-have, but a must-have. While the journey towards greater organizational maturity can be challenging, the rewards are well worth the effort.

13.5 Ways to improve hospital cost accounting approaches

Cost accounting requires commitment to rigorous processes but there are ways to make the initial implementation smoother and ongoing maintenance easier. Key among them is selecting the right technology that reflects the circumstances of the organization, without overcomplicating the process. In addition, consider the following:

- **Service-line planning:** Service lines like cardiology, neurology and many others are a way to look at a hospital's operations through the lens of a patient's care

journey, rather than by unrelated departments. Attributing revenue and costs to each multidisciplinary service line can help leaders understand how each service line impacts profitability, opportunities to increase efficiency and which lines should be expanded or reduced.

- **Provider modelling:** can help make cost accounting more accurate. Predicting treatment approaches and the supplies, diagnostic tests and specialists that are involved helps ensure that all the costs of a treatment are captured and properly attributed.
- **Revenue analytics:** Examining and analysing revenue can improve cost accounting in several ways. First, analysing reimbursement amounts can show whether payers rejected any billed charges so that the costs related to those unpaid charges can be re-evaluated. Second, revenue analytics are necessary for various costing approaches such as RCC. Third, revenue analytics highlight trends in payer behaviour and patient services and volume which can be correlated with changes in costs.
- **Strategic pricing:** As the healthcare industry becomes more competitive, organizations will be tasked with setting strategic pricing for their services. Certain service lines may be seen as high-value rainmakers while others are necessary loss makers. Strategic pricing helps ensure that revenue is maximized and helps leaders prioritize resource allocation.
- **Variation analysis:** Cost accounting can uncover variations in the costs for providing the same service. The underlying variations in clinical procedures and resource utilization that drive the cost variations can highlight areas for continuing process improvement and potential cost savings.
- **Performance management:** Cost accounting sets standards for the cost of care that can be used to measure performance. When compared to actual costs, physicians can be held accountable for the financial performance of their service line, department or practice.

13.6 Final words

Armed with data about how much it costs to provide a service, healthcare providers can better negotiate payment levels with insurance companies and other payment providers. Without that information, a disconnect between the price charged for a treatment and the expenses the provider incurs to fulfil it, will exist. Before price competition demands hospitals to reduce their operating costs, hospital pricing practices must change. Hospitals will have to set prices that relate to the cost of providing individual services instead of setting prices at levels that maximize profitability under contract pricing with insurers. **This is an important step in achieving the ultimate goal of creating a marketplace in which hospitals compete on the basis of price.** Unfortunately, little is known about the cost accounting systems hospitals are using to collect service-level cost information and the capabilities these systems afford the hospitals using them.

Firms' decisions to adopt or change their cost accounting methodologies result from various organizational, technical and economic factors. The functionalist view of contingency theory states that organizations will develop or adopt control of management systems to achieve a goal or outcome. However, the goals or outcomes will be influenced by the external environment, technology, organizational structure, size, culture and strategy. The various cost accounting methodologies (ABC, TDABC, PFABC and RCCs) and systems have emerged in response to the different information needs of organizations and industries. Price transparency and changes in individuals' insurance benefits will certainly bring important changes to the hospital marketplace and these changes are likely to affect the costs and benefits associated with hospitals' adoption of cost accounting systems.

It goes on to suggest that hospitals have not adopted sophisticated cost accounting systems because characteristics of the hospital industry make the costs of doing so high and the benefits of service-level cost information relatively low. However, changes in insurance benefit design are creating incentives for patients to compare hospital prices. If these changes continue, hospitals' patient volumes and revenues may increasingly be dictated by the decisions of individual patients shopping for low-cost services and as a result, providers could see increasing pressure to set prices at levels that reflect the costs of providing care. If these changes materialize, cost accounting information will become a much more important part of hospital management than it has been in the past.

Chapter-14

Costing summary template for several procedures

The name and type of procedure has to be as per the classification prescribed by the Ministry of Health and Family Welfare (MoHFW) and the returns submitted by the hospital.

Part -I	Treatment details	Reference	Orthopaedic surgery	Neuro surgery	Emergency surgery	General surgery	Others (list to extend)	Total
	Package details							
	Type of procedures							
	Number of procedures							
	Details of hospital stay	Patient days						
	OPD visits							
	Consultations							
	Investigations							
	Procedures							
	Casualty							
	Consultations							
	Investigations							
	Procedures							
	IPD visits							
	Ward days (general, special or day care)	Patient days						
	ICU/CCU details	Patient days						
	Post operative ward details	Patient days						
	Step down	Patient days						

	ward days							
	OT details							
	Major	Patient hours						
	Minor	Patient hours						
	Specialty Lab	Patient hours						
Part-II	**Cost elements for a procedure**							
1	**All direct costs**							
	Pharmacy costs	Schedule A						
	Consumables & Implants	Schedule B						
	Other direct costs like oxygen, nitrous oxide							
2	**Direct employee costs**	Schedule C						
3	**OT costs**	Schedule D						
4	**Investigation costs**	Schedule E						
	Laboratory charges							
	Radiology and Imaging							
5	**Blood bank**	Schedule F						
6	**Room/bed costs**	Schedule G						
	For single occupancy							
	For double occupancy							
	For multiple							

	occupancy							
7	**ICU**	Schedule H						
	Pre operation ward (general, specialty, day care)							
	Post operation ward (general, specialty, day care)							
	CCU							
	Others							
8	**Healthcare support (non-medical services)**	Schedule I						
9	**Hospital administration overheads**	Schedule J						
10	**Other costs**							
	Total costs							
	Revenue							
	Margin							

Costing template for Schedule A

Pharmacy costs		**Orthopaedic surgery**	**Neuro surgery**	**Emergency surgery**	**General surgery**	**Others (list to extend)**	**Total**
Particulars							
Pre operation							
Imported material							
Indigenous material							
Post operation							
Imported material							
Indigenous material							
OT							
Imported material							
Indigenous material							
Others							
Imported material							
Indigenous material							
Total costs							
Imported material							
Indigenous material							

Costing template for Schedule B

Consumables & Implants		**Orthopaedic surgery**	**Neuro surgery**	**Emergency surgery**	**General surgery**	**Others (list to extend)**	**Total**
Particulars							
Pre operation							
Imported material							
Indigenous							

Consumables & Implants		**Orthopaedic surgery**	**Neuro surgery**	**Emergency surgery**	**General surgery**	**Others (list to extend)**	**Total**
material							
Post operation							
Imported material							
Indigenous material							
OT/Cath Lab							
Imported material							
Indigenous material							
Total costs							
Imported material							
Indigenous material							

Costing template for Schedule C

Direct employee costs		**Orthopaedic surgery**	**Neuro surgery**	**Emergency surgery**	**General surgery**	**Others (list to extend)**	**Total**
Particulars							
Super specialist							
Specialist							
Assistant or Attending or Resident Doctor costs							
Others							
Total cost							

Costing template for Schedule D

Operation Theatre (OT) cost		**Orthopaedic surgery**	**Neuro surgery**	**Emergency surgery**	**General surgery**	**Others (list to extend)**	**Total**
Particulars							

Operation Theatre (OT) cost		**Orthopaedic surgery**	**Neuro surgery**	**Emergency surgery**	**General surgery**	**Others (list to extend)**	**Total**
Manpower							
Employees							
Nursing							
Non- nursing							
Materials							
General consumables like anaesthesia							
Machinery							
Depreciation							
Maintenance							
Expenses & Utilities							
Expenses							
Non-medical furniture							
AC							
Fumigation							
Utilities							
Building							
Power consumption							
Others							
Total cost							

Costing template for Schedule E

Investigation		**Orthopaedic surgery**	**Neuro surgery**	**Emergency surgery**	**General surgery**	**Others (list to extend)**	**Total**
Particulars							
Lab							
Manpower							
Materials							

Investigation		**Orthopaedic surgery**	**Neuro surgery**	**Emergency surgery**	**General surgery**	**Others (list to extend)**	**Total**
Consumables & Implants							
Utilities							
Expenses							
Others							
Total cost							
Radiology							
Manpower							
Materials							
Utilities							
Expenses							
Others							
Total cost							

Costing template for Schedule F

BLOOD BANK		**Orthopaedic surgery**	**Neuro surgery**	**Emergency surgery**	**General surgery**	**Others (list to extend)**	**Total**
Particulars							
Manpower							
Consumables							
Equipment							
Non-medical furniture							
Power consumption							
AC							
Building							
Total cost							

Costing template for Schedule G

Room/bed costs (to be made for each level of occupancy such		**Orthopaedic surgery**	**Neuro surgery**	**Emergency surgery**	**General surgery**	**Others (list to extend)**	**Total**

as single or double or multiple)							
Particulars							
Nursing							
IP services							
OP services							
Billing							
inhouse							
Laundry							
Tailoring							
Hospital administration							
Doctors							
Total							
Total IP services area (in sq. ft)							
Cost per day							
Rate per sq. ft.							

Costing template for Schedule H

Pre-operative & Post-operative wards		**Orthopaedic surgery**	**Neuro surgery**	**Emergency surgery**	**General surgery**	**Others (list to extend)**	**Total**
Particulars							
Manpower							
Employees							
Nursing							
Non-nursing							
Duty doctors							
Others							
Materials							
Consumables							
Others							
Machinery							
Depreciation							
Maintenance							
Others							

Expenses & Utilities							
Expenses							
Non-medical assets							
AC							
Food							
Utilities							
Building costs							
Power consumption							
Others							
Total cost							

Costing template for Schedule I

Health care support or non-medical services		**Orthopaedic surgery**	**Neuro surgery**	**Emergency surgery**	**General surgery**	**Others (list to extend)**	**Total**
Particulars							
CSSD							
MRD (Medical Records Department)							
Media Co-ordination							
Dietetics and Discharge							
Biomedical waste							
AC plant							
Security							
House-keeping							
Maintenance							
Genset power back-up							
Electricity							
Laundry							
Social service department							
Computerisation Facility							

Stores							
CCTV							
Kitchen							
In-house training centre							
Others							
Total cost							

Costing template for Schedule J

Hospital Administration overheads		**Orthopaedic surgery**	**Neuro surgery**	**Emergency surgery**	**General surgery**	**Others (list to extend)**	**Total**
Particulars							
Finance & Accounts							
Parking							
Transport							
Cafeteria							
Operations & Administration							
Finance & Accounts							
Biometrics							
Communication							
Building cost							
Marketing							
Non-medical furniture (indirect)							
Solar heating							
Accreditation							
Others							
Total cost							

Chapter-15

Future directions in Cost Management Accounting

Cost management is the process of planning and controlling the **budget** of a business. Having a good cost management system in place makes it easier for an organization to estimate and allocate its budget. This is especially relevant in case of healthcare organisations where the number of activities performed to produce an output (treating the patient) is large and complicated. Management accounting and control system practices have changed dramatically in last few decades. All these changes were in response to rapid technological developments, environmental complexity, changes in organizational structures, managerial style and other different things that have emerged throughout the years.

The increasingly competitive environment and technological developments during the last quarter of the previous century, have been the prime stimulus for a range of new directions in management accounting and control system practices. These developments were mainly linked to changes in the way organizations measure and manage costs and in how they evaluate short and long-term performance. On the other hand, conventional cost and management accounting practices were criticized for their lack of insight change and their inability to support management accounting innovation in coping with the requirements of a changing environment.

Cost accounting is the process of estimating and classifying costs of healthcare incurred by governments or other organizations. The costs are categorized under various heads like salaries, material costs, radiology costs, canteen, allied services for visitors, burden costs (rent, water, electricity). Once, the costs are calculated under each head, the organisation can determine which costs have potential for reduction. For instance, a costly service may be widely used but has only traditional value like free medical care for all employees, when their insurance can pay. Similarly, some screening procedure may not be needed for the whole population.

At a private hospital level also, the management can optimize the margins by identifying the source of largest costs. Example, data revealed that a hospital was losing money on some reimbursement contracts. The paying organizations knew about this but had continued to reimburse the hospital on these low rates. So, the contracts were cancelled and then were reinstated with higher reimbursement rates based on the cost accounting data. **Uses of cost accounting in healthcare:**

- Cost control
- Planning and allocation of resources
- Calculating the price of reimbursement

Furthermore, contemporary organizations display flexibility, adaptation and continuous learning both within and across organizational boundaries. The academic literature has been critical of conventional management accounting and control

systems, particularly for their lack of efficiency, capability to present comprehensive and the latest information and to assure decision makers and potential users of such information. For these reasons, management accounting and control systems have evolved throughout the last 200 years, to cope with the emerging needs of contemporary organizations. Even there has been an increasing expectation that management accounting and control systems should be innovative in design and enable rapid organizational change in response to uncertain environmental circumstances.

Cost management is a form of management accounting that helps a business reduce the chance of going over budget with more accurate forecasts of impending expenditures. Many businesses use cost management tactics for specific projects and for the overall business. When applied to a project, expected costs are calculated while the project is being planned and are approved beforehand. All project expenses are recorded and monitored to ensure they align to the cost management plan. After the project is finished, the actual total costs are compared to the predicted costs. This analysis enhances future cost management predictions and cost budgeting. The benefits of cost management include the following:

- **Reduces overspending.** Cost controls help project managers keep their budget on track and not let costs get out of control.
- **Encourages planning.** Cost management helps identify what is and isn't working. It provides insight into resources and processes that helps managers make faster and better decisions about the current project and future ones.
- **Facilitates financial health.** Continuous monitoring, cost control and cost reporting contribute to a company's long-term financial health. These efforts provide the data necessary for good decision-making. Implementing a cost management structure for projects helps a business keep its overall budget under control.
- **Mitigates risk.** Cost management typically involves setting a risk allowance for unforeseen costs, a useful step to prevent overspending.
- **Supports standards.** Consistent cost control, analysis and reporting help organizations adopt standards for assessing future cost data and productivity levels.
- **Improves visibility.** Many cost management tools for cloud services give real-time visibility into cost management metrics like savings. They also provide a list of the users' assets and some use machine learning to provide suggestions on areas where users can change behaviours to save money.

While cost management software is useful, it's not imperative for executing a cost management plan. These tools commonly include the following functions:

- budgeting
- time tracking

- reporting
- analytics

Several business intelligence programs offer cost management software to help organizations monitor costs and increase profitability. Some of these include Google's Looker, Microsoft Power BI and Oracle Analytics Cloud. Cloud vendors also offer proprietary cost management tools to help users track and optimize costs. Two such tools are the following:

- **Azure cost management tools.** The Azure cloud computing service includes a pricing calculator, alerts and dashboards that let Azure users optimize their spending and clearly monitor use. Cloud users are charged per use, sometimes per second, so using these tools is important for keeping costs down. These tools integrate with Azure budgets for planning and cost optimization. Azure cost alerts aid monitoring and tracking and Azure cost analysis can suggest potential adjustments based on monthly cost breakdowns.
- **Amazon Web Services (AWS) Cost Management.** This tool set provides dashboards and billing reports that help users track AWS cloud use and set budget goals. AWS Cost Management tools included are AWS Budgets, AWS Cost Explorer, AWS Cost and Usage Report and AWS Cost Anomaly Detection which uses machine learning to monitor cloud use and detect unusual spending.

The accounting profession will face significant changes in the next three decades and professional organizations, their members and educational institutions should respond. The three changes, that is, evolving smart and digital technology, continued globalization of reporting and disclosure standards and new forms of regulation are also major challenges for the profession.

Association of Chartered Certified Accountants (ACCA) research has explored the important changes, expected to be encountered in the near future. Three are highlighted here:

- Accountants will use increasingly sophisticated and smart technologies to enhance their traditional ways of working and these technologies might even replace the traditional approach. Smart software systems (including cloud computing) will support the trend toward outsourcing services (including more overseas outsourcing) and greater use of social media via smart technology will improve collaboration, disclosure, engagement with stakeholders and broader communities.
- Continued globalization will create more opportunities and challenges for members of the accounting profession. While globalization encourages the free flow of money from one capital market to another, enhanced overseas outsourcing activities and the transfer of technical and professional skills will simultaneously continue to pose threats to resolving local problems (with different cultural, financial and tax systems).

- Increased regulation and the associated disclosure rules will have the greatest impact on the profession for years to come. For example, increased regulation is imminent because of massive tax avoidance, transfer pricing and money laundering as exposed via the Panama papers. Many professional (tax) accountants will be affected by intergovernmental tax action to limit base erosion and profit-shifting.

Additionally, because of greater public pressures and stakeholder expectations, social and environmental considerations are getting importance alongside economic concerns in contemporary organizations. There is a range of stakeholder groups including shareholders, workers, governments or regulators, non-governmental organizations, media and the community have a growing interest in organizational social and environmental issues. Because of the widespread stakeholder concern and associated regulations toward social and environmental considerations, contemporary organizations are facing challenges to find sustainable solutions to deal with the complexity of integrating financial, social and environmental performance. Furthermore, the regulatory concern for different social and environmental issues along with the associated measurement and reporting complexities of these issues has allowed accounting professionals to open their minds to the possibility that accounting has the capacity to change. The important implication is that all professional accountants will be expected to look beyond the numbers, which will, in turn, enhance collaborations among members of multiple professions including accountants, doctors, lawyers, environmental scientist, sociologists and so on. Management accounting and control systems have changed dramatically throughout the last 200 years. These changes were in response to rapid changes in various contingency variables which affects the design and operation of management accounting and control systems. Such variables include, external environment, organizational structure, size, culture and technology.

Specifically, rapid technological developments have enhanced the role of contemporary management accounting systems by enabling fast processing of information and provision of such information for mangers to make different planning and control decisions. As a result of all these changes, many of the various contemporary techniques and practices of management accounting, have emerged to fulfil the rising information needs of organizations.

In order to cope with continuous changes in the discipline, the following recommendations are provided:

- In order for management accounting to maintain its relevance, there is a need to react to changes in business environment and awareness of management of the need for change.
- More emphasis needs to be placed on developing the personal skills, in addition to technical skills of management accountants i.e. they need effective skills in communication, analysis, creativity and adaptability.

- Managers require better understanding of contemporary management accounting methods to make better decisions.
- To be competent and reliable in an organization, management accountant should proactively be involved in organizational leadership, strategic management, operational alignment and long-life learning and improvement. Furthermore, there are different research areas that need to be addressed in the management accounting discipline. Among these areas are-
- The impact of gender and gender role in management accounting and control system.
- Social and ethical issues need to be researched extensively.
- Integrated reporting, as a means of holistic reporting of creation of value from both financial and non-financial resources.
- Behavioural issues of management accounting should be investigated further
- Human Information Processing (HIP) issues.
- A comparative study on the different practices of management accounting and control systems across companies in different countries.
- Environmental Management Accounting (EMA) issues

The list is not exhaustive, as every day a new area may arise in response to technological, organizational and overall environmental complexity and uncertainty.

Chapter-16

Regulatory Approach in Healthcare costing: International

The healthcare industry is a service as well as an industry. Therefore, it must be regulated to ensure that the needs of the government and the welfare of its population are appropriately upheld. In the context of patient efficacy, regulations are defined as actions made by institutional actors with the intention of influencing, overseeing, managing or changing activities inside healthcare organizations to lower the possibility of patient damage while receiving treatment. Regulation is a key element in the domains of healthcare and health insurance. In addition to ensuring that healthcare facilities and organizations follow public health policies and provide all patients and visitors to the healthcare system with safe, reasonably priced treatment, regulations are necessary to standardize and monitor healthcare.

In accordance with the goals of this technical guide, regulatory agencies monitor both public and private healthcare facilities and providers, inform the government of changes in the global healthcare industry, offer guidance on how much to charge for medical medications and procedures, ensure higher safety standards and strive to improve healthcare quality. Cost-effectiveness, performance analysis, tariff assessments, recurring reviews and the creation of dispute resolution processes between parties are all covered under the ambit of this system.

This chapter aims to understand the primary issues surrounding health market regulation in different countries while keeping in mind the goals of regulation, which include quality and safety of care, value for money, social agreement over equitable access, finance and accountability. Price caps, licensing and other traditional approaches to market regulation for health products and services have been important but their capacity to ensure user safety and effectiveness has been questioned. Indeed, the safety and efficacy of medical care and drugs as well as the rising costs that keep the poor from obtaining them are now the primary concerns in many countries.

16.1 Objectives of health market regulation

The following arguments explore the multiple objectives of regulating the health markets:

- **Quality of care**: Are providers of health services competent? Is health care safe and effective? Are medicines and medical equipment safe and effective?
- **Value for money**: Is health care available at a reasonable price? Is it cost-effective? Is it affordable given the resources available to consumers of health products and services as well as society as a whole? Value for money concept holds much significance especially in Indian healthcare system where majority of the people still relies on government financing (PM-JAY) and affordability remains a critical issue.

- **Social agreement**: Is health care seen to be provided in a fair and equitable way, in terms of both access and financing?
- **Accountability**: Is health care provided and paid for in a transparent way that holds key actors responsible?

The government can pass legislation to influence market structure and increase competition. If the government is unable to provide this basic kind of expectations, its legitimacy may be questioned into question. The degree of development of each nation, the prevalence of cost maturity models, regulatory needs and procedures, taxation laws and protectionism and competition policies all influence cost accounting techniques in various nations with regard to improved cost containment. It was noted that governments from a number of nations have historically had a significant influence on how cost accounting procedures developed and eventually advanced. The main factors that effectively pushed for the implementation of best cost and management accounting principles and practices were funding plans, tax resolutions, administered pricing, social pricing and policy involvement. As a result, they have proposed comprehensive judicial or even quasi-judicial criteria for cost accounting.

Countries all across the world are investing in systems to expand the body of knowledge for healthcare decision-making in an effort to increase value for money. Where governments are reimbursing healthcare providers, understanding the cost-of-service provisioning is a critical part of this evidence base. Many countries like the UK and Australia, that have advanced along the universal health coverage (UHC) route have developed sets of healthcare reference costs and costing repositories providing a source of locally appropriate cost data for price negotiations, priority setting and budgeting. Other countries have relied on sporadic costing exercises or international sources of cost data such as the WHO choice database.

16.2 Regulation of healthcare in USA

In America, healthcare is a huge industry. Healthcare spending accounts for 18.3 percent of the nation's GDP, with yearly expenditures in 2021 surpassing USD 4.5 trillion. The public sector provides financial subsidies for almost half of personal healthcare expenses in the United States, making the government a crucial policy actor. The US does not have a national health insurance program and the right to healthcare is not expressly guaranteed by the US Constitution. As a result, most Americans obtain health insurance through either public programs (such as Medicare and Medicaid) or private commercial policies. The prevalence of private health insurance coverage remains higher than that of public coverage. Further, employer-sponsored commercial health insurance is the most common type of coverage in US.

According to a classification system called diagnostic-related groups (DRGs), the payment process in US was modified in 1983 to pay a fixed amount based on each patient's diagnosis regardless of the services actually provided. Hospital operations have been significantly altered by DRG-based reimbursement, which still has an impact

on the functioning of hospital organisations and their treatment and reimbursement practices. Lengths of stay were drastically reduced as a result of its efficiency incentive. Additionally, it promoted the transfer of a significant portion of care to outpatient settings which were nonetheless paid for on a fee-for-service basis. Some important regulatory bodies in the USA include:

- the State Offices of Health Care Quality is responsible for **certifying** and **licensing** all the health care and community long-term care facilities.
- the Centres for Medicare and Medicaid (**CMS**) supervise and regulate the provisions linked to the healthcare system, providing care at a subsidized rate through different programs. These include **Medicare** for older people and the disabled; **Medicaid** for the low-income individuals and families and State Children's Health Insurance Program (**SCHIP**) for the under-19 population.
- Another is the Agency for Healthcare Research and Quality (AHRQ), part of the U.S. Department of Health & Human Services (HHS) which works to boost the quality of healthcare and improve patient safety at a lower cost.
- the Joint Commission on Accreditation of Health Care Organizations (**JCAHO**) that ranks healthcare organizations by the quality of care. Such a ranking will also affect insurance payments.
- The HHS also heads other regulatory departments including the Centres for Disease Control and Prevention (**CDC**) in Atlanta, that monitors public health for birth defects, disabilities, genetics, environmental health, injury, violence and travel guidelines, among others. It also looks into possible infectious outbreaks.
- The Food and Drug Administration (FDA) is a federal agency that oversees the drug supply to the USA for safety and efficacy.
- Prices for public programs, on the other hand, are administratively determined by federal rules and regulations. This has a significant impact on healthcare costs actually charged by service providers.

16.3 Regulation of healthcare in UK

In the UK, cost accounting was included into the foundational body of accounting knowledge after World War I. The UK government requires complete economic costing to be used in order to determine the viability and sustainability of an activity or project. Additionally, UK costing is based on full absorption, which means that costs should reflect the whole cost of the service rendered and be proportionate to the services that generate them. The best ways to do this are by maximizing the portion of costs that are charged directly to services and by putting in place a uniform process for distributing indirect and overhead costs.

Regulators want accounts, business plans, cost information or operating expense calculations in a few UK regulated businesses including social care, healthcare, water, education and pensions. These are sometimes used to set price caps and other pricing regulations as well as for general monitoring and to paint a complete picture of the

industry. A fraction of the information received may be subject to selective checks or audits by the regulator and providing false or misleading information could have negative repercussions.

The National Health Service (NHS) uses cost information provided by healthcare institutions to determine national standards and for deciding the tariffs of major medical products and services. The NHS is regulated by numerous other service regulators like Care Quality Commission (**CQC**) as well as the Medicines and Healthcare Products Regulatory Agency (**PRA**). The CQC is the **primary healthcare regulator** in England. It is responsible for registering, inspecting, monitoring and rating healthcare services in England. The **Costing Transformation Programme** (CTP) was set up to implement **Patient Level Information and Costing System (PLICS)** across acute, mental health, ambulance and community providers. This help organisations understand exactly how costs are built at the most basic and accurate level, that of the patient, and therefore, inform decision making to improve both the quality and effectiveness of services.

The process of reporting cost information is standardized through the use of Patient Level Information Costing data. This aids the government in implementing the essential NHS reforms. Every year, patient level costing data must be submitted by all recognized providers of acute care, ambulance services, mental health services, IAPT (Improving Access to Psychological Therapies) and community activities. NHS England can more efficiently carry out its licensing and pricing responsibilities under the Health and Social Care Act of 2012 thanks to PLICS data. The cost data is also used for:

16.3.1 Analytics

- developing analytical tools, metrics and reports to help providers improve their data quality, identify operational and clinical efficiencies and review and challenge their patient-level cost data at provider and national level.
- supporting efficiency and quality of care improvement programmes.

16.3.2 Investment, pricing and pathway design

- inform the existing payment models including the NHS payment scheme
- inform and model new methods of pricing NHS services
- review investment decisions for technology and staffing

16.3.3 Effectiveness, efficiency and quality

- implement integrated care systems and organisations
- support efficiency and quality of care improvement programmes
- inform the relationship between provider, patient characteristics and cost

16.3.4 Improving costing

- inform future cost collection design

- develop costing standards

16.4 Regulation of healthcare in Poland and France

The law in Poland regulates the use of cost accounting in medical organizations. The Minister of Health issued the regulations that provide methods for the identification and collection of costs actually incurred and for the calculation of the cost of healthcare services. Cost accounting is the main tool for generating cost information for pricing health services in hospitals and is also used to analyse and control medical activity costs. Hospitals in Poland have clear cost accounting rules that can be used to report costs and price medical services appropriately. Since the middle of 2008, the Diagnosis Related Groups (DRG) system has been used to price medical operations that resulted in payment for hospitals and other health care organizations in Poland. These are groups of hospital cases characterised by a similar diagnostic and treatment approach (in clinical terms) as well as a similar level of resources used (similar costs).

The pricing is based on flat rates that are allocated to clinically and financially comparable disease cases that belong to particular groups. ICD-9 (International Classification System for Surgical, Diagnostic and Therapeutic Procedures) and ICD-11 (International Statistical Classification of Diseases and Related Health Problems) codes are used in conjunction with contracts between hospitals and the National Health Fund (contracting party and payer) to settle health services. Every item in the classification has a label that identifies the medical activity it contains together with a unique number or code. Then, a pertinent set of DRG systems is chosen based on this data classification. The goal of the DRG system was to categorize individual patients and standardize the guidelines for financing services for all service providers.

Every hospital keeps thorough expense records. The costs associated with carrying out the activity for which the hospital was conceptualised, that is, offering medical services are referred to as basic activity costs. Basic organizational units such as departments that offer health services and other auxiliary activities, clinics and laboratories are responsible for implementing these. The goal of the Ministry of Health and Welfare's regulation on specific guidelines for cost accounting in public health care facilities was to implement changes in cost accounting by utilizing both the subjective objective system that recognizes cost objects and the current generic cost system. This would make it possible to calculate a wide range of cost objects from the settlement of complicated health services to the most basic medical events. The premise of such cost accounting was to generate the data required to calculate the costs of contract services established by service providers for payers' benefit and to ascertain a hospital's accurate financial result.

The intended use of the resources available in a particular healthcare facility results in costs. Patients and medical procedures are the subject of calculations in hospitals. The supply of medical services by auxiliary activity cost centres (boiler rooms, kitchens, laundries, blood donation centres and sewing rooms) is also taken into account when

calculating the unit cost in hospitals. Both unit and global cost information is produced as a result of this.

In France, Government had played a major role in the evolution of the cost and management accounting domain. French government has issued single version of cost analysis and product costing, applicable to all industrial and trade sectors, both for profit and not for profit.

16.5 Regulation of healthcare in Thailand

Hospital administrators need to have information about unit cost analysis in order to plan, budget, regulate and evaluate the organization. Individual hospitals in Thailand perform unit cost analysis using various techniques since there is no uniform hospital costing system or reference unit cost for medical services. For instance, there are a number of direct cost distribution criteria, a number of indirect cost allocation criteria and a number of departmental allocation techniques that are based on accounting-based approaches (averaging the capital purchase prices over their useful lives) and economic-based approaches (combining depreciation costs and interest on the undepreciated portion over the useful life).

The results of various approaches vary. Comparing efficiency presents a challenge since we are unsure of how various costing techniques affect variance. Health insurance schemes' financing techniques and performance-based budgeting systems also require information on the unit costs of medical services. Thailand is one of the developing nations that has implemented health reforms. Costing techniques have been progressively standardized in order to negotiate suitable payment rates or budgets based on the findings of hospital cost analysis.

16.6 Regulation of healthcare in Cyprus

By focusing on the nature and competition of the health care market, the Cyprus government has attempted to reduce costs and increase efficiency over the past 20 years. The healthcare costing system has been evaluated as a major factor that ensures efficiency and effectiveness for hospitals. In fact, a traditional system, which is common, particularly for Turkish hospitals, may cause a barrier to efficiency because it recognizes patient-days in order to determine the cost of services. This system is inefficient because patients who require the same length of stay in a hospital may consume resources at different levels, so dividing the total cost by the number of patient-days may yield inaccurate values and inappropriate results, which lowers hospitals' competitiveness.

Because traditional cost systems are unable to meet the demands of modern businesses, a new and more efficient cost system known as TD-ABC was developed for hospitals in Cyprus. This system considers only two factors: the unit cost of supplying capacity and the time required to complete an activity. Additionally, it determines unused capacity by taking practical capacity into account. As a result, managers eliminated or can easily

spot the cost of unused capacity in order to achieve better results and based on the results, hospital management is better able to understand the costs of various surgeries.

16.7 Regulation of healthcare in Canada

The healthcare sector of Canada has adopted Transitional hospital cost accounting system. In addition, Canada's Competition Commission extensively deal with cost data for judging on predatory pricing. Besides, the Securities Commission and Auditor General are also interested in seeking cost information. Hence, all companies including healthcare organisations are required to maintain cost records and cost information.

16.8 Regulation of healthcare in Japan

Cost competitiveness has been at the heart of the Japanese success. Japanese brought the application of cost accounting in the form of target costing that focuses on cost reduction and its interface with operational cost management to such micro levels that they reached the zenith of cost competitiveness across sectors. In Japan, the Ministry of Finance has issued 10 Cost Accounting Standards with following three key aspects:

- Nature and basic structure of the cost accounting standard
- The application of the cost accounting standard
- The framework of the cost accounting Standard

These standards indicated that cost accounting has the following purposes:

- Price setting
- Preparing financial statements
- Cost management
- Budgeting and budgetary control

These standards are followed by all business entities including healthcare

16.9 Regulation of healthcare in Australia

All corporate entities including hospitals in Australia use the Cost and Management accounting system at the request of regulatory bodies. Some regulators also require the availability of such cost information, in addition to the tax office, which is interested in accessing the cost information of every organization. Costing data is used by the Australian Competition and Consumer Commission, an antitrust agency, to regulate monopolistic commercial activities.

In Australia, all financial transactions that take place during an organization's lifetime are included in the general ledger. The financial statements of that organization will be prepared using the general ledger. Transactions are organized in the general ledger into cost centres, which represent management duties and points of cost control, and accounts, which represent expense categories. A crucial component of the cost management process, the general ledger, offers an impartial source of data that acknowledges all of the costs incurred by a hospital in the delivery of services.

The cost ledger shall incorporate the general ledger as a key input to inform the product costing process. It is also recognised that additional expenses may be incurred on behalf of the organisation by a third party which directly contributes to delivery of that organisation's products. Where this is the case, these expenses must be included in the cost ledger for the purpose of **full product costing**. Under this, offsetting means the reduction of an expense by income or vice versa so that only the net amount is reflected in product costing.

The Accounting Standards of Australia states that the **hospital's cost of production** will include all hospital expenses, found on the hospital's general ledger and other inclusions such as third-party costs, that contributed to the hospital's full cost of production. This means that where funds have been paid from any Special Purpose Accounts (SPAs) including trust accounts, the associated hospital activities expenses need to be included in the cost of production as they relate to hospital activities. In broad terms, the source of the fund is not important, however, how these funds are used is important to the cost of production. Expenses in SPA need to be reviewed by relevant stakeholders, who have an understanding of the details involved, to understand if they relate to hospital activities.

At a patient level, where a patient consumes medical resources, a cost is associated with this consumption and these costs should be allocated to the patient irrespective of funding source. The payment to specialists are recognised as a salary expense and are considered third party costs as the expenses reflects services provided to a hospital's patient. Relevant stakeholders should maintain documentation of the the allocation methods applied as part of the product costing process and review at each costing iteration.

16.10 Emerging issues with regulation

A rather narrow view of regulation is as a government function involving **administrative** and **bureaucratic** controls aimed at correcting market failures through laws, orders and rules placed by government on enterprises, citizens and government itself. This kind of government regulation plays an important role in protecting the public against incompetent medical practices and dangerous medicines. However, it has **failed** to live up to expectations in many countries because of the limited information available to the state on the functioning of market and the limited capacity of the state to enforce regulations.

16.10.1 There is an increasing recognition that states, on their own, are unable to regulate the complex health systems of the 21st century effectively. One possible implication is that states should withdraw from trying to regulate modern economies. However, a large body of evidence has shown that **unregulated** markets in health and many other sectors can lead to highly undesirable outcomes, particularly for the poor.

16.10.2 There is also an increasing interest in **regulatory partnerships** between state and non-state actors. Alongside state regulation of enterprises (so-called public

regulation), enterprises are seen to regulate one another (private regulation) and even to regulate themselves through internal management arrangements (self-regulation). Civil society organizations also play important regulatory roles.

16.10.3 An important explanation of the need for regulatory arrangements in health sector is the **asymmetry of information** between the possessors of specialised knowledge and expertise and the rest of the population. Societies have developed mechanisms to ensure that practitioners are competent and refrain from abusing the power this knowledge gives them. Associations of experts or organizations that employ them, are best placed to ensure the quality of their performance but they may prioritise the interests of the suppliers of expertise. This can lead to inadequately informed policies for majority of the population who seek care and medicines in informal markets or who are operating outside the formal and state-led regulatory system.

16.10.4 Beyond the safety and efficacy of health products and services, many governments make efforts to facilitate **access by the poor.** Such efforts most frequently take the form of **price controls** at the wholesale or retail levels of the supply chain or **subsidies** of an implicit or explicit kind at the point of supply. However, effective price controls are more difficult in the private sector due to weak enforcement capacity on the part of government and little incentive for compliance on the part of health product and service providers. Thus, while it may be possible to stipulate the medicines that can be used for particular conditions in public hospitals and clinics, laying down systems of incentives and penalties to induce private providers to follow these rules is much more problematic.

16.10.5 The regulation of health products and services needs to balance the costs and benefits incurred by the regulator. The combined costs should be less than the social costs of market failure that are being mitigated through the regulation. Regulators incur costs in developing and implementing the regulation and in undertaking conformity assessment and enforcement efforts. Both regulators and value chain actors in many countries lack essential resources, such that while regulations may be efficient in principle, they are not implemented to the level where they are efficient.

16.10.6 Further, the emergence of regulation cannot be seen as distinct or divorced from the nature of the markets being regulated and the actors within the associated value chains. As with any complex system, markets for health products and services are dynamic, requiring that different actors are involved in these processes over time and regulatory approaches are updated (or at least reassessed) on a continuous basis. This suggests that a special effort will be needed to facilitate the forging of new kinds of partnerships that can begin to create effective institutions to regulate these markets.

16.11 What and who is regulated?

Globally, a large number of regulatory bodies seek **cost information**, the prime being the tax authorities, trade commissions, anti-trust bodies and competition commissions. In **China**, Ministry of Commerce and Ministry of Finance are empowered to access cost

information of any business entity. Similarly in **USA**, all listed companies are required to maintain cost information and share relevant details with the regulator. Application of cost accounting in social sectors like healthcare and education, has been mandated in different countries.

In trying to fulfil the broad social objectives of health market regulations, governments have traditionally focused their efforts on

- **health products** and **equipment-** the regulation of medicines and medical equipment in most emerging economies has evolved and developed somewhat in recent years. Nearly all countries have regulatory agencies to register and monitor pharmaceutical safety, although these differ widely in their capacity and effectiveness. Indeed, many national drug authorities are ill-equipped to do testing for drug efficacy, safety and/ or quality, whether for products manufactured domestically or imported. This situation is exacerbated by the weakness of controls on imports, especially in the case of informal trade from neighbouring countries. In most cases, their ability to monitor for adverse events due to medicines is virtually non-existent. Many countries have adopted essential medicines programmes like Jan Aushdi in India whereby drug use in the public sector is restricted to a set of essential medicines.
- **practitioners** and **facilities** engaged in the provision of health services. The most common regulation of health markets across the globe is the ***certification*** of healthcare providers. This is usually a *mandatory* requirement in terms of minimum educational conditions in order to practice for those with formal training as physicians, nurses and other health professions. In most developing economies like India, once the initial licensing standards have been met, there is little regulation that requires health providers to ensure that they maintain their skills.

The ultimate aim of the regulation of health products and services is to ensure they are safe, effective and affordable at the point of use. For example, regulating the manufacture and distribution of drugs will be ineffective at ensuring safe, quality and efficacious products, if there is an appreciable supply of unregulated and sub-standard imports and if retailers do not provide informed guidance about the use of these products. It is, therefore, recommended to regulate value chains at so-called 'pinch points' where there are a smaller number of critical actors.

From the perspective of the entities being regulated, it also implies that the opportunity costs of compliance should be at least no more than the costs of non-compliance, including the direct costs of fines and sanctions and the loss of revenue or professional prestige from non-compliance. Regulators can enhance the costs of non-compliance through their enforcement actions (for example increasing the frequency of inspection) and the scale of penalties imposed when infractions are identified.

16.12 Potential regulatory strategies

The foregoing discussion has highlighted how administrative approaches to the regulation of markets for health products and services may be ineffective and inefficient. At the same time, the nature of health market systems suggests that regulations are co-constructed by many actors and that these can have wide-ranging and sometimes unintended consequences that can have profound implications for the ways health markets are organised and operate.

- Defining **alternatives** to traditional regulatory modes needs to be approached with some care. In approaching the implementation or reform of health market regulation, it is important to recognise and build on established formal and informal rules and norms that influence the behaviour of health product and service providers and all actors along the value chain.
- Requirements for the **disclosure** of **information** to consumers on health products and/or services, patient redress and disclosure-based remedies are aimed directly at the empowerment of consumers. Therefore, the issue of trust is a critical issue in health product and service markets.
- Given the complexity of issues surrounding health markets and also the nature of the value chains for health products and services, it is likely that a **multi-pronged approach** will be needed to improve the performance of markets for health-related goods and services. Also, reliance on a single regulatory measure is likely to induce compensatory or evasive behaviours on the part of market actors.
- Taking drugs as an example, where **value chains are well developed** and have a high degree of integrity, most regulatory efforts can focus at the level of manufacture and/or importation, complemented by measures that control the right to prescribe any drugs. Where this is not the case, more intensive regulation and enforcement efforts are needed in distribution.

The implication is that regulatory strategies will need to be defined and adapted according to local contexts and adjusted as health markets develop and evolve. Reforming approaches to the regulation of health markets is not something that can be driven from outside. The ultimate aim has to be the establishment of rules that are recognised as legitimate by all stakeholders in the provision and use of health products and services.

16.13 Conclusion

Many countries face the challenge of creating institutional arrangements for their health systems in a context of rapid change and rising public expectations. Attempts to import models from the advanced market economies are often not effective. These countries cannot retrace the lengthy process through which the latter countries created their regulatory arrangements. There is little systematic evidence on strategies for building effective institutional solutions to the problem of asymmetric information in low and middle-income countries. Countries will have to pursue a learning-by-doing strategy, in which they test alternative interventions and build new regulatory arrangements.

There are challenges, the **first** is the degree to which market structures and norms of behaviour have become established in the informal and formal sectors in many countries. The process of change is likely to be highly contested and complex. The **second** is role of the relatively small number of large multi-national companies that supply pharmaceuticals and diagnostic technologies. They have actively engaged in the creation of the regulatory frameworks in the advanced market economies.

Experience over many years suggests that governments cannot address these problems alone. Their capabilities and resources are simply inadequate. This suggests the need for explicit and transparent regulatory partnerships with multinationals and other stakeholders through the value chain that put in place the necessary controls whilst recognising the risk of regulatory capture. The **third** is the emergence of new health-related companies in rapidly growing middle-income countries.

Whereas the regulatory framework in the advanced market economies has restricted vertical integration between pharmaceutical companies, retail pharmacy chains and prescribers of medications to reduce the incentive to sell excessive volumes of medicines, this may not be the case in many developing ones. It is not unreasonable to expect that complex ownership structures will emerge in these countries with a significant degree of vertical integration and horizontal market concentration.

The **fourth** is the speed of potentially disruptive innovations in information and communication technologies (ICTs) and in point of treatment diagnostics. The rapid diffusion of access to the internet through mobile phones is enabling people in countries with weak health systems to gain access to expert advice and to products and services at more accessible prices. However, mechanisms for ensuring the quality of information provided to consumers are weak in less advanced economies. Further, these technologies have the potential to act as powerful new pathways for major stakeholders to establish large market shares. These technologies alone, however, are not sufficient effectively to discipline providers of products or services that are of poor quality. The overall impact of ICTs on health systems and the degree to which it makes them more accountable for quality and costs, will depend, to a large extent, on the regulatory framework that governments put in place.

The history of health system development in the advanced market economies has shown that decisions made early can have profound effects for many years in the future. That is why it is particularly important that health system analysts understand the structure and operation of the complex markets that have emerged and build systematic knowledge on effective strategies for influencing their performance. The creation of appropriate institutional arrangements to regulate complex health markets will be an increasingly important health priority in coming years.

Chapter-17

Regulatory Approach in Healthcare costing: Domestic

Countries worldwide are at various stages of health systems development and differ widely in the health challenges they face. In India, while the private health sector is a dominant stakeholder both in terms of financing and provisioning of health care, **it often functions in an unregulated and unaccountable manner**. This has led to high levels of out-of-pocket spending by households on accessing health care and in the process has led to large sections of population getting impoverished. Such issues get exacerbated in times of emergency, as was witnessed during the COVID-19 pandemic. The characteristics of health care provide a strong case for government involvement and **regulation** is often seen as a potential response to address the many problems which arise in the production, financing and delivery of health services.

Selznick's definition of regulation has been defined as sustained and focused control exercised by a public agency over activities that are valued by the community. In simpler words, **regulation is government control** over the activities of individuals or organisations and more specifically, it can be understood as government action to limit, steer or manipulate **target variables** such as prices, quantities, distribution and quality of products and services. It also denotes implementation of cost management systems that contribute to better price discovery for essential medical procedures and practices. Regulation is crucial to discourage practices that lead to overuse of services and escalation of costs. A regulatory system is made up of the institutions, stakeholders and processes involved in designing, making, implementing and reviewing the regulation.

17.1 Purpose of regulation

- The primary purpose of regulation in the health sector is to ensure **access** to health services to the population, maintaining quality standards and effectiveness, pricing and cost containment, information collection and dissemination and protecting the rights of patients/consumers.
- The regulation seeks to ensure accountability of service providers, address information asymmetry between the beneficiary and the provider, maintain the confidentiality of medical information and protect consumers from opportunistic behaviour or malpractices.
- Further, regulation assists in controlling distortions created by market forces and establish conditions for the markets to function, with fair competition among providers while ensuring the consumer/patients' best interest. This is especially relevant in case of Indian healthcare sector where there are numerous schemes offered by the government in which cost of healthcare procedures are reimbursed to the private hospital.

17.2 Instruments for Regulation

India has strategies and supporting instruments for regulating various entities. Self-regulation is also enabled through peers, accreditation bodies and councils that may be voluntary or legally mandated. Licensing, accreditation and certification are the most practised approaches to regulation.

17.2.1 Licensing: is the process by which legal permission is granted by a competent public authority to an individual or organisation to engage in a practice or occupation. For example, a license to practice medicine and surgery.

17.2.2 Accreditation and Certification: Accreditation is the formal process by which an authorised body assesses and recognises an organisation, programme or group as complying with requirements such as standards or criteria. These are the procedures and actions by which a duly authorised body evaluates, recognises or certifies an individual, as meeting pre-determined requirements such as standards. Certification programmes are generally non-governmental and do not exclude the uncertified from practice, as do licensure programmes. Certifications and accreditations are voluntary and are given by autonomous bodies such as the

- National Accreditation Board for Hospitals and Healthcare Providers (NABH)
- National Accreditation Board for Testing and Calibration Laboratories (NABL)
- Joint Commission International (JCI) and
- ISO certifications.

17.3 Applicability of Cost Audit & Cost Records in Indian Health Care Sector (CCRA)

To be able to achieve and maintain financial sustainability, healthcare organizations must take a deeper look and understand how best to modernize their current cost strategy and practices. Determination of cost and fixation of price is important in every business organisation. This is especially true in case of healthcare institutions where the number of activities performed and services delivered to patients are enormous. For better decision making, it is crucial that healthcare businesses maintain regular cost records and perform or undertake necessary cost audit so as to check for any revenue leakages and in order to comply with the provisions of Companies Act, 1956. Further, to remain competitive in the market, the need for effective cost management and transparency has become critical.

Besides the regulatory approach discussed above, Indian health system also seeks continues insights and directions from independent, professional bodies like ICMAI for cost computation and cost evaluation for different care services. India was the first country to prescribe cost accounting record rules (**CARR**) in respect of industries/class of companies and their audit by independent cost auditors appointed with the prior approval of the Government in the context of frauds committed by the Dalmia Jain Group of Companies and Enquiry Report submitted by the Vivian Bose Commission of

Enquiry (1963). Companies were required to maintain cost records in compliance with the Cost Accounting Standards & Generally Accepted Cost Accounting Principles issued by the Institute of Cost Accountants of India (ICMAI). This includes:

- As per Companies (Cost Records and Audit) Rules, 2014 & Amendment thereto, any **company** engaged in "health services, namely functioning as or running hospitals, diagnostic centers, clinical centers or test laboratories" are **required to maintain cost records**.
- having an overall turnover from all its products and services of INR **35 crores or more** during the immediately preceding financial year needs to maintain prescribed cost **records** in accordance with Form CRA 1 of the rules to the extent applicable,
- if the turnover of the company which is engaged in hospital industry, **exceeds INR 100 crores or more** in immediately preceding financial year, then cost **audit** is also applicable on it and
- companies running hospitals exclusively for its own employees are excluded from the ambit of these rules, provided however, if such hospitals are providing health services to outsiders also, in addition to its own employees on chargeable basis, then such hospitals are covered within the ambit of these rules.

The aforesaid provisions were made operational through notification of the Companies (Cost Records and Audit) Rules, 2014. The legal dictum created a template which resulted in manifesting cost culture across industries and companies. It enabled the organisations to adopt a structured framework of cost accounting and reporting to help all stakeholders. Further, it is also recommended by the committee on reviewing the existing framework of cost accounting records and cost audit that separate cost audit formats be designed for the healthcare industry. For this, Ministry of Corporate Affairs (MCA) is collaborating with ICMAI to develop relevant templates keeping into mind that there is no additional compliance requirement on the stakeholders of the healthcare sector. ASSOCHAM also suggested that the cost accounting and cost audit in healthcare sector should be holistically reviewed and revisited and the regulation with enforcement of the same must be followed.

National health care costing systems found in many countries (England, Australia, Germany and Thailand) are fundamental for informing the design of case-based payment schemes. By accurately capturing direct and indirect costs associated with procedures, cost systems enable health care organizations to make informed decisions regarding reimbursements, resource allocation and process optimization. Incorporating cost information into rate-setting processes also enhances credibility and transparency, providing stakeholders with a clear understanding of the rationale behind pricing decisions. Moreover, establishing a direct link between costs and reimbursement rates enables policymakers and the public to assess the efficiency and effectiveness of health care spending. This transparency fosters trust and accountability, enhancing the overall stewardship of public resources in health care.

A comprehensive costing system for the healthcare industry would enable the large corporate hospitals to improve decision making with an aim to reap the benefits of economy, efficiency, profitability and sustainability. The committee that reviewed the existing framework of cost accounting records and cost audit in India was of the view that there is a need to develop the cost database based on cost accounting records and cost audit provisions for major sectors of economy (like healthcare) for the benefit of different government departments, regulatory authorities and other bodies. This would result in greater accountability of government expenditure. This would also improve transparency and uniformity across sectors. Cost database needs to be developed gradually. This must be done in a systematic manner so that the data is used effectively for various important policy decisions.

Based on cost database, benchmark cost/price of major products and services may be developed and operating ratio of major national services can be decided. This is true in case of fixing the prices of essential drugs and medical procedures in the country by NPPA and NMC. Currently, only limited medical devices are covered under the ambit of price controls as of now. This should be increased so as to keep prices of other essential devices in check. Government should also fix range of rates for various medical procedures and services. This will help the industry to negotiate most competitive rates for the services covered under different schemes.

This database will also help in cost-benefit analysis of future activities. Structured cost records and audit thereof may be of immense use in monitoring of timely implementation and achieving completion within the approved cost estimates in respect of major projects, programmes and schemes involving sizable amount of public funds. This may prove to be a good tool for cost control and assist in avoiding delays and large time and cost overruns in the government projects and schemes.

Cost audit is a systematic examination of an organisation/company's cost accounting records, ensuring that costs are accurately recorded, allocated and reported. This process aids in

- identifying inefficiencies
- improving cost control measures and
- enhancing overall operational effectiveness.

The main **objective** of cost audit when statutorily introduced under the provisions of Companies Act, 1956 was to meet the government requirements for regulating the price mechanism in core industries like cement, sugar and other consumer prone industries like healthcare. The **objective** was to provide an authentic data to the government to regulate the demand and supply of essential commodities and services in the country through a price control mechanism.

In each country (including the USA, UK, Germany, Japan, Australia, China, France, South Korea and Poland), there exists a distinct mechanism for gathering cost data and information, a process that must undergo certification or audit by external agencies or

auditors. Global practices allow either a single institute (in countries with only one professional accounting body) or multiple professional institutes (like in India with ICAI, ICMAI and ICSI) to interchangeably certify or audit cost data and other financial data.

Further, the use of the PM-JAY platform to its full potential is contingent upon the availability of robust cost evidence which can be used to set priorities and allocate resources to obtain the best value for limited available resources. Recognizing the need for good quality cost data in setting reimbursement rates for services covered by PM-JAY, the government is devising mechanism through its administrative and governance arms by investing in the production of cost data by healthcare institutions and is concurrently supporting the development of a national database of healthcare costs, that is, the National Health System Cost Database (NHSCD).

Further, the digital transformation of healthcare sector in the form of maintenance of EHRs has created more urgency to have decision support, cost accounting and preparation of cost records, thereby, giving providers the ability to analyse and optimize the costs associated with patient care. By organizing the data and aligning it to with the financials, a decision support and cost accounting system can help provide meaningful insights into the operations.

- **Costing systems**: focus on tracking and allocating costs related to patient care.
- **Decision Support Systems**: Decision support systems take cost data to the next level, transforming raw financial information into insights that can be used to improve clinical outcomes and financial performance. They allow hospitals to link cost data to quality metrics, patient outcomes and other key performance indicators.

In short, costing in healthcare lays the groundwork for understanding costs while decision support systems help organizations turn that data into actionable insights that drive decision-making (Costflex, 2024). Today, hospital cost accounting is a vital component of a hospital's financial strategy. Accurate and accessible cost information enables healthcare organizations to make informed decisions, manage operational costs and maintain or improve care quality. By embracing robust patient cost accounting systems, healthcare providers can navigate today's challenging financial environment with greater confidence.

17.3.1 National Health System Cost Database (NHSCD)

This cost repository of India is catering to the needs of policymakers and researchers (Chugh et al. 2023). A cost database is a public good to inform evidence-based decisions and economic evaluation research by providing access to a transparent set of country-specific reference costs. India's cost repository is being established to offer access to national cost data on primary care provisioning through community health centres, primary health cares and hospital-based secondary and tertiary care from both public and private providers.

The development of NHSCD, a collaborative effort by the Post-Graduate Institute of Medical Education and Research, Chandigarh, India; the Department of Health Research and the Centre for Global Development has facilitated the process of collating all these data into a single dataset and promoting their use and application. This initiative will make the average health facility cost data collected from multiple states freely available for researchers and policymakers.

The cost data within this database provides annual and average healthcare facility costs at different levels of healthcare delivery. Another feature available on this web-based platform is the unit cost estimator which is based on a set of key variables known to influence the unit cost, generates an average or unit cost in the form of cost per outpatient visit or inpatient admission for different states in India. The platform also hosts a costing manual and training videos on cost analysis. The data collection tool and the methodology deployed to estimate these costs have also been made available on the website to ensure transparency and for use and application by other practitioners. Moreover, the website also provides links to useful publications and resources in the context of costing and economic evaluations. More importantly, such data also aid the setting of reimbursement rates for various healthcare services. For instance,

- As India established PM-JAY, a system for calculating reimbursement rates that adequately reflected the cost-of-service was needed. As per CHSI study, the cost data so generated could be used to analyse the difference between existing reimbursement prices and costs so that the two could be aligned. Also, the data were used to identify variance in cost based on types of providers and their geographical locations and inform a price weight scheme that compensates providers according to these factors.
- For scaling up of HWCs, it is fundamental to understand the resource requirements to assess the budgetary implication for the government. The cost data from this costing repository have been used to estimate the financial implications of this strategy over the next five years.
- The data from NHSCD has facilitated the growth of Health Technology Assessment (HTA) in India by providing healthcare unit costs. For example, the data was used in the assessment of the cost-effectiveness of the typhoid conjugate vaccine (TCV) in children over six months of age and a cost-effectiveness analysis of population-based screening for diabetes and hypertension in India. Both these studies demonstrate wider level policy implications of costing and HTA where the former was conducted to aid policy-level decisions undertaken by India's National Technical Advisory Group on Immunisation (NTAGI) along with Ministry of Health and the latter was aligned with the government's aims to expand primary care for diabetes and hypertension through the HWCs.

17.4 Cost Accounting standards

Cost accounting in healthcare is a major contributing factor to its viability. Unlike other industries that have highly evolved cost accounting systems and can precisely analyse their gross profit on products and services, healthcare organizations are challenged when it comes to measuring their costs for providing different services. Cost accounting standards intends to achieve uniformity and consistency in the cost accounting practices which governs the measurement, assignment and allocation of different types of costs. The key tasks involved are to organize and track all direct and indirect costs by product or service. The aim is to create visibility that enables business leaders to manage those costs and make price-setting decisions that maximize profitability. A comprehensive list of costing standards that are applicable to healthcare organisations are as follows:

Sr.No	CASs
CAS 1	Classification of costs
CAS 2	Capacity determination
CAS 3	Production and operation overheads
CAS 6	Material cost
CAS 7	Employee cost
CAS 8	Cost of utilities
CAS 10	Direct expenses
CAS 11	Administrative overheads
CAS 12	Repairs and maintenance costs
CAS 16	Depreciation and amortisation
CAS 18	Research and development costs
CAS 21	Quality control
CAS 24	Treatment of revenue in cost statements

The healthcare industry strives to provide quality care for its patients and cost accounting provides significant benefits that help to achieve that goal. Better and more granular understanding of finances helps the organization maximize its duty to patients, employees and owners. The relevance of incorporating such standards by healthcare organisations is as follows:

- **Make better-informed decisions about resource allocation and pricing:** Leaders in healthcare organizations are challenged by regulatory changes, price pressure and increased competition. Cost accounting gives visibility into how resources are being used which can help to identify the areas that are working well and those that aren't.
- **Forecast costs and revenues, leading to better financial planning and control:** Cost accounting is especially important for developing financial forecasts which is essential for managing expected cash flow and profitability. More realistic forecasts put the organization in a better position to make investments, hire resources, set up credit facilities or downsize, depending on what circumstances require.

- **Analyse performance by comparing actual costs with budgeted costs:** It's vital for a healthcare system to get the most productivity from its resources while still providing high-quality patient care. Establishing a cost accounting process provides a basis to analyse performance across time periods, departments and providers and against industry benchmarks.
- **Set prices that accurately reflect the cost of services provided:** Understanding the true cost of services is central to setting prices or negotiating contracts with payers. Without full knowledge of actual costs (direct and indirect), the organization is at risk of setting prices too low and even possibly losing money on services.
- **Increase transparency with patients, insurers and stakeholders:** Cost accounting helps a healthcare organization substantiate its costs to provide services. Such documentation helps payers, whether an individual patient or large insurer, better understand the value they are receiving and put the charges into context. It can also assist with regulatory compliance and auditability.
- **Understand the financial risks associated with different services and treatments:** At a macro level, the cost data from cost accounting helps health system leaders be more sensitive to external factors that might create financial risks to their organizations. For example, significant changes to reimbursement rates of a particular procedure from government or private insurers might cause that procedure to become a financial drain. Arming physicians with cost data acquired via robust cost accounting systems can influence their decisions on the cost/benefit of one care path versus another, driving up patient value.
- **Understand the cost-effectiveness of different treatments:** Analysing cost accounting information can provide insights into clinical treatment variations that increase costs without enhancing patient outcomes. For example, cost variances for the same procedures performed in different locations or by different providers might represent an opportunity for clinicians to collaborate and improve processes for everyone.
- **Identify areas where costs can be reduced without compromising patient care:** Cost accounting shows the amount of resources spent on a particular service, as well as the drivers of those costs. This level of granularity helps identify opportunities for raising efficiency, reducing waste and adjusting workflows, all of which can increase profitability without lowering care quality.

Besides the costing standards that are outlined above, following is the list of acts and regulations that a particular hospital entity must abide by:

Sr.No	Acts
1	The Companies Act, **2013**
2	The Securities Contracts (Regulation) Act, **1956**
3	The Depositories Act, **1996**
4	Foreign Exchange Management Act, **1999**
5	The Securities and Exchange Board of India Act, **1992**

6	Atomic Energy Act, **1962**
7	The Clinical Establishment (Registration and Regulation) Act, **2010**
8	The Drugs Control Act, **1950**
9	Drugs and Cosmetics Act, **1940**
10	Delhi Nursing Homes Registration Act, **1953**
11	The Pre-conception and Pre-natal Diagnostic Techniques (Prohibition of Sex Selection) Act, **1994**
12	Medical Termination of Pregnancy Act, **1971**
13	Narcotic Drugs and Psychotropic Substances Act, **1985**
14	The Nursing Council Act, **1947**
15	Indian Medical Council Act, **1956**
16	The Transplantation of Human Organs Act, **1994**
17	The Pharmacy Act, **1948**
18	Environmental Protection Act, **1986**
19	Hazardous and Other Wastes (Management and Transboundary Movement) Rules, **2016**
20	Bio-Medical Waste Management Rules, **2016**

17.5 Importance of cost records for stakeholders

The review committee was of this view that there should be some correlation between fees charged and cost incurred and for which the healthcare sector should be brought under the ambit of cost accounting principles and cost audit. There is also a need to move towards user cost-based pricing. The committee felt that in the liberalized or decontrolled economy, need for mandatory cost audit has become more relevant in sectors which are prone to tax evasions and fraudulent practices. Having a regular cost database based on cost audit of the major products and services may give multi-fold advantages to all the stakeholders which may be as follows:

17.5.1 From Government or MoHFW perspective:

- Maintaining of cost records and its subsequent audit in important sectors like healthcare may play a pivotal role in ***developing cost database*** for the government. It will help in better decision-making and promote transparency and accountability in the financial management of government.
- The cost database may be very useful for ***appraisal and approval of public funded schemes*** and projects, thereby, protecting government revenue.
- Government may receive precise input cost data with details which can be used to ***decide the benchmark cost*** for future government decisions which would result in huge savings of public funds. This will help in better cost benefit analysis of projects and schemes.
- Such costing records will also result in ***better allocation and apportionment of overheads*** among different products and services.

- Based on the benchmark cost, Ministries/Departments will be in better position to award the future contracts at ***competitive prices*** of different products/services/works.
- Cost audit is of immense assistance to governments in helping for ***tax optimization***, dealing with transfer pricing matters, valuation of inventories and segmental reporting.
- Audited cost records and the resultant cost audit report becomes a major source of information, which can be effectively used by both Indirect and Direct tax authorities. At present, CBIC and CBDT are working on faceless assessments. Availability of authentic and reliable activity-wise, input-output data will help in better tax assessment. It can help audit officers to reconcile the produced data with GST return and major variation (if noticed) should be investigated. Audit officers may utilize cost statement or cost of production statement in cost audit report for valuation aspect so as to compute taxable value of the final services performed in a particular hospital. Therefore, need for cost database for major products and services have increased substantially for their audit/ investigation/ examination purpose.

Cost accounting system and cost reports are useful tools for the public authorities to gauge efficient deployment of public resources, monitor the outputs & outcomes of various public policies, schemes and programs. Government should use this data for the benefit of the industry and economy by periodically undertaking benchmarking and competitiveness studies and share the outcomes with the industry to enable it to focus on improving cost competitiveness. The systematic and rigorous application of cost analysis methods may provide critical support to government authorities.

17.5.2 From Insurance companies' perspective:

- The mandatory maintenance of such cost records will also help in efficient utilization of scarce resources of the country as precise input cost breakup will be made available. The availability of actual per-unit cost data of similar product/services will also ensure inter-unit, inter-region and inter-period comparison.
- There is also a need to control cost in the health sector especially tertiary care where subsidies are provided by the Government in the form of national schemes like PM-JAY.
- Undertaking strategic planning.
- Addressing risk management.
- Health insurance systems that understand these costs better can optimize pricing, offer competitive rates and negotiate contracts more effectively.
- Accurate cost information strengthens an organization's position in contract negotiations and/or partnerships with payers, suppliers and other stakeholders. Cost data accuracy and reliability will help demonstrate the value they bring,

negotiate fair reimbursement rates and identify areas for collaboration to improve cost efficiency.

- Moreover, having a realistic estimate of projected costs makes for effective resource allocation and it increases the probability of a contract's success. Reliable cost estimate needs to be comprehensive, well documented, accurate and credible.
- To curtail shrinking profits of the healthcare sector, advanced tools in the form of healthcare cost accounting is paramount. Stakeholders like government can use such tools to control costs, negotiate payer contracts and make informed decisions about resource allocation among targeted institutions. Without accurate cost data, efforts to reduce waste and improve operational efficiency are significantly hindered. However, cost estimation is challenging. Moreover, credible cost estimates take time to develop.
- Costing is an important tool in assessing organizational performance in terms of shareholder and stakeholder value. It informs how profits and value are created and how efficiently and effectively operational processes transform input into output. It includes product, process and resource-related information covering the organization and its value chain.
- Cost accounting provides detailed information about individual products, activities, divisions, plants, operations and helps Board to make effective business decisions as it measures the consumption of economic resources and support the accountability of business performance.

17.5.2 From health companies' perspective:

- An updated costing strategy enables health systems to provide accurate and transparent cost information to patients, thereby promoting trust and accountability.
- Cost audits can be used to the benefit of management, consumers and shareholders by helping to identify weaknesses in cost accounting systems and to help drive down costs by detecting wastage and inefficiencies.
- Availability of authentic and reliable activity-wise, input-output data will help in elimination of wastage and improve efficiency.
- Cost audit report provides quantitative and financial details regarding related party transaction, valuation of services rendered as per service tax return etc.
- It was stated that cost audit helps companies comply with the provisions of the GST Act by ensuring accurate cost reporting, which is essential for calculating input tax credits and determining the value of supply. The ITC claimed aligns with the actual costs incurred, reducing the risk of non-compliance and potential penalties.
- Hospitals can use cost data to identify opportunities for growth by analysing patient care patterns, physician productivity, and payer relationships.

- Accurate *healthcare costing* data allows organizations to negotiate more favourable rates with payers, ensuring that pricing reflects the true cost of care.
- Costing data enables providers to track performance across departments and service lines, identifying areas where efficiency can be improved without sacrificing quality.
- From the corporate governance angle, maintenance of cost records and cost audit plays an important role.

Cost competitiveness being a key to success in a global market, one can hardly do away with maintenance of cost records and their cost audit as it is an important tool for healthy growth of economy in general and individual companies in particular. Further, cost audit plays a pivotal role in promoting transparency and accountability in the financial management of businesses as it ensures that costs are accurately recorded, allocated and reported. This process aids in identifying inefficiencies, improving cost control measures and enhancing overall operational effectiveness. With access to detailed financial data, hospitals and health systems can make strategic decisions that improve both clinical and financial outcomes.

17.4 Regulatory overview of healthcare sector in India

Given that health markets in many countries especially India have evolved rapidly and with little or no planning, the development of support institutions has tended to lag behind. In many cases, markets for health products and services are not well linked to the broader health system and regulatory systems are weak and under-resourced. The government plays a key role in setting policy and proposing, designing and implementing regulation. Governments regulate to meet desired goals or outcomes such as improved health (coverage and equity), social and financial risk protection, assure quality, protect patients and assure good clinical outcomes. The Ministry of Health and Family Welfare is the central legislative body in charge of framing India's health policies. Various governmental regulatory bodies implement these policies namely,

- The **National Medical Commission** (NMC), constituted under the National Medical Commission Act, 2019, is the apex body in India regulating the quality and delivery of medical services and education, **replacing the previous Medical Council of India**. The primary legislation governing medical professionals is the NMC Act and the Indian Medical Council (Professional Conduct, Etiquette and Ethics) Regulations, 2002.
- Other regulatory bodies include the Central Council for Indian Medicine, Indian Nursing Council, Dental Council of India, Pharmacy Council of India and Allied Health Professionals Council. Moreover, each state in India also has its own councils to regulate medical professionals.
- Although unregulated, the private sector's pricing of professional medical services is based on market standards, demand and supply of healthcare services, clients' affordability and health insurance reimbursement rates. The

pricing of drugs in India is regulated by the **National Pharmaceutical Pricing Authority of India** (**NPPA**) as per the provisions of the Drugs Price Control Act, 2013 and drug price control orders issued by the Department of Pharmaceuticals. Specifically, the NPPA monitors the availability and shortages of drugs, collects data on imports, exports, production and sales of drugs by companies, sponsors or undertakes studies relevant to determine prices of drugs, enforces drugs price control orders, deals with legal matters relating to the authority and gives advice to central government on drug policy and pricing. For instance, in 2021, the NPPA fixed the ceiling prices of 355 medicines and 822 drug formulations. During the covid-19 pandemic, the NPPA capped the trade margin of oxygen concentrators, pulse oximeters, glucometers, blood pressure monitors, nebulisers and digital thermometers at 70 per cent on the price to distributor level.

- The manufacture and sale of drugs in India is governed under the **Drugs and Cosmetics** Act, 1940 (the D&C Act), along with the Drugs and Cosmetics Rules, 1945. Recently, the MoHFW released a draft of the Drugs, Medical Devices and Cosmetics Bill, 2022 to replace the current D&C Act to regulate online pharmacies, clinical testing, medical devices and other system of medicine namely Ayurveda, Unani and Homeopathy.
- All substances used for the diagnosis, treatment, mitigation or prevention of any disease or disorder are integral components of health care service delivery. Hence, drugs/medicines, vaccines and medical devices are among the entities to be regulated. The **Pharmacy** Act, 1948 and the D&C Act regulate pharmacies, the education of pharmacists and the registration of pharmacies.
- The setting up and licensing of hospital establishments are governed by the **Clinical Establishments** (Registration and Regulation) Act, 2010.
- Establishing medical colleges for students require prior approval from the central government under the Establishment of Medical College Regulations, 1999 and compliance with the regulations.

The National Health Authority (NHA), entrusted with the implementation of PMJAY, sets the reimbursement rates for and regularly updates the list of health benefits packages (HBP). The setting of reimbursement rates is currently informed by evidence from a one off nationally representative costing survey, evidenced from economic evaluations and expert consultation (Chugh et al. 2024; National Health Authority, 2022). While the use of evidence on health care costs is critical, costing exercises are resource and time intensive and have rapidly become outdated. At the same time, empanelled providers complain of the inadequacy of the reimbursement rates and the flat rate payment that does not adjust for severity and complexity. These issues raise the risk of providers declining to participate in the scheme, balance billing or selectively denying hospitalization to sicker and more vulnerable patients.

The NHA is considering reforms to the payment scheme, similar to a Diagnosis Related Group (DRG) based payment mechanism, built on a classification system which factors

in the patient case mix and severity. Such systems rely on transparent and robust evidence to inform both diagnosis groupings and their reimbursement tariffs. In particular, data are needed for standardized patient classification around diagnosis and procedures, how costs might vary with case mix and severity and the average costs of providing health services. These data could be generated through a sustainable national cost system that produces reliable time-relevant cost information based on standardized costing methods. However, the scope to capture these data at a national level in this way in India is unclear.

- Additionally, health care involves the discharge of professional duties by the health care practitioners, which may at times lead to acts of medical negligence. The term may be understood as wrongful actions or omissions of professionals in the field of medicine, in pursuit of their profession, while dealing with patients. Cases of medical negligence can be brought before the courts, either for criminal liability or for civil liability. Criminal liability can be fixed under the **Indian Penal Code, 1860** which are general in nature and do not provide specifically for medical negligence.
- The services provided by medical practitioners are also covered under the **Consumer Protection Act, 2019**. If a case of medical negligence or breach of duty of care is established against the medical practitioner, a civil case can be filed in consumer courts to seek compensation.
- In India, the authority to suspend or revoke a medical practitioner's registration or licence lies with the respective **state medical councils or the NMC**, after conducting an inquiry, investigation or hearing by the respective regulatory body. Revocation of registrations and imposing penalties on clinical establishments are governed mainly by state-specific laws. If any hospital is found non-compliant with the standard conditions of registration or if the person in the managerial position of such establishment has been convicted of a punishable offence, a show cause notice may be issued to the establishment.

A compilation of the existing legislation promulgated by the Union Government identified around 250 specific areas which have been put into the following categories such as those related to the regulation of:

- Health facilities
- Medical services
- Human resources
- Pharmaceuticals and vaccines
- Medical devices
- Health insurance
- Occupational health
- Patient rights and ethics
- Mental health
- Narcotic drugs and substance abuse

- Tobacco control
- Health Information
- Public health
- Epidemics, pandemics and outbreaks amongst others.

17.4.1 Entities for Regulation

There are various **providers** involved in delivering health care services. This includes **practitioners** such as:

- **Doctors** comprising medical graduates with bachelor or postgraduate specialist diploma or degree in allopathy/western/modern medicine or other/traditional systems of medicine.
- **Dentists** have a bachelor's or postgraduate degree in dentistry to provide care related to diseases and conditions of the mouth.
- **Nurses** (including midwives) are people with formal education and training in the care of the sick or the infirm, promoting and maintaining health and usually, assist or work under the supervision of medical practitioners.
- **Pharmacists** are involved in storing, preserving, compounding and dispensing medicinal products. They counsel on the proper use and adverse effects of drugs and medicines following prescriptions issued by medical practitioners.
- **Allied** health professionals, also known as **paramedical** professionals, are part of the health care team but distinct from doctors, nurses or pharmacists. Allied health professionals may include
    - ❖ Psychologists
    - ❖ Opticians
    - ❖ Physiotherapists
    - ❖ Laboratory technicians
    - ❖ Radiology technicians
    - ❖ Emergency medical technicians
    - ❖ OT/ICU technicians or attendants
    - ❖ Audiometry technicians
    - ❖ Speech therapists
    - ❖ Dieticians/nutritionists
    - ❖ Occupational therapists
    - ❖ Medical or psychiatric social workers
    - ❖ Community health workers among others

17.4.2 Issues faced in regulation

While regulation is an important tool, there are **challenges** associated with developing suitable regulatory mechanisms and implementing them, as regulation is technically complex, resource-intensive and a continuous process, when in fact it must be clear and transparent in its application and the procedure of applying the regulation must be simple and user friendly. In India, the main problems are

- **multiple regulatory** bodies that share the same aims, make for a complex and rapidly changing regulatory environment and cause duplication of work, increasing the workload and creating frustration and negative relationships with the regulatory bodies Not only so, but the **uncoordinated** nature of the interactions between the various organizations and agencies can also create confusion and can cause resources to be diverted from where they could be best used.
- Efforts by the government to **import** institutional arrangements for the regulation of health markets from the advanced market economies have had limited **success**. In many cases, the underlying rule-making and enforcement systems are weak. New approaches are needed that build on existing arrangements prevalent in the country.

17.5 Final words

Cost is an important criterion to measure the performance of a particular entity or a project. Maintenance of cost data by healthcare institution is useful in the public interest. This is especially relevant for hospitals or sectors which are more prone to unfair trade practices, tax evasion, arbitrary pricing methods, public services or schemes and where the funds of the government are invested. A costing strategy provide accurate insights into the costs associated with various healthcare services, procedures and activities. It is also necessary to understand the cost drivers so as to implement cost-control measures, optimize resource allocation and improve operational efficiency (Hill, 2023). The relevance of cost management strategies and overall effectiveness will continue to be increasingly important to improve operational efficiency, manage resource allocation, reduce costs and explore new revenue streams. As discussed, while a central repository reduces the transaction costs of obtaining cost information for a range of activities in healthcare decision making, the data embedded within the NHSCD must be expanded and updated regularly given continuous healthcare reforms as well as rising healthcare costs. Further, to model costs, it is pivotal to understand what is meant by costs and how it differs from prices. More importantly, the level of granularity of availability of records due to lack of electronic patient records extends the effort to determine costs by many folds, which is a deterrent to good quality cost data. Therefore, the government of India needs to focus on building sustainable mechanisms for setting up systems for generating accurate cost data rather than relying on resource intensive studies for cost data collection.

Keeping in view of the public interest, costing records and cost audit framework should be mandated to all corporates and non-corporate entities providing health services in the country. Further, only a limited number of medical devices are covered under the rules. PHDCCI suggested enhancing this number to include all. PHDCCI suggest that based on the cost data, governments should fix range of rates for various medical procedures & services. This will help the industry to negotiate most competitive rates for the services covered under CGHS/PMJAY. Equally, a comprehensive costing system

for the healthcare industry would enable the large corporate hospitals to improve decision making with an aim to reap the benefits of economy, efficiency, profitability and sustainability.

As the Indian health system embarked upon adopting an evidence-informed and inclusive health policy, it identified the lack of cost evidence as one of the key gaps requiring attention. The development of the cost repository is one of the crucial steps in providing access to transparent, country-specific reference costs, and has proved to be an invaluable resource for priority-setting and decision-making. Further, on maintenance of cost records, it is suggested to develop industry-specific guidelines or templates to ensure that cost accounting records are tailored to the specific requirements of different sectors.

CHAPTER-18

Role of CMAs in healthcare sector

Pricing in healthcare industry is important because it must neither be too high nor too low to meet the operational expenses. The mechanism behind hospital procedures and their prices have been frequently questioned by the health insurance sector as well as the regulator especially with regard to payments customers make to the hospital entity. To do this, a thorough understanding of the cost structure is required along with an annual review and adjustment of the cost sheets and prices. This necessitates the diligent input and working of the cost accountants in the country.

Professionals such as cost accountants (henceforth CMAs) with specific understanding in business planning and value development are needed by firms in today's globalized environment. Cost accountants with the necessary skills, training and experience are in constant demand in India and worldwide. CMAs are multifaceted professionals since they form the cornerstone of businesses and receive specialized education and training from statutory institute of the country. CMAs are driving force in all economic activities, as they are the value creator, value enabler, value preserver and value reporter.

A high level of cost and management accounting and pricing techniques is required for the CMAs to add value in internal audit, hospital management system implementation, internal control setup, project appraisal, project financing, government subsidy planning and government free patient schemes. By doing so, they can advise management on how to keep costs and pricing in check, which benefits society as a whole (Sriram, 2021).

Cost accountants provide useful financial services to companies in many sectors of the economy. They provide production cost analysis to assist an organization in budget planning and profit maximization. An expert in finance, a cost accountant looks into a company's cost of production, that is, the amount of money needed to produce goods or render services. In addition to evaluating supply chains, individuals in this position do profitability analyses to assist management in comprehending the profitability of their goods, services, procedures, divisions or departments.

Cost accountants utilize their evaluations to create budgets and cost-control plans that would eventually boost the company's earnings. Cost accountants are in high demand across a wide range of industries including the public utility, banking and finance, developmental agencies, education, training and research sectors as well as the government and private sectors. Further, role of cost accountants goes beyond a financial accountant and they help the management in regulating production operations and processes of production. This is evident from the following:

- Fixing fair prices for the various services of the hospital.
- Help the management to achieve sustainable cost reduction in the healthcare delivery process.

- Draw up a meaningful budget based on volumes of different activities and services offered, to track variances and facilitate mid-course correction.
- Develop a robust cost management software to improve transparency in cost data.
- Increase awareness of cost among all levels/functions of the organization.
- Aid the company to be a good corporate citizen, by being compliant with statutory laws.

In current scenario, CMA's can also play a crucial role in framing business solutions for hospitals or overall healthcare sector from the perspective of cost management. Their role is necessary in light of the following challenges that the hospital industry is facing:

18.1 High costs of implementing accounting systems:

- Hospitals are particularly costly organizations in which to implement cost accounting efforts. For one thing, they produce a staggering number of products and services ranging from 12,000 to 45,000 individual items.
- Secondly, even under the same Diagnosis Related Group (DRG) categories that Medicare and many other payers utilize for payment, the precise treatments that a given patient needs can differ greatly. As a result, determining the cost of an output (in this case a DRG) presents typical cost accounting challenges associated with allocating indirect costs and other apportionment costs.
- The cost of providing a specific type of care might differ from patient to patient based on the clinical needs of the patient and the treating physician's choices, even in cases when expenses are precisely documented. It is obvious that the hospital production process is intricate, and that in the context of hospital operations, even the often straight-forward process of determining what output is being costed is challenging. For healthcare businesses, all these variables add to the comparatively high cost of developing and maintaining a comprehensive cost accounting system.
- Another notable cost of implementing a sophisticated cost system is the potential resistance from the facility's medical staff. To the extent that a sophisticated costing system like ABC would assist hospitals in standardizing clinical processes, individual physicians may feel that their professional judgement is being impeded and may oppose efforts to develop more sophisticated systems. This conflict may be reinforced by the traditional separation between payments for hospitals' facility fees and professional fee payments made to physicians practicing in hospitals. While a large amount of a physician's compensation is based on a fee-for-service model, hospital reimbursement is primarily case-based. Thus, although the hospital is motivated to decrease the number of resources used per episode, the doctor is not!
- The cost of implementing a cost accounting system for a hospital is **significant** yet the benefits of a sophisticated cost accounting system may be **low** for many hospitals. The reason for this limited benefit relates to hospitals' perceived inability to influence their prices. Many hospitals feel that their ability to

improve payment rates is limited even if they develop sophisticated cost accounting systems.

- Moreover, even hospitals that can exert influence on the prices they charge tend to ignore service-level cost information in their pricing negotiations. This is probably due to the traditional methods used to price and reimburse hospital services. This is especially true in case of Americans. **First, most U.S. patients have traditionally been insured and had plans that kept them relatively insulated from the full cost of medical care. As a result, price negotiations have taken place not with individual patients purchasing single services but with insurance companies purchasing a mix of services on behalf of their beneficiaries.**
- For hospitals, negotiating profitable contracts as a whole has been more crucial than determining the reasonable and profitable prices for particular services. As a result, as long as they could work out agreeable insurance contracts, hospitals have not had to precisely cost and profitably price individual inpatient treatments. Hospitals have reaped relatively little benefit from investing in cost accounting systems that produce precise cost estimates at the service or patient level, since negotiations have occurred at the contract level rather than at the level of individual services. But there are significant changes occurring in the healthcare sector that could boost the advantages of having an advanced cost accounting system while reducing the costs of implementation.

18.2 The hospital **charges** to patients **vary** widely from hospital to hospital across the country. This is justified in many cases but demands a revisit. The necessity for near uniform **charge** or **cost structure** is felt by all stakeholders and here the CMAs shall facilitate for uniform costing/pricing structure.

18.3 For a highly populated country, Government of India (GOI) wishes to provide free medical services or at subsidized prices through hospitals. Moreover, due to diversity and interplay of various forces, central government and few state governments are bringing in a system of **Public Private Partnership** (PPP) method in providing such services uniformly/consistently to all users. In this context, CMA's play a key role of developing and enabling the PPP business model for successful implementation of near uniform pricing model.

18.4 CMA's can play a **bridging role** between third party administrators of insurance companies (for reimbursement of expenses incurred by a patient) and the hospital in working out the correct costs that need to be charged to patients.

18.5 On many instances, the stakeholders remain clueless on what is or has to be the ideal/correct costs of medical services. Government is trying to **standardize** the key procedural costs or cost of rendering the services. Keeping this as an important area on scope for improvement, CMA's can render **justice** to the health care system in proving authenticated cost details to the concerned stakeholders.

18.6 In the context of above narrated difficulties faced by the hospital and stake holders, it is felt that enormous opportunities are available to CMAs in the hospital industry. They can develop **Activity Based Cost** (ABC) **Management**, under which, accountants identify how fixed and variable costs correlate with the direct cost of a product or service. **ABC method would be the most appropriate method of identifying the cost to respective departments. We have to calculate the cost of each and every activity involved based on cost drivers and cost pools.** Cost of each activity is accumulated according to the cost drivers.

ABC takes a rational approach to product and service costing since it begins with an effort to identify the fundamental activities and resources involved in producing an output. The indirect expenses are then allocated to the activities using cost drivers that are carefully selected to reflect the use of each particular resource pool. This methodology has been found to produce accurate and rational financial management information and to provide information that helps managers make accurate product mix decisions, product price calculations and consumer profitability analyses.

The **basis** for ABC is a belief that **all activities exist to support** the production and delivery of goods and services and that all indirect costs can be traced and allocated to individual products and services. ABC provides managers a more accurate view of the true cost of their products and services. It is designed to provide more accurate information about product costs so that management can focus its attention on value-added activities. ABC has been found to generate information that is superior to traditional systems.

However, the approach is not without its **drawbacks**. The ABC process has been criticized as being **resource intensive** for complex organizations. Identifying the appropriate cost drivers, an essential step in the ABC process, requires significant managerial time and financial investment. Moreover, significant investments are required to maintain an ABC system as the organization's processes change. ABC systems can become outdated very quickly if the assumptions regarding the cost drivers are not updated to reflect organizational changes. The selection of cost drivers is also subjective. Lastly, ABC may allow managers to select cost drivers that reflect their personal preferences for particular inefficient processes, under-utilized resources or unprofitable products. Besides above, there are certain other challenges that CMAs might face in the healthcare sector like

- To bring about a uniform **methodology/SOP** (Standard Operating Procedure) for performing costing functions across different hospitals under the same management.
- To **automate** the costing function by developing a software solution based on the above SOP.
- To generate hospital specific cost reports, incorporating healthcare KPIs (Key Performance Indicators) like ALOS, ARPOB, bed occupancy, survival rate, first time right.

- To consolidate the cost reports across various hospital locations and help the management to draw inferences on cost comparisons across locations, trends and relative profitability.

18.7 Fixation of charges for various services provided by the healthcare industry can be determined by CMAs using latest costing concepts and methodologies like

- opportunity cost
- joint costing principles
- total cost method
- ABC method
- Marginal costing method
- Managing cash activities, billing and finances
- Finance & Accounts activities
- Budgeting and budgetary control
- Inventory control and
- Finance management and costing systems

18.8 Hospital management systems and stand-alone inventory control management systems can be designed with the assistance of CMAs. Efficiency can be ascertained using this. HMS and ERP systems function similarly in that patient data is entered directly from the source. Because the system records every treatment the patient received while in the hospital, it facilitates the billing process. The HMS should be connected to every department for this. It also implies that there should be strict controls put in place for payables. For example, it is important to regularly perform continuous physical verification and check for excess billing on consumables, reagents, x-ray films, pharmacies, and medications.

18.9 According to reports, the Indian government is planning to introduce a credit incentive programme worth INR 500 billion to boost the country's healthcare infrastructure. The programme will allow firms to leverage the fund to expand hospital capacity or medical supplies with the government acting as a guarantor and strengthening COVID-19-related health infrastructure in smaller towns. As per estimates of 2023, there are currently 706 medical colleges in India (IBEF, 2023). In May 2022, the Union Government approved grants for five new medical colleges in Gujarat with a grant of INR 190 crores each. These colleges will come up in Navsari, Porbandar, Rajpipla, Godhra and Morbi. India requires about 2000 medical colleges with 500 bedded hospitals immediately to meet with the requirement of the country. This also present enormous opportunities to CMAs who may provide their expert services in the following areas:

- Preparation of **project reports** following the norms prescribed under "Establishment of Medical College Regulations, 1999" by Medical Council of India for establishing a medical college or hospital.

- Project **appraisal** & **evaluation** and project monitoring being a member of Project Implementation Team.
- Help the management in project **financing** through financial institutions.
- **Tendering**, evaluation of tenders of civil & electrical and other works, procurement of equipment, furniture & fixture and helping management in award of various works.
- **Monitoring** day to day project activities through MIS system. Reports may comprise of the comparative statements for projected costs of activities/actual costs, cost over-runs, payment of bills, evaluation of extra and substituted items, escalation & other claims.
- After the hospital and its medical college are established, designing a costing system for hospital as suggested above and for medical college, helping in establishing a costing system which may enable it to fix the fees for various courses offered by it, examination fee, hostel charges and charges for various services rendered by medical college.

18.10 In addition to above, CMA's can render services in below mentioned areas also. GOI has created new opportunity for CMAs in healthcare industry and the threshold limits prescribed under maintenance of cost records rules and cost audit are very low. Even trading and supply of medical devices are covered. In view of these rules, the CMAs may provide the following additional services to healthcare sector

- Maintenance of cost **records** as per companies (Cost records and Audit) rules 2014.
- Establishing the **standard** costs of products and services and updating them based on the associated expenses.
- Suggesting **changes** to procedures and policies to increase the organization's cash flow.
- **Analyzing** organizational data and reviewing rates of labor, overhead and depreciation to recommend policy changes that may improve numbers.
- CMAs can be engaged as cost **auditors** by healthcare companies who meet the threshold limits under Cost Audit Rules, 2014.
- **Designing** of costing accounting system keeping in view requirement of companies (Cost Records and Audit) rules 2014, Generally Accepted Cost Accounting Principles (GACAP), Cost Accounting Standards (CAS) and Cost Auditing Assurance Standards (CAAS) and designing of Integrated Costing Accounting system (ICAS).
- The Companies Act 2013 contains several opportunities for CMAs apart from maintenance of cost records under section 148(1), conduct of cost audit under section 148(2) and internal audit under section 138. Accordingly, CMAs can be appointed **internal** auditor in the healthcare sector.
- In view of provision of internal audit in the Companies Act 2013, the Ministry of Health & Family Welfare informed the ICMAI that the National Health Mission

(NHM) will empanel the cost accountants also for internal audit & concurrent audit.

- CMAs can design the **internal control system** in the healthcare industry and also prepare internal audit manual for them.
- **Reporting** of compliance of laws to various governmental agencies.

18.11 However, to perform above aspects diligently, it is vital that CMAs are equipped about the following:

- Good **understanding** of the nature and severity of diseases.
- Medical **specialties** dealing with these diseases.
- Various treatment **processes** adopted by doctors like types of surgeries, transplants, transfusions, cardiac and other interventions.
- Medical **equipment** and **facilities**, specifically used in these processes like Cath Labs, OTs, Blood Bank, Robotics and knowledge about dealing with stents.

18.12 Cost statement is prepared at various levels of the hospital organisation and finally rolled up to the company level as follows:

Figure 18.2 Flow of cost statement at different levels.

An illustrative patient billing or cost sheet is also mentioned below:

Table 18.3 Cost sheet at patient level.

Description	
Bill No.	IP No.
Admission No.	ID No.
Name of the patient	
Age	
Sex	
Address	
Admission date	
Discharge date	
Ward/Room No.	
Name of the Consulting Doctor	
TIN No.	
Patient type	Cash/Corporate/Insurance reimbursement
Room type (Single/Deluxe)	
Procedures undertaken	Amount (Rs.)
Admission charges	
Pharmacy/medicines/consumables charges	
Implant charges	
Room charges	
• Ward bed charges	
• Single room bed charges	
• Deluxe room bed charges	
Doctor charges	
• Speciality doctor charges	
• Duty doctor charges	
• Resident doctor charges	
• Anaesthetist doctor charges	
• Dietician charges	
• Physiotherapist charges	
• Nursing charges	
Investigation charges	
• Preliminary investigation charges	
• Secondary investigation charges	
Blood bank charges	
ECG and Echo charges	
Scanning charges	
Laboratory charges	
Radiology investigation charges	

OT charges	
• Medical procedure charges	
• Surgery charges	
Other administrative charges	
TOTAL	

18.13 Cost ascertainment in Radio Diagnostic department

Radiology department is a diagnostic investigation department and is an essential part of any hospital. It is a **revenue earning** department and nearly 30 to 40 percent of patients are subjected to X-ray investigation out of the total number of patients who are visiting the hospital. The different categories of patients who visit the hospital for whom the X-ray service is rendered are

- Outpatients
- Inpatients
- Casualties and
- Patients referred for x-ray by private practitioners.

The function of this department covers

- Radiography
- ultrasound and
- special procedures like Intravenous Pyelogram (IVP), MCU and Barium swallow.

The X-ray service is more essential for orthopaedic patients for whom X-rays are taken repeatedly for assessing the progress of improvement. The charges for different treatments for different category of patients differ and they are market driven. Hence the need for cost differentiation to assess the adequacy of the charges is essential. The cost ascertainment in the present system has the following components.

1. **Material cost**- consists of the cost of the film and cost of the developer and mixer. While a cost of the film depends on size of the film, cost of the developer and fixer is based on estimated number of films that can be developed in one time mix of the solution.
2. **Labour cost**- consists of fee payable to the radiologist and the salary paid to the radiographer. Under this, the radiographer's fees is based on piece rate system. Radiographer's salary and other perquisites are related to a standard output of films exposed per days.
3. **Utility cost**- consists of power, water, compressed air and others.
4. **Administrative cost**- It is recovered as a percentage on direct cost (material and labour).
5. **Other expenses**- these are expenses like equipment depreciation, maintenance charges of buildings and equipment, interest on capital and other annual expenditure are allocated first on a technical estimate based on time and in turn

related to standard output of exposed films per day. The number of films to be exposed differs depending upon the type of investigation to be done.

Table 18.4 Cost statement in radiology department.

Particulars	**Amount (Rs.)**
Personal expenses (Radiographer)	
Material/Consumables	
• Dyes/Catheter	
• Films	
• Chemicals	
Power	
Other expenses	
General Administration Overheads	
Depreciation	
Total cost of Operation	
Number of X-ray films during the year (weightage to be given to the area or size of the film also)	
Cost per X-ray film or cost per sq ft. of the film	

18.14 Activity analysis- Detailed activity analysis, resources involved for each type of activity and mode of recovery and the suggested activity pool is placed in annexure. It may be seen that the present practice can be further refined by adopting the ABC approach and forming activity cost pools with a distinct cost driver to ascertain more realistic cost. The ABC-based ascertainment of cost serves as a guide to fix the charges to the patient reasonably.

18.15 Final words

CMAs possess extensive expertise in pricing and cost methodologies. Profitable businesses must strike a balance between pricing and cost structure; they cannot afford to lose. Customers will become hostile to overcharges, and business will ultimately suffer. However, under-pricing will destroy the business since the losses will be irreversible and the costs cannot be compensated. Organizations ultimately lose if the two circumstances are not appropriately balanced. In this context, CMAs can be very helpful. They can also provide value to the firm, which benefits the stakeholders and improves price discovery and society as a whole (Sriram, 2021).

Chapter-19

Implementation of costing system: A case study approach

19.1 Costing approach in XYZ Hospital: An overview

XYZ is a popular organisation providing a range of healthcare services to domestic and international citizens through its various units operational in metropolitan cities of Mumbai, Kolkata, Ahmedabad and Delhi. The organisation has been adhering to the statutory requirements of maintain cost records and undertaking cost audit. There is clear bifurcation of medical cost centres, medical intermediary cost centres and other service support centres. This is evident from the following figure 19.1 which depicts the allocation of different costs for one of the units of XYZ healthcare:

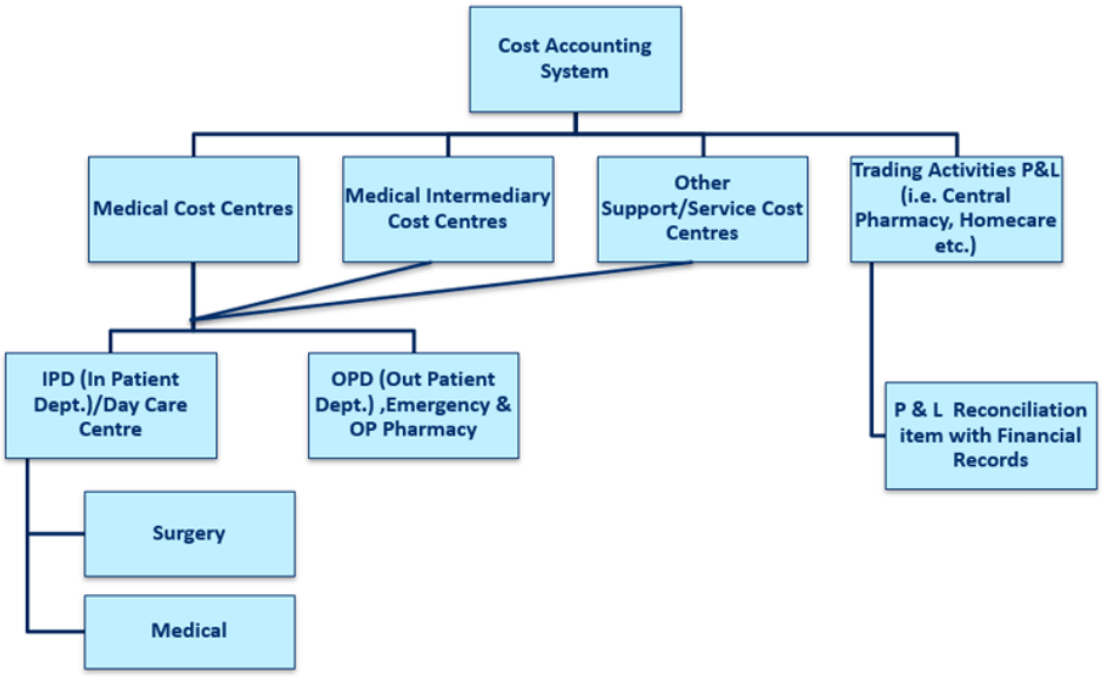

Figure 19.1 Costing system

- **Primary allocation of cost and cost charts:** Cost allocation is the process of assigning the costs of providing healthcare services to different cost objects such as

✓ Patients
✓ Departments
✓ Procedures

As can be seen from above figure 19.1, medical cost centres are primarily divided into two areas, namely IPD and OPD.

✓ **IPD (Indoor or In-patient department)** is a crucial component of any hospital or medical facility. It is a department that provides medical care and treatment to

patients who require hospitalization. The IPD is responsible for providing round-the-clock care to patients, including monitoring their vital signs, administering medications, and performing medical procedures as required.

- ✓ **OPD (Out-Patient Department**) is a medical facility where patients receive medical attention without being admitted to the hospital. Patients can visit the OPD for consultation, diagnosis, and treatment of various medical conditions. The OPD is usually open during specific hours of the day, and patients can visit at their convenience.

Further, IPD and OPD functions are distributed in following categories as shown in Table 19.1 below:

Table 19.1 Division of medical functions into IPD and OPD.

Medical or Main or Primary functions		
IPD functions		***OPD functions including Emergency***
Surgery	***Medical***	
Neuro surgery	Gastronology	Consultation/speciality
Interventional neurology		
Ortho surgery	Pulmonology	Pharmacy
Cardiac surgery	Nephrology	Preventive Health Package (PHP)
Paediatrics cardiac surgery	Oncology (medical)	Radiology OP
Laps and General surgery	Cardiac (medical)	Physiotherapy
Liver transplant	Paediatrics (medical)	Radiotherapy
Urology surgery	Neurology (medical)	Pathology Lab
Gastroenterology	Internal medicines	Emergency
Minimal access, Metabolic & Bariatric (MAMBS)	Other medicals	Others
Oncology		
ENT		

- **Cost structure:** From Figure 19.1, it is clearly visible that costs incurred on medical intermediary and medical support functions are allocated within medical functions or to say, between IPD and OPD functions. In other words, whatever costs are incurred within medical support functions are allocated to medical intermediary and medical functions. Similarly, whatever costs are incurred within medical intermediary functions are allocated on medical functions. The table given below identifies the major intermediary and support functions in XYZ. Since, these are in the nature of complementary or indirect

activities, it is proper or appropriate to allocate them on the basis of well-defined medical functions. Some of the medical intermediary and support centres are outlined in Table 19.2 given below:

Table 19.2 Aspects of medical intermediary and support functions.

Medical intermediary functions	Medical support functions
Radiology	Quality
Anaesthesia	Medical records room
Nuclear medicine	Food and Beverages
Ambulance services	Human Resource
ICU medical	Finance & Legal services
ICU surgery	Medical & General Administration
IP Pharmacy stores	Commercial
Physiotherapy	General & consumables stores
PICCU/NICCU	Biomedical engineering
Blood bank	Front Office
Bronchoscopy suite	Information Technology (IT)
Operation Theatre	Security
Dietician	Laundry
CSSD department	House-Keeping
Nursing administration	

- **Secondary distribution of costs:** Moving further, there is identification, measurement and evaluation of various costs on the basis of direct and indirect costs so as to undertake comparative speciality-wise P&L analysis. For example, some of the specialities include oncology, plastic surgery, ortho surgery, pulmonology, cardiac surgery and other medicals. Further, allocation of various costs is also done with respect to employees related costs (salaries), utility expenses (power, fuel and water), repairs & maintenance, administration expenses, costs incurred on account of amortisation and depreciation, financing costs, product related costs (selling and advertisement costs) and other interest costs. This is necessary so as to determine the contribution generated, EBITDA and the absolute profit or loss as per the cost statement.

Table 19.3 Allocation of medical support functions on medical intermediary functions.

	Medical Intermediary functions					
	Total cost	***Radiology***	***Anaesthesia***	***CSSD***	***ICU/CCU***	***Dietician***
Medical Support functions						
Human	66,32,945	6,41,337	6,76,096	2,09,823	48,49,239	2,56,450

Resource						
Finance and Legal services	40,38,265	7,37,172	11,69,017	1,71,158	19,00,630	60,288
Housekeeping	1,58,24,756	8,50,450	0	12,35,496	1,34,98,784	2,40,026
IT	1,55,15,213	15,00,159	15,81,465	4,90,800	1,13,42,923	5,99,866
Commercial	1,56,009	75,529	0	51,720	28,760	0

- In XYZ, there is proper identification of cost drivers to each of the cost centres, namely, consumption of ICU care, food and beverages and other consumables is done on the basis of number of occupied bed days. Similarly, CSSD costs is determined on the basis of number of surgeries done. Cost statements are prepared annually showcasing proper division of materials consumed, utilities provided, cost of production, cost of operations, cost of goods sold and margin determined. There are ***cost control charts*** clearly depicting the source of income from operations (surgical procedures and other medical treatments), income from inter-hub transactions, income from other sources like training income, CME sponsorship and interest income on security deposit. From these different incomes, discounts forwarded to patients/customers are deduced to arrive at gross income from operations. Lastly, non-operational income like sales of scrap, parking rental income, deferred tax income is added to gross income so as to arrive at net income which is nothing but, the summation of net sales and non-operational income. The Table 19.4 given below shows some of the major heads of income and expenses and their corresponding allocation criteria:

Table 19.4 Different facets of hospital incomes and expenditures along with their basis of allocation.

GL Codes/Income received	***Basis of allocation***	***Description***
Income from operations like surgeries, consumables, consultations, laboratory services, endoscopy, dental, health check-ups, radiology services, vaccination, dialysis, OT procedures, IVF,	Actual or direct assignment basis Reconciliation basis	For instance, the income is allocated to both medical and medical intermediary functions. Further, the total income under this head is allocated across various medical functions of IPD, OPD and emergency
Income from inter-hub transactions like IHR-radiology, IHR-pathology, IHR- IP consumables		
Other income like CME sponsorship, clinical study, training income, interest income, service fee, educational course fee, income from plasma		

Non-operational income like parking rental income, deferred tax income, sale of scrap, allied services, miscellaneous income		
GL Codes/Expenses incurred	***Basis of allocation***	
Material consumption (IPD or OPD or stores)	Actual basis	For instance, expenses incurred on account of consumables are allocated on actual basis across medical and intermediary functions
Direct expenses like outsourcing-ENT, outsource- dialysis, equipment hiring charges, IHE Emergency Radiology, Visiting consultation fees	Direct assignment Occupied bed days Revenue	
Employees cost like employee discounts, food subsidy, medical allowance, ESOP	Direct assignment Number of employees	
Discounts like corporate discount, policy discount, management discount, contractual discount	Direct assignment	
Utilities provided like water, electricity, fuel	Direct assignment Electricity consumption in kwh Water units consumed	
Administrative expenses like internet, postage, legal & professional charges, vehicle running & maintenance, audit fees, parking fees, printing & stationery, foreign visa expenses	Direct assignment	
Depreciation and amortisation on fixed assets like building, furniture,	Fixed assets allocation cost centre-wise	

medical equipment		
Interest and finance costs like bank charges		
Selling & Advertisement expenses like business promotion expenses, facilitation charges, marketing medical events,	Direct assignment Revenue	
Reconciliation or non-cost items like bad debts, advances written off, deferred tax expenses		
Other expenses like insurance, property tax, record storage charges, lease rentals and gardening expenses	Area of building Direct assignment Number of employees Fixed assets allocation cost centre-wise	
Intermediary functions (allocated to medical functions)		
Radiology	Radiology revenue speciality wise	
Anaesthesia	Anaesthesia revenue speciality wise	
Dietician	Occupied bed days	
CSSD department	Number of surgeries	
Nursing administration	Occupied bed days	
Support functions (allocated to intermediary and medical functions)		
Quality	Occupied bed days	Bed days allocated to different surgery and emergency centres
House-Keeping & Laundry	Floor area	The allocation is done between main functions (IPD and OPD) and intermediary functions.
Medical records room	Occupied bed days	
Information Technology (IT)	Number of employees	
Security	Number of patients	
Human Resource	Number of employees	
Front Office	85:15 sharing ratio whereby 85% is allotted to IP and 15% to OP patients	
Finance & Legal services	Prime cost ratio	
Medical and General administration	85:15 sharing ratio whereby 85% is allotted to IP and 15% to OP patients	
Commercial	Material consumption	

Biomedical Engineering	Occupied bed days	
Food & Beverage	Food & Beverage cost ratio	

Next is to find different expenses occurred in terms of materials consumed in IPD, OPD, pharmacy, direct expenses accruing to salaries with respect to staff deployed, outsourcing activities, expenses on account of power and fuel consumption, administration, depreciation of long-term assets, insurance expenses, interest and finance expenses and other miscellaneous expenses. The organisation also maintains reconciliation statement to account for those incomes and expenses that were not considered in preparing the cost records so as to arrive at net margin. This is explained in Table 18.5 below:

Table 19.5 Reconciliation statement.

S.NO	Particulars	Amount (in Rs.)
	Margin as per cost records	55,94,63,088
Add (+) income not considered in cost records	Unbilled revenue- Sponsorship and educational income	1,09,890
	Parking rental income	8,02,092
	Sale of scrap/newspaper	17,98,670
	Interest income	1,86,90,750
	Allied services income	4,86,000
	Others	7,80,51,998
	Sub Total (A)	9,99,39,401
Less (-) expenses not considered in cost records	Provision for doubtful advance	3,31,238
	Provision for bad debts	-2,40,21,763
	Interest on lease liability	59,72,502
	Advances written off	2,10,644
	Deductions from receivables	3,66,34,429
	Other fees	3,30,448
	Foreign exchange fluctuation expenses	-12,03,480
	Others	-1,06,26,989
	Sub Total (B)	76,27,029
Net margin as per cost records		65,17,75,460

Allocation is done by considering the main, supportive and intermediary functions which involves IPD, OPD, surgery, emergency and other functions like ambulance

services, front office operations, IT services and security personnel deployment. As previously mentioned, this allocation is done as per the defined cost drivers like number of occupied bed days, average patient days, number of surgeries, floor area, material consumption and other well-defined ratios. Further, there is computation of cost per patient in terms of materials consumed, utilities provided to customers.

Table 19.6 Allocation of support and intermediary functions on medical functions (Amount in lakhs).

		Medical cost functions				**Total Amount**
Allocation		**IPD**		**OPD including Emergency**	**Others**	
		Surgery	**Medical**			
		Neurosurgery	***Gastronology***	***Consultation***		
Intermediary functions	**Cost drivers**					
Anaesthesia	Anaesthesia revenue specialty wise	7,375	5,351	0	58,130	70,856
Radiology	Radiology revenue speciality wise	4,614	4,968	0	58,044	67,626
Nursing Administration	Occupied bed days	2,154	2,552	0	47,355	52,061
Operation Theatre	OT utilisation ratio	2,694	115	0	53,013	55,822
Dietician	Occupied bed days	206	244	0	4,533	4,983
CSSD	Number of surgeries	1,062	0	0	17,710	18,772
Support functions						
Commercial	Material Consumed	195	128	1	7,396	7,720
Housekeeping	Floor area	107	195	1,585	56,017	57,904
HR	Number of employees	326	233	350	27,044	27,953
IT		763	545	818	63,259	65,385
Medical record room	Occupied bed days	153	181	0	3,355	3,689
Security	Number of patients	49	83	14,894	26,127	41,152

Preparation of cost statements: Cost statements are prepared after the primary and

secondary distribution of costs. For instance, while allocating the materials consumed between various medical functions of IPD and OPD, cost per patient is calculated by dividing the total amount incurred or materials used in, lets' say, ***neurosurgery*** by total number of patients who have availed the particular IPD activity. Similarly cost per patient is also calculated with regard to power consumed, utilities provided, direct expenses incurred, direct employee costs, other administrative overheads, selling and distribution overheads to determine the overall cost for individual patient in IPD function of neurosurgery. From this, net sales realisation is deducted to arrive at the margin generated per patient in neurosurgery. The same procedure is followed with respect to other IPD functions of surgery and medical and other OPD functions encompassing emergency and OP pharmacy. This is evident from the following table 19.7 given below:

Table 19.7 Proforma for cost statement (Amount in 000s).

	Cardiac surgery (347)		**Neurosurgery (544)**		**Ortho Surgery (890)**	
	Total amount	***Cost per patient***	***Total amount***	***Cost per patient***	***Total amount***	***Cost per patient***
Materials consumed	12,651	36	22,422	41	52,966	60
Utilities like power used	1,960	6	3,097	6	5,215	6
Direct employees' cost	21,245	61	30,456	56	33,375	38
Consumables stores and spares	0	0	0	0	0	0
Quality control expenses	0	0	0	0	0	0
R&D expenses	0	0	0	0	0	0
Repairs & Maintenance	926	3	2,588	5	2,179	2
Other direct expenses	4,358	12	6,853	13	27,541	31
Other	21,569	62	43,572	80	41,405	47
Total	62,710	180	1,08,989	200	1,62,680	183
Increase/decrease in work in progress	**0**	**0**	**0**	**0**	**0**	**0**
Cost of production	62,710	180	1,08,989	200	1,62,680	183
Add/less-administrative overheads, selling & distribution overheads, interest &	**4,759**	**14**	**5,972**	**11**	**3,631**	**4**

financing charges						
Cost of sales (A)	67,469	194	1,14,961	211	1,66,311	187
***Net Sales realisation* (B)**	**57,611**	**166**	**1,32,559**	**244**	**1,42,962**	**161**
Margin (profit/loss) (A-B)	**-9,858**	**-28**	**17,598**	**32**	**-23,350**	**-26**