Hospital Planning and Designing
This book is a part of the course by Jaipur National University, Jaipur. This book contains the course content for Hospital Planning and Designing.

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Index

I.  Content........................................................................................................II

II. List of Figures............................................................................................VI

III. Abbreviations ...........................................................................................VII

IV.  Case Study ...............................................................................................111

V.  Bibliography ..............................................................................................119

VI. Self Assessment Answers ..........................................................................122

Book at a Glance
Chapter VII ................................................................. 81
Staffing the Hospital ......................................................... 81
Aim ............................................................................. 81
Objectives ................................................................... 81
Learning outcome ........................................................... 81
7.1 Introduction ............................................................. 82
7.2 Methods of Staff Selection ........................................... 83
7.2.1 Screening ............................................................ 83
7.2.2 Quality Assessment and Data Extraction ......................... 83
7.3 Medical Staff ............................................................ 83
7.3.1 Nurses ............................................................... 84
7.3.2 Nursing Aspects of Patient Service Areas ................. 84
7.4 Organisation and Administration ................................... 85
7.5 Other Administrative Staff .............................................. 86
7.5.1 The Finance Officer ............................................. 86
7.5.2 Professional and Technical Staff Medico-Social Workers .... 87
7.5.3 Medico Social Worker ......................................... 88
7.5.4 Physiotherapists and Occupational Therapists ............ 88
7.5.5 Pharmacists ........................................................ 88
7.5.6 Radiographers ...................................................... 88
7.5.7 Laboratory Technicians ......................................... 88
7.5.8 Dieticians ............................................................. 89
7.5.9 Catering Officers .................................................. 89
7.5.10 Records Officer (Records Librarian) ......................... 89
7.6 Other Staff .............................................................. 90
Summary ................................................................. 91
References ................................................................. 91
Recommended Reading .................................................. 92
Self Assessment .......................................................... 93

Chapter VIII ................................................................. 95
Evaluating the Quality of Medical Care .................................. 95
Aim ............................................................................. 95
Objectives ................................................................... 95
Learning outcome ........................................................... 95
8.1 Introduction ............................................................. 96
8.2 Definition of Quality .................................................. 96
8.3 Approaches to Assessment: What to Assess? ................... 96
8.4 Sources and Methods of Obtaining Information ............... 98
8.5 Sampling and Selection ............................................. 100
8.6 Measurement Standards ............................................ 101
8.6.1 Empirical Standards ............................................ 101
8.6.2 Normative Standards ........................................... 101
8.6.3 Other Standards ................................................... 102
8.7 Measurement Scales ................................................ 103
8.7.1 Reliability .......................................................... 104
8.7.2 Bias ................................................................. 105
8.7.3 Validity ............................................................. 106
Summary ................................................................. 108
References ................................................................. 108
Recommended Reading .................................................. 108
Self Assessment .......................................................... 109
# List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fig. 1.1</td>
<td>The role of regional health improvement collaborative</td>
<td>3</td>
</tr>
<tr>
<td>Fig. 6.1</td>
<td>Elements of hospital planning project</td>
<td>68</td>
</tr>
<tr>
<td>Fig. 7.1</td>
<td>Hierarchy of medical staff</td>
<td>87</td>
</tr>
</tbody>
</table>
**Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHRQ</td>
<td>Agency for Healthcare Research and Quality</td>
</tr>
<tr>
<td>AIA</td>
<td>American Institute of Architects</td>
</tr>
<tr>
<td>BGSF</td>
<td>Building Gross Square Feet</td>
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<tr>
<td>CVE</td>
<td>Chartered Value Exchange</td>
</tr>
<tr>
<td>DGSF</td>
<td>Departmental Gross Square Feet</td>
</tr>
<tr>
<td>HHS</td>
<td>Health and Human Services</td>
</tr>
<tr>
<td>HVAC</td>
<td>Heating, Ventilation and Air Conditioning</td>
</tr>
<tr>
<td>ICSI</td>
<td>Institute for Clinical Systems Improvement</td>
</tr>
<tr>
<td>LOS</td>
<td>Length of Stay</td>
</tr>
<tr>
<td>MOB</td>
<td>Medical Office Building</td>
</tr>
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<td>NRHI</td>
<td>Network for Regional Healthcare Improvement</td>
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<td>NSF</td>
<td>Net Square Feet</td>
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<td>PBGH</td>
<td>Pacific Business Group of Health</td>
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<td>PPACA</td>
<td>Patient Protection and Affordable Care Act</td>
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<td>PPC</td>
<td>Perfecting Patient Care</td>
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<td>PRHI</td>
<td>Pittsburgh Regional Health Initiative</td>
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<td>QIO</td>
<td>Quality Improvement Organisations</td>
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<td>RHIC</td>
<td>Regional Health Improvement Collaborative</td>
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<tr>
<td>RN</td>
<td>Registered Nurses</td>
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<td>ROI</td>
<td>Return on Investment</td>
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</tbody>
</table>
Chapter I

The Hospital in the Regional Health Service

Aim

The aim of this chapter is to:

- explain roles of regional health improvement
- explicate cost of healthcare services
- explore qualities of physician services

Objectives

The objective of this chapter is to:

- explicate qualities of health plans
- enlist patient experience of care
- define disparities in quality

Learning outcome

At the end of this chapter, you will be able to:

- define sustainability of regional health improvement collaborative
- identify ensuring successful reform of healthcare system
- recognise health care services
1.1 Introduction

One of the greatest challenges facing the nation is how to make the healthcare system more affordable while maintaining and improving its quality. Although, many people believe costs cannot be reduced without rationing care, the evidence is clear that healthcare costs can be significantly reduced while improving quality, such as through prevention of illnesses; avoiding unnecessary and potentially harmful tests, interventions, and medications; eliminating harmful and expensive infections and medication errors; and educating patients with chronic disease about how to manage their conditions and prevent the need for costly hospitalisations. However, there are also many barriers that have prevented these opportunities for reducing costs and improving quality from being realised. For example:

- Patients (and healthcare providers who are trying to advise them) cannot get the data on quality and costs they need to choose the highest-quality, highest-value providers and services
- Doctors, nurses, and other healthcare professionals typically do not have the kind of training or experience needed to redesign care processes in order to improve quality and reduce costs
- Health plans and government programs fail to pay for many high-value services and often financially penalise physicians, hospitals, and other healthcare providers for reducing infections, errors, complications, and unnecessary services
- The fragmented structure of healthcare providers and the lack of efficient methods of sharing information among them makes it difficult to coordinate care for patients
- Health plan benefits are often not structured in ways that enable and encourage consumers to improve their health, adhere to treatment plans, etc.

Clearly, if healthcare reform efforts are to succeed, multi-faceted approaches will be needed to overcome all of these barriers in a coordinated way. These approaches will, by necessity, be different in different parts of the country, the significant differences across the country in the structure of health care and in the specific types of cost and quality problems in each community make it unlikely that any one-size-fits-all national solution will work.

Moreover, since all of the healthcare stakeholders in a community – consumers, physicians, hospitals, health plans, businesses, government, etc., will be affected in significant ways, they all need to be involved in planning and implementing changes. In many communities there is considerable distrust between different stakeholder groups, so a neutral facilitator will likely be needed to help design “win-win” solutions. A growing number of communities are recognising that Regional Health Improvement Collaborative (RHIC) are an ideal mechanism for developing coordinated, multi-stakeholder solutions to their healthcare cost and quality problems. A RHIC does not deliver healthcare services directly or pay for such services; rather, it provides a neutral, trusted mechanism through which the community can plan, facilitate, and coordinate the many different activities required for successful transformation of its healthcare system.

Regional Health Improvement Collaborative has three key characteristics:

- They are non-profit organisations based in a specific geographic region of the country (i.e., a metropolitan region or state)
- They are governed by a multi-stakeholder board composed of healthcare providers (both physicians and hospitals), payers (health insurance plans and government health coverage programs), purchasers of health care (employers, unions, retirement funds, and government), and consumers
- They help the stakeholders in their community identify opportunities for improving healthcare quality and value, and facilitate planning and implementation of strategies for addressing those opportunities.

In 2010, there were more than 40 Regional Health Improvement Collaborative in the country. Many were formed relatively recently, but some have been in existence for 10-15 years, or longer. There has been a dramatic growth in the number of Regional Health Improvement Collaborative in recent years, partly due to the rapidly growing concern about healthcare costs and quality across the country, and partly due to proactive efforts by the Robert Wood Johnson Foundation (through the Aligning Forces for Quality program) and the U.S. Department of Health and Human Services (through the Chartered Value Exchange program) to foster the creation of such entities. The leading Collaborative are members of the Network for Regional Healthcare Improvement (NRHI), which is the national association of Regional Health Improvement Collaborative.
1.2 The Roles Regional Health Improvement Collaborative Play

Regional Health Improvement Collaborative helps their communities to deliver higher quality, more affordable health care in many different ways. Five of the most important roles they are playing across the country are measuring health system performance, facilitating payment and delivery system reform, providing training and assistance to providers, educating consumers, and helping to plan and coordinate the many different health improvement activities in the community.

1.2.1 Performance Measurement

It is a well-known principle that “you can’t manage what you can’t measure.” In the case of healthcare reform, communities need the ability to identify opportunities for reducing costs and improving quality and to monitor whether those opportunities are being successfully addressed. Regional Health Improvement Collaborative can serve as neutral, trusted sources of actionable information about the cost and quality of healthcare services, the health of the population, and/or the extent to which state-of-the-art methods of delivery, payment, and health promotion are being used in their communities. Regional Health Improvement Collaborative across the country are publishing reports on many aspects of the quality and cost of care that are not available to either the public or healthcare providers through any other source. These measurement and reporting initiatives are developed and operated with the active involvement and supervision of the physicians and hospitals whose performance is being measured, so those providers can ensure that the measures are meaningful, and the data are accurate. This, in turn, increases the willingness of healthcare providers to change care processes in order to improve their performance.

1.2.2 Quality of Physician Services

Most Regional Health Improvement Collaborative collects and publicly report data on the quality of care delivered by physician practices. The types of measures reported include both clinical processes of care (e.g., did all diabetic patients receive a test to measure their level of blood sugar?) and care outcomes (e.g., how many diabetic patients had well-controlled blood sugar levels?). Most of these measurement systems rely on health plan claims data, but the Wisconsin Collaborative for Healthcare Quality has pioneered a methodology to obtain clinical data directly from physicians to enable more comprehensive quality measurement. This system does not depend on physicians having electronic health record systems, thereby enabling broad-based participation. Similar approaches are now being used by other Regional Health Improvement Collaborative, such as Minnesota Community Measurement and the Health Improvement Collaborative of Greater Cincinnati.
While Regional Health Improvement Collaborative typically use nationally-endorsed measures where they exist, they have also pioneered the development of new and improved measures where needed. For example, Quality Quest for Health in Illinois uses a multi-factor composite measure to determine the quality of colonoscopies, and it is currently pilot-testing a composite measure of whether all appropriate preventive care has been performed. The California Cooperative Healthcare Reporting Initiative conducts a telephone survey of primary care physician offices to assess after-hours physician availability and access to appropriate emergency and urgent care information.

1.2.3 Quality of Hospital Services

A number of Regional Health Improvement Collaborative also report on the quality of care delivered in the hospitals in their community. Here again, the measures range from processes (e.g., how quickly heart attack patients were treated?) to outcomes (e.g., infection rates and mortality rates). For example, the Iowa Healthcare Collaborative issues a detailed report with extensive measures of the quality and safety of patient care in hospitals in Iowa, and the Greater Detroit Area Health Council issues reports on a wide range of measures of the quality and safety of patient care in hospitals in south-eastern Michigan. The Maine Health Management Coalition gives blue ribbons to hospitals with the highest performance on the quality of patient care.

1.2.4 Quality of Health Plans

Many Regional Health Improvement Collaborative also report on the quality of care delivered to patients who have health insurance from a specific health plan. For example, the Puget Sound Health Alliance issues an extensive analysis of health plan quality and services, rating health plans on over three dozen different items.

1.2.5 Patient Experience of Care

In addition to clinical quality measures, a growing number of Regional Health Improvement Collaborative is also collecting and reporting information on patients’ experiences with healthcare services. For example, since 2005, Massachusetts Health Quality Partners has been collecting and reporting results from its state-wide Patients’ Experiences Survey on patients’ experiences with their primary care providers, making Massachusetts the first state in the nation to report about patient care experiences publicly, down to the physician practice site level.

1.2.6 Cost of Healthcare Services

Some Regional Health Improvement Collaborative have also begun developing measures of the cost of healthcare services, such as the prices charged for individual services, the extent to which the most cost-effective services are used, and the total number of services used to address a particular healthcare issue. For example, Minnesota Community Measurement reports on the costs at different healthcare providers for procedures ranging from colonoscopies to labour and delivery. Quality Quest for Health of Illinois reports on the rate at which both primary care physicians and specialists prescribe generic drugs for their patients.

1.2.7 Disparities in Quality

In addition to reporting on the quality of care for all patients, some Regional Health Improvement Collaborative are also reporting whether there are differences in the quality of care for different types of patients. For example, the Puget Sound Health Alliance compiles quality measures separately for patients with commercial insurance and patients whose health care is paid by the state Medicaid program and the Alliance highlights areas where there are significant differences. Better Health Greater Cleveland also separately compiles quality measures for patients who are uninsured.

It is important to recognise that not only is Regional Health Improvement Collaborative collecting and publicly reporting an extensive array of quality measures, they are also actively using those measures to encourage improvements in the quality of health care in their communities. Indeed, in many cases, the measures have been developed specifically to support a local quality improvement initiative, rather than the other way around. For example, Minnesota Community Measurement is measuring the remission rate from depression as part of a major, successful community initiative to improve the treatment of individuals with depression.
1.3 Payment and Delivery System Reform

Although performance measurement efforts have made a positive impact on quality, only so much can be done when healthcare payment systems penalise improvement and the fragmentation of providers impedes coordination. Significant changes in the way health care is paid for, the way providers are organised, and the way consumer benefits are structured will be needed to achieve greater value in health care. To be successful, these changes must be made in a coordinated way. Regional Health Improvement Collaborative can serve as a neutral planning and problem solving forum where win-win multi-payer, multi-provider payment and delivery reforms can be designed.

In a number of cases, the performance measures collected and reported by Regional Health Improvement Collaborative are being used by all employers and health plans in the community to reward providers that deliver higher-quality care and to encourage patients to use higher-quality providers. Using a common set of measures developed by the Regional Health Improvement Collaborative reduces administrative costs for both plans and providers. For example, the Integrated Healthcare Association in California assembles quality information to support the largest pay-for-performance (P4P) system in the country, involving 229 physician organisations and 35,000 physicians.

Regional Health Improvement Collaborative were among the first healthcare leaders in the country to recognise that more fundamental payment reforms were needed than pay for performance systems. In 2007 and 2008, the Network for Regional Healthcare Improvement convened two national Payment Reform Summits that brought together national thought leaders and regional stakeholders and made detailed recommendations on the types of reforms needed to payment systems and what was needed to implement these payment reforms successfully in regions across the country. Building on NRHI’s national summits, a number of Regional Health Improvement Collaborative have held regional Payment Reform Summits to build consensus in their communities on the types of payment reforms which should be implemented by all payers, so that physicians and other healthcare providers are not forced to deal with multiple, disparate new payment structures. For example, Health Insight and its Nevada Partnership for Value-Driven Health Care held a state-wide Payment Reform Summit in April, 2010 that brought together 140 individuals from across the state to develop recommendations for payment reforms to support medical homes for chronic disease patients and to support more efficient, successful care of major acute episodes.

Many Collaborative are also working with all of the stakeholders in their communities to implement multi-payer payment reforms. For example, the Institute for Clinical Systems Improvement reached agreement among all of the major health plans in Minnesota on changes in payment to both primary care practices and specialists to support better care for patients with depression; this change has resulted in significant improvements in remission rates. The Puget Sound Health Alliance is co-sponsoring a demonstration project which will give participating primary care practices in Washington State both greater resources and greater accountability for helping patients avoid unnecessary emergency room visits and hospitalisations.

As more communities begin efforts to develop and implement payment changes, the need for the performance measurement capabilities of Regional Health Improvement Collaborative described earlier will grow. For example, in order to define outcome targets and strategies for reaching them, healthcare providers will need information about the current costs and outcomes associated with their patients. The data that many Collaborative are already collecting can serve as a trusted source of information that both providers and payers can use to design and implement new payment models. Finally, no matter how much effort is put into designing new payment systems and delivery system reforms, implementation problems will inevitably arise. A Regional Health Improvement Collaborative that is supported by all stakeholders and perceived by them as neutral can provide a critical mediation mechanism for resolving problems quickly and effectively.

1.4 Training and Assistance in Performance Improvement

Although measurement and reporting and changes in payment systems and organisational structures are necessary to support higher-value healthcare delivery, improvements in quality, efficiency, and patient satisfaction are actually achieved through the actions of frontline healthcare workers. Regional Health Improvement Collaborative can operate programs which enable physicians, nurses, hospital administrators, and other healthcare professionals to obtain affordable training, coaching, and technical assistance on ways to analyse problems in care delivery and ways to design and successfully implement solutions. For example, the Pittsburgh Regional Health Initiative (PRHI)
pioneered the adaptation of Lean manufacturing tools from the Toyota Production System so that they could be successfully used to improve quality and reduce costs in health care. PRHI’s “Perfecting Patient CareSM (PPC)” method has been used by hospitals, physicians, nursing homes, and other providers all over the country to achieve dramatic reductions in hospital-acquired infections, preventable hospital readmissions, pre-term deliveries of babies, and many other areas that benefit patients and reduce healthcare costs.

The Institute for Clinical Systems Improvement in Minnesota has developed and maintains an extensive array of guidelines for healthcare services based on the best evidence available, and then it works to help healthcare providers implement the guidelines and make other improvements in their own organisations.

Regional Health Improvement Collaborative can also help providers, either individually or in groups, to better organise and deliver health care in order to improve quality and efficiency. For example, several Collaborative, including Health Insight in Nevada and Utah, the Louisiana Health Care Quality Forum, and Quality Counts in Maine, are helping physician practices become patient-centred medical homes, implement electronic health records, and more effectively coordinate care with other providers.

1.5 Patient Education on Engagement

Even the best-performing healthcare providers can only do so much to improve quality and reduce costs without strong support and engagement from patients. Regional Health Improvement Collaborative can help citizens in their communities to:

• Understand and actively engage in activities that will maintain and improve their health
• Choose providers and services based on their cost and quality
• Support the delivery of higher quality, more coordinated care

For example, the Oregon Health Care Quality Corporation has developed patient-friendly materials to help people select quality healthcare providers and work with them to develop appropriate treatment plans. Minnesota Community Measurement has established “The D5: 5 Goals for Living with Diabetes” to make it easier for people with diabetes to manage their condition and to find the healthcare providers who can most effectively help them.

1.6 Strategic Planning and Coordination

Finally, in addition to the previous four roles, an increasingly important role for Regional Health Improvement Collaborative will likely be to provide the critical planning, coordinating, and support roles that will ensure these many inter-related changes happen successfully and in a coordinated way. The structure of a Regional Health Improvement Collaborative is designed specifically to help build consensus among all healthcare stakeholders on the changes needed in their community, and then to provide support and coordinate the implementation of those changes. The Structure of Regional Health Improvement Collaborative to be successful, the roles described earlier need to be performed with the full support and trust of all of the key stakeholders in health care:

• Healthcare providers, i.e., physicians, medical practices, hospitals, and health systems
• Healthcare payers, i.e., health insurance plans and public programs such as Medicaid
• Healthcare purchasers, i.e., employers who purchase health insurance for employees
• Healthcare consumers and organisations representing consumer interests

Regional Health Improvement Collaborative ensures the support and trust of these stakeholders by actively engaging them in the governance of the Collaborative organisation, as well as in the design and operation of individual programs. Indeed, a key difference between Regional Health Improvement Collaborative and organisations such as Medicare Quality Improvement Organisations (QIOs), business health coalitions, regional health information exchanges, consumer health coalitions, medical societies, hospital associations, and others that work on quality improvement is that the Collaborative are governed by individuals and organisations from all four of the key stakeholder groups. This is why Collaborative are referred to as “multi-stakeholder” rather than merely “multi-member” organisations. Other differences between Regional Health Improvement Collaborative and other organisations is that Collaborative establish their direction through consensus among their members and implement their efforts through voluntary
cooperation of the members, rather than through government mandates, financial rewards or penalties, etc. Beyond this, however, no two Regional Health Improvement Collaboratives are structured exactly alike. Collaborative are very diverse in terms of their goals, structure, and programs because of the differences in the number, structure, and capabilities of the purchasers, payers, providers, and other community organisations in their local regions.

- Some Regional Health Improvement Collaborative had their origins in efforts among healthcare providers to work collaboratively to improve the quality of care they were delivering, and then they evolved over time to involve a broader array of stakeholders. For example, one of the first Regional Health Improvement Collaborative, the Institute for Clinical Systems Improvement (ICSI) in Minnesota, was established in 1993 by two healthcare systems (Mayo Clinic and Park Nicollet Health Services) and an HMO (HealthPartners); today, the majority of the members of the Board of Directors are physicians or staff of medical groups, but there are also representatives of health plans and consumers on the Board.

- Other Regional Health Improvement Collaborative were initially formed through the efforts of health plans or businesses in the community seeking ways to control increasing healthcare costs or to address concerns about healthcare quality in the community. For example, both the California Cooperative Healthcare Reporting Initiative and the California Quality Collaborative are multi-stakeholder Regional Health Improvement Collaborative, but they were formed through the leadership of the Pacific Business Group of Health (PBGH), a major business health coalition based in California, and they continue to be housed at PBGH. In some cases, the Regional Health Improvement Collaborative also serves as the community’s health purchasing coalition. For example, both the Maine Health Management Coalition and the Puget Sound Health Alliance are multi-stakeholder collaborative, but their policy requires that a majority of the members of their Boards of Directors be healthcare purchasers.

- Still other regional collaborative were formed from the beginning as multi stake holder efforts. For example, the Pittsburgh Regional Health Initiative (PRHI) was formed in 1997 as a community organisation with representation from a wide range of groups that were interested in advancing healthcare quality—hospitals and physicians, health insurance plans, major employers, consumers, academics, foundations, local government and civic leaders.

Some regions have two or more Regional Health Improvement Collaborative. In these communities, one of the organisations typically takes responsibility for collecting and reporting on various measures of healthcare quality and/or cost, while another carries out initiatives designed to help healthcare providers improve performance on those measures. As a result of this diversity, communities which do not have a Regional Health Improvement Collaborative but want to form one have a variety of models from which to choose. Since a common element of all Collaborative is their multi-stakeholder structure, the most important first step in establishing a Collaborative is for leaders from each stakeholder group to seek out leaders from other stakeholder groups and reach agreement that the interests of their communities would be served best by having all stakeholders working collaboratively toward improving healthcare quality and reducing costs.

### 1.7 Sustainability of Regional Health Improvement Collaborative

All of the work done by Regional Health Improvement Collaborative is challenging, but one of the most challenging tasks Collaborative faces is obtaining adequate funding to support their work. Collaborative typically obtain their funding from three types of sources:

- Membership “dues”: Most Regional Health Improvement Collaborative relies on annual financial contributions from the healthcare stakeholders in the community. Unlike dues payments made to many professional associations, however, these payments will usually be treated as tax-deductible contributions because of the charitable tax status of the Collaborative. These types of payments are critical because they provide flexible funding to cover the operating costs of the Collaborative (rather than being restricted to particular programs).

- Grants: In addition to membership dues, most Regional Health Improvement Collaborative relies on grants from foundations and government agencies to support their programs. In some cases, Collaborative may receive unrestricted operating grants from foundations which can be used to fund general operations, particularly in the early years of their existence, but more typically, foundation grants will be restricted to use for specific projects and time-limited activities.
• Fees for services: Some Regional Health Improvement Collaborative provides specific services to healthcare providers or others for which they charge a fee. For example, some Collaborative provide consulting services or coaching to healthcare providers to help them improve their quality of care, or offer courses in quality improvement for the employees of healthcare providers.

Despite the key role that Regional Health Improvement Collaborative can play in ensuring the success of federal healthcare reforms in local communities, there is currently no federal funding program that provides support for the administrative operations of Regional Health Improvement Collaborative. Although the Department of Health and Human Services (HHS) and the Agency for Healthcare Research and Quality (AHRQ) promoted the creation of multi-stakeholder Collaborative through the Chartered Value Exchange (CVE) program, they do not provide any funding for general operating support of Regional Health Improvement Collaborative. The Beacon Community Cooperative Agreement Program, which was established through the Office of the National Coordinator for Health Information Technology at HHS, has provided significant funding to a number of communities for multi-stakeholder healthcare improvement activities, but since the funding came through the 2009 American Recovery and Reinvestment Act, it is explicitly a time-limited program.

In the years ahead, it will be critical for Regional Health Improvement Collaborative to have adequate resources both to maintain their current programs and to address the exponentially increasing demands that will be placed on them by healthcare reform efforts. Although programme-specific funding is desirable, unrestricted funding is essential to support the core operations of the collaborative and to provide the flexibility to pursue new opportunities in innovative ways. In addition, if collaborative are to remain truly multi-stakeholder, community-based organisations, those resources will need to come from all stakeholders in their communities, as well as from state and federal government sources.

1.8 Ensuring Successful Reform of Healthcare System

The federal Patient Protection and Affordable Care Act (PPACA) of 2010 will address one of the major barriers healthcare providers have faced in delivering high-quality, coordinated care: the lack of healthcare coverage for millions of Americans. It also provides the ability for the Medicare and Medicaid programs to pay providers in ways that support higher value instead of higher volume of care. However, because health care is actually delivered by physicians, hospitals, and other healthcare providers, not by the federal government, and because most patients will continue to have their healthcare services paid for by private health insurance, the nation’s ability to achieve higher-quality, more affordable health care will still depend on the ability of individual communities to bring all of the stakeholders together to forge feasible solutions. In other words, the passage of the Patient Protection and Affordable Care Act means that Regional Health Improvement Collaborative will be needed more than ever.

Although, state governments will be playing an increasingly central role in healthcare reform in the future, partly as a result of the programs in the PPACA, they will not supplant the roles of Regional Health Improvement Collaborative. While the regulatory powers and financial resources of state governments give them some unique strengths, such as the ability to mandate the submission of quality and cost data by providers and payers and the ability to provide anti-trust safe harbours to help establish multi-payer payment reforms and help independent providers coordinate their services, it is difficult for state governments to support multi-year healthcare transformation efforts through changes in state administrations and changes in fiscal priorities, and it is difficult for them to balance regulatory enforcement powers with programs to facilitate provider improvement. In contrast, the independence and stakeholder governance of Regional Health Improvement Collaborative provides greater ability to support providers through multi-year transformation efforts and to do so in a way that can be adapted to the unique needs of individual geographic regions. Consequently, the greatest success in healthcare transformation will likely come from strong partnerships between state governments and Regional Health Improvement Collaborative.

The greatest success in healthcare reform will be achieved if every community in the nation focuses on addressing the most important quality issues in that community, with support from both consumers and a broad range of healthcare providers, with participation by all payers, and with effective local mechanisms for monitoring implementation and resolving problems. Regional Health Improvement Collaborative is an essential mechanism for accomplishing this, and consequently, supporting them should be a national priority.
Summary

- One of the greatest challenges facing the nation is how to make the American healthcare system more affordable while maintaining and improving its quality.
- Patients (and healthcare providers who are trying to advise them) cannot get the data on quality and costs they need to choose the highest-quality, highest-value providers and services.
- Health plans and government programs fail to pay for many high-value services and often financially penalise physicians, hospitals, and other healthcare providers for reducing infections, errors, complications, and unnecessary services.
- There has been a dramatic growth in the number of Regional Health Improvement Collaborative in recent years, partly due to the rapidly growing concern about healthcare costs and quality.
- Regional Health Improvement Collaborative helps their communities to deliver higher quality, more affordable health care in many different ways.
- Many Collaborative are also working with all of the stakeholders in their communities to implement multi-payer payment reforms.
- Collaborative are very diverse in terms of their goals, structure, and programs because of the differences in the number, structure, and capabilities of the purchasers, payers, providers, and other community organisations in their local regions.
- The Institute for Clinical Systems Improvement in Minnesota has developed and maintains an extensive array of guidelines for healthcare services based on the best evidence available, and then it works to help healthcare providers implement the guidelines and make other improvements in their own organisations.

References


Recommended Reading

Self Assessment

1. One of the greatest challenges facing the nation is how to make the healthcare system more affordable while maintaining and improving its _______.
   a. quantity
   b. quality
   c. range
   d. level

2. Regional Health Improvement Collaborative has ______ key characteristics.
   a. two
   b. three
   c. four
   d. five

3. The types of measures reported include both clinical ________ of care and care outcomes.
   a. processes
   b. resources
   c. implementation
   d. income

4. Collaborative and other organisations is that Collaborative establish their direction through consensus among their ____________.
   a. team
   b. department
   c. managers
   d. members

5. Some regions have _____ or more Regional Health Improvement Collaboratives.
   a. two
   b. three
   c. four
   d. one

6. Even the best-performing healthcare providers can only do so much to improve quality and ______ costs.
   a. increase
   b. improve
   c. reduce
   d. meet

7. Most Regional Health Improvement Collaborative relies on ________ financial contributions from the healthcare stakeholders in the community.
   a. quarter
   b. annual
   c. half year
   d. full
8. Which of the following statement is not one of the roles of regional health improvement service Collaborative?
   a. Performance measurement
   b. Patient education and engagement
   c. Delivery of care
   d. Cost of health care services

9. Common element of all collaborative is their __________ structure.
   a. multi-stakeholder
   b. multi-stock holder
   c. single stakeholder
   d. single stock holder

10. What is QIO?
    a. Quality Improvement Organisations
    b. Quality Interactive Organiser
    c. Quantitative Improvement Organisations
    d. Quantitative Interactive Organisations
Chapter II
Hospital Cost and Utilisation

Aim
The aim of this chapter is to:

- explain the general hospital
- explicate cost of hospital services
- explore turnover interval

Objectives
The objective of this chapter is to:

- enlist availability of hospital beds
- explicate method of payment of hospital services
- define hospital utilisation and statistics

Learning outcome
At the end of this chapter, you will be able to:

- define medical customs and social patterns
- understand supply of physicians
- recognise the existence of proprietary hospitals
2.1 Introduction: The General Hospital

Hospitals may be divided, very broadly, into two classes: special and general. Special hospitals deal exclusively with specific organs or systems of the body (e.g., eye; ear, nose, and throat; central nervous system; orthopaedics), certain conditions (e.g., tuberculosis, accidents, infectious diseases, cancer), or certain groups of the population (e.g., children). General hospitals, which contain a range of specialist services, aim to provide treatment for men, women, and children suffering from any form of illness except highly infectious and dangerous conditions, such as smallpox.

The main disadvantage of the special hospital lies in its isolation from the general body of medicine. Patients do not always conveniently restrict their disabilities to those organs with which the special hospital deals. Moreover, the members of the staff of a special hospital tend very naturally to concentrate upon their own particular specialty. Historically, special hospitals have played an important part in the development of medicine. By reason of the high concentration of clinical material in them and their specialised staff, they have been natural centres of research and of postgraduate medical education. Their existence is still justified in major metropolitan areas of developed countries.

For the provision of medical care to a community, the general hospital is a more useful institution. In principle, a developing country should concentrate upon general rather than special hospitals, but there may be one or two exceptions. One of these is the children’s hospital, which is really a general hospital devoted to a limited age group and which needs practically all the supporting services of a general hospital with a few more added. If a country has an unduly high incidence of diseases of childhood that seem unlikely to be brought under control for many years, there may well be a case for establishing children’s hospitals. The same may be true for countries in which there is a very high incidence of some endemic disease, e.g., tuberculosis, with a great number of severe cases calling for institutional treatment, which, without special provision, would swamp the resources of the general hospital. If special institutions are built for such purposes, however, great care should be taken in their siting and planning so that when, in years to come, the need for them has passed, they can readily be adapted to other types of case.

Various kinds of general hospital (the regional hospital, the district hospital, and the rural hospital) have been defined. The district hospital is the basic unit in a hospital system, and it is this type of hospital with which this book mainly deals. If too big, the hospital tends to lose the human touch and to become a somewhat soul-less and impersonal machine. At the lower end of the scale, the hospital should not contain fewer than 200 beds or it becomes difficult, or impossible, to provide a differentiated service. A hospital of 500 beds or more enables adequate departments of general medicine, general surgery, paediatrics, obstetrics, and psychiatry to be set up, together with a full range of the ordinary specialities, the several departments being large enough to justify the appointment of full-time, or nearly full-time, specialists to the staff. These should be men and women who will make the work of the district hospital their chief interest. The smaller the general hospital, the more difficult this is to accomplish if a desirable range of specialisation within general medicine and general surgery is to be provided.

In addition to its conventional role, the modern general hospital should make in-patient provision for mental patients, the chronically ill (for diagnosis, assessment, and short-term treatment), and patients suffering from the common acute specific fevers. With the exception of the obstetric, paediatric, isolation, and psychiatric units, which call for specialised planning, all other in-patient accommodation should be designed according to a standard pattern, as this makes for flexibility in use, increases the utilisation rate, and enables the hospital to cope better with seasonal fluctuations in the incidence of disease.

The isolation block should not only admit from the outside patients suffering from the acute specific fevers, but should also serve for the segregation of patients from within the hospital who develop infectious conditions of a serious nature (e.g., staphylococcal infections). The cubicles should be designed somewhat on the large side so that, if need be, two patients suffering from the same condition (many will be children) can be nursed together. The in-patient units for psychiatric and for chronically ill patients will be dealt with more fully in the sections on these subjects.
As stated earlier, the in-patient treatment of the sick is only one of the functions of a modern hospital. At a very early stage in the planning of a hospital service, consideration needs to be given to the details of the administrative machinery required (and this will vary from country to country) to make the hospital truly a centre of preventive as well as curative medicine, including ambulatory and domiciliary treatment. This entails bringing “outside” doctors into close association with the hospital. The special diagnostic departments of the hospital (X-ray, pathology, and, possibly, electrocardiography) can be made easily available to domiciliary patients, and local doctors can be offered part-time clinical assistant appointments in such parts of the hospital as the casualty and out-patient departments. They can also, for instance, be invited to use the hospital’s medical library and the staff common room.

All these measures will help to maintain a good standard of medical practice and encourage doctors to treat as many of their patients at home as is possible. To enable them to do this effectively, the senior staff of the hospital must be prepared to support them by meeting them in consultation, when necessary, in the homes of their patients.

Liaison will also need to be established with the local preventive health services, possibly by an interchange of staff with the health visitors, who should be encouraged to attend certain hospital out-patient clinics (e.g., those for diabetics) to see that the physician’s advice is being followed at home and with the home-nursing and domestic help services of the area.

A good amount of building space as well as administration will be needed if a hospital is to fulfil the above requirements. Many of the services will be in, or associated with, the out-patient department. For instance, it may be thought desirable for the medical officer of health or the head of the department of preventive medicine to have an office in the hospital. He is the best possible liaison with the environmental and preventive services of the town, and would also be available to advise hospital staff on matters of hygiene and outbreaks of infection. His quarters could advantageously be placed near the medico-social service in the out-patient department. It may also be found desirable to provide accommodation in the out-patient department for such functions as protective inoculations and miniature mass radiography.

A consultant in occupational health is a great asset to a large hospital. His work is mostly of a preventive nature, in factories and workshops in the area; and he needs room for his department, a place to house his demonstration exhibits, and facilities for teaching.

### 2.2 Cost of Hospital Services

One bed in an elaborate hospital, with all the accompanying ancillary facilities, can cost as much as some people earn in a whole lifetime. And the cost of running a hospital bed per year amounts, in many countries, to several times the average man’s annual income. Hospitals can, therefore, easily absorb an undue proportion of a nation’s health budget, leaving too little for the critical preventive services that can do so much to reduce the need for hospital care in the future. To keep the hospital bill in check and to make the most economical use of this expensive health facility, three principles should be observed.

First, the building must not be more elaborate than is necessary to perform the function allotted to the particular hospital in the medical care system. Second, only those patients should be admitted whose needs cannot be met by cheaper means. Third, none of the time that the patient spends in the hospital should be wasted. Much is said about hospital construction in later chapters. There are, of course, economies in standardisation and, where practicable, these economies should be sought. A hospital should, moreover, be built realistically in terms of the staff that will actually be available to work in it. It is far too common to find hospitals built on the assumption that particular grades of staff will be available and then, when they are opened, to have whole wards and clinics remain unused or under-used because the necessary staff cannot be recruited or the money cannot be found to pay them. Plans that are suitable for a wealthy country with a large number of trained personnel are quite unsuitable for a country with limited money and staff. Financial planning and staff training programmes must be in line with plans for hospital construction.
Once a hospital has been built and the staffs have been engaged, it is likely that its beds will be fully used. Within limits, the supply of hospital beds can determine the demand for them. There is always a danger of patient’s being admitted to hospital that do not need such an expensive form of medical care. Patients should not be admitted whose needs can be met more cheaply and more satisfactorily in another type of institution or by making extensive use of ambulatory and domiciliary health facilities. Properly developed community health facilities are essential to prevent waste of expensive hospital in-patient resources. Thus, as previously suggested, a realistic survey of community health needs must be undertaken before the size of a hospital to serve a given community is decided upon. There is an advantage in making the hospital staff itself responsible for determining which patients need to be admitted.

The proper use of the hospital can be encouraged by close contacts between the hospital staff and those working in the health units outside the hospital. It can also be furthered by wider social and, particularly, housing policies, which make it as easy as possible for relatives to play their full part in looking after patients in their own homes, with the necessary professional help and support. Used intelligently, hospital costs can be a valuable guide to hospital management. Costing data, like other statistical data, can be collected only by expenditure of money; and this should be undertaken only if the data are going to be used as a tool of management. The first step is to attempt to separate in-patient costs from out-patient costs, and a second is to attempt to separate services provided for the staff from services provided for the patients. Units of service need to be developed for such departments as kitchens, laundries, boilers, and pathology and X-ray departments so that valuable comparisons can be made between hospitals on a cost per unit of service basis.

Studies have shown that the cost of services per in-patient day or week varies greatly both among countries and within countries. Some of these variations are unintentional. Some hospitals are unduly expensive because they are under-utilised, whereas others are unduly cheap because they cannot recruit the staff they need to fill their staff vacancies. Other variations are deliberate and justified. Some patients may not need as much attention from the specialised departments of the hospital as others. Further variations may be due to chance or to history.

It is the purpose of a costing system to raise the questions that need more investigation. Conclusions about the efficiency of a hospital cannot be drawn from crude comparisons of the cost per in-patient day. Account has to be taken of the types of patient who have been cared for, and whether they were discharged to their homes or to low-cost convalescent or other residential facilities for the later stages of their care. Even if two hospitals are being compared whose cases and opportunities for arranging further care are similar, it is by no means certain that the hospital that costs less per day is doing the more economical job.

Consideration has to be given to the effectiveness of the treatment given. Did any of the patients have to be readmitted to this hospital or another? Where case loads and effectiveness of treatment are similar, what matters more than the cost per day is the cost per patient treated; in other words, more active treatment, though it costs more per day, may lead to a proportionately greater reduction in length of stay. Thus, an apparently costly hospital may, in fact, be more efficient and more economical.

In a recent study, when the cost of a hospital bed-day in six countries was expressed in terms of dollars, extremely wide variations were apparent. A general hospital bed cost one and a half dollars per bed-day in Ceylon, about 5 dollars in Chile, around 10 dollars in Czechoslovakia, Israel, and Sweden, and over 35 dollars in the USA. It was therefore remarkable to find that, when the expenditure per day on a general hospital bed was related to total national expenditure per day and per head, the variation was comparatively narrow. A hospital bed cost nearly three times the personal expenditure per head in Sweden, over three times in Chile, four times in Ceylon and Israel, and five times in the USA. The range for mental hospitals, though also varying enormously when local costs were translated into a common currency, was even narrower when related to daily expenditure per head.

In all cases the cost of the mental hospital bed varied from about the same as the national expenditure per head to less than twice the national expenditure per head. In-patient care seemed to consume just under half of all the expenditure on health services. In Ceylon the percentage was under 40%; in the USA and Sweden, it was higher about 45%. Most of the current hospital expenditure was for staff. From the patient’s point of view, admission to hospital can be a financial disaster. Serious illness has the double effect of making the patients incur expenditure for medical services and, at the same time, markedly reducing their ability to finance them (except, of course, for patients with considerable investment income, pensions, etc).
In general, a hospitalised patient costs much more than a patient who does not need to go into hospital; and, as shown above, the cost of a day in hospital may be several times the patient’s normal daily income while at work. It is for this reason plus the fact that the need for hospital care is greater among the aged than among the young that most, if not all, countries of the world have developed some means of enabling some, or all, patients to pay indirectly. Such arrangements for indirect payment (including government services, compulsory and voluntary insurance schemes, provisions by employers, charities, and others) have tended to be developed on a larger scale for hospital services than for other medical services. It has been shown that over 90% of hospital costs are paid for by schemes of indirect payment in Ceylon and Israel; in Sweden, over 98% are paid for in this way; in the USA, about 80% of hospital costs are paid for indirectly. In countries in which compulsory insurance schemes exist, the actual cost per bed-day (including all expenditures) must obviously be calculated accurately. This entails government control of hospital accounting, whether the institutions are public or private.

Systems of indirect payment involve real costs in collecting the money to pay the hospital bills—an expense that does not arise when the patient pays directly. These costs are lowest when the collecting mechanism is attached to an existing system of collecting money, such as taxation or compulsory social security insurance. Voluntary insurance (particularly when there is a considerable choice of schemes) tends to cost more than compulsory insurance. In collective schemes operated by employers in the USA, the cost of operating the insurance is about 10%; in individual schemes in the same country, about half of the premiums go to administration and profit.

2.2.1 Hospital Utilisation and Statistics

The term “hospital utilisation” denotes the manner in which a certain community makes use of its hospital resources. Since the modern concept of a hospital includes services to the community on an out-patient as well as an in-patient basis, the role played by the hospital in the community can be fully studied only by taking into consideration all aspects of hospital service, including in-patient, ambulatory, and domiciliary care, preventive medicine, and health education. This concept is fairly new; however, and no indices have been developed to measure the various components of hospital utilisation in its widest sense. The best known indices apply to in-patient care and, to a certain extent, to out-patient care within the hospital. In the present section, therefore, hospital utilisation will be considered in its narrowest sense, attention being centered mainly on in-patient care.

2.3 Indices of Measurement of Hospital Utilisation

Various indices are commonly used in the assessment of hospital utilisation, but no one of them alone can give a full picture of the utilisation pattern in a certain area or country. Furthermore, they are all affected by a multiplicity of factors, and their use must therefore take into consideration the particular circumstances of the area concerned. The different indices may be calculated on a gross or a specific basis. A gross index is an index expressing the over-all average utilisation for all types of hospital in the area. The specific index, on the other hand, expresses the utilisation of a certain type of hospital or of a certain service within the hospital. The various indices may be classified under two main headings:

- Those relating to data concerning the hospital, such as the number of beds, bed-days and admissions, discharges, and deaths
- Those relating to the population at risk. In this section, the following definitions will be used.

2.3.1 Hospital Beds

A hospital bed is one regularly maintained and staffed for the accommodation and full-time care of a succession of in-patients, and is situated in wards or areas of the hospital in which continuous medical care for in-patients is provided. The total number of such beds constitutes the normally available bed complement of the hospital. This bed complement excludes the cots for normal, healthy, newborn babies in maternity wards but includes incubators and bassinets for premature babies.

2.3.2 Admissions

Admissions refer to the number per year of acceptances by a hospital of a patient who is to receive medical care while in residence therein and who is expected to remain for one or more nights. Normal, healthy, newborn babies should not be counted as in-patient admissions, but babies requiring special care should be included among the admissions.
2.3.3 Discharges and Deaths

The annual number of discharges includes the number of patients who have left the hospital (cured, improved, etc.), the number who have transferred to another health or social institution, and the number who have died.

2.3.4 Bed-Days or Patient-Days

“Bed-day” or “patient-day” is the unit of measure denoting the service rendered to one in-patient in the hospital census between one day and the succeeding one. Sometimes the day of admission and the day of discharge are counted as one day. In other cases, a full day is counted only when admission is before mid-day or discharge is after midday. Thus, the data given should be the annual total of the daily census of occupied in-patient beds throughout the reporting year. Patient-days should not include data for healthy, newborn infants.

In this section, the bed complement will be designated “B”; the annual number of admissions will be A, which can be replaced by the sum of discharges and deaths (D+d); and the annual number of hospitalised patient days will be “H; the daily average of beds occupied (N) will be H/365.”

2.4 Indices Relating to the Hospital

The indices relating to the hospital are as follows:

2.4.1 Average Length of Stay (L)

This index indicates the average period in hospital (in days) per patient admitted. Ideally, it should be calculated as follows: cumulative number of bed-days of all discharged patients (including those dying in hospital) during one year divided by the number of discharged and dead patients. This calculation takes into account the bed-days of patients in the year (or years) previous to the one under consideration, but disregards the bed-days of patients who were still in hospital at the end of the year. It may be said, therefore, that the result of this method of calculation represents the true average length of stay per patient and it is recommended that this method be used, at least in long-stay hospitals. However, various countries or various institutions obtain the figure for the average length of stay in hospital in different ways. The following are some of the formulas currently in use:

- Total number of bed-days in the year divided by the number of admissions in the same year: \( L = \frac{H}{A} \)
- Total number of bed-days in the year divided by the number of discharges and deaths in the same year: \( L = \frac{H}{(D+d)} \)
- Total number of bed-days in the year divided by half the sum of admissions and discharges (including deaths) in the same year:

\[
L = \frac{H}{X\sum_{i=1}^{k} (A+D+d)_{i}} = 2X \frac{A+D+d}{X}
\]

It will be noted that these three methods result in a figure representing the average length of stay per patient per year, which is not the same as the average period of stay per patient admitted. In hospitals in which the patient’s stay is usually short, the two figures are practically identical, and either may be used in hospitals in which patients stay for relatively long periods, or in cases in which changes in the bed complement have occurred during the year, the average length of stay is more correctly calculated by the first method described above.

A new method of assessing the length of stay in hospital derives from the distribution of patients by number of days spent from the day of admission. This can be done by counting, on a survey day taken at random, the number of days all the patients have spent since their admission. It is possible to obtain a graphic curve that expresses the number of patients in relation to the number of days spent between the admission day and the survey day. This curve shows a maximum that corresponds to a value that can be called “average time after admission”. This value is practically identical to the average length of stay. It happens that the curve shows two maxima because the patients are composed of two groups, the acutely ill, with a short length of stay, and the long-term patients.

The great advantage of this method is that it is possible to select during a ward round with the clinician a homogeneous group of patients and to disregard those who suffer from chronic disorders and those who are kept in hospital for social reasons. It is also possible to study separately one category of patient those suffering from pleurisy, for instance and to determine their average length of stay. To obtain a higher standard of accuracy the survey can be made at intervals.
2.4.2 Bed-Occupancy Rate (O)
This expresses the average percentage occupancy of hospital beds. It is calculated by dividing the daily average number of beds occupied (obtained from the daily census of occupied beds) by the bed complement (nominal number of beds in the establishment) and multiplying by 100:

\[ \frac{N}{B} \times \frac{H}{365} = \frac{O}{100} = \frac{O}{100} \times \frac{100}{B} \]

The bed-occupancy rate reflects the ratio between beds used and beds provided. Opinions differ regarding the wisdom of using this mode of presentation, and some would prefer to use as a denominator the actual number of beds used (including any additional beds) rather than the bed complement. On the other hand, it would appear preferable to use the bed complement as a denominator since a bed-occupancy rate of 100 or over would call the attention of administrators to a disproportion between the number of beds provided and the number used. Furthermore, it sometimes happens that the need for additional beds is only seasonal in nature, in which case a month-by-month analysis would enable administrators to plan ahead for meeting this contingency. A persistently high occupancy rate all through the year would, on the other hand, call attention to a possible shortage of beds.

Occupancy rate should not be thought of solely as a measure of administrative efficiency. Although it is reasonable to expect that services such as cold orthopaedic surgery, in which admissions can be controlled, should achieve high occupancy rates, such as 90%, there are other services, such as accident care and children’s services, in which a fairly low occupancy rate is necessary, perhaps 75%, to ensure that emergency admission is always possible. Thus, the establishment of occupancy rate is an instrument of medical and social policy.

2.4.3 Turnover Interval (T)
The turnover interval expresses the average period, in days, that a bed remains empty, in other words, the average time elapsing between the discharge of one patient and the admission of the next. This is obtained by subtracting the actual number of hospitalisation days from the potential number of hospitalisation days in a year and dividing the result by the number of discharges (and deaths) in the same year:

\[ \frac{B \times 365 - H}{T} = \frac{D}{D} \]

The turnover interval is zero when the bed-occupancy rate is 100 and becomes negative when the bed-occupancy rate is over 100. In order to be meaningful, the turnover interval should be calculated separately for the various types of hospital and, especially, for the various wards of the hospital. A very short or negative turnover interval points to a shortage of beds, whereas a long interval may indicate an excess of beds or a defective admission mechanism.

2.5 Indices Relating to the Population at Risk
The object of calculating indices relative to the population at risk is to know to what extent the population utilises the hospital services; therefore, it is necessary to know the number of people that this population comprises. This number can easily be found when two conditions are fulfilled:

- The geographic area served by the hospital or group of hospitals is clearly defined and a regular census is made, as in the case of nations, or regions, or isolated areas.
- The hospital or group of hospitals is within reach of this population and the means of communication are fairly-convenient and fast.

If these two conditions are not fulfilled, it is necessary to make a detailed statistical survey. If there is more than one hospital in the area, the analysis will show the distribution of patients among them. If part of a population cannot easily reach the hospital, the survey will give the gradient of the attraction of each hospital. The method for determining the population at risk is applied by the planning authorities; it will be discussed in the following chapter. The population at risk is designated “P”.
2.5.1 Admission Rate

The admission rate, which is also known as the hospital frequentation rate or hospital attendance rate and which is designated “F”, is usually expressed as the number of hospital admissions per 1000 of the population per year. Other units of population may be used, however: rate per person, rate per 100 persons, etc.

In calculating admission rates, all admissions, including readmissions for the same pathological condition, are counted. In the case of mental hospitals and other establishments in which the patients stay for a long time but may be allowed to leave the hospital for short or long periods. “on parole” or “on leave”, an admission should be counted only if the patient has previously been discharged, not simply let out “on parole”.

Admission rates are calculated both on the basis of total admissions to all hospitals, regardless of type, ownership, etc. (gross admission rates), and separately for the various types of hospital or hospital service (specific admission rates): A

\[ F_h = \frac{p}{1000} \]

2.5.2 Hospitalisation Rate per Person

This index expresses the volume of hospitalisation in terms of number of hospitalisation days per person per year. It is calculated by dividing the total number of hospitalisation days in a year by the mean population in that year.

2.5.3 Bed-Occupancy Ratio

The bed-occupancy ratio is the average daily number of persons hospitalised per unit of population (usually per 1000 population). It is obtained by dividing the average daily number of beds occupied (average daily census) by the mean population in the same year and multiplying by 1000. Alternatively, this ratio could be obtained by the product of the bed/population index (\( I_{bp} \), see below) and the bed-occupancy rate, divided by 100: N

\[ B_c = - x 1C00 = \frac{b}{p} x. \]

2.5.4 Bed Population Index

The bed/population index is probably the commonest and most controversial figure used for the assessment of hospital utilisation. It expresses the availability of hospital beds in terms of the number of beds per 1000 of the population. Sometimes this figure is expressed as the number of persons per bed. The bed/population index is obtained by dividing the bed complement by the mean population and multiplying by 1000: Used alone, this figure cannot be considered as an index of hospital utilisation, but simply as an indicator of the availability of beds, regardless of how they are utilised. On the other hand, as will be seen below, the availability of beds is perhaps the most important single factor in the determination of the hospital utilisation in a country.

2.6 Factors Influencing Hospital Utilisation

The manner in which a certain community utilises the hospital bed and the extent of such utilisation are influenced by many factors that depend on the social, economic, educational, and cultural characteristics of the people and on the attitudes and special habits of the medical profession. With regard to the latter, it may be presumed that the doctor orders or advises admission to a hospital primarily for medical reasons; however, this is not always the case. Very often the people themselves influence the decision for or against hospital admission. Thus, in less developed communities, fear of the hospital or unwillingness to separate from the family may be strong arguments against hospital admission, whereas in more sophisticated communities the hospital “habit” may be such that a person may bring pressure to bear on the attending physician for admission to the hospital, even though there may not be objective reasons for this course of action.

In view of such considerations, comparative studies on hospital utilisation must be interpreted with caution, as a wide divergence in utilisation may be found among countries without its meaning that this divergence reflects any difference in the quality or efficiency of the medical services. Nevertheless, because of the rising cost of hospital care, such studies are valuable in pointing out the directions in which economy may be effected without influencing the quality of care. The following are some of the factors that affect the utilisation of hospitals.
2.6.1 Availability of Hospital Beds
It has been observed in the economically developed countries that the larger the number of available hospital beds, the larger the volume of hospital utilisation; but it is unlikely that these two trends are really correlated. They are the result of factors linked to the socio-economic development, such as better health education, increased health consciousness, larger protection by social security, and higher standards of living, leading to an increased number of demands for medical care. A saturation level is eventually reached, especially for maternity services and some specialised departments. In some cases, there is a direct relationship between the bed/population ratio and the utilisation indices, such as admission rates, bed-occupancy rate, per person hospitalisation rate, and others. If the bed complement is very great, high bed/population ratios may be accompanied by a low bed-occupancy rate and/or a high turnover interval.

2.6.2 Methods of Payment for Hospital Services
As previously noted, there are two methods of payment for hospital services: direct and indirect. In the former, payment is made directly by the utilisation of the hospital services; in the latter, services are paid for through prepaid programmes, sickness insurance, general taxation and other indirect means. Hospital utilisation is greatly influenced by the method of payment.

2.6.3 Age of the Population
A population with a high life-expectancy (and a consequently higher proportion of aged persons) tends to raise the volume of hospitalisation. The effect of age on utilisation indices is reflected in an increase in the per person hospitalisation rate and in the average length of stay per patient.

2.6.4 Service Coverage and Bed Distribution
A high bed/population index does not always indicate a full coverage of the population; this depends on the geographic distribution of hospital beds rather than on the total number of beds, and even geographic distribution increases hospital utilisation by making the hospitals more available to all the people. On the other hand, a large number of beds concentrated in urban areas may still mean a low admission rate for the country as a whole, as large sectors of the rural population may not be able to take full advantage of the hospital because of the distances involved. Similarly, the per person hospitalisation rate may be low while the bed-occupancy rate may be high, indicating a very high utilisation rate by one segment of the population and a low utilisation by another.

2.6.5 Availability of Extramural Medical Services
The type, extent, and quality of extramural medical services affect hospital utilisation in various ways. A well-organised domiciliary medical service can, by caring for patients in their homes or clinics, reduce the load on the hospital. However, in developing countries these services also tend to uncover hitherto undiscovered sickness in the community, which can give rise to a completely new demand for hospital services.

An important role is played by the out-patient department of the hospital. A good consulting out-patient department with diagnostic facilities may greatly reduce the number of admissions to the hospital. Similarly, hospitals provided with a casualty station or an observation ward in the out-patient department may avoid many unnecessary admissions.

2.6.6 Hospital “Bottlenecks”
Another important factor in hospital utilisation, connected with the hospital itself, is what might be termed hospital bottlenecks, or, in other words, the efficiency of the hospital’s supporting services: X-ray department, laboratory services, operating room services, and others. Shortage of personnel, space, or equipment in these departments results in a prolonged average hospital stay and a lowering of the admission rate. Improved efficiency in these departments increases the admission rate and thereby increases the cost per day. This results in decreased hospital stay, however, and may lower the cost per case, i.e., per person treated. Similarly, the administrative services, such as the admission and discharge procedures, may act as bottlenecks and adversely affect the efficiency of the hospital.
2.6.7 Medical Customs and Social Patterns
The customs or attitudes of the medical profession affect hospital utilisation. Thus, early ambulation, which has been adopted in many countries, has resulted in a lower average stay in hospital. With regard to obstetrics, customs differ greatly from country to country. In some countries, the medical profession, or the women concerned, insists on hospital deliveries for nearly all cases whereas, in other countries, hospital deliveries are confined to abnormal cases and, possibly, primiparas. In addition, the length of hospitalisation in normal obstetric cases varies from two to three days in some countries to up to fourteen days in others. The demand on hospitals is also affected by social and cultural patterns of the population, as previously suggested.

2.6.8 Supply of Physicians
The number of doctors in a country influences hospital utilisation in a number of ways. On the whole, the pattern of hospital utilisation is less influenced by the number of doctors than by factors such as the attitude of the medical profession toward hospitalisation and the organisational patterns of medical care.

Other factors being equal, the number of doctors influences the admission rate as follows: in areas with a very small supply of doctors, the admission rate tends to be low, as large sectors of the population have no access to medical practitioners, and much illness remains undetected. As the number of doctors increases, more cases of illness are detected and the hospital admission rate rises. A point of maximum rise is reached when the physician/population ratio is such that there is practically complete coverage of the population, but the number of patients per doctor is very high. Thus, the overburdened practitioner tends to refer to the hospital cases that had he more time; he could deal with efficiently on an out-patient basis or at home. A further rise in the number of doctors diminishes the patient load and allows for more medical work outside the hospital. The admission rate therefore tends to fall, though not to the level of areas undersupplied with doctors.

2.6.9 Research and Training
Hospitals with programmes of research or training, or both, tend to be more selective in their admission policy. On the other hand, the average length of stay in these hospitals tends to be longer because there are many specialised departments, such as neurosurgery, orthopaedics, and neuropsychiatry that select serious cases.

2.6.10 Existence of Proprietary Hospitals
The proprietary hospital is also selective in its admission policy, usually receiving minor or curable cases. Therefore, complicated cases are mostly referred to general hospitals, which must keep them longer. Thus, in the proprietary hospitals, the length of stay is generally shorter than that in other hospitals.

2.6.11 Housing
The current trend for families to live in smaller houses or apartments has a definite influence on hospital utilisation. Many admissions to hospital are due not so much to the need for hospital care as to the inconveniences encountered in caring for the sick person at home. Smaller housing units demand fewer home help. Therefore, the combination of shortage of space and shortage of home help is an important factor in the demand for hospital admission. This is particularly true with regard to the elderly, who often cannot be kept at home when sick.

2.6.12 Morbidity
Hospital utilisation is greatly influenced by the morbidity pattern of the community. The sporadic increased demand due to an outbreak of disease and the day-to-day morbidity pattern both determine, to a large extent, the type and volume of hospital admissions. Thus, the acute, communicable diseases result in a demand for more beds in “short-stay” institutions, which raise the admission rates, whereas the degenerative or chronic infective and parasitic diseases tend to prolong the average stay in hospital.
2.6.13 Internal Organisation
The greater the amount of segmentation within a hospital, the less the degree of utilisation, as shown by the bed-occupancy rate and the turnover interval. This points out the need to provide the greatest practicable flexibility in planning a hospital and to avoid, so far as possible, earmarking beds for particular diseases or putting them at the sole disposal of particular consultants. The length of stay in hospital and the interval between onset of disease and resumption of work should be shortened by all possible means.

The work and importance of a hospital ought not to be measured in terms of beds; the average length of stay, occupancy rate, and admission rate are all part of the picture. The hospital’s activity should also be related to the number of patients examined and treated as in-patients or out-patients, in the rehabilitation service, or under home care. The hospital of the future should have fully developed extramural services and a reduced number of beds. Consideration of the hospital bed as the sole yardstick of medical care activity belongs to the past.
Summary

- Hospitals may be divided, very broadly, into two classes: special and general.
- Special hospitals deal exclusively with specific organs or systems of the body (e.g., eye; ear, nose, and throat; central nervous system; orthopaedics), certain conditions (e.g., tuberculosis, accidents, infectious diseases, cancer), or certain groups of the population (e.g., children).
- General hospitals, which contain a range of specialist services, aim to provide treatment for men, women, and children suffering from any form of illness except highly infectious and dangerous conditions, such as smallpox.
- The main disadvantage of the special hospital lies in its isolation from the general body of medicine.
- At the lower end of the scale, the hospital should not contain fewer than 200 beds or it becomes difficult, or impossible, to provide a differentiated service.
- A hospital of 500 beds or more enables adequate departments of general medicine, general surgery, paediatrics, obstetrics, and psychiatry to be set up, together with a full range of the ordinary specialties, the several departments being large enough to justify the appointment of full-time, or nearly full-time, specialists to the staff.
- One bed in an elaborate hospital, with all the accompanying ancillary facilities, can cost as much as some people earn in a whole lifetime.
- A gross index is an index expressing the over-all average utilisation for all types of hospital in the area.
- A hospital bed is one regularly maintained and staffed for the accommodation and full-time care of a succession of in-patients, and is situated in wards or areas of the hospital in which continuous medical care for in-patients is provided.
- The turnover interval expresses the average period, in days, that a bed remains empty, in other words, the average time elapsing between the discharge of one patient and the admission of the next.
- The number of doctors in a country influences hospital utilisation in a number of ways.
- A further rise in the number of doctors diminishes the patient load and allows for more medical work outside the hospital.
- The greater the amount of segmentation within a hospital, the less the degree of utilisation.

References


Recommended Reading

Self Assessment

1. The main disadvantage of the ________ hospital lies in its isolation from the general body of medicine.
   a. special
   b. general
   c. children
   d. public

2. Which one of the following is not a part of General Hospital?
   a. Regional Hospital
   b. Rural Hospital
   c. District Hospital
   d. Urban Hospital

3. The hospital should not contain fewer than ________ beds.
   a. 50
   b. 100
   c. 200
   d. 300

4. Match the following

<table>
<thead>
<tr>
<th>1. Bed day</th>
<th>A. The average period, in days, that a bed remains empty</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Average length of stay</td>
<td>B. Number of hospital admissions per 1000 of the population per year</td>
</tr>
<tr>
<td>3. Turnover interval</td>
<td>C. The average period in hospital (in days) per patient admitted</td>
</tr>
<tr>
<td>4. Admission rate</td>
<td>D. Unit of measure denoting the service rendered to one in-patient in the hospital</td>
</tr>
</tbody>
</table>

   a. 1-D, 2-C, 3-A, 4-B
   b. 1-C, 2-B, 3-D, 4-A
   c. 1-B, 2-C, 3-B, 4-A
   d. 1-A, 2-C, 3-B, 4-D

5. The customs or attitudes of the medical profession affect hospital ________.
   a. environment
   b. utilisation
   c. bills
   d. operations

6. A ________ index is an index expressing the over-all average utilisation for all types of hospital in the area.
   a. gross
   b. average
   c. utility
   d. prime
7. There are _______ methods of payment for hospital services.
   a. three
   b. four
   c. two
   d. five

8. The admission rate is also known as the _______ rate.
   a. hospital frequentation
   b. bed occupancy
   c. gross admission
   d. turnover

9. An important role is played by the _______ department of the hospital.
   a. in patient
   b. out patient
   c. billing
   d. hospital management

10. The current trend for families to live in smaller houses or apartments has a definite influence on _________.
    a. hospital environment
    b. hospital utilisation
    c. hospital bills
    d. hospital operations
Chapter III
Hospital Administration and Organisation

Aim
The aim of this chapter is to:

• explain public hospitals
• elucidate private hospitals
• explore public control

Objectives
The objective of this chapter is to:

• define hospital administration
• explicate hospital organisation
• enlist general principles of hospital organisation

Learning outcome
At the end of this chapter, you will be able to:

• recognise countries enjoying dynamic economic development
• identify principles of hospital administration
• understand hospital organisation in various countries
3.1 Introduction

Hospitals are very expensive to build and to operate. Their initial capital cost is high and their running cost year after year, especially for in-patient services, is enormous, as authorities in many countries have discovered to their discomfiture. There are modern hospitals that today are standing almost empty for lack of funds to maintain them.

The first task of the health service is to reach all the people all the time at the best level of care the country can afford. Hospital provision is only one part of the health service, and the money devoted to it must not impoverish the rest of the service. At the same time, expenditure on health services, of which hospitals are a part, should be regarded as an investment that will pay economic dividends in the form of lessened invalidity, reduced unemployment caused by sickness, and increased industrial production. Further, it should be expected and desired that expenditures on health should rise at least pari passu with increasing productivity and increasing national income.

Hospitals are the most costly part of a health service. It is sound economics, therefore, to do everything feasible to keep patients out of hospital and, by reducing the reasonable demand for in-patient treatment, to lessen the need for further provision of hospitals. There are two essentials in attempting to attain this desirable aim. The first is a system of comprehensive medicine operating throughout the community, embracing environmental hygiene and personal, occupational, and social health services. The second is the provision of a home care service that will enable as many as possible of those who are sick or injured to be nursed at home, with merely supporting help from the hospital. In both of these functions the hospital has an important part to play. As previously noted the concept of a hospital as the centre of a home care service and as one of the centres of preventive medicine in an area differs fundamentally from the old idea of a hospital as no more than a place for the treatment of the sick.

The primary function of a hospital is the provision of medical care to a community. A hospital, however, has two other important roles to fulfil, to be a centre for the education of all types of health workers doctors, nurses, midwives, and technicians and for the health education of the public and to be a centre for research.

Despite these varied functions, exaggerated importance must not be given to the place of the hospital in a scheme of community health care. The hospital’s appearance is impressive, and its work is dramatic. It therefore seizes the imagination. But the provision of hospital beds is no substitute for effective environmental, preventive, and domiciliary health services, which can lead to a reduction in the number of beds required as these services develop and produce their effect upon the health of the population. The truth of this has been demonstrated in some countries of Western Europe during the past few decades, when improved standards of living and discoveries in medical science have, to a large extent, brought under control tuberculosis, the acute specific fevers and many diseases of children, and have made the beds previously provided for these conditions unnecessary. This fact needs to be borne in mind in the planning of hospital services in the developing countries, for what is true of Western Europe and North America today will surely become true in many other countries of the world in years to come. Hospital beds needed now for tuberculosis, for children, and for fevers of various types should be planned in such a way as to make them readily convertible to other uses when, fortunately, they are no longer needed for their original purposes.

In many countries of the world today, medical needs are great, but financial resources are slender. There is an essential minimum of hospital service required, but such countries should relate the money they spend on hospitals to the development of environmental, preventive, and domiciliary medicine, and should not lavish it upon expensive hospital buildings, with their high cost of maintenance. Indeed, if the knowledge and facilities for applying the elementary principles of hygiene are lacking in a community, the cost of hospital care will be partly wasted by reason of a high relapse rate of disease.

“For many years to come the world will continue to harbour many different philosophies, cultures and systems; hence hospital programmes, which reflect so closely the essential features of the style of life, will have to be carefully adapted to the diverse conditions prevailing in individual regions.”
3.2 Regional Planning

It is essential that hospital and health services be planned on a wide-area basis; planning on an individual or local community basis creates gaps and overlapping. Civic pride, though commendable, does not necessarily produce a hospital service that combines efficiency and economy and that serves the best interests of the patient.

The idea of regionalisation is the placing under unified, general, administrative control the hospitals and health services of a wide area, containing a population of up to several million people. In this way the provision of hospital services can be related with reasonable accuracy to the population they are intended to serve, gaps and overlapping can be avoided, and new hospitals can be sited in the most strategically suitable positions with regard to population density and means of communication.

The concept of regional planning varies within wide limits from one country to another. For example, in the USA it amounts to no more than a voluntary association of a group of hospitals in an area with a view to affecting some economies in such matters as bulk purchasing of supplies and some sharing of medical and other staffs. In Canada it has gone somewhat farther. In Great Britain regionalisation of hospital services is complete. In the USSR, the concept has gone beyond the planning and organisation of hospitals and embraces the entire health services of a community, the curative and preventive services being under a single administration. In Chile, where regionalisation is quite complete, the hospital is the headquarters’ of the public health services of an area.

The planning of hospitals on a regional basis provides a better and fairer distribution of services, particularly in less prosperous areas, in which the need is often greatest. It also enables a measure of control to be exerted to secure a reasonably uniform standard of medical care throughout the region. On the business side, a regional system promotes economy by making possible the centralisation of such functions as accounting, statistics, laundry services, and bulk purchasing of drugs and hospital supplies. Certain expert advisory services can also be organised to advantage on a regional or sub regional basis.

In advanced countries, the regional authority is the proper body to organise and administer, for the entire region, a blood transfusion service. This would include setting up mobile teams for the collection of blood, a laboratory for blood typing, refrigerated storage facilities, a distribution system, and arrangements for the preparation and dissemination of publicity material.

The role that each hospital is to play in a regional service should be laid down in general terms by the regional authority; but, within this broad direction of over-all policy, the day-to-day administration of individual hospitals is often best left to local initiative. In the first report of the WHO Expert Committee on the Organisation of Medical Care, three types of hospital were contemplated:

- The regional hospital, designed to provide a complete range of treatment, including such specialities as radiotherapy, neurosurgery, thoracic surgery, and plastic surgery. Where possible, such a hospital would comprise, or be closely associated with, an undergraduate medical teaching centre. This hospital would be strategically placed in the region so that patients in need of its highly specialised services could be readily referred to it.
- The intermediate (or district) hospital of several hundred beds, providing a high standard of medical, surgical, obstetrical, and specialised treatment.
- The small, local (rural) hospital of 20 to 100 beds, probably undifferentiated, providing, where necessary, general medical, surgical, and maternity care.

This monograph deals mainly with the intermediate, or district, hospital. The small, local hospital is dealt with comprehensively in Dr. R. F. Bridgman’s monograph.

3.2.1 The Rural Hospital

This small, local hospital should not be necessary except in countries in which the population is very diffuse and the lines of communication are long. The small hospital, contrary to general belief, is not intrinsically economical and tends to be medically inadequate except for the treatment of the most straightforward and ordinary conditions. Their staffs are often tempted to undertake procedures beyond the capacity of the hospital’s facilities, sometimes
with disastrous results. It is usually better for a sick person to undertake a somewhat longer journey to a large, well-staffed, and well-equipped hospital than to receive treatment near his home in a less well-equipped establishment. This is especially true for the treatment of fractures and other injuries, which will be dealt with in more detail in another section.

There are many places in the world, however, where the population is so sparsely distributed in scattered villages, perhaps that the small, local hospital is the only practicable means of providing in-patient care. Here the idea should be one of a preventive health clinic and out-patient station with some beds provided, for the health centre is essentially local in its function. It deals with the supervision of the health of expectant and nursing mothers and of young children, with health education in the homes of the people, with protective inoculations, with sanitation and control of insects and parasites and with the health of the school child. For these services to be rendered, easy access to the people is essential: the health centre must be near the homes of those it serves. The same is true to some extent with regard to certain out-patient services, i.e., those requiring frequent re-attendance for supervision, treatment, and, especially, rehabilitation. An out-patient station remote from its parent hospital but regarded as a projection of the out-patient department of that hospital and receiving periodic visits from members of its staff can perform a very useful function. Special arrangements need to be made, however, for the transmission of records between the two establishments.

It was formerly thought that, in a system of hospitals administered on a regional basis, a considerable flow of patients in both directions would take place. Such, in fact, has not been found to be the case. A patient is usually treated entirely in the hospital to which he was first admitted, unless treatment by one of the “super specialties”, such as radiotherapy, is indicated and such treatment is not available in the hospital in which the patient finds himself. What, however, does, and should, take place is a free measure of sharing of senior medical staff. Consultants on the staff of the regional hospital should hold consultant sessions at district hospitals, and vice versa. This facilitates interchange of medical opinion (often over the luncheon table) and brings the staffs of both hospitals into closer rapport. Consultant physicians and surgeons should also pay regular visits to small, local hospitals, where these exist, to ensure the maintenance of a good standard of medical care.

The appointment of consultant staff, unless made at the national government level, is best undertaken on a regional basis, the regional authority paying due regard to the wishes of the hospital to which the appointment is to be made. A regional authority can, and should, where desirable, encourage a district hospital to develop a particular service. It need not be a rigid rule that highly specialised services should be available only at regional hospitals; a large district hospital may sometimes have such facilities. It is more likely, however, that the regional authority may have to exercise a restraining influence on a district hospital that, for reasons of prestige, wishes to establish a new service that is not really required for the area served or that the district hospital would not be capable of running. A function of the regional authority is to lay down in fairly broad terms the range of services that each hospital should provide.

The principal factors to be borne in mind when defining the boundaries of a hospital region are major centres of population, existing major hospitals and lines of communication. One of the aims should be to make a region reasonably self-sufficient in the provision of all types of medical care. If this care is to include radiotherapy, neurosurgery, and cardiac surgery, which call for a high and rare degree of skill, abundant staff, and expensive equipment, large populations are necessary to keep the requisite facilities and staff fully occupied and working at maximum efficiency in order to justify the very heavy overhead expenses. Provided communications are adequate, the geographical size of a region is not of great importance; but a population of somewhere between one and three million is desirable. However, departure from these limits may well be necessitated by local conditions in some parts of the world.

If it can be arranged, it is well for a teaching hospital to be included within a region and for its work to be closely associated with that of the region in order that it may exert an academic influence and foster postgraduate medical education and research throughout the hospitals of the region. A teaching hospital is by no means essential, however, and in many developing countries such an establishment would be impossibility.
One of the first steps to be undertaken in a country contemplating hospital development on a regional basis is an accurate and up-to-date survey of existing facilities of the whole health service in the region, including domiciliary as well as hospital services. An inventory of existing health buildings and major equipment will also be needed. One way to accomplish this is to appoint a number of small teams, mainly or entirely medical, composed of two or three men of high standing, with wide experience of what a hospital should provide. These teams would visit every hospital in the country, ascertaining the “watershed” of each hospital in terms of patients, drawing attention to gaps or overlapping, recommending amalgamation of neighbouring hospitals where appropriate, and indicating in a general way any necessary expansion of existing hospitals in building, staff, or equipment to enable them to play their part in the regional scheme. The teams might also indicate again, in a general way the need for new hospitals in various places. Detailed consideration would probably not be given to their recommendations until the regional scheme had been in operation for a few years and until the nature and scope of the demands had been more accurately estimated.

In planning a regional health scheme, the responsible authority should not only take present needs into account, but should also try to forecast future demands in the light of such considerations as population changes, increase or decrease in industrialisation, and the progress of preventive medicine, including the success or failure of programmes aimed at the elimination of certain endemic diseases. This should lead in due course to the preparation of a master plan for the region as a whole, indicating the functional developments that should take place and the architectural growth that will, in consequence, be necessary. Such a master plan, intended to cover a number of years, must be flexible to permit changes that may be necessitated by unforeseen alteration of environmental circumstances. It will involve liaison with town and country planning and economic development authorities.

The assessment of needs in terms of hospital beds for a region is discussed in later chapters. Here it may merely be noted that there is, in many places, a tendency to overestimate the need; and it is probably a good deal safer to aim deliberately at an underestimation rather than to risk saddling a community with a burden beyond its resources in manpower and money. An important aspect of regional planning is that it readily enables certain hospitals to be designated as centres for the treatment of conditions that call for highly specialised staff or equipment conditions such as tetanus, paralytic poliomyelitis, poisonings, severe burns, and serious accidents, for example.

3.3 Public Hospitals and Private Hospitals

As a rule, a distinction is made between public hospitals and privately owned hospitals, but there are shades of meaning within the two classifications, and there are terms to describe intermediate types of hospital:

3.3.1 Public Hospitals

The public hospital is understood to be an establishment, or group of establishments, created and managed by a public authority. In some cases this authority is local and corresponds to a municipality. In other cases, the public hospital may be created and managed by a wider community, such as a department, province, or region, containing a larger or smaller number of communes. In this instance it is administered by the depart-mental or regional services. Finally, the public hospital may be created and managed by the State itself and be administered directly by a ministry.

In certain countries, administrations responsible for hospitals have their own budgets, which are balanced either by a system of daily tariffs calculated to cover the expenses exactly and charged to users of the hospitals or to the bodies responsible for their fees (sickness insurance, social security, aid to indigent persons, funds for pensioners of the armed forces, and others) or by means of an annual budgetary allocation, also calculated to cover exactly the costs of running the hospital. The public hospital enjoys legal status; and the administrative board that manages it can buy or sell property, accept donations and legacies bear witness in court, and so forth. In some countries the term “public hospital” covers hospitals that are managed by government services or public municipal, departmental, or national bodies and that are financed as part of the over-all budget for public services.
3.3.2 Private Hospitals
As a rule, the following types of private hospital are distinguished:

- Private hospitals run by philanthropic institutions, which make no profit and do not operate on a commercial basis. These are created and managed by very different groups: religious communities or groups lay philanthropic institutions, sickness insurance and mutual aid societies, industrial undertakings, social security organisations, and others.
- Private hospitals run on a commercial basis, founded and managed by commercial groups or by individuals as commercial enterprises.

3.3.3 Public Control
Although, the distinctions between public and private institutions are quite clear and definite, and although they are reflected in very different types of administration, public control of both types of establishment tends to be exercised more or less closely at different levels, for three reasons:

- The conditions of hygiene are subject to control by the public health authorities and such control, as a rule, includes enforcing certain technical standards and inspection by the public health service.
- There should be co-ordination between public and private hospitals in order to avoid duplication of equipment and overlapping of services. This may be achieved by deciding the total number of beds required for a given area and making the extension and/or creation of new beds, either public or private, subject to an official authorisation.
- The extension of medical aid to indigent persons and of social security facilities for workers means that more and more of the patients admitted to hospitals of all kinds no longer pay the whole cost of diagnosis and treatment and that the budgets of public and private hospitals depend more and more on payments from sickness insurance or other welfare funds. Such financial bodies naturally tend to demand the right to exercise control over the finances and operation of private hospitals, even of those that are run on a commercial basis. This is one of the results of the constantly higher cost of medical and hospital treatment, and leads to budgetary control by the public authorities.

3.4 Hospital Administration
The term “hospital administration” covers a large number of activities, as diverse as are the systems of hospital organisation themselves. As occasion arises, the hospital administration fulfils very different functions, which may be roughly classified into three categories:

- Preparation of hospital legislation, planning of the hospital system as a whole, determination of investment policy and of regulations for the operation of hospitals, and establishment of architectural control and standards. These activities come within the State’s legislative and executive power and are essentially the responsibility of the ministry of public health, in co-ordination with other ministries (interior, finance, construction, education, labour and social security, and planning). Some of these responsibilities can be transferred to local or regional governmental authorities.
- Application of hospital legislation and of social assistance provisions by the authorities responsible for the management of hospital services, whether they be local or regional, public or private. Administrative boards, where they exist, are responsible for managing the establishments and examining the proposals of hospital directors. Otherwise, the hospital directors are themselves responsible to the appropriate authorities.
- Daily running of the hospital by the administrative staff concerned with personnel, finance, accounts, and technical services. The director of the hospital and his assistants are in charge of these activities. This distribution of responsibility naturally varies according to the degree of development and complexity of the hospital administration in each country.

Since, it is recognised that the hospital can no longer be considered as an isolated unit but must become a part of the general health services. The present chapter deals essentially with hospital administration at the national and regional levels, that is to say, with structure and methods that are applicable to the planning and management of a hospital system. The management, financial and accounting problems particular to individual establishments are not considered.
3.5 Hospital Organisation: Principal Types of Hospital Organisation

The hospital administration in each country is the result of historical development over varying periods of time, it differs according to the history of the institutions themselves and according to the way in which the country’s social structure has evolved. At first sight, it seems that each country has a different hospital administration and that all the intermediate stages can be found between the fullest possible liberalism and complete state control. In order to throw some light on this problem and to attempt to define the lines of future developments, it seems advisable to commence by examining the broad categories of juridical organisation existing today. It is impossible to describe in detail the many systems in the various countries of the world, but there are several characteristic systems in certain countries or groups of countries that it is very useful to consider as examples.

3.6 Hospital Organisation in Different Countries

The organisation of hospital in different countries is as follows:

3.6.1 The United Kingdom and the USA

One of the main characteristics of these countries was the marked development of private and essentially philanthropic initiative and the ease with which elements of quite different structure were co-ordinated.

The USA has one of the largest hospital networks in the world. Its structure is extremely heterogeneous since it includes private philanthropic hospitals (voluntary and non-profit) side by side with municipal establishments and State and Federal hospital centres. One feature is common to them all: each has its own administration and enjoys a high degree of autonomy. Co-ordination among the various hospitals is achieved by means of mutual agreements, and interference by the central government is limited to the element of control inherent in the giving of subsidies for construction and equipment (Hill-Burton Act). The technical standards with regard to amenities are applied by national, but not governmental, bodies of a private character (American Hospital Association, American College of Surgeons, American College of Physicians, American Medical Association) through a Joint Commission on Accreditation of Hospitals.

In the United Kingdom, a similar system operated until 1948, when a new and comprehensive regional system was created under the National Health Service. Roughly speaking, the administration of the hospitals is co-ordinated by regional hospital boards serving up to several million inhabitants. Each hospital or group of hospitals has anything from a few hundred to 1000 to 2000 beds, and is administered by a hospital management committee. The central government exercises over-all control, establishes the over-all budget, and distributes it to the several management committees. It should be noted that in England each of the teaching hospitals has its own board of governors, independent of the regional hospital board; but this is not the case in Scotland.

3.6.2 Latin America and Western Europe

The Latin countries and some other countries of Western Europe have been greatly influenced by the hospital legislation that emerged from the French Revolution of 1789. The public hospitals are municipal establishments enjoying administrative and financial autonomy. At the departmental or provincial level, strict control is exercised by the representative of the government; but the central government has executive power with regard to organisational plan and budget. Although this central government has the power to reverse decisions that are not in accordance with the regulations, the initiative rests to a great extent with the local authorities. However, the latter are calling more and more upon the State for equipment subsidies. The statutes of the specialised hospitals are different: they are often managed at the departmental or provincial level; but, here again, the initiative is not entirely in the hands of the central government.

3.6.3 Eastern Europe

Hospital legislation in the countries of Eastern Europe was affected by the Russian Revolution of 1917. There are no more private hospitals, and hospital administration is, to all intents and purposes, state-controlled. The central authorities (which may be organised on federal lines) are responsible for the control of hospitals, which are public services and not in any way autonomous. Integration of preventive and curative health services has reached a very advanced stage and the health authorities run hospitals, specialised institutions, social and preventive medical services, and public health organisations. Hospitals are just one of the elements in the public health service.
3.6.4 Emerging Countries
In the emerging countries, four important influences have affected hospital organisation in the past and, because of the absence of hospital law in most of these countries, these influences are still felt.

Turkish influence: In many Moslem countries, where Turkish and Islamic influence has predominated, the legislation does not confer legal status upon hospitals. The hospitals depend for their income on the provisions made by their founders; but, as these provisions are progressively nationalised, the hospitals are becoming State services. There is a tendency towards more and more centralised government, and the hospital administration is in the hands of the central authorities.

British influence: In the countries that were formerly a part of the British Empire, and in the countries of the Commonwealth, hospital organisation is very similar to what it was in the United Kingdom before the introduction of the National Health Service in 1948. Private, philanthropic hospitals exist; but the bulk of the service is given by public hospitals, which are a government service. The operational budgets of these hospitals derive partly from local budgets, but many services are run directly by a public works department and a central supplies office.

French influence: In the former French colonies, hospital administration is an adaptation of the military system, and most of the care is free. Hospital organisation is therefore centralised, and there is very little participation by the local authorities. It is, therefore, fundamentally different from that of continental France. It should be mentioned that, both in these countries and in countries formerly under British influence, a great deal of work has been done by religious missions, which continue to be private undertakings.

Chinese influence: In the countries of Eastern Asia that were under the influence of the traditional Chinese civilisation, the communes enjoyed complete liberty to create mutual aid and co-operative services at the communal level, particularly public health and medical care services. Although profound changes have recently taken place, there still remain some traces of this particular type of organisation, which is not altogether unlike that which existed in past centuries in Europe.

3.7 General Principles of Hospital Organisation
It is obvious that, where there is such diversity, it is impossible to recommend a uniform scheme of hospital organisation that would be applicable in all countries. The hospital system in any country depends too much on social institutions, level of development, needs and resources, and the relations existing between the public and the authorities for it to be possible to envisage any type of organisation as a model for all countries. It is also essential to guarantee the availability of capable and well-trained administrative personnel and of highly qualified architects, engineers, and technicians before embarking on such a difficult enterprise as establishing a network of modern hospitals. However, on the basis of reforms introduced in various countries, of criticism directed at existing systems, and of experience acquired from such systems, it is possible to arrive at some general idea of present tendencies in hospital administration.

Within the framework of regional planning, definite functions are assigned to each type of hospital; and there is, therefore, a grading of hospitals. Furthermore, the increasing technical complexity of modern hospitals and the mounting costs of operating them, which require the intervention of the State and of social security and sickness insurance organisations on a national scale, call for planning at the highest possible level.

On the other hand, there is no doubt that local initiative has been an extremely dynamic feature of the recent past and that, when the resources are available, such local initiative can achieve important results. This is due partly to the fact that the local population is interested in the local hospital and partly to the diversity of the needs and the many factors involved. However, although it is highly desirable to encourage the dynamism of local initiative, care must be taken to avoid any kind of isolationism. The organisation of hospitals ought to be thought of in terms of regional planning and co-ordination to ensure that health institutions of any kind fit into the regional pattern. It seems, therefore, that hospital organisation should be a compromise between centralisation and decentralisation and that, generally speaking, this compromise should be related to the country’s economic, social, and cultural development.
3.8 Countries in Early Stages of Development

In these countries, very few technicians and administrators are available; and the traditional local communities are not sufficiently informed to be able to define their needs and desires. The hospital service is limited to a few scattered establishments to which most of the population cannot have easy access. In such cases, a strong, central administration, with full power to apply a rational and efficient plan, is essential. At the outset, such an administration should endeavour to obtain valid statistics concerning the number of existing establishments, their capacity, their equipment, their personnel, and the extent to which the facilities are used by the population.

Simple legislation should define the three essential categories of hospital regional hospitals, intermediate hospitals, and rural health centres with a few beds for the purpose of applying the total, integrated, public health programme. The financial and technical resources are apt to be so limited that priorities will have to be established, and it will often be necessary to compare the possibilities in terms of equipment, personnel, and material and the financing of the various possible organisational schemes, and to adopt, initially, the system that can be most easily put into operation, even if it is not what would be theoretically ideal. A choice will often have to be made between the two alternatives: concentration of technical means and qualified personnel in regional centres, or the constitution of a network of intermediate hospitals of medium capacity. All the existing factors must be taken into account; and, in addition to the availability of material and personnel, consideration will have to be given to facilities for transporting patients to centres and medical teams to rural areas, and to problems connected with the maintenance and repair of technical equipment. The central administration must be responsible for the choice among different possible solutions and for the application of the plan.

Nevertheless, the development of basic health services will, as a rule, be given first priority; and no opportunity should be neglected to encourage local initiative in the form of collective building of rural health centres.

3.9 Countries Enjoying Dynamic Economic Development

In countries in a stage of dynamic economic development, industrial and commercial expansion leads to important population migrations towards towns and to the formation of zones that acquire distinctive characteristics.

The advice of the local communities becomes useful, and regional or local public health committees can be set up to advice on needs and to receive the reports of hospital administrators. If such local communities are authorised to collect taxes, they may be required to participate financially in the erection of health establishments and to be responsible for certain operating costs.

3.10 Countries that have Achieved a High Level of Economic Development

When local communities have considerable resources in personnel and funds at their disposal, the hospital organisation can be developed to the full.

At the local and intermediate levels, it will be possible to set up public health administrative committees that can administer and manage local health establishments such as health centres, rural hospitals, convalescent homes and homes for chronic patients, old peoples’ homes, maternity homes, and preventive medicine and hygiene services. Services well suited to local requirements can be promoted if the local committees can receive technical guidance and are given financial aid.

At the regional level, in an area with one to three million inhabitants, a planning committee should be set up. It should prepare the regional hospital plan and advise the central government on the proposals of local and intermediate administrations. A subcommittee comprising some of the members of the regional committee, with the addition of technical advisers, can be responsible for the management of the regional hospital centre. The committee and the subcommittee should include members of the medical teaching staff if the regional centre acts as the teaching hospital for a faculty of medicine. Other subcommittees or special hospital boards can be created to administer the intermediate hospitals.

At the national level, the ministerial department responsible for the adaptation and application of the hospital legislation should be assisted by technical committees and services as follows:

- An operational research unit, basing its work upon hospital statistics kept regularly up to date, to provide the basic data for the study of the hospital plan.
• An architectural control and advisory service, to be responsible for the establishment of standards, the trying-out of new solutions, the criticism of technical documents submitted by the hospital administrations and accompanied by the opinion of the regional committees, and the supervision of the building and equipment.

• An interministerial committee grouping together the various interested departments to establish the hospital plan for a given period (at least four years).

This plan should include a list of operations classified in order of priority, with their estimated cost. Such a plan should be submitted to the legislative authorities responsible for approving the financial provisions, earmarking the necessary credits for the period in question and co-ordinating the various contributions (government subsidies, loans, participation by social security organisations and local authorities, donations, allocation of scarce national building resources, and others). The hospital plan should provide, over a given period, for the adaptation of the hospital system to the developing needs of the population, by the modernisation and extension of existing facilities and the erection of new buildings.

The method for the calculation of the number and distribution of beds and technical services comprises three stages:

• The first stage is an analytical study of the situation. This should take into account the statistical elements and the utilisation indices previously described, as well as statistics concerning the number of surgical operations, radiological and laboratory examinations, by category, and all other elements of hospital service. It must be emphasised that the various indices must be compared, and that none of them taken alone has any absolute value. One of the most useful elements in the establishment of the hospital plan is the admission rate for each administrative unit served by the hospital network. This can be obtained by establishing the geographical origin of patients admitted to the different hospitals. By technical methods of analysis of the distribution of patients, the admission rate for each geographical unit can be obtained. The population at risk and the degree of attraction of each hospital can be estimated. With this information it is possible to determine what modifications in capacity must be made to meet the conditions prevailing at the time of the survey.

• In the second stage, the forecasts concerning population movements and demographic development in towns and rural areas should be obtained from the town and country planning services. For example, if a rural zone with a low hospital utilisation rate is to be industrialised and considerably increase its population, the provision of new hospital accommodation may be justified. If, on the other hand, a relative depopulation is expected owing to the modernisation of agricultural methods and the attraction of industries outside a zone, the solution will probably be found in improvement of communications and means of transport.

• In the final stage of preparation of the plan, all the above-mentioned data are assembled; and a selection is made of the most probable figures relating to: future hospital admission rate by each geographical unit; distribution of beds and of general and specialised services among regional, intermediate, and local hospitals; degree of attraction of specialised services; average duration of hospitalisation and average bed-occupancy; trends in morbidity and new therapeutic means; and requirements in ambulatory and domiciliary services.

Ultimately, a model hospital plan is obtained in which priority can be given to the various phases of implementation according to financial provisions, resources in personnel, and actual architectural possibilities. A study of this kind calls for the collaboration of many services so that a complete operational analysis can be made. The administration can therefore set up its own technical services to make the study, providing it with wide facilities for obtaining information, or make use of bodies specialising in the subjects in question.

It must be said, again, that the statistical analysis of the present situation and the forecasts concerning the demographic changes are a prerequisite to hospital planning; but they must be complemented by consideration of the many social, professional, and cultural factors that are impossible to measure accurately. The decisions concerning, for instance, the care of elderly and chronically ill patients, the policy towards tuberculoses and mentally ill patients, the attention given to preventive medicine, the structure contemplated for the rural health programme, the means of communication, and all the factors studied by specialists in human geography and influencing the pattern of society can alter dramatically the results obtained by the statistical methods.
Summary

- Hospitals are very expensive to build and to operate.
- The first task of the health service is to reach all the people all the time at the best level of care the country can afford.
- Hospitals are the most costly part of a health service.
- The primary function of a hospital is the provision of medical care to a community.
- It is essential that hospital and health services be planned on a wide-area basis; planning on an individual or local community basis creates gaps and overlapping.
- The public hospital is understood to be an establishment, or group of establishments, created and managed by a public authority.
- Private hospitals run on a commercial basis, founded and managed by commercial groups or by individuals as commercial enterprises.
- Preparation of hospital legislation, planning of the hospital system as a whole, determination of investment policy and of regulations for the operation of hospitals, and establishment of architectural control and standards is one of the category of Hospital Administration.
- The public hospitals are municipal establishments enjoying administrative and financial autonomy.
- The hospital system in any country depends too much on social institutions, level of development, needs and resources, and the relations existing between the public and the authorities for it to be possible to envisage any type of organisation as a model for all countries.
- A subcommittee comprising some of the members of the regional committee, with the addition of technical advisers, can be responsible for the management of the regional hospital centre.

References

- Das, C. N., Hospital administration and Organisation, [Video online] Available at: <http://www.youtube.com/watch?v=lejHMq4o8sw>[Accessed 3 December 2012].

Recommended Reading

Self Assessment

1. At the ______ level, in an area with one to three million inhabitants, a planning committee should be set up.
   a. regional
   b. local
   c. intermediate
   d. national

2. The ______ function of a hospital is the provision of medical care to a community.
   a. secondary
   b. primary
   c. vital
   d. common

3. Which of the following statements is false?
   a. The public hospital enjoys legal status.
   b. Hospital and health services are to be planned on a wide-area basis.
   c. The committee and the subcommittee should include members of the medical teaching staff.
   d. The concept of regional planning does not vary within wide limits from one country to another.

4. The planning of hospitals on a regional basis provides a better and fairer distribution of ________.
   a. hospitals
   b. wards
   c. services
   d. patients

5. In the emerging countries, ____ important influences have affected hospital organisation in the past.
   a. two
   b. three
   c. four
   d. five

6. ______ hospitals run on a commercial basis, founded and managed by commercial groups or by individuals as commercial enterprises.
   a. Public
   b. General
   c. Rural
   d. Private

7. The conditions of hygiene are subject to control by the _______ health authorities.
   a. public
   b. general
   c. rural
   d. private
8. The statutes of the specialised hospitals are managed at the departmental or _________ level.
   a. provisional  
   b. provincial  
   c. regional  
   d. urban

9. The_____ has one of the largest hospital networks in the world.
   a. Europe  
   b. USA  
   c. France  
   d. Turkey

10. Match the following

<table>
<thead>
<tr>
<th>1. Public Hospital</th>
<th>A. Placing under unified, general, administrative control the hospitals and health services of a wide area.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Private Hospital</td>
<td>B. Medically inadequate except for the treatment of the most straightforward and ordinary conditions.</td>
</tr>
<tr>
<td>3. Regional Planning</td>
<td>C. Founded and managed by commercial groups or by individuals as commercial enterprises.</td>
</tr>
<tr>
<td>4. Rural Hospital</td>
<td>D. Group of establishments, created and managed by a public authority.</td>
</tr>
</tbody>
</table>

a. 1-D, 2-C, 3-A, 4-B  
   b. 1-C, 2-B, 3-D, 4-A  
   c. 1-B, 2-C, 3-B, 4-A  
   d. 1-A, 2-C, 3-B, 4-D
Chapter IV
Some Special Roles of the Hospital

Aim
The aim of this chapter is to:

• explain the hospital as teaching centre
• elucidate hospital laboratory services
• explore hospital as consumer central store

Objectives
The objective of this chapter is to:

• define public laboratory services
• explicate role of general hospital in mental health program
• enlist administrative considerations

Learning outcome
At the end of this chapter, you will be able to:

• define the process of storage in hospital
• understand the process of purchasing for hospital
• analyse the administrative considerations
4.1 Introduction

Hospitals pose many challenges to those undertaking reform of health care systems. This chapter examines the evolving role of the hospital within the health care system in industrialised countries and explores the evidence on which policymakers might base their decisions. It begins by tracing the evolving concept of the hospital, concluding that hospitals must continue to evolve in response to factors such as changing health care needs and emerging technologies. The size and distribution of hospitals are matters for ongoing debate. This chapter concludes that evidence in favour of concentrating hospital facilities, whether as a means of enhancing effectiveness or efficiency, is less robust than is often assumed. Noting that care provided in hospitals is often less than satisfactory, this chapter summarises the evidence underlying three reform strategies:

- Behavioural interventions such as quality assurance programmes
- Changing organisational culture
- The use of financial incentives

Isolated behavioural interventions have a limited impact, but are more effective when combined. Financial incentives are blunt instruments that must be monitored. Organisational culture, which has previously received relatively little attention, appears to be an important determinant of quality of care and is threatened by ill-considered policies intended to ‘re-engineer’ hospital services. Overall, evidence on the effectiveness of policies relating to hospitals is limited and this paper indicates where such evidence can be found.

Hospitals pose many challenges to those undertaking reform of health care systems. They are, quite literally, immovable structures whose design was set in concrete, usually many years previously. Their configuration often reflects the practice of health care and the patient populations of a bygone era. Their incompatibility with present needs ranges from major design problems, such as a scarcity of operating theatres, to more minor problems, such as the lack of power sockets for the ever expanding number of electronic monitors.

It is not only the physical structure that is difficult to change. Hospital functions are also resistant to change, as illustrated by the persistence of large tuberculosis sanatoria in some countries long after they were required. Hospitals are staffed by the elite members of the medical profession who, in many cases, can use their excellent political connections to oppose changes that threaten their interests. An environment that is technically complex, surrounded by much uncertainty, and which contains information asymmetry, only enhances the mystique of the medical professional and often leaves the outsider confused and perplexed.

Given these barriers to change, it is unsurprising that hospital reform is viewed with trepidation by health policymakers. Yet hospitals are a very important element of the health care system. Financially, they account for about 50% of overall health care expenditure. Organisationally, they dominate the rest of the health care system. Symbolically, they are viewed by the public as the main manifestation of the health care system, as shown by the enthusiasm with which politicians seek to be photographed opening new hospitals.

This chapter seeks to redress this information balance by examining the place of the hospital within the health care system in industrialised countries. It draws on a major study being undertaken by the European Observatory on Health Care Systems, which addresses a series of crucial but often overlooked questions. First, why were hospitals created and do these conditions still pertain? Has the dramatic growth in knowledge and technology invalidated the nineteenth-century foundations of hospitals? More fundamentally, what do we mean by the term ‘hospital’ and does the designation of a building as a ‘hospital’ mean the same thing everywhere?

Second, if hospitals are to be integral parts of the health care system, what should they look like? What size should they be? How should they be distributed within a geographical area? What should they look like on the inside? How can hospitals be designed in ways that enhance their performance, both in terms of health outcomes and economic performance?

Finally, hospitals are often considered as black boxes when, in reality, they are complex adaptive human systems. Why do some hospitals seem to work well whereas others do not? How can hospital performance be optimised? These questions will be considered in turn.
Hospitals, as recognisable institutions, emerged at different times in different places, reflecting existing social and, especially, religious contexts. The first recorded hospitals arose in the Byzantine Empire in the fifth and sixth centuries AD.

- Hospitals in Western Europe emerged later, beginning in the monasteries
- A legacy reflected in the religious designations of many present-day European hospitals

Most health care relied on extended families and local communities, however, since formal health services had little to offer.

The industrial revolution brought enormous social changes that impacted on health and health care. The rapid growth of cities provided opportunities for transmission of infections, unsafe factories increased injuries, death rates rose rapidly, and social supports crumbled with increasing population mobility. A combination of philanthropy and self-interest among the wealthy stimulated both public health measures and the construction of new hospitals. However, urban overcrowding and high levels of infection often meant that going into these hospitals actually increased the chance of one dying.

By the end of the nineteenth century infectious disease was beginning to be understood. Semmelweis showed that hand-washing could reduce the transmission of puerperal fever. Lister’s introduction of antisepsis, coupled with the discovery of safe anaesthetic agents, made elective surgery safer. In England, Florence Nightingale established a professional basis for nursing. Hospitals were now able to offer more than basic care, but their role as a setting for medical treatment was not yet established, and the middle classes continued to have the doctor treat them at home. By the twentieth century, the hospital was beginning to take on its present-day role. Advances in chemical engineering laid the basis for a pharmaceutical industry; for example, research on chemical dyes led to the invention of sulphonamides. Hospitals began to offer cure rather than care. As the scope for clinical intervention increased, technology became more complex and expensive. By the 1930s, few surgeons operated on wealthy patients in their own houses.

Advances in military surgery in the Second World War had a profound impact on hospital care, with the introduction of safe blood transfusion, penicillin, and surgeons trained in trauma techniques. The greatest changes occurred from the 1970s onwards, however, with advances in laboratory diagnosis and the recognition of new, and often treatable, diseases. The massive expansion in pharmaceuticals transformed the management of diseases and conditions such as peptic ulcer, childhood leukaemia and some solid cancers. New specialities emerged, such as oncology, and common conditions such as peptic ulcer, previously treated with prolonged hospitalisation, were managed in ambulatory care. Whole new areas of surgery became commonplace, such as coronary artery bypasses, transplantation of kidneys and other organs, and microsurgery.

These advances took place against a background of changing patterns of disease. At least in industrialised countries, many infectious diseases were disappearing. General surgeons saw fewer cases of acute appendicitis. Orthopaedic surgeons turned to hip replacements, as a substitute for surgery on tuberculosis disease of the spine, or tendon transplants for poliomyelitis. Thoracic surgeons, no longer occupied by tuberculosis lung cavities, turned to the surgical management of lung cancer and to open heart surgery.

By the beginning of the twenty-first century, the work of a major hospital in an industrialised country has been transformed from that of a century earlier. The image beamed into homes throughout the world, in television programmes such as the North American series “ER”, is that a ‘hospital’ means a modern complex in which seriously ill patients are treated at high speed with highly technical equipment and by skilled specialist staff. A patient with a head injury is given an immediate magnetic resonance imaging scan and is seen by a neurosurgeon that has sub specialised in intracerebral trauma.
By contrast, a small rural hospital in a middle income country, providing basic care with limited facilities, could not be more different. For this image we can turn to the travel writer, Colin Thubron, who describes a small hospital in Siberia thus: “Inside the building was a simple range of three-bed wards, a kitchen and a consulting room. It had no running water, and its lavatory was a hole in the ground. Between the double windows the sealing moss had fallen in faded tresses. It was almost without equipment.”

4.3 The Hospital as Teaching Centre

A hospital system should include provision for training the staff needed to man all the health services of a country, both curative and preventive. Every hospital, whatever its size and whether or not it is designated as a teaching hospital, should be regarded as a potential centre for teaching and research. In the larger hospitals, special facilities must be provided to encourage these functions.

Medical education can conveniently be divided into undergraduate and postgraduate levels. Undergraduate education lasts from the time a student enters his medical school until he passes his qualifying examination. In most countries, he then undergoes a period of postgraduate training before he is permitted by the law of his country to practise as a doctor. The medical school usually comes under the aegis of a university, comprises the buildings lecture theatres, dissecting rooms, and laboratories. Among others in which the student’s preclinical work is done and sometimes the associated teaching hospital, where he is brought into contact with patients.

In some countries, the medical school does not have its own hospital but makes an agreement with the hospital authorities permitting it to utilise the required number of hospital departments for the teaching of clinical medicine. In this case, the hospital doctors have teaching responsibilities and their qualifications are recognised both by the university and by the hospital authorities. In the present chapter, any establishment that fulfils a double role treating patients and teaching medical students will be referred to as a teaching hospital, irrespective of its administrative pattern.

It is obviously not practical in a book of this kind to describe in detail the establishment of an undergraduate teaching hospital in terms of buildings and teaching staff, but it can be stated that a teaching hospital has a triple role to play. It must provide for the treatment of the sick, for medical education undergraduate and postgraduate and for research. It is therefore necessary for generous provision to be made in size, number, or both of the many parts of the hospital laboratories, consulting and examination rooms, operating theatres and others to accommodate students in addition to the normal staff working therein. There will also need to be provided lecture theatres, demonstration rooms, a library, a museum, and clinical laboratories in association with wards, research laboratories, and other facilities. Because a teaching hospital ought to have a full range of medical services, it is, in most cases, identified with the regional hospital centre.

A teaching hospital tends to be somewhat selective in the types of patient it admits, often giving preference to those who are suffering from rare conditions or who are suitable subjects for research. Though it is important that a medical student see patients of this sort, it is also important that he acquire a thorough working knowledge of common ailments the kind that are likely to make up the bulk of his work if he goes into general practice. For this reason there is much to be said for an undergraduate’s spending, for example, six or twelve months of his clinical years in district hospitals, where he is likely to encounter an unselected cross-section of the diseases of the locality. If this is to be the policy of the planning authority, some additional accommodation will need to be provided in selected district hospitals lecture and demonstration rooms, studies, cloak-rooms, and so on.

Postgraduate clinical education is less didactic than undergraduate medical studies and is mostly a matter of gaining further knowledge, experience, and judgement by practising a specialty under the supervision of an expert. A planning authority will need to establish posts equivalent to that of a registrar in teaching, regional, and district hospitals in which young doctors of ability may work under expert supervision with a view to becoming, in due course, masters of their specialty and to attaining senior posts in the service. If a sufficiency of such training posts cannot be found, it may be necessary for a country to send its graduates abroad for more advanced training. In addition to the medical training of doctors, the hospital has a responsibility to provide clinical facilities for the training of nurses. However, an adequate nursing staff should be employed by the hospital to cover all the nursing service needs.
Arrangements should also be made for the training of radiographers and of physiotherapists; but, important as their work is, they will not be needed in numbers at all comparable to that of nurses. Consideration should be given to the establishment of a limited number of training schools for radiography and physiotherapy, which would entail some augmentation of the relevant departments in a few selected hospitals.

The training of laboratory technicians should also be undertaken, but this can be done in any reasonably well-established department of pathology by a system of apprenticeship supplemented by courses in theory.

4.4 Hospital and Public Health Laboratory Services

Historical events and tradition have led, in some countries, to the development of hospital and public health services as separate and parallel functions. In other countries the treatment and the prevention of disease are the responsibilities of a single health service. Between these two extremes there are many intermediate types of organisation. Common to them all is the need for an efficient and reliable laboratory system if prevention of disease, on the one hand, and diagnosis and cure, on the other, are to be effective. If the opportunity arises in a developing or expanding health service to handle both functions through a unified laboratory service, there are important reasons for doing so.

A laboratory that is concerned solely with public health work tends to be oriented towards the concept of disease as a manifestation of community life. A hospital laboratory, on the other hand, concentrates upon the individual patient. There are many points, however, at which the interest and functions of public health and hospital laboratories merge. Prophylaxis of infectious disease in the community by immunisation procedures, by control of water and food supplies, and by supervision of community hygiene is the first and obvious way in which the public health laboratory decreases the number of persons likely to become hospital patients. However, having achieved an increasingly successful control of infectious disease, public health administrators are now tending to turn their interests to other aspects of community environment that have a bearing upon the potential hospital patient load. Their interests are being drawn, for example, to such matters as food control, atmospheric and water pollution, industrial hygiene, early cancer detection, prevention of sepsis in hospitals, Rhesus sensitivity in antenatal patients, and other relevant matters.

The responsibilities of public health laboratories are, therefore, spreading into fields that overlap those of hospital laboratories. Overlap is also evident in the responsibility that the hospital laboratory assumes for patients admitted for pulmonary conditions induced by heavy atmospheric pollution, patients with carcinoma or viscerotoxicity induced by industrial processes, patients with undetected late cases of cervical cancer, diseases complicated by strains of organisms resistant to antibiotics, cases of Rhesus sensitivity, and conditions caused by food poisoning or water pollution. In the reverse direction, the central sterilisation department of a hospital might well consider as one of its community responsibilities a “syringe service” to the medical profession in the area, thus reducing the public health risk of infectious hepatitis transmitted by improperly sterilised syringes.

Increasingly closer contacts between public health and hospital laboratory functions underline the need for a single, unified laboratory service that will serve equally the prophylactic and the diagnostic needs of the community and of the individual. Fragmentation of laboratory services is undesirable; and, inasmuch as the hospital diagnostic laboratory must, of necessity, be situated within the hospital perimeter, it is well to have the functions of the public health laboratory closely related to those of the hospital laboratory. This not only permits a certain elasticity of service, but also brings medical officers of health and clinicians into closer relationship. Through the medium of the laboratory, which serves the responsibilities of both, they are enabled to devise programmes centred upon the regional hospital, which can thus be a preventive as well as a curative centre, and one in which the medical officer of health is involved in the hospital service. A co-ordinated national health laboratory service not only meets the needs of both preventive and curative medicine, but also is more economical and avoids the overlap and duplication that are the inevitable result of parallel services.

4.5 Role of the General Hospital in the Mental Health Programme

The need to developmental health services as a part of general health care has been frequently stressed by the World Health Organisation. As a starting point for relating the hospital service to the mental health programme, general practitioners, social services, public health services, and health clinics should rely on the psychiatric services of the
general hospital for early diagnosis and treatment of mental illness. The integration of the general hospital psychiatric services into the community psychiatric services can be established on this basis. Psychiatric clinics can be held in the hospital out-patient department, where the psychiatric staff psychiatrists, psychologists, nurses, and social workers can first consider whether the patient can be treated through domiciliary care, with visits to the outpatient clinic. This is the preferred course of action since it avoids removing the patient from the community, where, like everyone else, he belongs.

If out-patient treatment should be inadequate, it may be appropriate to give day or night psychiatric care within the community. If this still leaves opportunity for the patient’s condition to deteriorate, or permits too little control of his illness, a third possibility could be considered: day or night treatment in a centre within the precincts of the general hospital. Should all these possibilities be excluded, should all emergency situation become apparent during the first consultation, or should it be thought advisable to keep the patient for observation, a period of in-patient treatment may be necessary; but it should not exceed an average of three months. With discharge to the community and expert after-care by the same social and/or nursing service (depending on the training and skill of the workers), it should not be necessary to have longer hospital care for the patient, except in a very small minority of cases. For such cases, it will be advisable to have well-equipped annexes to the general hospital for longer hospitalisation.

The whole question of mental hospitals is under discussion at the present time. In countries in which mental hospitals played a central role long before community services and psychiatric units in general hospitals were developed, there tends to be some competition between those who believe that the future of mental health lies in the improvement of the mental hospital and those who go so far as to state that such hospitals will, in the near future, disappear completely. Other experts, however, take a middle view. Under these circumstances, it is clear that, in the vast majority of countries, it would be wise not to begin with custodial care, but to emphasise strongly the need for active and intensive treatment of psychiatric patients, during the early stage of their disease, within the confines of the psychiatric service of the general hospital. The more psychiatry has its place in the general hospital, the more will patients and their families, no longer afraid of the stigma of the old insane asylum; seek help when the first symptoms of mental disease appear. Such a development for the setting-up of mental health services is advantageous both to psychiatry and to general medicine. Medical experts are becoming aware of the fact that, even when there are very clear somatic symptoms and diseases, emotional factors play a minor or major part in the causation of general illness in a high percentage of cases.

Since this monograph deals especially with health care as provided by district (intermediate) hospitals, not much will be said about specialist care such as child psychiatry, which could be better provided in regional and teaching centres. Nevertheless, it should be stated that there would have to be some facilities in the district hospital for child psychiatry, for geriatric services, and others. With regard to the psychiatric care of children, it has to be decided whether this can be provided more appropriately by the paediatric department or by the psychiatric service. There should, in any case, be close co-operation and interaction between these two services in a good general hospital. The requirements for the establishment of a child psychiatric unit should be set forth by a specialist in the field. In addition to some beds for observation, the needs will probably include treatment facilities for hospitalisation of moderate length, foster homes in which psychotherapeutic care can be given, and an out-patient department along the lines of a child-guidance clinic.

4.6 The Hospital as Consumer Central Stores

Hospitals are consumers of a great variety of goods; and the problems of storage, inventory, and distribution of these goods are of great importance. Supplies are most often stored and distributed from the department concerned. For instance, so long as the amount remains small and corresponds to a few days of consumption, food is kept in the annexes of the kitchen; linens in the laundry department; drugs in the pharmacy; surgical instruments in the operating block; and laboratory supplies in the laboratory. But, when the bulk of these goods is great, it becomes necessary to keep them in a central store.

In economically developed countries, where the network of trade centres is highly organised, it is generally not necessary to keep a large amount of goods in the hospital stores because the factories or retail departments are able to provide the hospitals, in a matter of hours, with a great number of items upon receipt of a simple telephone call. The
goods can be stored by the manufacturers, and the delivery of relatively small amounts can be made upon request. However, the rules of public administration are such that the cost and technical specifications of these items must have been agreed upon by contracts following examination of tenders.

Nevertheless, small hospitals can encounter difficulties in organising their own stores, especially when they cannot be certain that the delivery of an important item will be made at once in case of emergency. This applies, for instance, to spare parts for radiological apparatus, operating lamps, reagents for testing blood, and other supplies. Therefore, there is a tendency to organise a central store at the regional level. This central store is a kind of “co-operative” for all the institutions of the region. Contracts are made on a very large scale so that the regional storage centre can benefit from lower costs, have a comprehensive collection of spare parts for vital equipment, and organise workshops for the production of many items, such as perfusion sets, tubes, special laboratory apparatus, and other supplies.

In developing countries, the problem is of a different nature. Long experience has shown that, if countries do not possess within their borders a reliable medical supplies industry, with an output sufficient to cover most of the needs of the health services, so that they are necessarily dependent upon imports, bulk purchase and distribution of medical supplies on a national basis are the most economical practice. (Even in industrially advanced countries, economy and efficiency can usually be achieved by having groups of institutions procure and distribute supplies in bulk, as suggested above.)

In considering the arguments for or against the establishment of regional central stores, the main questions that must be raised at the beginning are the following: Is there already a governmental organisation to administer a medical supplies service? Is it functioning as part of the ministry of health or of some other government agency, such as the ministry of supply? To what extent are its services regionalised? What are its functions and responsibilities? Does it control all phases of the medical supply programme data accumulation, planning, purchasing, receipt, storage, and distribution? Does the government have the necessary physical facilities for handling supplies in bulk offices, warehouses, transport? To what extent are other government agencies involved in any of these operations? Are trained personnel available to fill at least key positions in all of the operations mentioned above? Are there local possibilities for producing linen, wood or metal furniture, cotton wool, bandages, crockery, glass, or other supplies? Does the country have pharmaceutical plants? Are there local representatives of dealers in X-ray equipment, surgical instruments, and laboratory apparatus to ensure maintenance and repairs?

4.7 Administrative Considerations

It goes without saying that there can be no effective working and smoothness of operation unless there is a sound administration to deal with the problems of medical supplies. All the wise planning, all the scientific counsel, all the financial operations will be wasted endeavour unless the administration of every aspect of the services is handled with a high degree of efficiency. This efficiency is dependent upon the services of properly qualified and trained personnel.

The chief official is, naturally, the most important figure. He must have knowledge and experience in the handling of medical supplies if not of all categories, then at least of those constituting the major requirements. He must have experience in business, that is, he must have a record of successful management in this field. It is not necessary that he should have a scientific specialty he need not, for example, be a pharmacist, and the assumption that only a pharmacist can fill the post of director of a medical supplies organisation is false. The specialty of pharmacy is too narrow for this very wide field. Similarly, this official need not be a medical practitioner.

It would seem and experience tends to bear this out that the obvious and most suitable agency to contain the government medical supplies organisation is the ministry of health, which would necessarily effect coordination with other government agencies concerned with finance, economics, and related matters.

The major activities of a medical supplies administration consist of the accumulation of data, the estimation of requirements, purchasing, storage, and distribution.
4.7.1 The Accumulation of Data

The assembling of realistic information upon which a programme can be built can only be achieved by a properly organised office force that knows how and where to get the needed information and how to present it. In order to estimate the requirements for supplies, it is necessary to know, first, who will be using them that is, the hospital facilities of the country and their bed capacity and, second, the respective rates of consumption analysed by groups first-aid stations, casualty departments, out-patient departments, general dispensaries, polyclinics, and the like. Similar and, in some cases, more complicated, analyses concerning supplies such as antibiotics and X-ray films, which have a limited life, or antimalarials the need for which fluctuates with the incidence of the disease, have to be worked out in different degrees for literally thousands of items. Unless such data are assembled with business-like attention to detail, a medical supply programme can become a matter of wild guess-work.

4.7.2 Estimating Requirements

The aim here must be to know not only the quantity required but also the quality. To achieve the necessary precision, knowledge of what is already available in the country must be at hand, as well as estimates of the total quantities needed to carry out the programme. Information on available sources of supply and the adjustability of need to suit the purpose are basic essentials for the clear presentation of the requirements. Planning preliminary to procurement of supplies must be realistic in outlook. The inclusion of items that are controlled or in short supply must be envisaged accordingly. The expendability of these supplies, both consumable and no consumable, must be determined according to their use.

An index of consumption and replacement cannot be found for all items and for all countries; there is no such thing as an international replacement rate. Variations in the characteristics of peoples are very pronounced. Thus, one nation may by nature be thrifty and careful, whereas others may be the reverse; and these propensities are reflected in the annual demands of their institutions. The standards of maintenance of machinery and apparatus are another highly variable characteristic. The unnecessarily prolonged use of certain therapeutic agents and the tendency in some countries to regard medicaments such as penicillin as panaceas have a direct bearing on the requirements for certain supplies.

There are available formulas, with which any medical supply expert should be familiar, that show the equipment necessary for unit numbers of beds and for various types of hospital and other medical installations. These formulas, which have been compiled from statistical data in technologically advanced countries, are useful references and provide a comprehensive mathematical means for calculating the requirements on a component basis. However, it is the task of the planning group to relate the data of these formulas to the data that have been locally accumulated and to the peculiar exigencies of the country, and to adjust the requirement programme accordingly. This has been found to be the key to accurate and appropriate planning.

Planning is not to be thought of simply as a limited activity preceding the formulation of requirements. It is a continuous process involving knowledge of all the other operations of a medical supplies programme, and requires a continuous study and follow-up of past and present activities in order to prepare for future operations. For example, with regard to X-ray machines, the planner must decide on the quality and quantity required on the basis of the existing data, the present X-ray facilities in the country and their condition, the degree to which the machines are suitable, and the ability of those who use them. When the planning does not involve replacement of existing equipment, the scope of the projected work, the availability of trained medical and technical staff, the suitability of other technical components, and the type and constancy of electric current are all important for the determination of the requirement specifications and figures. The procurability of the materials required within a specified time and the storage, handling, distribution, and delivery to the point of ultimate use are all factors of weight in the preparation of a realistic order.

Broadly speaking, there are two aspects to planning. The one is budgetary and involves the determination of a proposed total expenditure on the basis of monetary estimates for established item categories, for preliminary appropriations. The other is the more specialised and technical task of preparing detailed lists to goods for purchase.
4.7.3 Purchasing

Procurement involves the choosing, according to item specifications, of the best source of supply, establishing a delivery date, and the acquisition of items at the most favourable cost. The difficulty in procurement of medical supplies lies in the enormous variation in specifications for the same standard item, the number of standards that exist in the world, and the many sources of supply for each standard. For instance, proprietary preparations of acetylsalicylic acid are innumerable, and it is also sold by many firms under the common name; and a piece of apparatus, such as an electrocardiograph, can be produced in probably equal quality by many countries. This is true for most of the items in a medical supply programme. A further difficulty lies in the restrictions imposed by the foreign exchange policies that are in existence almost everywhere. In addition, because of certain trade agreements, a country may be subjected to pressure to purchase through channels that are not the cheapest ones. These factors, together with the complications resulting from the present world supply situations, make it hard to reach a decision in terms of money or in kind.

4.7.4 Storage

The administration of storage covers the receipt, storage, maintenance, and issue of supplies at a general depot. The operation differs from storage operations of other commodity groups, food supplies, and engineering supplies because small quantities of medical supplies may represent great sums of money, and because special storage conditions are required for their preservation. Practically all forms of storage are involved in the handling of medical supplies: the strong-room for housing narcotics, the cold room kept at -20°C for the storage of live virus vaccines, the spacious warehouse for hospital equipment, and the shelter for barrels containing crude disinfectants.

The sorting-out of medical supplies and the storage in proper sections of the warehouse, according to item classifications, of the thousands of individual commodity lines, are highly technical matters. Swift and accurate delivery can be assured only by a uniform and intelligent system of identification and cataloguing. The identification of each item by nontechnical personnel is impossible unless there is a simple, progressive, numerical coding system. The warehouse catalogue, the key to this labyrinth, must be clear, ample, and up to date; and its maintenance should be the responsibility of the specialist head of each section. When a word description does not suffice for accurate identification, as in the case of a complicated apparatus or something new to the country, illustrations are a necessary supplement to the catalogue.

It is obvious that different items require different kinds of handling and storage. For instance, it would be a mistake to keep together the laboratory and the pharmaceutical equipment and supplies. The use of these two categories of material is very different: pharmaceutical supplies are expandable and never come back from the hospital, whereas a great amount of laboratory equipment is returned to the central laboratory for control and reconstitution of sets.

In imports from countries of a different language, difficulty may be experienced in identification, storage, issue, and, what is more important, the end-use of the product. Unless such items carry labels and instructions for use, including dosage equivalents, in the language of the receiving country, translation of the necessary information will become a part of the storage operations. This is particularly essential in the case of dangerous drugs. The risk of fire and explosion in a medical supplies warehouse, and the storage of items such as picric and nitric acids, inflammable materials, and oxygen and other gas cylinders merit special attention.

A properly functioning inspection service is necessary. There are, in a relatively limited space, supplies of great value, requiring constant attention, not only from the viewpoint of the risks suggested above, but also with the object of proper maintenance of the stock and the premises. A repair shop is a useful and economical activity of this service.

The preparation of consignments for distribution requires appropriate procedures, especially in the handling of fragile and precision equipment, with due consideration of the time factor. Great losses can, and do, accrue from careless and unskilled packing and lack of attention to the very important handling instructions, especially when these appear in a foreign language. The keeping of accurate supply records and inventories and the preparation of reports require experienced clerical staff.
The introduction of machines for storage operations has been an advance in modern warehousing. However, the mechanisation of these operations must be examined in relation to the volume of work, the speed of handling required, and the cost of ordinary labour.

4.7.5 Distribution
Distribution includes all movements of supplies, both incoming and outgoing, at the point of arrival, at the manufacturer’s plant, or when ready for issue at the State warehouse. The necessary transport facilities must be available; and, for smooth and rapid flow of materials, liaison should be established with the authorities controlling ports, railways, air freight firms, road hauliers, the postal services, and other agencies as needed. The administration’s object will be the organisation of this final and important stage of the whole supply operation with the major aims of speed and efficiency of movement. Where no satisfactory common means of transport exists, it may be necessary to maintain a network of conveyance either alone or in conjunction with other government services.

The distribution services must observe the same care with regard to instructions concerning loading and shipping as have been previously mentioned with reference to packing. It must always be borne in mind that every load of medical supplies carries an element of particular risk. Few consignments leave the warehouses that do not include some highly inflammable materials, such as alcohol or ether, or other potentially dangerous substances, such as strong acids and alkalis. Of equal importance is the care required for the safe transport of delicate apparatus; and special attention must be given to radioactive agents’ isotopes and radium, or cobalt stock.

It must always be remembered that the store service exists to serve the medical supplies needs of the hospital. Therefore, it is a vital part of the task of the store service to win the confidence and co-operation of the doctors, nurses, and hospital workers who use what it provides. This can be achieved only if the store service personnel consult freely and continuously with the doctors and the hospital staff concerning their needs and explain to them the policy and methods of the service. Rigid bureaucratic methods are to be strenuously avoided.
Summary

- Hospitals pose many challenges to those undertaking reform of health care systems.
- Isolated behavioural interventions have a limited impact, but are more effective when combined.
- Hospitals are, quite literally, immovable structures whose design was set in concrete, usually many years previously.
- By the beginning of the twenty-first century, the work of a major hospital in an industrialised country has been transformed from that of a century earlier.
- Most health care relied on extended families and local communities, however, since formal health services had little to offer.
- Hospitals, as recognisable institutions, emerged at different times in different places, reflecting existing social and, especially, religious contexts.
- Advances in military surgery in the Second World War had a profound impact on hospital care, with the introduction of safe blood transfusion, penicillin, and surgeons trained in trauma techniques.
- A hospital system should include provision for training the staff needed’ to man all the health services of a country, both curative and preventive.
- Arrangements should also be made for the training of radiographers and of physiotherapists; but, important as their work is, they will not be needed in numbers at all comparable to that of nurses.
- A laboratory that is concerned solely with public health work tends to be oriented towards the concept of disease as a manifestation of community life.
- Procurement involves the choosing, according to item specifications, of the best source of supply, establishing a delivery date, and the acquisition of items at the most favourable cost.
- The need to developmental health services as a part of general health care has been frequently stressed by the World Health Organisation.
- The distribution services must observe the same care with regard to instructions concerning loading and shipping as have been previously mentioned with reference to packing.

References

- McKessonNews, Some special roles of the Hospital, [Video online] Available at: <http://www.youtube.com/watch?v=xysb3Tw2Fgs>[Accessed 4 December 2012].
- Ignousohs, Some special roles of the Hospital, [Video online] Available at: <http://www.youtube.com/watch?v=s0yJd3P5NgU>[Accessed 4 December 2012].

Recommended Reading

Self Assessment

1. Which of the following statements is false?
   a. Isolated behavioural interventions have a limited impact.
   b. Isolated behavioural interventions are not effective.
   c. Physical structure of hospital is difficult to change.
   d. Hospital functions are resistant to change.

2. __________, as recognisable institutions, emerged at different times in different places, reflecting existing social
   and, especially, religious contexts.
   a. Hospitals
   b. Colleges
   c. Medical College
   d. Temple

3. Most health care relied on extended __________ and local communities.
   a. society
   b. environment
   c. families
   d. hospitals

4. As the scope for __________ intervention increased, technology became more complex and expensive.
   a. medical
   b. clinical
   c. environmental
   d. human

5. The assembling of realistic information upon which a programme can be built can only be achieved by a properly
   ________
   a. organised office
   b. organised hospital
   c. organised society
   d. standardised environment

6. __________ of laboratory services is undesirable.
   a. Organisation
   b. Standardisation
   c. Fragmentation
   d. Improvisation

7. Which of the following is not one of the factors of weight in preparation of realistic order?
   a. Storage
   b. Handling
   c. Delivery to the point of ultimate use
   d. Ordering
8. The distribution services must observe the same care with regard to instructions concerning loading and
   __________.
   a. shipping
   b. packaging
   c. moving
   d. distributing

9. __________ bureaucratic methods are to be strenuously avoided.
   a. Flexible
   b. Easy
   c. Innovative
   d. Rigid

10. Match the following

<table>
<thead>
<tr>
<th>1. Accumulation of data</th>
<th>A. The receipt, storage, maintenance, and issue of supplies at a general depot.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Distribution</td>
<td>B. The choosing, according to item specifications, of the best source of supply, establishing a delivery date, and the acquisition of items at the most favourable cost.</td>
</tr>
<tr>
<td>3. Storage</td>
<td>C. All movements of supplies, both incoming and outgoing, at the point of arrival, at the manufacturer’s plant, or when ready for issue at the State warehouse.</td>
</tr>
<tr>
<td>4. Purchasing</td>
<td>D. The assembling of realistic information upon which a programme can be built.</td>
</tr>
</tbody>
</table>

   a. 1-D, 2-C, 3-A, 4-B
   b. 1-C, 2-B, 3-D, 4-A
   c. 1-B, 2-C, 3-B, 4-A
   d. 1-A, 2-C, 3-B, 4-D
Chapter V
Planning Procedures and Estimates

Aim
The aim of this chapter is to:

• explain planning methods
• elucidate short and long range implications
• explore steps in hospital planning

Objectives
The objective of this chapter is to:

• enlist estimation of requirements
• explicate total project budget
• define present master plan options to hospital planning

Learning outcome
At the end of this chapter, you will be able to:

• recognise development of site plan
• understand master facility plan
• identify area wide factors
5.1 Introduction

The economics of healthcare planning can either make or break a hospital. In addition to codes and regulations, hospital administrators have to consider the Return on Investment (ROI) for upgrading their facilities. The question we have to ask is, “What is the most cost efficient method of expansion: adding or renovating facilities?”

The hospital administrator realises that the hospital is part of the community, and the input from physicians, staff, and community leadership is vital to survival. If leadership chooses to build a new hospital based solely on financial feasibility numbers, there is no guarantee that the new hospital will bring in the same amount of business as the old one. On the other hand, many small hospitals cannot function properly simply due to the age and obsolete condition of the current building. Building a new hospital may be the more expensive route, but it may dramatically improve the efficiency and quality of health care over time. In this study, we take a look at one example of the hospital planning process in which we answer these important questions: Should we stay and expand, or should we relocate?

In 2004, Mercy Health Partners hired the HFR planning team to conduct a campus master planning study for the Mercy Hospital of Tiffin, a small, rural hospital in central Ohio. The original hospital building was over 90 years old, and leadership was facing problems such as crowded and inefficient departmental spaces, outdated engineering systems, and growing patient volumes in limited space. With a limited budget, Mercy Tiffin had to expand its facilities to accommodate for the growing patient volumes. After a thorough analysis of the building, EMhc concluded that it was time for the hospital to phase out of the old facility and relocate, in phases, to a new site.

In 2004, Mercy Health Partners hired EMhc to conduct a campus master planning study for the Mercy Hospital of Tiffin, a small, rural hospital in central Ohio with a strong leadership team. The original hospital building was over 90 years old and in need of repair and expansion.

Significant portions of the facility were built in 1912 and 1947. Leadership was facing problems such as crowded and inefficient departmental spaces, outdated engineering systems, and growing area-wide opportunities within the regional network. The inpatient bed units consisted of mostly semi-private rooms, and the leadership hoped to upgrade to all private rooms, suitable for family support and patient care. The hospital was also faced with growing patient volumes and limited space to provide diagnostic treatment. With a limited budget, Mercy Tiffin had to expand their facilities to accommodate the growing patient volumes, recruit high-quality physicians, and retain staff that had been working for years in very inadequate spaces.

Progress was taking place, but it wasn’t enough! Access and image became the key “watch words” for the next steps in updating the facility. The vision was to create an efficient facility that fostered suburban renewal and family-friendly care. Before “blindly” proceeding ahead with designing a facility on paper, leadership wanted to hire a consultant to assess their space needs to determine the most financially feasible solution. The selection process for planning consultants was competitive, but balanced and thorough. EMhc and HFR Architects were engaged as the planning consultants, and the team initiated the planning process.

5.2 Planning Methods

The team (planner, owner) followed a ten-step master planning process, normally completed within a 12 to 15 week time frame. Timing depended on the size and complexity of the project. In the Mercy Tiffin project, a little more time was needed to determine if a replacement hospital was more cost-efficient than renovating the older facility. We also involved the community in a series of community awareness and feedback meetings and undertook the steps highlighted below.

5.2.1 Project Start Up Session and Questionnaire

In this first step, EMhc needed to assess the hospital’s present situation and compare the situation with area-wide and national trends. We suggested that Mercy Tiffin create a Planning Committee with five to seven executive leadership members to direct the planning efforts. Membership normally consists of hospital senior leadership, such as board members, medical staff, and administrative leadership. The Mercy Tiffin Planning Committee included the hospital’s Chief Executive Officer, Chief Financial Officer, VP Human Resources, VP Clinical Services, VP Physician Relations, and the Director of Engineering.
EMhc conducted a preliminary meeting with the Planning Committee and hospital departmental directors. During this open forum, we discussed the planning process, outlined the project work schedule, and reviewed relevant trends in health care. Key staff helped us electronically distribute our departmental questionnaire (Q/A) form and general data requests to each of the department heads. In some cases, one department head managed multiple departments, and we asked that one form be completed for each department separately. The Q/A forms helped us to identify key functional factors, client goals, and current conditions, staffing patterns, future trends and clinical volumes for each hospital department. Clinical volumes were needed to complete the workload projection calculations in Step 4. This interactive process is key to building consensus and justifications for change.

5.2.2 Situation Assessment and Area Wide Factors
The purpose of Step 2 was to confirm the program and service scope for Mercy Tiffin and to develop a week-by-week project work plan for the duration of the planning project. Team member assignments were made in tandem with local and system-wide consulting partners on the master planning team, including planners, architects, engineers, demographers, etc. During this step, the EMhc team also prepared as-is composite site plans and building composite floor plans suitable for use during the first round of departmental interviews. Existing departmental boundaries and room sizes were crosschecked and noted on the existing plans. Everything was converted to automated one-line drawings.

Completed questionnaire forms were compiled, reviewed, and formatted for the first round of interviews. EMhc used the clinical data provided in the Q/A forms to determine workloads for each department and make linear projections for a ten-year time frame. These projections were later used to develop a phased room-by-room space program of the hospital and related functions that might be included on the new campus.

5.2.3 Interview Sessions with Directors
The purpose of the one-on-one departmental interviews was to integrate the perceptions of the board members, medical staff, senior management, and departmental managers into the campus master planning process. Physician involvement and input was also important to building consensus in the master planning process. During this phase of work, EMhc conducted interviews with the departmental directors and key staff to ascertain their opinions and guidance and to share ideas that may be of value as the upgrade of existing facilities is carefully considered and compared to new construction.

Options and concepts related to “new construction versus renovation” and “lease versus purchase” were tested and recorded. The interview was divided into three-day sessions with the following agendas.

Session no. 1
Session one comprises of the following:
- Record narrative input and confirms statistical data
- Use interactive visuals to illustrate notes
- Compare and contrast to other providers

Session no. 2
Session two comprises of the following:
- Review notes, test space and functional needs
- Room-by-room analysis and functional factors
- Test planning concepts with architect/engineer
- Prepare site-planning options for review
Session no. 3

Session three comprises of the following:

- Present master plan zoning and site concepts
- Master Plan options and recommendations
- Pros/cons and Return on Investment (ROI)
- New site versus existing (pros/cons and alternatives)

**Short and long range implications**

These interviews also allowed EMhc and the hospital to justify the quantity of diagnostic and treatment spaces based on historical utilisation and projected needs. Based on the conversations, service lines were sized appropriately based on numbers and staff feedback. Acute inpatient rooms, for example, were reduced in quantity to permit more efficient use of private rooms and alternative “swing beds”.

**5.2.4 Departmental Space Allocation Program and Master Plan Concepts**

All departments that were carefully studied to determine existing conditions and projected space needs over time. Each service or department was tested for size and need and converted to net square feet (NSF), departmental gross square feet (DGSF) and building gross square feet (BGSF). These “building blocks” were used for the master zoning of each campus. Each room and/or space was carefully reviewed to consider:

- Human performance standards and needs
- Efficiency and staff interactivity plus flow patterns
- Furnishings, equipment and clinical factors
- Space functionality, flexibility and future growth

EMhc used recommended building standards from the Guidelines for Design and Construction of Hospital and Healthcare Facilities (1), published by the American Institute of Architects (AIA), to adjust the size and composition of each department. Functionality and size were reviewed carefully with the architect and engineer to ensure proper fit, design, and compliance with the hospital's expectations. The DGSF to BGSF factors were based on primary circulation, mechanical system needs and future infrastructure expectations. Future expansion was also a function of the construction cost and flexibility. During this phase, we also conducted research related to on-site ambulatory surgery and how the physician might participate as “vested” parties in the future business venture.

**5.2.5 Master Facility Plan and Building Zoning Concepts**

An Architectural Master Zoning diagram illustrated the zoning of each area of the building (existing site and new campus). The diagram used moveable blocks to represent each hospital department that were drawn to DGSF scale. Creativity was essential during this step, as EMhc required the input and guidance of the Planning Committee as the process evolved. Service re-alignments to economise on new efficiencies were tested at this phase of work. Building and site improvements were prepared for Planning Committee feedback and comment. In addition, we introduced the concept of placing non-clinical and “soft” functions into the Medical Office Building (MOB). This helped with initial capital costs and reduced costs per square foot in the “less technical” MOB.

**5.2.6 Develop Site Plan Alternative Concepts**

The purpose of Step 6 was to develop a comprehensive site plan of existing and proposed buildings. The site plan diagrams illustrated the best use of land and the zones of growth for the future. Key factors to address included image, access, and parking, building elements, future expansion, utility factors, and land value over time. In addition, we also consider possible sites for relocating the hospital. A civil engineer assisted and conducted numerous meetings with city planners in the Ohio Department of Transportation.
5.2.7 Total Project Budget, Schedule and Phasing

Once the Planning Committee approved the preliminary site plan, a preliminary project budget was developed for planning and phasing purposes. This budget was also tested with the architect, engineer, construction advisor, and Planning Committee prior to the presentation to the Board of Directors. Upon approval, the phase one schematic design (first phase of basic A/E services design work) was initiated to further fine-tune the space layouts and room-by-room design details. The project budget outlined the projected construction costs estimated on a per square foot basis, equipment budgetary ranges on a percentage basis, empirical site development costs, estimated professional fees, contingencies and inflation factors. The Planning Committee and departmental leadership played key roles in this phase of analysis as local conditions were considered and costs compared to other projects of similar size.

5.2.8 Present Master Plan Options to Hospital Leadership

Once the budget was fine-tuned, EMhc presented the “preferred” campus master planning options developed during the previous Steps 5–7 to departmental leadership. In previous projects, we also summarised the analysis of the existing facility master plan to illustrate the differences for background purposes. Directors were encouraged to share ideas, opinions and comments during the presentations. All comments and feedback were tested with the Planning Committee and incorporated into the campus master plan.

5.2.9 Final Budget/Phasing Options

At the conclusion of Step 8, the Planning Committee was asked to approve the preferred master plan direction prior to presentation to the Board of Directors. Staff comments were incorporated into the work effort and new ideas reviewed briefly for their appropriateness. The final master plan building zoning and campus site plan were compiled following this review and included: site plan concepts, sketches suitable for board comment, renderings as required, budgetary ranges, and project phasing.

5.2.10 Final Presentation to the Board of Directors

In the final step, EMhc presented the recommended master plan to the Board of Directors for comment. Members of the Planning Committee were invited to participate in the presentation process as well. Since Mercy Hospital of Tiffin was owned and operated by Mercy Health Partners, members of the Planning Committee also presented our recommendations to executive leadership for the entire hospital system. The project was funded, and the final architectural and construction designs were scheduled to be completely by 2006.

5.2.11 Results

The space program prepared for the existing building demonstrated a shortage of approximately 20,000 BGSF necessary to meet current hospital standards. Properly expanded space permitted the hospital’s transition to an “all private” and “family-focused” hospital design. Future analysis suggested the current room sizes in the existing facility were too small (diagnostic/treatment and patient care areas primarily) and in many cases the room layouts were not functionally appropriate to meet current standards of design, life/safety, and operation. Another major inhibiting factor was the very restrictive floor-to-floor heights, which prevented proper access for heating, ventilation and air conditioning equipment (HVAC). These limiting factors were most prevalent in the 1912 and 1947 portions of the existing hospital.

After a thorough analysis of the building, EMhc concluded that it was time for the hospital to phase out of the old facility and relocate, in phases, to a new site. Due to the condition of the hospital, it turned out to be more cost and time-efficient to build a new facility than to renovate the older one. EMhc’s team worked with hospital staff to complete a full-scale master plan and schematic design for the new campus. Users, patients, staff, physicians, planners, architects and engineers made good “decision-making” partners in completing the design.

Although EMhc did not participate in the ultimate site selection process, we were asked to provide an objective assessment of the site selected by the Planning Committee. The new site, located at the intersection of Highway 18 and 224 in Tiffin, was selected as an alternative site for development representing approximately 76 acres of available property. The land for the new site was relatively un-encumbered, had a gentle slope toward the major intersection and was bounded on one side by trees, residential property on a second side and a church on the third.
side. Access routing at Highway 18 and 24 was required with some street improvements that were submitted to the city for consideration. The fourth quadrant was also relatively un-encumbered and provided convenient service access as well as potential access points for other site tenants, including, for example,: Senior Housing, Skilled Nursing, and YMCA, Ambulatory Care Services and Medical/Professional (MOB) office space. The hospital master plan was created to fit the acreage on this alternative site.

In completing the master plan, EMhc addressed specific needs and problems associated with the older hospital and incorporated the following solutions into the design:

- Utilise less space to drive down the building costs
- Create better flow patterns between departments
- Convert from semi-private rooms to all private rooms
- Create a staff and patient-friendly work environment

The original hospital housed 24 inpatient beds in semi-private rooms. According to our workload analysis calculations, the projected bed need for year 2009 was 36 inpatient beds. The new hospital allowed adequate space to convert to all private rooms as recommended in the AIA Guidelines for Design and Construction of Hospital and Healthcare Facilities (1). In order to cut down construction costs, space needed to be shared and utilised efficiently such that the new facility could still house and maintain the recommended number of private rooms. The preliminary schematic design utilised the “pod concept,” which divided the 36 beds into three pods with 12 beds each. These pods shared common support functions and were spatially arranged with the six-bed CCU/ICU to create maximum visibility for nursing staff.

Due to the footprint of the facility, flow patterns were hindered between the diagnostic/treatment areas and support service areas. In particular, the surgery department was built into a very tight space in the old building, which created problems with patient transportation and holding. In addition, the building also had narrow corridor spaces that violated compliance codes. The space program increased circulation space and arranged the departments to allow for better flow patterns between departments. On the ground floor, surgery was placed adjacent to emergency to limit transportation time and distance between departments. The new facility also allowed for growing departments, such as imaging and emergency, to expand over time.

### 5.3 Steps in Hospital Planning

It is necessary to proceed in an orderly manner through a series of stages in the planning and building of a hospital. Appropriately qualified planning staff must be available at each stage and must be given sufficient time to do the necessary work in a careful and accurate manner. It is particularly necessary that sufficient time be allowed in the early stages of planning. It has been a common practice for hospital authorities to press forward too hastily in the preparation of the architects’ plans without sufficient preliminary planning. The result is always that, when the plans come under the scrutiny of the personnel who are going to work in the hospital, they are found to be all wrong. It is an expensive matter to scrap a complete set of architectural drawings: it may cost the hospital authority as much as 1% of the estimated total cost of the project to scrap the plans for a hospital, even at a fairly early stage. Time spent thinking out clearly what the requirements of the hospital are will save both money and time in the long run.

As a first step, a planning team should be assembled and given the task of preparing the architect’s brief. The team may consist of only two or three people to begin with, but will need to be enlarged as the project develops. The nucleus of the team will usually be one or two medical administrators, preferably with public health and social medicine orientation, and a lay-administrator, all experienced in hospital planning.

During the early stages of the project, while the extent of the need for the hospital is being assessed, medical and administrative personnel, with appropriate assistance in statistical matters, can work without other technical or professional members of the planning team. They will, however, soon need consultant advice from an architect. In some countries there are specialist architects employed within the national health ministry, or by the regional health office. In other countries, it may be necessary to call in consultant advice from architects outside the health service. However, that the planning of a hospital is a highly specialised matter that is outside the experience and competence of most architects engaged in normal practice.
Sometimes the planning of the hospital is the responsibility of the public works department or the ministry of construction, in which case it too often appears that the architects in charge are not sufficiently trained in hospital architecture. It will therefore be best to employ architects who are specialists in hospital building as consultants, either to the ministry of health or to the ministry of construction.

During the later stages of the project, architects and engineers from outside the health service and without previous experience in hospital building can be employed in an executive capacity, with good results; but, in the early planning stages, when consultant advice is required, hospital experience is necessary.

In most countries the administrative and medical members of the planning team will be available from among the employees of the health service, but occasionally in developing countries it may not be possible to take such personnel from their normal duties to form part of the planning team. In such cases, it may be necessary to seek men with appropriate experience from outside the official staff of the health service for this purpose. However the planning team is made up, it is essential that the key members should have sufficient time available to devote themselves effectively to the task.

The first task of the team will be to establish the need for the particular hospital under consideration in relation to the regional plan, as previously described. This will be based on the population and morbidity data of the region; projections of changes in medical practice, population, and economic conditions in the area and projections of the future development of the medical services. It will be necessary to define the role of the new hospital in relation to a regional plan.

At this stage it will also be necessary to determine the site. This may involve surveys of existing health facilities in the area and projections of the future development of transport, economic development, and the general building programme in the area. The planning team, which should include the architect, will need to collaborate closely with the authorities concerned with the economic development of the area and with the town and country planning authorities. At the conclusion of this stage, approximate estimates of the capital and running costs can be made and a master plan prepared.

The second stage will consist of the preparation of the architect’s brief. This work will involve, first, determining, in quantitative terms, the services to be provided in the hospital and, second, the preparation of schedules of accommodation based on the requirements of the services. At this stage, the team should be enlarged to include as a member the architect who will be charged with the general design of the hospital, in addition to the administrative and medical personnel who will have formed the team during the first stage. A senior member of the nursing staff of the hospital authority should also join the team at this stage.

This second stage is most important, as the design of the hospital will become crystallised by the preparation of the schedules of accommodation. Time and trouble spent during this stage will be well repaid and will enable the whole project to proceed smoothly, with a minimum of subsequent revision. In determining the services to be provided in the hospital, it will be necessary to consult, on an ad hoc basis, senior medical specialists and members of the nursing profession as particular problems arise. If at this stage any of the senior staff members of the projected hospital have already been chosen, then they should also be consulted with regard to those services for which they will ultimately be responsible. At the end of this stage, the architects’ brief should be complete. This will comprise general descriptions of the scope and functioning of each service, together with a schedule showing all the rooms required, with approximate floor areas, and notes on any special requirements or special equipment.

The third stage is the design of the hospital from the brief. This will be mainly the work of the architect. It will be necessary either to make a team of architects available from the health service staff or to commission a team from outside. The team engaged in the design may include one or more firms of architects, consultant mechanical engineers, and consultant civil engineers. The amount of work involved in the design process is considerable; from 10 to 20 architects and engineers will probably be engaged during the working-drawing stage of a 500-bed hospital; and the design costs are likely to amount to 10-12% of the building cost.
In some countries in which there is a shortage of professional architects and engineers, hospital building has been undertaken by “package deal” arrangements with large firms of contractors who operate on an international scale. Under this system the contractor takes responsibility for the design as well as the construction of the building and hires architects and engineers. From the point of view of the health authority, this system has the defect that the authority does not have the benefit of independent professional advice and some measure of control over the design and cost of the buildings is surrendered.

During the process of design, the medical and administrative members of the planning team will operate as consultants to the architects and engineers, answering their questions and defining the requirements of the hospital in detail. The design will proceed through a series of stages. First, preliminary designs will be produced and submitted to the planning team and the health authorities for approval. These preliminary designs will probably need some modification; but, when they are agreed on in their modified form, the architects and engineers can proceed to prepare working drawings.

These working drawings will constitute a complete set of instructions to the contractor for the building of the hospital; they will show the whole of the construction process in minute detail, and will be accompanied by specifications and bills of quantities. Close and continuous collaboration is needed throughout this stage among architects and medical and nursing members of the planning team. As the drawings proceed to greater detail, the advice of the medical and nursing members of the team will be needed on a day-to-day basis by the architects. Extra costs and severe delays will be involved if there are any important modifications in the design of the hospital during the working-drawing stage.

The final stage will be the actual building of the hospital. This will be carried out by a contractor, who may be selected by competitive tender. His work will be controlled and supervised by the architects and consulting engineers. At this stage, it will be still more unfortunate if any major alterations are requested by the hospital authorities.

The time required to complete the hospital will depend primarily on the capacity of the contractor to bring large numbers of men and working equipment to the project. For example, if a hospital is going to cost £4 million and the contractor can only deploy his forces to the extent of a maximum output of £500,000 a year, then the hospital will take eight years to complete. It is therefore important, when selecting a contractor, to investigate the capacity of his firm in terms of managerial personnel and plant capacity. It will be necessary to confine the list of those invited to tender to a limited number of firms that can satisfy the health authority with respect to their capacity to work at an appropriate rate.

During the construction period, it will be necessary to set up a second team in addition to the planning team to prepare for the “commissioning” of the new hospital. This team should include one or two experienced administrators and certain key members of the staff of the future hospital, in particular, the director of nursing. If possible, the senior physician, the medical superintendent, the chief nurse and the chief administrator should also be appointed a year or two before the hospital is likely to be finished so that they can take part in the work of the commissioning team. At this stage it will be necessary to decide, in detail, the staffing required and to arrange for the engagement of all staff. It will also be necessary to schedule the acquisition of items of furniture and equipment down to the last teaspoon and to arrange for their purchase and delivery at the appropriate time.

There will be special problems in staff training. The new hospital, unless it is to be out of date before it is finished, will certainly contain innovations of a radical kind. There will be new arrangements of the departments, and new equipment; consequently, many new working methods by staff of all kinds will be necessary. Obviously, staff cannot be transferred overnight from an old hospital with out-of-date methods of working and be put into the unfamiliar surroundings of a new hospital. It will therefore be necessary to plan and to carry out special staff training courses to give the staff the experience and confidence to enable them to function under new conditions. The key members of the future staff may be sent for training to modern hospitals in other parts of the country or, perhaps, abroad, where the methods and equipment proposed for the new hospital may have been recently put into operation. It is important not to underestimate the difficulties that staff will experience upon moving into a new building unless adequate preparation and training have been arranged beforehand. In view of the fact that patients will be admitted when the hospital is opened, this orientation may literally be a matter of life and death.
5.4 Estimation of Requirements

The first task of the planning team will be to determine the broad requirements for the new hospital. Where a regional plan already exists, the new hospital will be seen as providing part of the regional service; and the services it is to provide will be related to the regional plan and, particularly, to the regional hospital, which will act as a centre for referral of some types of case. The new hospital may itself provide supporting services to health centres and rural hospitals in its area.

The initial step will be to establish the area and population likely to be served by the new hospital. This is sometimes easy, as the area may be defined by geographical features or by communication facilities. Generally, in rural areas it is fairly easy to determine the population served; but it is more difficult in metropolitan areas, or in areas with a high density of population. In the latter, there will be other hospitals nearby, and the boundary lines between the service areas of the different hospitals may often be hard to determine. There are, however, techniques for defining service areas, as has been previously noted.

Once the population has been determined, it is possible to estimate the demand for medical care. In developed countries that already have a fairly high standard of care, there are established methods for surveying the demand. These methods, however, depend on the assumption that the demand for care, which can be measured, is reasonably close to the need that is to say, it is assumed that there is not any considerable volume of sickness that does not reach the notice of the hospital authorities in the form of requests for care. This assumption will not be valid in countries in which medical services are in an early stage of development and in which the need may be far greater than the overt demand. In such cases it is doubtful whether there is any value in trying to measure demand as it exists. It will probably be necessary to estimate the need for care on the basis of personal experience. It may be possible, however, to supplement the findings thus obtained, which are based on guess-work, by conducting an ad hoc survey of morbidity in the area. In any case, when the bed-to-population ratio in a region is less than one per thousand for acute diseases, there is little chance of being wrong in extending the bed complement up to double, provided the proposed hospital is sufficiently flexible to adapt to the changing needs. By one means or another, it will be necessary to predict broadly the demand for care in each specialty. Both the staffing and the planning of the building must start from such predictions. Even if they prove to be erroneous, it will at least be known what load of work the hospital has been planned to provide for, and it will be much easier to determine what modifications or additions are necessary if the design has, from the beginning, been related to an assumed and clearly stated volume of work.

Once the assumed number of patients presenting for care in the various departments of the hospital has been established, the requirements for the hospital can be estimated. Assuming that a certain number of out-patients will present themselves at surgical clinics in a month, then the staffing of the clinic and the number of consulting rooms can be determined by making an estimate of the average length of time each consultation will require. Similarly, in determining the number of beds that may be needed for medical cases, surgery, midwifery, and other departments, it will be necessary to make estimates not only of the number of patients that will present themselves for admission, but also of their length of stay in the hospital.

As an example of the method by which the broad outlines of a service can be determined, one may consider the provision for maternity. This would be established by taking the birth rate in the population and, in the light of local culture and medical opinion, estimating the proportion of births that would take place within the hospital. Next, the average length of stay that would have to be provided for in the maternity department could be simply worked out.

From the number of beds and from the predicted number of out-patient attendances, it is possible to proceed to an approximate definition of the requirements for the medical service departments, such as radio diagnosis and laboratories. There are available data from several countries that relate the demand for these services to the number of beds and to the number of out-patient attendances and these can be used to give an approximate guide to the scale of provision of services in these departments. The extent to which it is proposed to make the diagnostic departments available to general practitioners and clinic doctors would need also to be taken into consideration.
At this stage in the study it should also be possible to draw up rough figures for the “population” at the hospital site, including the patients and the staff of various categories. These figures are important, for they enable approximate estimates to be made of the requirements for the non-medical service departments catering, laundry, stores, boiler house, and others. Figures for staff population also enable the provision for staff housing to be estimated.

At the conclusion of the operations described above, it will be possible to establish, in broad terms, the volume of building required for the various sections of the hospital. It will also be possible to estimate the demand that the hospital will make on the public services, such as water, electricity, gas and sewage disposal. An architect should be able to give the hospital authority some idea of the cost of the project in round figures at this time. Furthermore, the operational costs of the hospital and of the staff salary can be approximated. Finally, an architect with specialist knowledge of hospital planning can make a master plan for the hospital development, once a site has been chosen.
Summary

- In addition to codes and regulations, hospital administrators have to consider the Return on Investment (ROI) for upgrading their facilities.
- The hospital administrator realises that the hospital is part of the community, and the input from physicians, staff, and community leadership is vital to survival.
- The team (planner, owner) followed a ten-step master planning process, normally completed within a 12 to 15 week time frame.
- The Mercy Tiffin Planning Committee included the hospital’s Chief Executive Officer, Chief Financial Officer, VP Human Resources, VP Clinical Services, VP Physician Relations and the Director of Engineering.
- Existing departmental boundaries and room sizes were crosschecked and noted on the existing plans.
- Options and concepts related to “new construction versus renovation” and “lease versus purchase” were tested and recorded.
- Acute inpatient rooms, for example, were reduced in quantity to permit more efficient use of private rooms and alternative “swing beds”.
- Future expansion was also a function of the construction cost and flexibility.
- Creativity was essential during this step, as EMhc required the input and guidance of the Planning Committee as the process evolved.
- Once the Planning Committee approved the preliminary site plan, a preliminary project budget was developed for planning and phasing purposes.
- The space program prepared for the existing building demonstrated a shortage of approximately 20,000 BGSF necessary to meet current hospital standards.
- Due to the footprint of the facility, flow patterns were hindered between the diagnostic/treatment areas and support service areas.
- During the process of design, the medical and administrative members of the planning team will operate as consultants to the architects and engineers, answering their questions and defining the requirements of the hospital in detail.
- During the construction period, it will be necessary to set up a second team in addition to the planning team to prepare for the “commissioning” of the new hospital.
- An architect should be able to give the hospital authority some idea of the cost of the project in round figures.

References

- CMSHHSgov., Planning procedures and estimates, [Video online] Available at: <https://www.youtube.com/watch?v=0PyPyS5r3Zo&feature=bf_play&list=WLiFC29hi3Pv5j9yNzuDepKarPmm0uv3NZ>[Accessed 7 December 2012].
**Recommended Reading**

Self Assessment

1. Which of the following inputs is not vital to the survival of hospitals?
   a. Physicians
   b. Staff
   c. Community leadership
   d. Ministers

2. Before “blindly” proceeding ahead with designing a facility on paper, leadership wanted to hire a ___________ to assess their space needs to determine the most financially feasible solution.
   a. doctor
   b. nurse
   c. consultant
   d. social medical worker

3. What is the time frame for ten-step master planning process?
   a. 12-15 week
   b. 5-10 week
   c. 10-12 week
   d. 7-10 week

4. Match the following

| 1. Project start up session and questionnaire | A. Integrate the perceptions of the board members, medical staff, senior management and departmental managers into the campus master planning process. |
| 2. Situation assessment and area wide factors | B. Each service or department was tested for size and need and converted to net square feet, departmental gross square feet and building gross square feet. |
| 3. Interview sessions with directors | C. Confirm the program and service scope for mercy tiffin and to develop a week-by-week project work plan for the duration of the planning project. |
| 4. Departmental space allocation program and master plan concepts | D. Assess the hospital’s present situation and compare the situation with area-wide and national trends. |

   a. 1-D, 2-C, 3-A, 4-B
   b. 1-C, 2-B, 3-D, 4-A
   c. 1-B, 2-C, 3-B, 4-A
   d. 1-A, 2-C, 3-B, 4-D

5. During the process of design, the medical and ___________ members of the planning team will operate as consultants to the architects.
   a. administrative
   b. hospital
   c. union
   d. share
6. Preliminary designs will be produced and submitted to the ________ team and the health authorities for approval.
   a. design
   b. architect
   c. planning
   d. executing

7. The first task of the planning team will be to determine the broad ________ for the new hospital.
   a. area
   b. requirements
   c. space
   d. infrastructure

8. The initial step will be to establish the ________ and population likely to be served by the new hospital.
   a. area
   b. requirements
   c. space
   d. infrastructure

9. The amount of work involved in the design process is considerable from ________ architects.
   a. 20-25
   b. 10-20
   c. 20-30
   d. 15-30

10. Contractor’s work will be controlled and supervised by the architects and consulting ________.
    a. owners
    b. engineers
    c. architects
    d. contractors
Chapter VI

Hospital Design

Aim

The aim of this chapter is to:

- explain choosing a site for hospital
- elucidate the master plan for hospital
- explore hospital zoning plan

Objectives

The objective of this chapter is to:

- define planning for growth and change
- explicate considerations based on climate
- enlist the plans for hospitals

Learning outcome

At the end of this chapter you will be able to:

- define hospital engineering
- understand planning a hospital
- identify site for the hospital
6.1 Introduction: Choosing a Site

The first consideration in choosing the site of a hospital is convenience for the patients. In view of the increasing importance of the out-patient service given by the hospital, convenience of access to patients is absolutely essential, and should take priority over other factors in the selection of the site. The next most important consideration is that the site should be large enough to enable the hospital to expand and develop in the future. Past experience has shown that much valuable investment in hospital building has been thrown away when too small a site has been chosen. The result is that, at some time in the future, the hospital cannot expand sufficiently to meet its responsibilities and has to move to some larger and often remote site, with consequent waste of much that has been put into the original project.

Unfortunately, the second criterion is often in conflict with the first, and must not be allowed to override it. Central positions, particularly in urban areas, are in great demand; and it is often difficult, or even impossible, to find a site big enough for a hospital in a central area. Sometimes there is a fairly well-developed main residential area, and the hospital can be sited in a central position in relation to this. Sometimes it is known that the town is going to expand in a particular direction; and it may be possible to find a large site fairly near the periphery of the present town that will, in due course, become central to the major residential area. Close collaboration with town-planning authorities is obviously necessary in choosing the hospital site.

In determining the area for the hospital, it will be necessary to have available the preliminary calculations described in the previous chapter. These will show the approximate total volume of the building, and the site area must be related to this. The degree of crowding on a site can be considered in terms of “plot ratio”. This is the ratio of the total area of the building on all floors to the area of the site. A “plot ratio” of one represents a building whose total floor area is equal to the area of the site that is to say, if the hospital is to be a two-storey structure, half of the site will be covered with buildings and the other half will be available for open space, access roads, car parking, and so forth.

For purpose of reference, it may be assumed that a plot ratio of two to one is the greatest that should be considered for hospital development, and that this ratio is acceptable only in the centres of cities, where a high density of building is the rule. Generally speaking, it will be found that hospitals developed at a plot ratio of two to one will give a crowded site, high buildings close to one another, very little open space, and a certain amount of overshadowing and overlooking between the buildings. In suburban and rural areas, a site should be sought that gives plot ratios of 0.5 to one or less. The degree to which a site may be built up will depend, to some extent, on whether the hospital is in an urban or rural area, on the climate, and on the general character of buildings in the neighbourhood.

Thus far we have considered only the area needed for the hospital as initially built, but in most cases a site should be accepted only if it provides room for substantial future growth. In principle, the site should be at least double the area required for the hospital as it is originally planned, though there may be exceptions in highly developed countries in which the projected new hospital forms part of an already highly developed service and shares its load of work with other hospitals.
As soon as one or more possible sites satisfying the requirements as set out above have been found, they should be surveyed by the architect, assisted by an engineer. The site will need to have available, from public services, supplies of water, electricity, and, perhaps, gas. It should also, preferably, have main sewerage that is capable of carrying the hospital effluent. If main sewerage is not available, the suitability of the soil for the installation of an effective sewage plant will have to be investigated. It should also be established that the site is free from air pollution from adjoining industries or other sources, and free from insect vectors of disease. The proximity of sources of noises, such as some industrial plants and airfields, should be avoided. In hot climates, it is important that the site be exposed to breezes, and in harsh climates, that it should be reasonably sheltered. The bearing qualities of the soil will also require investigation; the risk of earth movements, geological faults, or underground mine workings has to be considered.

### 6.2 The Master Plan

The first task of the architect is to prepare a master plan for the site as a whole. This plan should take into account foreseeable future developments of the hospital as well as the buildings erected in the first project. An architect who has specialised in hospital construction will be able to prepare a hospital plan once the results of the early studies, previously discussed, are available. At this stage there will be no schedules of accommodation or detailed plans of the individual buildings, but an architect with sufficient experience will be able to calculate the approximate volume of each building from the general data that are available.
The master plan is really the equivalent of an exercise in town planning on a small scale. It is mainly concerned with establishing the circulation routes on the site and the relative disposition of the various departments and buildings that make up the hospital. The circulation routes on the site are of prime importance, and the success of the hospital plan depends very largely on getting them right. A hospital has two independent sets of circulation routes external and internal.

AH the major departments need to be linked by internal traffic routes for the use of patients and staff and for the delivery of supplies from the supply areas to their points of use. A great deal of the interior traffic in a hospital involves the use of trolleys. Bedfast patients are moved on beds or trolleys; food and supplies are generally also moved on trolleys. Trolleys cannot be pushed up stairs, and all vertical circulation points within the hospital therefore have to be provided with lifts. Much of hospital planning stems from the problems of internal circulation and in particular, the need to localise vertical circulation, so far as possible, at certain key points. It is very much more economical and efficient to concentrate lifts than to distribute them among different parts of the building. Four lifts banked together will give the same service as eight individual lifts distributed at separate points.

The external traffic within the site is considerable. Ambulances and delivery vehicles need access to the buildings at various points. Staff and visitors to patients need car-parking facilities. Although there is likely to be a point, or points, where the majority of deliveries are made for the hospital as a whole, it is also desirable to have road access to all major sections of the hospital, and certainty to any independent buildings that there may be. This access will facilitate the bringing of heavy items of equipment close to the point at which they are to be installed. It is also necessary for the use of fire engines in the event of fire in the hospital, and will facilitate the maintenance of the fabric of the buildings.

In developing the master plan, areas have to be allotted within the site for each major department of the hospital. These areas should always be large enough to allow for each department to expand by additional building while remaining properly connected to the circulation networks. Only if this is done will it be possible for the hospital to grow in an orderly manner. In many old hospitals in which provision for growth was not made in the master plan, a necessary addition to one department has become a malignant growth, blocking some vital artery of communication. Certain broad principles for establishing the departmental zones may be set forth. The parts of the hospital that are most closely linked to the community should be allotted positions closest to the main entrance to the site.

6.3 Hospital Zoning Plan

These include the out-patient and casualty services and such offices or other facilities as are needed to provide a base for domiciliary services. Next in order of distance from the entrance should be a zone allotted to the medical service departments, such as radio diagnosis and the laboratories. These departments receive a great deal of work directly from the out-patient department and need to be close to it. Beyond this is the area allotted for in-patient care. Apart from the areas of the hospital used by the patients, there is a substantial area required for the housekeeping and domestic services stores, laundry, kitchens, and boiler house. These departments are best grouped together around a service yard, to which most of the delivery vehicles will go. This service area should be independent of, and can be remote from, the main hospital entrance. Staff housing, which will take up a substantial proportion of the site, can best be placed around the perimeter, to give the staff easy access to roads and public transport.

The considerations set out above will need to be related to, and perhaps modified by, the nature of the site. In many climates the orientation of buildings in relation to sunlight or to the prevailing breeze will determine many aspects of the master plan. Many sites are sloping, and this may areas to have a circulation system linking them with the operating theatres, radiological department, and other areas at a different level from the corridors used by out-patients and visitors. If the site is sloping, lifts will obviously be necessary; and the use of high, multi-storey buildings may prove more economical than low buildings connected by long corridors and scattered one- or two-storey lifts.
6.4 Planning for Growth and Change

The first requirement in providing for growth and change is room for expansion in the master plan, as suggested earlier; but there are other factors that need consideration. The master plan can develop in the form of a very concentrated building, making use, where necessary, of multi-storey blocks; or it can be comparatively loose, occupying more area on the ground and employing lower buildings.

The former approach will lead to a hospital which is compact and in which the distance from point to point within the hospital is minimised. There are many advantages in a compact hospital; it saves the time of the staff and helps to promote collaboration by making it easy for members of the staff to meet one another. But the more the hospital is planned as a single, massive block, the more difficult will it be to make effective provision for growth and change. The concentration of all departments close to one another means that only a very little space is available for each to expand into. Further, concentration makes it inevitable that the buildings go up to a fair number of storeys; and to add to a department on the fourth or fifth floor of a block is always difficult, and sometimes impossible. If such a department needs to be extended, it means taking over space from some adjoining department above or below it. This will involve massive redistribution and reorganisation of many departments. It is therefore necessary to weigh very carefully the advantages and disadvantages of concentrated versus diffuse types of structure. The principal factor in the decision will be the prediction of the amount of change and growth likely to occur. It may be that some sacrifice in concentration during the early years of the hospital’s life will be justified in the interests of allowing for future growth and change. The preparation of a master plan at an early stage will bring this consideration forward and enable the advantages to be weighed and a rational decision to be reached.

It is essential to consider which parts of the hospital are most likely to require room for growth and which are relatively static. The former should, if possible, be planned in comparatively low buildings, whereas the latter may be massed together to form tall blocks if necessary. The department for which growth can be predicted with certainty is that which deals with out-patient care. The outpatient work of hospitals has expanded vigorously during recent years and shows every sign of continuing to grow. Is therefore vital to provide for the easy extension of this department. The casualty service is also likely to require extension. In the more highly developed countries, in which economic and social advances and improvement in public health are gradually reducing the demand for hospital care due to illness, there is a continuous increase in the number of accident cases coming into the hospital. This increase results directly from the increase in motor traffic, and sometimes from mechanisation in industry and there seems no reason to suppose that further development in these directions will not cause continued increase in casualty rates.

The medical service departments, particularly the radio diagnostic service and the laboratories, will generally need to be extended. The demand for these services by the clinical staff is continually increasing as new methods of diagnosis and treatment become available. Therefore, these departments, too, should be planned to allow for substantial growth and should, if possible, be at ground level, or in two-storey buildings.

On the other hand, the accommodation for in-patients may, in many instances, not need to be extended to any comparable degree, if at all. There is hence relatively little objection to planning the in-patient accommodation in the form of multi-storey buildings. There are many practical arguments for doing so, as the services required on each in-patient floor can be conveniently and economically designed to run up and down in a vertical building, e.g., lifts can be planned to deliver food trolleys to the ward servers on every floor. The lavatories, bathrooms, and sanitary rooms can be placed one above the other, making use of vertical ducts for plumbing services.

Although it may not be necessary to increase the total amount of inpatient accommodation within a hospital, it will almost certainly be necessary to redistribute the accommodation among the different clinical departments, whose relative requirements for beds are likely to change within the life of the building. This can best be provided for by having on each floor a single, general-purpose arrangement, capable of taking any category of patient; then, shifting a user from, say, medicine to surgery on a particular floor will not involve any structural change. For reasons that will be set out in the next part of this book, certain in-patient accommodation that for children, maternity, infectious diseases, and psychiatry will require special planning. As a result, the in-patient accommodation for these services may best be planned as separate wings apart from the main block.
In certain climates, buildings have to be heated in winter or cooled in summer and in some areas, buildings may need both heating and cooling, at different times of the year. Wherever this is the case, running costs can be reduced by concentrating the buildings as much as possible. The more spread out the hospital is the larger is the surface available for heat loss or heat gain and the more expensive is the maintenance by artificial means of the desired internal conditions.

The expense of cooling by air-conditioning is very great, far exceeding that of heating in most climates. Therefore, wherever air-conditioning is deemed to be necessary, the building should be designed in as compact a manner as possible. The cooling costs will be directly proportional to the volume of the building, so the volume should be kept down by the use of low ceilings and by restricting the size of rooms to the absolute minimum. It is of vital importance that the decision should be taken at an early stage as to whether cooling by air-conditioning is required, as the whole design of the building will be affected by this decision. When in a hot climate it is concluded that air-conditioning is unnecessary or impracticable, and then the design of the building must be carefully considered in order to get the maximum natural cooling. In hot climates, air-conditioning will always be needed for operating theatres and, very often, for recovery wards, labour rooms, X-ray rooms, and other special areas.

There has been considerable research on the design of buildings for various tropical conditions, and the results are available in the form of recommendations. It is worth noting that the design of a building for comfort in a hot, humid climate is totally different from that in a hot, dry climate. Broadly speaking, in the former air movement past the body is the main objective. The buildings should be light and open and planned so that even the slightest breeze can pass right through the buildings at low level to cool the occupants. It is impossible to plan highly concentrated hospitals for use in hot, humid climates without recourse to air-conditioning. In hot, dry climates, the nights are cool, and the object of the building design is to protect the occupants from the fierce heat during the day. Buildings in these climates are therefore massive, with heavy walls and small windows. The heavy walls absorb the daytime heat and dissipate it at night. The small windows keep the amount of radiation entering the building to a minimum.

The orientation of buildings in hot climates is of critical importance. Generally speaking, they should be planned so that the long sides of each building face north and south. Sun falling on the buildings from the north or south is fairly easily controlled by horizontal louvers or awnings; sun from the east or west, which strikes the building at a low angle, is almost uncontrollable, and should be confined to the end walls. It is also well to plan so that the ends of blocks contain staircases, or other accommodation not in permanent use, as these areas will be hotter than the rest of the building.

In developing the master plan, attention must be given to the relation of buildings to each other with regard to sunlight and shade. In cool climates, where sunlight is desirable, buildings should not be planned so as to cut off one another’s light. In hot climates, the buildings can be planned to shade each other to some extent. The shadows cast by the sun can be studied by means of models on a device known as the heliodon, which simulates the movement of the sun. Architects concerned with the building of hospitals in tropical climates should take care to familiarise themselves with the great mass of valuable information now available on design for comfort.

In temperate climates, where the winters are not very long or very severe, it will not be necessary to give great weight to the problem of heating in relation to the general plan of the hospital, which can be designed primarily with other considerations in mind. But in climates of extreme cold and long winters, where the cost of heating is heavy, some thought should be given to making sure that the general plan results in a reasonably compact building.

The methods used for heating and ventilation of the hospital are important, as bad design can increase the risks of cross-infection. It has been shown that massive ventilation is very advantageous in reducing this risk. In warm climates, massive natural ventilation is easily obtained and is desirable, in any case, for comfort. It will therefore be wise to rely, in hot climates, on natural ventilation as much as possible and to have recourse to air-conditioning only under extreme conditions.
In cold climates, the ventilation of hospitals during the winter presents difficulties, as sufficient ventilation is apt to cause undue cooling by the introduction of cold air from the outside. It has been found in Scotland, for example, that, during the winter, ventilation rates in hospitals are extremely low because of the reluctance of staff and patients to open windows.

There is a tendency to install artificial ventilation in hospital buildings. With artificial ventilation, the air can be warmed before it enters a room; and good ventilation can be maintained even in very cold weather. But artificial ventilation for hospital use requires very careful design. Systems normally installed in buildings such as offices or hotels are not satisfactory in hospitals, and may dangerously increase the risk of cross-infection by transmitting contaminated air from one part of the hospital to another. Any proposal for artificial ventilation or air-conditioning in hospital buildings must, therefore, be submitted to expert bacteriological criticism before adoption.

Certain areas of the hospital must always be provided with artificial ventilation or air-conditioning. These include the operating theatres and any other areas in which open wounds are exposed to the air. These areas must be ventilated by special means to give a high degree of air hygiene. The design of a ventilating plant for these purposes is highly specialised, and must be entrusted to an expert.

6.6 Light and Colour
Most hospitals are lit by windows; but the amount of light coming in has not, until recently, been subject to scientific control. Recent research has enabled us to define natural lighting and to consider the design of windows to give the best results. Whereas old hospitals were sometimes under lit, many modern hospitals are over lit. Very large areas of glass can produce severe discomfort from glare and can also result in overheating of the building during the summer and in cold draughts during the winter.

It is important that patients lying in bed should not be exposed to too large an area of sky in direct view through the windows. In many tropical countries it is best if the view of the sky is completely cut off by shading devices; even in temperate climates, too much sky can cause serious discomfort. Control of glare from windows requires great care in design, and various special arrangements have been proposed for this purpose. It is therefore important for the architect to consider the design of the windows in the light of criteria that are now known to be good for hospital purposes.

Criteria for the artificial lighting of hospitals by night have also now been established. Study has shown that most of the methods of artificial light at present on the market are unsuitable for hospital conditions, and special fittings and equipment are available that provide artificial light in the form appropriate for hospital purposes. A note of caution is in order with regard to fluorescent lights: these may give rise to difficulty for doctors and nurses who have to assess a patient’s condition partly by reference to his skin colour.

Emergency arrangements for providing artificial lighting by a stand-by plant, in the event of a failure of electric power from the main source, are always essential. The colour used internally on the walls, ceilings, and floors of a hospital is an integral part of the design of the building and should be determined by the architect. The general lighting of a room is greatly affected by the colour scheme, and it is necessary for the colours to be considered simultaneously with the design of the windows if the best effect is to be achieved. Colour can make all the difference between a depressing or disquieting atmosphere and a restful or a pleasantly stimulating one. There now exists an international colour notation, and colours can be specified in relation to this.

6.7 Visual Impact of the Hospital
Hospital buildings are very large. In a town of small or medium size, the hospital will very likely be many times as large as any other building. As the hospital is very often set in a residential area among buildings of a domestic scale and character, the contrast between its size and the small, scattered houses around it may be very violent. In the past, hospital authorities and architects have been quite willing to treat the hospital as a massive and imposing monument. More recently, however, architects and town planners have felt some concern about the disruption of the visual scale caused by very massive hospital buildings. It has also been felt by some hospital authorities that a huge, monumental building is the wrong symbol for the modern hospital, which wishes to stress its links with the community and its human, personal character, rather than its power and glory as a temple of healing.
To some extent, the consideration of planning for growth and change, as discussed earlier, tends to soften the visual impact of the hospital. The parts of it that form its front door or shop window are the buildings for out-patient care, reception, and emergency care. These will almost certainly be located nearest to the entrance to the site, and may very well be planned as comparatively low buildings, in the interests of future growth and flexibility. The more massive buildings for in-patient care will be set back behind them, and thus be somewhat less imposing and terrifying.

The architectural handling of the design will also affect the visual impact of the hospital. The architect has the opportunity, in planning the hospital, to give visual expression to the human units of which the hospital is composed, or to suppress these divisions in the interests of uniformity. For instance, in designing a ward building, he could allow each nursing unit individual expression on the facade of the building; or, by giving each unit an identical series of windows, he could carry uniform architectural treatment over the whole. If he does the latter, the building will look powerful and monumental; if he chooses to do the former, the building will be more irregular in appearance and will look smaller and more human in scale.

6.8 Hospital Engineering

In developed countries, about a third of the cost of hospital building goes into the mechanical engineering service such as heating and ventilating, electricity, lifts, and communications. These services form the circulation and nervous systems without which the hospital cannot function. Therefore, the contribution of engineers to the design is of capital importance. Their help will be needed at an early stage, when the approximate demand for water, electric power, fuel, gas, and sewerage is being estimated. Their advice will be needed on the choice of site and on the master plan for the hospital. Later, they will have to design systems of heating and ventilation, lifts, and telephonic and other communications.

Engineers will have to concern themselves not merely with the installation of all the mechanical equipment, but also with its subsequent maintenance. They should advise the hospital authority on maintenance problems at a very early stage in the design. They should advise against the installation of any machinery or equipment for which maintenance arrangements cannot be guaranteed. Decisions on these matters may affect the master plan of the hospital, and they should be considered at an early stage.

The engineers must also collaborate with and advise the architect on the space that will be needed in the building to house the mechanical services. This space must be of sufficient size to allow not just for present services, but also for any future services that may be required. The mechanical services must be planned so that easy access can be obtained to all equipment for repairs and maintenance without disruption of the daily function of the hospital. As previously noted, provision must be made for stand-by power in the event of a general power failure at the main source.

All these considerations point to the fact that a modern hospital can be built and operated only if the town in which it is located is sufficiently well equipped with electric power, potable water, sewers, and other technical infrastructures. In addition, competent personnel must be available to maintain the mechanical and electrical equipment; and spare parts and other essentials for repair must be obtainable. All of these resources must be fully developed and at the disposal of other institutions as well as the hospital; it would be unrealistic to think that an isolated and self-supporting hospital could bear the cost of such technical services only for itself.

6.9 Hospital Hygiene

Another important factor in hospital design is the special attention that must be given to conditions of hygiene. Although hospitals exist to treat illness, they can, and often do, act as reservoirs of infection. Wherever accurate surveys have been made, it has been found that a substantial proportion of patients acquire infections during their stay in hospital that they did not have on admission. It has recently been estimated that about a million extra patient days in hospital result from the 1,500,000 operations performed in Britain each year because of post-operative sepsis. Apart from additional suffering or inconvenience, the cost of extra patient-days in hospitals as a result of cross-infection bears heavily on the patients themselves, on sickness insurance, or on the national health budget. It is therefore essential to take reasonable precaution in the design and organisation of hospitals to minimise the risk of infection.
In addition to the risk to patients and staff, hospitals can also prove a danger to the community if the arrangements for waste disposal are inadequate. The hospital’s sewage may contain dangerous organisms. In many countries outbreaks of typhoid have been traced back to pollution of the water supply by hospital effluents. The approval of health authorities should be sought with regard to hospital sewerage and disposal installations.

A few years ago, the introduction of antibiotic drugs substantially reduced the dangers of infection within the hospital. As a result, many precautions in the design of the buildings and in the methods of work by the hospital staff were abandoned or neglected. Unfortunately, in more recent years, strains, particularly of Staphylococcus, have developed resistance to nearly all antibiotics known at the present time. These resistant organisms tend to establish themselves in hospitals, whose staffs often become carriers. It is therefore more necessary than ever to pay the strictest attention to all available methods of control of infection.

The first line of defence must be appropriate training of all staff in correct methods of work. Staff must be trained in aseptic techniques for use in all surgical procedures and in “barrier” nursing of infectious patients. It may be extremely useful to secure the permanent advice of a technician with an engineering background in order to control and periodically survey all the many vulnerable points of the hospital, such as sewers, drains, faucets, lavatories, sinks, and so forth. The design of the buildings can also do a great deal to facilitate safe working by the staff.

One of the most important matters in planning a hospital is to consider the disposal routes of all waste and infected material. In every part of the hospital where patients are treated, there will be infected material to be disposed of. In wards there will be the patients’ bedding and infected utensils, and other waste material of various kinds. Operating rooms and surgical treatment areas will have infected dressings, dirty instruments, and soiled linen to dispose of. In principle, it should be possible to take infected material away from its point of use without contact with any clean supplies coming into the unit and with minimum handling by hospital personnel. In the nursing units, soiled linen should preferably be taken immediately from the patient’s room to a disposal room, from which a lift or other special route is available to a reception point where the linen can be sterilised or otherwise dealt with to make it safe. Dirty materials should, in general, go into a bin, bag, or other disposal container at its point of origin and remain in that container until it reaches a point at which it is sterilised or incinerated.

It has been demonstrated that chutes are to be avoided at any cost, because they cannot be cleaned and disinfected. Moreover, because of the possible difference in atmospheric pressure between the upper floors and the basement, clouds of dust can circulate through the chutes. Chutes should be replaced by small lifts or vertical conveyors of the “dumbwaiter” type. It should be noted that under no circumstances should nurses or other persons concerned with the care of patients be required to sort or count soiled linen. The disposal route from the wash-up room serving the operating theatre should be direct to the central sterilising department, and should not pass through the operating room or any other room in the operating suite. Blankets used on patients’ beds are a special problem, as the wool blankets traditionally used cannot be sterilised or laundered without becoming felted and rapidly destroyed. Therefore, it is preferable to use blankets of cotton or other material that can be boiled.

Cleaning methods can help or hinder hygiene. Sweeping and dusting as traditionally performed are dangerous. They spread dust in the air and raise the bacterial count. Wet cleaning by approved methods and vacuum cleaning by approved types of machine with special filters must be the methods adopted.

Surgical instruments and bowls have, until fairly recently, been sterilised in boiling-water sterilisers at various points in the hospital; and dressings have traditionally been sterilised in drums in autoclaves. These methods have not proved adequate, however, and in recent years this type of sterilisation in a central department serving the whole hospital. It is recommended that new hospitals should be planned, from the start, with facilities for central sterilisation. Under this system, all objects that require sterilisation are supplied in sealed packages from the central department to the point of use. After use, non-disposable items are returned to the central sterilising department for re-sterilisation. In recent years many new disposable articles of equipment (e.g., syringes and needles, surgical bowls, and sputum mugs) have come on the market. It may be found more economical to use these items than to incur the cost of cleaning and re-sterilising the conventional equipment after each use.
The planning and operation of the central sterile supply service require expert technical advice. However, several authoritative reports that give guidance on the subject are available. It should be noted that the adoption of a central sterile supply service, which has gained favour on grounds of improved safety, may have economic advantages as well. It affects the planning of the hospital radically, inasmuch as it eliminates the need to provide sterilisation facilities in the nursing units, out-patient and casualty departments, and many other points within the hospital. In addition, this type of sterilisation avoids the damage to paint that sterilisation with boiling water causes.

There is one exception to the range of materials that should be sterilised centrally: the surgeon’s instruments used in major operating theatres. Because so many surgeons like to have their own individual sets of instruments, it is generally more convenient to arrange for these to be sterilised in a room adjoining the operating room. All other requirements for operations, including dressings, bowls, syringes, and so forth, can be supplied to the operating room from the central sterilising department. In planning operating rooms and treatment areas generally, it is of vital importance to separate clean and dirty areas and to ensure that clean material goes directly to its point of use without coming into contact with any used material or with personnel concerned with the handling of used material.

Proper techniques by staff and effective sterilisation of instruments, bowls, and dressings will combat infection arising from contact. But many infections are air borne, and air hygiene is a vital part of hospital design. Patients and staff may be infected by air-borne organisms through the mouth and nose. Open wounds are particularly subject to infection from air-borne organisms. Hence, air hygiene must be considered as affecting the atmosphere in the hospital as a whole, and particular regard must be paid to it in operating rooms and treatment areas in which open wounds are exposed to the air.

In so far as the general areas of the hospital are concerned, it is important to ensure a good general rate of ventilation, and standards have been established for this purpose. The arguments for and against artificial ventilation have already been considered. It should be noted, in addition, that isolation rooms should be provided with special ventilation arrangements to ensure that contaminated air from them does not reach other parts of the hospital. The ventilation of operating rooms is a highly technical matter on which important research has recently been conducted; it is now possible to specify with considerable exactitude the requirements for the special ventilating system needed in operating rooms. Such systems need very careful design by engineers, and should be subjected to bacteriological control.

When hospital sewage is not passed into the public sewage disposal system, it requires treatment by an effective disposal plant kept under continuous bacteriological control. All hospital drains, including those from wash basins and baths, must be fully enclosed. A central incinerator should be provided in which all infected material is destroyed. Opportunities should be taken whenever possible to use disposable materials, which can be destroyed.

### 6.10 The Architect’s Brief

Thus the discussion is centred around the principles of hospital planning, many of which would need consideration before a master plan for a hospital could be prepared. The next stage in an actual project would be the preparation of the architect’s brief. At this point it is necessary to go into the needs of every service and department individually and in great detail, always bearing in mind the general principles governing the plan as a whole.

It is necessary to consider, first, the function and organisation of each section, whether it be the surgical service or the catering department. It is essential to decide on controlling principles and to reach decisions on methods of working before attempting to draw up schedules of rooms. At this stage advice should be sought from people with practical experience in the running of the various services. It is important, however, to pose problems in a general form to these advisers and to press them to think afresh to consider not only how they have organised their work in the past, but also how they would organise it for better service to patients, or for greater efficiency, if free to think things out from first principles. Unless care is taken at this point, there is a risk that the architect’s brief will reflect, with minor improvements, some old building in which the adviser has worked for many years and which enshrines methods of work that are out of date or otherwise unsatisfactory.
Medical science is proceeding at such a prodigious pace that many modern hospitals are out of date by the time they are built. It is of the utmost importance in planning a hospital that a large measure of imaginative foresight should be brought to bear in an endeavour to identify the probable growing points and to plan the greatest degree of adaptability in those services that seem most likely to expand.

Undue weight should not be given to the demands of individual clinicians, who may base their requirements on past experience and present accommodation rather than on anticipated future needs. Like many other expert professionals, doctors tend to be individualistic and to have strong likes and dislikes for certain methods and procedures. It is a mistake to tailor a department to the idiosyncrasies of a particular clinician (as is so often done) unless he happens to be a man of extraordinary wisdom and foresight. The hospital will still be standing after he has passed on. In the detailed planning of a department, it is usually better to seek the opinions of several hand-picked, distinguished consultants in the specialty not necessarily those who will work in the new hospital with the object of obtaining a balanced view.
Summary

- The first consideration in choosing the site of a hospital is convenience for the patients.
- Central positions, particularly in urban areas, are in great demand; and it is often difficult or even impossible to find a site big enough for a hospital in a central area.
- For purpose of reference, it may be assumed that a plot ratio of two to one is the greatest that should be considered for hospital development, and that this ratio is acceptable only in the centres of cities, where a high density of building is the rule.
- The bearing qualities of the soil will also require investigation; the risk of earth movements, geological faults, or underground mine workings has to be considered.
- The first task of the architect is to prepare a master plan for the site as a whole.
- In developing the master plan, areas have to be allotted within the site for each major department of the hospital.
- Staff housing, which will take up a substantial proportion of the site, can best be placed around the perimeter, to give the staff easy access to roads and public transport.
- The first requirement in providing for growth and change is room for expansion in the master plan.
- The medical service departments, particularly the radio diagnostic service and the laboratories, will generally need to be extended.
- In certain climates, buildings have to be heated in winter or cooled in summer; and, in some areas, buildings may need both heating and cooling, at different times of the year.
- The methods used for heating and ventilation of the hospital are important, as bad design can increase the risks of cross-infection.
- Most hospitals are lit by windows; but the amount of light coming in has not, until recently, been subject to scientific control.
- In a town of small or medium size, the hospital will very likely be many times as large as any other building.
- In developed countries, about a third of the cost of hospital building goes into the mechanical engineering service such as heating and ventilating, electricity, lifts, and communications.
- One of the important factors in hospital design is the special attention that must be given to conditions of hygiene.
- Medical science is proceeding at such a prodigious pace that many modern hospitals are out of date by the time they are built.

References

- Malkin, J., Hospital Design, [Pdf] Available at: <https://www.youtube.com/watch?v=KKuXcs5B0Kg>[Accessed 4 December 2012].
- Saunders, N., Hospital Design, [Pdf] Available at: <https://www.youtube.com/watch?v=tFy5fDR3UvQ>[Accessed 4 December 2012].
Recommended Reading

Self Assessment

1. The _______ task of the architect is to prepare a master plan for the site as a whole.
   a. first
   b. second
   c. third
   d. fourth

2. Which of the following statements is false?
   a. Trolleys cannot be pushed up the stairs
   b. The external traffic within the site is not considerable
   c. The circulation routes on the site are of prime importance
   d. Four lifts banked together will give the same service as eight individual lifts distributed at separate points.

3. Which departments receive a great deal of work directly from the out-patient department?
   a. Catering department
   b. Hospital zoning plan
   c. Radio diagnosis and laboratories
   d. Sonography

4. The first requirement in providing for growth and change is room for _______ in the master plan.
   a. destruction
   b. construction
   c. expansion
   d. contraction

5. The concentration of all departments close to one another means that only a very little ________ is available for each to expand into.
   a. facility
   b. space
   c. rooms
   d. departments

6. The orientation of buildings in _______ climates is of critical importance.
   a. cold
   b. hot
   c. normal
   d. critical

7. Bad design of hospital can increase the risks of ________.
   a. disinfection
   b. theft
   c. suffocation
   d. cross infection
8. Very large areas of _______ can produce severe discomfort from glare.
   a. glass
   b. metal
   c. steel
   d. wood

9. The architectural handling of the design will also affect the _______ of the hospital.
   a. infrastructure
   b. visual impact
   c. design
   d. planning

10. Match the following

<table>
<thead>
<tr>
<th>1. Master plan</th>
<th>A. Room for expansion in the master plan.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Medical service department</td>
<td>B. Relation of buildings to each other with regard to sunlight and shade.</td>
</tr>
<tr>
<td>4. Developing the master plan</td>
<td>D. First task of the architect.</td>
</tr>
</tbody>
</table>

   a. 1-D, 2-C, 3-A, 4-B
   b. 1-C, 2-B, 3-D, 4-A
   c. 1-B, 2-C, 3-B, 4-A
   d. 1-A, 2-C, 3-B, 4-D
Chapter VII
Staffing the Hospital

Aim
The aim of this chapter is to:

• explain medical staff activity
• elucidate activities of medico social worker
• explore activities of administrative staffs

Objectives
The objective of this chapter is to:

• define role of laboratory technicians
• explicate role of radiographers
• enlist the role of nurses

Learning outcome
At the end of this chapter, you will be able to:

• define activities of physiotherapists
• identify activities of occupational therapists
• understand nursing aspects of patient service areas
7.1 Introduction

The strength of a hospital is the strength of its medical staff. Many a hospital of world-wide repute is indifferently housed, and owes its reputation solely to the quality of its medical staff. Bricks and mortar and modern equipment, desirable as they are, do not in themselves make a first-class hospital. Indeed, there are hospitals of recent origin in various parts of the world, excellently built and equipped, but standing partly empty because of lack of adequate staff.

A hospital may appear to be an imposing monument and, in some places, for reasons of national or local prestige, there may be a temptation to erect a handsome building without giving sufficient thought to the staff, the driving force that will make it work. This temptation should be firmly resisted. Ultimately, a hospital, like a man, is judged by its works, not by its outward appearance; and it is a poor monument that fails to perform the function for which it was created. In considering the setting-up of a new hospital, one of the first things to which the planning authority should give serious thought is the question of staffing. It should be established beyond all reasonable doubt that medical, nursing, and technical staff of sufficient quality and in sufficient numbers will be available or able to be secured. If the medical staff is strong, the nursing, technical, and other staff needed is likely to be attracted by the quality of the work.

Mention has already been made of the desirability, in determining the size of a new hospital, of deliberately underestimating rather than overestimating the need; indeed, it is most important that a hospital should not be planned on such generous lines that it will drain medical manpower from the at least equally important, though less spectacular, preventive and domiciliary medical services. Moreover, in planning the staff of a hospital, careful regard should be given to those members whose base is the hospital but whose work lies mainly outside the hospital, in preventive and other community health services.

In an era of restricted health care funding and rising health care costs, hospitals have been compelled to restructure work environments, attempting to deliver health services at lower costs without decreasing the quality of care. As a result of restructuring and increasing attention to costs, many hospitals have chosen to decrease their overall labour pool, including the number of full-time nursing positions, leading to documented significant negative effects to nurses’ health, well-being, and ability to provide quality nursing care. Efforts to enhance operational efficiency have led to changes in nurse staffing patterns, decreasing the number of registered nurses (RNs) and replacing them with unlicensed assistive personnel. Whether the size and skill of the current health care workforce can adequately meet patient needs has become a question of growing concern. Increased caregiver workload and declining numbers of RNs threaten the quality of patient care and safety. Nurse staffing patterns are the subject of much discussion in the professional research literature.

Several authors examining the effects of reducing RN positions on patient outcomes report increased patient mortality, increased rates of failure to rescue; and increased incidence of no social infections, pressure sores, medical errors, and patient fall. Furthermore, findings suggest that increased numbers of RNs increases patient satisfaction. The availability of RNs and their professional nursing skills may also influence patient length of stay (LOS) and hospital costs. Several researchers analysed the relationship between nurse staffing and LOS. By increasing the number of RNs and providing more RN hours per patient day, patient LOS decreased Lange, Hodge, Olson, Romano, and Kravitz conducted a systematic review of the effect of nurse staffing on patient outcomes including LOS and costs, reviewing studies published between 1980 and 2003. However, they did not report the process and search strategy used. Few studies in the Lange and colleagues’ review examined the relationship between nurse staffing, LOS and hospital costs. Of nine studies showing an effect of nurse staffing on costs, eight were published between the 1980s and early 1990s. No clear recommendations were reported concerning the research design of included studies or cost and LOS measures, both of which are important for decision making in health care organisations. The systematic review reported in this article builds on Lange and colleagues’ review in two ways:

- It includes studies published between 1990 and 2006
- It provides a detailed search strategy for the review process and results from the research literature examining the relationship between RN staffing levels, patient LOS, and hospital costs

We also present recommendations for effective staffing and further research in this area.
7.2 Methods of Staff Selection

The search strategy was guided by the following research questions:

- Does RN staffing affect the cost of care delivered to patients in acute hospital settings?
- Does RN staffing affect patient LOS? The data search included five electronic databases (Medline, CINAHL, Healthstar, Cochrane, ABI/Inform), and manual searching from reference lists of key articles.

Studies relevant to the research questions were included if they met the following six criteria: published between 1990 and 2006; focused on nurse staffing and length of stay or costs; relevant to care of all patients; peer-reviewed; use of correlational, experimental, retrospective or observation methodologies allowing for a degree of general ability; and description of the designs and method of data collection to test the relationship between registered nurse staffing, length of stay, and hospital costs. Studies in nursing homes or that examined other health workforce characteristics, such as medical staff ratios or partnership between nurses and staff in other disciplines, were excluded.

7.2.1 Screening

The initial electronic search identified 718 titles and study abstracts. Of these, a second reviewer reviewed 80 abstracts to test the initial author decisions regarding inclusion and exclusion criteria. Inter-rater reliability was 99.8% agreement, with consensus reached on one abstract for a published systematic review. This led to the addition of another exclusion criterion: systematic reviews were excluded unless they examined research questions identical to this review study. Of 718 articles, 89 abstracts were selected using the final inclusion and exclusion criteria. Once 41 duplicate abstracts were removed, 48 abstracts remained for manuscript retrieval and screening. Forty-six full-text manuscripts were screened as two studies could not be found. Ten of the 46 studies were randomly screened by a second reviewer. Discrepancies in assessments were managed by consensus. Finally, the screening process yielded a total of 17 papers that met the final inclusion criteria.

7.2.2 Quality Assessment and Data Extraction

The studies were evaluated for methodological quality. A quality assessment tool guided this process and was adapted from an instrument used in several published systematic reviews. Twelve items were designed to assess five features of each study: research design, variable measures, sample, data collection, and data analysis. Each item was scored dichotomously. A total score for each paper ranged from 0 to 12. Studies with scores less than 4 were considered weak studies. Those with scores of 4 to 8 were considered to have moderate strength and those with scores greater than 8 were considered strong studies. Of the 17 papers, 12 studies were evaluated as moderate and 5 studies as strong. Weaknesses in the research included use of retrospective design, non random sampling, and inadequate management of data collection processes. Strengths of the final group of studies were the use of multiple sites and statistical methods for controlling extraneous factors. The following data were then extracted onto a standardised form: authors, year, country, study objectives, population, sample, research design, variable measures, data analysis, study results, and comments.

7.3 Medical Staff

The medical staff of the wards and departments of the hospital should be arranged wherever practicable on a team basis, particularly in the main specialties of medicine, surgery, and obstetrics and gynaecology. In many developed countries it has been found that a team composed of a specialist physician or surgeon with an experienced assistant and one or two recently qualified assistants, all working full time, can look after about sixty beds and the associated out-patient services. This proportion may, of course, vary according to circumstances. However, if staff duties include teaching, much extramural activity, and time-consuming research, the team would need to be augmented or the number of beds handled per team decreased.

Junior medical staff, that is, all below the rank of consultant or specialist, should ordinarily be appointed on a full-time basis. Consultants or specialists should either be appointed for whole-time duty, or else the times and periods of their hospital attendance should be very clearly defined and conscientiously observed, so that the claims of private work will not be permitted to conflict with hospital duties.
In the staffing of the various departments of a hospital, there are two systems in vogue: the parallel system, and the hierarchical system. In the parallel system all the teams in, say, the department of medicine are considered to be equal, and each follows its own line of practice without much reference to the others. In the hierarchical system, a head of the department, or chef service, is appointed: and he, without interfering with the detailed handling of patients by his colleagues, determines the general lines of policy his department is to follow. This he does after consultation with his colleagues, if he is a wise man. In some departments a head is almost a necessity for example, in professorial units, where these exist, and in departments of pathology, radiology, and obstetrics, in which the training of technicians and midwives is undertaken. Here, it is essential to adopt an agreed-upon and uniform code of procedure if students are to be properly trained. The hierarchical system of staffing of all departments is recommended for developing countries.

Reference has already been made to the role of a hospital in postgraduate medical training. After the immediate post-qualification period as a house officer, which is now fairly universal, many ambitious young doctors wish to remain in the hospital for additional two, three, or more years, with a view to improving their knowledge and experience. This they may do in order to make themselves more skilful general practitioners or they may consider embarking on the arduous course that ultimately leads to specialist status. In either event, they are extremely valuable people on the medical staff of a hospital, often capable of undertaking a considerable measure of responsibility. Their in-service training serves a double purpose: it improves the standard of medical skill of the nation’s doctors, and it helps enormously in the staffing of the hospitals.

In some countries in which the establishment of small local or rural hospitals is needed to serve small towns or groups of villages, medical staffing may create a problem, as doctors tend to congregate in the large cities, where greater opportunities await them. To overcome this difficulty, it may be necessary to offer financial inducements for medical and other staff to serve in the smaller hospitals.

7.3.1 Nurses

It is recommended that a nursing consultant be selected very early in the planning of a new hospital. A nurse with experience in public health is desirable. Such a nurse can offer practical suggestions from her experience in working with patients in their homes, as well as in the hospital. The chief nurse in the national health department of the government would probably be qualified to render this advisory service to the planning team, or she could recommend a colleague who could give capable assistance.

An early assessment should be made of the availability of nurses and other people in the community who might be employed as personnel for the hospital. This assessment should be included as part of the survey of the community that is made to determine the need for the hospital.

The nursing consultant could arouse the interest of trained nurses living in the area who might become staff members when the hospital is opened for service. No opportunity should be overlooked in recruiting personnel from the very beginning, for staffing is the greatest problem facing those responsible for the administration of the services of the new hospital once it has been built.

7.3.2 Nursing Aspects of Patient Service Areas

During the early planning, the nursing consultant should study and define the aims and functions of the nursing department of the hospital and of each of the nursing services related to the medical services specialties that are to be provided. Since nurses are responsible for providing the greatest part of the direct care to patients, it is necessary to set forth the objectives of the nursing service realistically.

In planning a new hospital, the curative aspect of medical care is apt to take precedence but, if rehabilitation is to be a major aim of the hospital as a whole, then this, too, must be included in the plan for nursing.

The physical design of the ward units controls the pattern of staffing. For example, team nursing, progressive patient care or any other pattern of nursing activity calls for appropriate architectural layout of the ward. Another consideration is the recent concern regarding the incidence of hospital-acquired infection, which has stimulated much research
and has resulted in new requirements in architectural planning, as well as in the development of new techniques and new training methods for nurses. Nurses assisting in the architectural design of wards, operating rooms, and clinics should study carefully the wealth of excellent material available on the control of hospital infection.

Specific planning for the physical features of patient-care areas is discussed in greater detail in the last part of this monograph.

### 7.4 Organisation and Administration

Once the physical design of the nursing units has been decided upon and the placement of the hospital services has been established, planning the organisation of a hospital nursing service may begin.

One of the first steps that may be taken in planning the nursing department is making an organisation chart showing the nursing services to be provided. In making such a chart, the nursing consultant should consider in an orderly way the categories of personnel needed to care for the patients on each ward. She can work out, at the same time, the authority to be assigned to supervisors and head nurses, and the lines of accountability. The organisation chart should show each category of nursing worker and establish the level of responsibility and working relationships on the wards and in the out-patient department.

It is generally accepted that a good nursing service depends upon strong supervision of each nursing unit, no matter what type of nursing management seems best suited to the new hospital. Several types of successful ward management have been, or are being, used in a number of countries. Among them are the traditional supervisor/ head-nurse (assistant-matron/ward-sister) plan, and the newer concept of the nursing team plan (graduate nurse responsibility). In another recent plan, called progressive patient care, patients are grouped according to the severity of their illness. Hospitals are being built to accommodate this plan as well as the team nursing plan.

It is highly recommended that the graduate nurse be given a strategic position of responsibility for bedside care at all times of the day and night. The quality of nursing care depends upon this nurse. However, it is recognised that sufficient numbers of nurses are not available in any country of the world. Attempts to find a substitute for the nurse take many forms.

In some countries, the present practice is to depend upon the services of students to provide some of the nursing care to hospital patients. In others, the staffing pattern is constructed without consideration of the service the student nurse gives on the ward. Careful thought should be given before a decision is made to establish a school of nursing, or to staff the hospital wards with student nurses.

The clinical experience of the students should be selected through close co-operation between the teachers of the school of nursing and those responsible for nursing service. Supervision should be provided to ensure safety for the patient and an adequate learning experience for the student.

The nurse can also be given assistance through the use of the formally trained auxiliary worker. This worker has proved to be a very effective assistant in some countries, but does not take the place of the trained nurse.

In the interest of establishing and maintaining the stability of staffing, the assignment of nurses to an individual hospital service should be the rule, in so far as possible; and nurses should not be moved about too often. The nurse can give her best service only if she is assigned to the service that is of greatest interest to her. Although this is not always possible, special consideration should be given to the nurse’s personal choice of service, and she should be transferred to that service as soon as possible if she cannot be assigned to it at once.

Assignment to a service should not, however, be limited to one ward. It is best to allow the nurse to become expert in the field of her choice, but this does not preclude assigning her to another ward for several hours of assistance from time to time when absences of personnel or an especially heavy workload of very ill patients requires the service that a trained, graduate nurse can give. Moreover, present emphasis upon the psychological problems of illness would justify the rotation of all nurses to the psychiatric ward for a planned, in-service introduction to the care of the patient with mental problems.
The availability of nursing staff varies greatly from country to country, and each country must work out its own staffing pattern, based upon the supply of workers and the training that can be provided for them.

In order that a high standard of nursing care may be established and maintained, the nursing consultant, or the director of nursing of the hospital, when appointed, should develop written procedures to serve as a guide for the nurses of the various units of the hospital. Several manuals or guides will need consideration early in the planning of the operation of a nursing department. Representative guides of this kind will be found listed in the annotated bibliography on pages whether the administrative head of a hospital should be a doctor or a layman is a vexed question about which universal agreement has not been reached. The important factor is that, lay or medical, the administrator should be thoroughly versed in hospital administration and should possess those qualities of mind and spirit that make for smooth working of the hospital and encourage all staff members to give willingly of their best. The business side of a hospital, important as it is not its primary reason for existence.

A hospital is essentially a medical institution and, logically, one would expect the head of it to be a doctor, just as one would expect the captain of a ship to be a sailor or the head of a school to be a teacher. The separate heads of the departments of a hospital may be individually brilliant, but some kind of medical co-ordination is needed to make the hospital function as whole and to bring the appropriate sum of its resources to bear on the needs of the individual patient. This co-ordinating function is a very difficult one for a layman to carry out. Deficient as he is in technical knowledge and experience. Moreover, as was pointed out in one of the technical discussions at the Tenth World Health Assembly, a medical administrator is in a more favourable position to encourage the development of preventive medical work in association with the hospital as a whole than is a layman.

The WHO Expert Committee on the Organisation of Medical Care, in its first report, decided unequivocally in favour of a medical administrator, employed full time and preferably without clinical responsibilities. There is something to be said, however, for a medical administrator’s undertaking a limited amount of clinical work himself so as to keep in practical touch with the developments of medicine and to avoid becoming a purely “office doctor”.

### 7.5 Other Administrative Staff

If the head of the hospital is a medical director, as is recommended, he should have as his deputy a layman thoroughly trained and experienced in hospital administration from the business or “hotel” angle. The deputy and the staff under him should assume responsibility for such matters as the general maintenance of the fabric of the building and the operation of the kitchens, stores, and laundry. The deputy may act as secretary to the governing body of the hospital and may supervise the clerical staff. He should, in fact, relieve the medical director of non-medical administrative duties and leave him free to advise on hospital policy, co-ordinate the medical services of the hospital, deal with medical staff within and medical agencies outside the hospital and supervise the medical records department, the pharmacy, the medico-social workers and through the heads of the respective departments the technicians employed therein.

#### 7.5.1 The Finance Officer

The finance officer, who should be a qualified accountant, is responsible for keeping the hospital accounts; for advising the governing body on financial policy and the control of expenditure; for departmental costing, where this is in operation; for preparing the annual estimates and budget; for paying accounts, salaries, and wages and for all other matters of a financial nature. The lay administrator (deputy director) and the finance officer will need staffs, often quite substantial in number, with appropriate office accommodation to enable them to carry out their functions. Secretarial staffs attached to the medical director and the hospital clinicians are very necessary. It is false economy to be parsimonious in the provision of medical secretaries, as one of the surest ways for a hospital to acquire a bad name among outside doctors is by failure to send out medical reports promptly on the conditions of patients, especially on discharge.
Social Worker, Physical Therapist, Respiratory Therapist, Ancillary Services such as laboratory, radiology, pharmacy services

**Fig. 7.1 Hierarchy of medical staff**
(Source: http://sickgirlspeaks.blogspot.in/2010/06/professional-chain-of-command.html)

### 7.5.2 Professional and Technical Staff Medico-Social Workers

It is generally recognised that social and domestic difficulties pay no small part in the causation of disease; they may precipitate an illness or retard recovery. A medico-social department under the direction of a trained medico-social worker who can collaborate with the clinicians is a virtual necessity in a modern hospital; without it, much of the skill and energy of the doctors and nurses may be wasted. In a hospital of 500 beds or more, it is desirable that there be several trained medico-social workers, together with their clerical assistants; but the demand for them is in excess of the supply. One sometimes hears it said by the governing body of a hospital that a department of medico-social service is an extravagance that the hospital cannot afford. It is a far greater extravagance not to afford one.
7.5.3 Medico Social Worker
A medico-social worker, in addition to her basic training in social science and her practical experience in hospital work, needs to have knowledge of local conditions, customs, traditions, and general mode of life of the people among whom she works. She must also be fully informed concerning the various social agencies whose help she can invoke on behalf of her patients. Her work should be linked with that of the public health and social services of the area.

A general hospital that has a department of psychiatric medicine will probably need one or more psychiatric social workers, whose functions with regard to patients suffering from mental illness are similar to those of the medico-social worker with regard to patients suffering from physical ill health.

7.5.4 Physiotherapists and Occupational Therapists
The modern trend in physiotherapy places far less reliance than formerly upon the traditional therapeutic measures of heat, massage, action-therapy, and electrical stimulation. Although these have their place in certain conditions and a physiotherapist should be adequately trained in their application and have knowledge of the circumstances in which they are likely to be of value, the encouragement of controlled, active movements on the part of the patients themselves is usually regarded as the best way to restore function. The training and outlook of physiotherapists should be oriented in this direction.

Occupational therapy covers a fairly wide field. For diversional work, intended mainly to arouse a patient’s interest and to take his mind off his illness, the occupational therapist should be able to give instructions in such crafts as basket-making, toy-making, simple weaving, needlework, and, perhaps, drawing and painting. Occupational therapy designed to enable a sick or injured workman to return to his former, or a similar, job needs the services of a craftsman-teacher skilled in metal and woodwork and in the handling of the kind of machinery found in a factory.

7.5.5 Pharmacists
The chief pharmacist is in charge of the hospital pharmacy and supervises the accurate dispensing of drugs prescribed by the doctors and the making-up of stock mixtures, lotions, and ointments in common use. It is no longer profitable in most cases to manufacture, in the pharmacy, pills and tablets but, if the pharmacist has the necessary training and experience, it may be desirable (and it is certainly economical) for him to prepare the various sterile solutions used in the hospital for intravenous transfusions (saline, glucose, and others). For this he would need a dust-proof, air-conditioned room, apparatus for the production of pyrogen-free, distilled water, and the autoclaves necessary for ensuring sterility. In some countries the pharmacist is responsible for biochemical assays, leaving other pathological examinations to his medical colleagues. There is nothing against this practice, provided the pharmacist and the pathologist work closely together. The pharmacist is responsible for keeping the stock-books and registers prescribed by the laws of his country with regard to certified poisons and addiction-producing drugs. It is also his proper function to order (usually through the appropriate supplies department) and to check on receipt all pharmaceutical supplies, appliances, and dressings.

7.5.6 Radiographers
The senior radiographer is responsible, under the supervision of the radiologist, for the smooth working of the X-ray department, for the keeping of registers, and for the ordering, checking, and safe custody of films and reagents. Requests for replacement of apparatus, tubes and other expensive items should be the function of the radiologist. The radiographer should be responsible, under the radiologist, for all the radiological apparatus everywhere in the hospital.

7.5.7 Laboratory Technicians
A pathological laboratory attached to a large hospital and dealing, perhaps, with specimens both from the wards and departments and from public health and other sources outside the hospital is likely to be divided into sections dealing with microbiology, blood chemistry, haematology, morbid anatomy and histology. Each of these sections needs its own staff of technicians and laboratory aides. All technicians, however, should be trained in all branches of pathological work so that they can, when necessary, be interchanged.
The chief technician, working under the direction of the pathologist in charge, should assist in the training of technical staff, allocate work within the department, be responsible for seeing that the necessary records and registers are properly kept, supervise media-making, and order and check reagents and minor equipment. Expensive apparatus should be requisitioned by the pathologist.

In developing countries, one of the greatest difficulties is in obtaining an adequate supply of skilled, non-medical, professional and technical staff. These personnel takes several years to train, and an insufficient number can gravely impair the quality of a hospital’s work. For instance, delays caused by shortage of staff in the X-ray department or pathology laboratory may have serious consequences for patients and may increase, unnecessarily and wastefully, the average length of stay per patient. Inaccuracy due to lack of sufficient technical skill or hurried work because of understaffing may have even more dire results.

It is essential, therefore, that, at an early stage in its programme of hospital expansion, a country should create conditions of employment including a promotion ladder that will attract to and retain within, the service the intelligent young men and women needed to fill these vital posts. Moreover, as recommended by the WHO Expert Committee on Health Laboratory Methods, “in the largest hospitals, laboratory units with satisfactory facilities for the training of technical and auxiliary personnel should build up a corps of skilled laboratory workers which can be used, in turn, to establish laboratories in regional, intermediate and finally local and ‘rural’ hospitals”.

7.5.8 Dieticians

A dietician is a necessity in a modern hospital. He (or she) is in charge of the diet kitchen and supervises the special diets required by patients with diabetes or with renal, gastric, or other disorders. He also has a most useful function in the out-patient department, instructing patients—referred to him by physicians—in ways and means of preparing in their own homes the types of diet prescribed for them. The dietician advises on the nutritive value of the ordinary hospital diets supplied to patients and staff and may be called upon to give mass instruction on nutrition to groups of people as part of the hospital’s programme of health education. His training is scientific rather than commercial, and his concern is mainly food values.

7.5.9 Catering Officers

A catering officer is a man (or woman) who has been trained, preferably for many years, in the commercial aspects of purveying foods, possibly in hotels or restaurants. He should be familiar with the techniques of mass food management, including the purchase, storage, preparation and service of food. Whether he is authorised to purchase or whether this should be done through the supplies department is a matter for local arrangement, but the catering officer must be aware of the best markets in which to buy. He is responsible for the quality and palatability of the food served to patients and staff, but he should take the advice of the dietician with respect to its calorific value and vitamin content.

7.5.10 Records Officer (Records Librarian)

One of the indices of efficiency of a hospital is its ability to produce full and accurate medical records of patients who have been under its care. The accurate filing, indexing, and storage of medical records call for skill and experience. This is probably best obtained by seconding a potential records officer to a hospital where there is an established medical records department noted for its efficiency.

A records officer must have intelligence and training of a fairly high order if the medical records are to be subjected to statistical analysis or data processing. He (or she) should have sufficiently high status to be able to approach physicians on the staff to draw attention to any obvious omissions in the records of individual patients. Other essential personal qualities of a records officer are integrity and a capacity for keeping strict confidence about the records entrusted to his care, inasmuch as some of them may contain intimate details about the lives of patients.
7.6 Other Staff

It is not proposed in a work of this kind to go into detail about the domestic and maintenance staffs that is required in a modern hospital. The tendency today is towards mechanisation, that is, the substitution of mechanical devices for the human hand and human eye in order to save labour. It must be remembered, however, that the further this process goes, the greater the number of highly skilled mechanics, electricians, and others who will be needed on the staff to maintain the complicated equipment and to deal promptly with breakdowns that could bring the work of the hospital almost to a standstill.
Summary

- The strength of a hospital is the strength of its medical staff.
- Many hospitals of world-wide repute is indifferently housed, and owes its reputation solely to the quality of its medical staff.
- A hospital may appear to be an imposing monument; and, in some places, for reasons of national or local prestige, there may be a temptation to erect a handsome building without giving sufficient thought to the staff, the driving force that will make it work.
- The initial electronic search identified 718 titles and study abstracts.
- A quality assessment tool guided this process and was adapted from an instrument used in several published systematic reviews twelve items were designed to assess five features of each study: research design, variable measures, sample, data collection, and data analysis. Each item was scored dichotomously.
- In many developed countries it has been found that a team composed of a specialist physician or surgeon with an experienced assistant and one or two recently qualified assistants, all working full time, can look after about sixty beds and the associated out-patient services.
- In the hierarchical system, a head of the department, or chef service, is appointed: and he, without interfering with the detailed handling of patients by his colleagues, determines the general lines of policy his department is to follow.
- It is recommended that a nursing consultant be selected very early in the planning of a new hospital.
- During the early planning, the nursing consultant should study and define the aims and functions of the nursing department of the hospital and of each of the nursing services related to the medical services specialties that are to be provided.
- Once the physical design of the nursing units has been decided upon and the placement of the hospital services has been established, planning the organisation of a hospital nursing service may begin.
- The clinical experience of the students should be selected through close co-operation between the teachers of the school of nursing and those responsible for nursing service.
- A medico-social worker, in addition to her basic training in social science and her practical experience in hospital work, needs to have knowledge of local conditions, customs, traditions, and general mode of life of the people among whom she works.
- The chief pharmacist is in charge of the hospital pharmacy and supervises the accurate dispensing of drugs prescribed by the doctors and the making-up of stock mixtures, lotions, and ointments in common use.

References

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Recommended Reading

Self Assessment

1. Efforts to enhance operational efficiency have led to changes in ________ staffing patterns.
   a. nursing
   b. medico social
   c. administrative
   d. technician

2. The availability of RNs and their professional nursing skills may also influence patient length of stay (LOS) and hospital ________.
   a. atmosphere
   b. costs
   c. infrastructure
   d. beds

3. Weaknesses in the research do not include use of which one of the following?
   a. Retrospective design
   b. Non random sampling
   c. Inadequate management of data collection processes
   d. Random sampling

4. The ________ of the wards and departments of the hospital should be arranged wherever practicable on a team basis.
   a. medico social worker
   b. nurses
   c. medical staff
   d. doctors

5. Who are composed in the junior medical staff?
   a. Nurses
   b. Below the rank of consultant or specialist
   c. Doctors
   d. Medico social worker

6. Which nurse can offer practical suggestions from her experience in working with patients in their homes, as well as in the hospital?
   a. With experience
   b. Without experience
   c. With experience in a private hospital
   d. With experience in public health

7. The ________ design of the ward units controls the pattern of staffing.
   a. physical
   b. logical
   c. hospital
   d. interior
8. A general hospital that has a department of psychiatric medicine needs to have approximately how many psychiatric social workers?
   a. No worker required
   b. One or more
   c. Mandatory five
   d. Mandatory ten

9. Who is in charge of hospital pharmacy?
   a. Doctors
   b. Nurses
   c. Pharmacist
   d. The chief pharmacist

10. Match the following

<table>
<thead>
<tr>
<th>1. Radiographers</th>
<th>A. Advises on the nutritive value of the ordinary hospital.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Laboratory technicians</td>
<td>B. Filing, indexing, and storage of medical records.</td>
</tr>
<tr>
<td>3. Dietician</td>
<td>C. Trained in all branches of pathological work.</td>
</tr>
<tr>
<td>4. Records officer</td>
<td>D. Smooth working of x-ray department.</td>
</tr>
</tbody>
</table>

a. 1-D, 2-C, 3-A, 4-B
b. 1-C, 2-B, 3-D, 4-A
c. 1-B, 2-C, 3-B, 4-A
d. 1-A, 2-C, 3-B, 4-D
Chapter VIII
Evaluating the Quality of Medical Care

Aim
The aim of this chapter is to:

- explain definition of quality
- elucidate approaches to assessment
- explore sources of obtaining information

Objectives
The objective of this chapter is to:

- enlist method of obtaining information
- explicate sampling
- define selection

Learning outcome
At the end of this chapter, you will be able to:

- identify measurement standards
- understand empirical standards
- define normative standards
8.1 Introduction

This chapter is an attempt to describe and evaluate current methods for assessing the quality of medical care and to suggest some directions for further study. It is concerned with methods rather than findings and with an evaluation of methodology in general, rather than a detailed critique of methods in specific studies. This is not an exhaustive review of the pertinent literature. Certain key studies, of course, have been included.

This chapter deals almost exclusively with the evaluation of the medical care process at the level of physician-patient interaction. It excludes, therefore, processes primarily related to the effective delivery of medical care at the community level. Moreover, this chapter is not concerned with the administrative aspects of quality control. Many of the studies reviewed here have arisen out of the urgent need to evaluate and control the quality of care in organised programs of medical care.

Nevertheless, these studies will be discussed only in terms of their contribution to methods of assessment and not in terms of their broader social goals. The author has remained, by and large, in the familiar territory of care provided by physicians and has avoided incursions into other types of health care. Also, consideration of the difficult problem of economic efficiency as a measurable dimension of quality has been excluded.

8.2 Definition of Quality

The assessment of quality must rest on a conceptual and operationalised definition of what the “quality of medical care” means. Many problems are present at this fundamental level, for the quality of care is a remarkably difficult notion to define. Perhaps the best-known definition is that offered by Lee and Jones in the form of eight “articles of faith,” some stated as attributes or properties of the process of care and others as goals or objectives of that process. This chapter convey vividly the impression that the criteria of quality are nothing more than value judgments that are applied to several aspects, properties, ingredients or dimensions of a process called medical care.

As such, the definition of quality may be almost anything anyone wishes it to be, although it is, ordinarily, a reflection of values and goals current in the medical care system and in the larger society of which it is a part. Few empirical studies delve into what the relevant dimensions and values are at any given time in a given setting. Klein et al found that “administrative officials,” among them, gave 80 criteria for evaluating “patient care.” They conclude that patient care, like morale, cannot be considered as a unitary concept and “it seems likely that there will never be a single comprehensive criterion by which to measure the quality of patient care.” Which of a multitude of possible dimensions and criteria are selected to define quality will, of course, have profound influence on the approaches and methods one employs in the assessment of medical care.

8.3 Approaches to Assessment: What to Assess?

The outcome of medical care, in terms of recovery, restoration of function and of survival, has been frequently used as an indicator of the quality of medical care. Examples are studies of perinatal mortality, surgical fatality rates and social restoration of patients discharged from psychiatric hospitals. Many advantages are gained by using outcome as the criterion of quality in medical care. The validity of outcome as a dimension of quality is seldom questioned. Nor does any doubt exist as to the stability and validity of the values of recovery, restoration and survival in most situations and in most cultures, though perhaps not in all.

Moreover, outcomes tend to be fairly concrete and, as such, seemingly amenable to more precise measurement. However, a number of considerations limit the use of outcomes as measures of the quality of care. The first of these is whether the outcome of care is, in fact, the relevant measure. This is because outcomes reflect both the power of medical science to achieve certain results under any given set of conditions, and the degree to which “scientific medicine,” as currently conceived, has been applied in the instances under study. But the object may be precisely to separate these two effects. Sometimes a particular outcome may be irrelevant, as when survival is chosen as a criterion of success in a situation which is not fatal but is likely to produce suboptimal health or crippling conditions.
Even in situations where outcomes are relevant, and the relevant outcome has been chosen as a criterion, limitations must be reckoned with. Many factors other than medical care may influence outcome, and precautions must be taken to hold all significant factors other than medical care constant if valid conclusions are to be drawn. In some cases long periods of time, perhaps decades, must elapse before relevant outcomes are manifest. In such cases the results are not available when they are needed for appraisal and the problems of maintaining comparability are greatly magnified. Also, medical technology is not fully effective and the measure of success that can be expected in a particular situation is often not precisely known. For this reason comparative studies of outcome, under controlled situations, must be used. Although some outcomes are generally unmistakable and easy to measure (death, for example) other outcomes, not so clearly defined, can be difficult to measure. These include patient attitudes and satisfactions, social restoration and physical disability and rehabilitation.

Even the face validity that outcomes generally have as criteria of success or failure is not absolute. One may debate, for example, whether the prolongation of life under certain circumstances is evidence of good medical care. McDermott et al., have shown that, although fixing a congenitally dislocated hip joint in a given position is considered good medicine for the white man, it can prove crippling for the Navajo Indian who spends much time seated on the floor or in the saddle. Finally, although outcomes might indicate good or bad care in the aggregate, they do not give an insight into the nature and location of the deficiencies or strengths to which the outcome might be attributed. All these limitations to the use of outcomes as criteria of medical care are presented not to demonstrate that outcomes are inappropriate indicators of quality but to emphasise that they must be used with discrimination. Outcomes, by and large, remain the ultimate valuator of the effectiveness and quality of medical care. Another approach to assessment is to examine the process of care itself rather than its outcomes. This is justified by the assumption that one is interested not in the power of medical technology to achieve results, but in whether what is now known to be “good” medical care has been applied. Judgments are based on considerations such as the appropriateness, completeness and redundancy of information obtained through clinical history, physical examination and diagnostic tests, justification of diagnosis and therapy, technical competence in the performance of diagnostic and therapeutic procedures, including surgery, evidence of preventive management in health and illness, coordination and continuity of care, acceptability of care to the recipient and so on.

This approach requires that a great deal of attention be given to specifying the relevant dimensions, values and standards to be used in assessment. The estimates of quality that one obtains are less stable and less final than those that derive from the measurement of outcomes. They may, however, be more relevant to the question at hand: whether medicine is properly practiced. This discussion of process and outcome may seem to imply a simple separation between means and ends. Perhaps more correctly, one may think of an unbroken chain of antecedent means followed by intermediate ends which are themselves the means to still further ends. Health itself may be a means to a further objective.

Several authors have pointed out that this formulation provides a useful approach to evaluation. It may be designated as the measurement of procedural end points and included under the general heading of “process” because it rests on similar considerations with respect to values, standards and validation. A third approach to assessment is to study not the process of care itself, but the settings in which it takes place and the instrumentalities of which it is the product. This may be roughly designated as the assessment of structure, although it may include administrative and related processes that support and direct the provision of care.

It is concerned with such things as the adequacy of facilities and equipment; the qualifications of medical staff and their organisation, the administrative structure and operations of programs and institutions providing care, fiscal organisation and the like. The assumption is made that given the proper settings and instrumentalities, good medical care will follow. This approach offers the advantage of dealing, at least in part, with fairly concrete and accessible information. It has the major limitation that the relationship between structure and process or structure and outcome, is often not well established.
8.4 Sources and Methods of Obtaining Information

The approach adopted for the appraisal of quality determines, in large measure, the methods used for collecting the requisite information. Since these range the gamut of social science methods, no attempt will be made to describe them all. Four, however, deserve special attention. Clinical records are the source documents for most studies of the medical care process. In using them one must be aware of their several limitations. Since the private office practice of most physicians is not readily accessible to the researcher, and the records of such practice are generally disappointingly sketchy, the use of records has been restricted to the assessment of care in hospitals, outpatient departments of hospitals and prepaid group practice.

Both Peterson and Clute have reported the prevailing inadequacies of recording in general practice. In addition, Clute has pointed out that, in general practice the lack of adequate records is not incompatible with practice of a good, or even an excellent quality. On the other hand, a recent study of the office practice of a sample of members of the New York Society of Internal Medicine suggests that abstracts of office records can be used to obtain reproducible judgments concerning the quality of care. But to generalise from this finding is difficult. It concerns a particular group of physicians more likely to keep good records than the average. Moreover, for one reason or another, the original sample drawn for this study suffered a 61 per cent attrition rate.

Assuming the record to be available and reasonably adequate, two further issues to be settled are the veracity and the completeness of the record. Lembcke has questioned whether key statements in the record can be accepted at face value. He has questioned not only the statements of the physician about the patient and his management, but also the validity of the reports of diagnostic services. The first is verified by seeking in the record, including the nurses’ notes, what appears to be the most valid evidence of the true state of affairs. The second is verified by having competent judges re-examine the evidence (films, tracings, slides) upon which diagnostic reports are made.

Observer error tends to be a problem under the best of circumstances. But nothing can remove the incredulity from the finding by Lembcke, in one hospital, that the true incidence of uterine hyperplasia was between five and eight per cent rather than 60 to 65 per cent of uterine curettages, as reported by the hospital pathologist. In any case, the implications of verification as part of the assessment of quality must be carefully considered. Errors in diagnostic reports no doubt reflect particularly on the quality of diagnostic service and on the care provided by the hospital, in general. But the physician may be judged to perform well irrespective of whether the data he works with are or are not valid. This is so when the object of interest is the logic that governs the physician’s activities rather than the absolute validity of these activities. Much discussion has centered on the question of the completeness of clinical records and whether, in assessing the quality of care based on what appears in the record, one is rating the record or the care provided.

What confuses the issue is that recording is itself a separate and legitimate dimension of the quality of practice, as well as the medium of information for the evaluation of most other dimensions. These two aspects can be separated when an alternative source of information about the process of care is available, such as the direct observation of practice. In most instances, however, they are confounded. Rosenfeld handled the problem of separating recording from care by examining the reasons for down rating the quality of care in each patient record examined. He demonstrated that the quality of care was rated down partly because of what could have been poor recording (“presumptive” evidence) and partly for reasons that could not have been a matter of recording (“substantial” evidence). He also found that hospitals tended to rank high or low on both types of errors, showing that these errors were correlated. Since routine recording is more likely to be complete in the wards, comparison of ward and private services in each hospital by type of reason for down rating might have provided further information on this important question.

Other investigators have tried to allow for incompleteness in the record by supplementing it with interviews with the attending physician and making appropriate amendments. Unfortunately, only one of these studies (length of stay in Michigan hospitals) contains a report of what difference this additional step made. In this study, “the additional medical information elicited by means of personal interviews with attending physicians was of sufficient importance in 12.6 per cent of the total number of cases studied to warrant a reclassification of the evaluation of the necessity for admission and/or the appropriateness of length of stay.” When information obtained by interview is used to amend or supplement the patient record, the assumption may have to be made that this additional information has equal or superior validity.
Morehead, who has had extensive experience with this method, said, “Many of the surveyors engaged in the present study employed the technique of physician interview in earlier studies without fruitful results he surveyor was left in the uncomfortable position of having to choose between taking at face value statements that medical care was indeed optimal, or concluding that statements presented were untrue.” Even in an earlier study, where supplementation by interview is reported to have been used, verbal information was discarded unless it was further corroborated by the course of action or by concrete evidence. Another question of method is whether the entire record or abstracted digests of it should be used as a basis for evaluation. The question arises because summaries and abstracts can presumably be prepared by less skilled persons allowing the hard-to-get expert to concentrate on the actual task of evaluation.

Abstracting, however, seemingly involves the exercise of judgment as to relevance and importance. For that reason, it has been used as a first step in the evaluation of quality only in those studies that use very specific and detailed standards. Even then, little information is available about how reliable the process of abstracting is, or how valid when compared with a more expert reading of the chart. The study of New York internists, already referred to, demonstrated a high level of agreement between physicians and highly trained non-physicians abstracting the same office record. While the controversy about the record as a source of information continues, some have attempted to reduce dependence on the physician’s recording habits by choosing for evaluation diagnostic categories which are likely to be supported by recorded evidence additional to the physician’s own entries. This explains, in part, the frequent use of surgical operations as material for studies of quality.

In general practice, patient records are too inadequate to serve as a basis for evaluation. The alternative is direct observation of the physician’s activities by a well qualified colleague. The major limitation of this method would seem to be the changes likely to occur in the usual practice of the physician who knows he is being observed. This has been countered by assurances that the physician is often unaware of the true purpose of the study, becomes rapidly accustomed to the presence of the observer and is unable to change confirmed habits of practice. Even if changes do occur, they would tend to result in an overestimate of quality rather than the reverse. These assurances notwithstanding, measuring the effect of observation on practice remains an unsolved problem.

Those who have used the method of direct observation have been aware that the problem of completeness is not obviated. The practicing physician often knows a great deal about the patient from previous contacts with him hence the need to select for observation “new” cases and situations that require a thorough examination irrespective of the patient’s previous experience. Moreover, not all of the managing physician’s activities are explicit. Some dimensions of care, not subject to direct observation, must be excluded from the scheme of assessment. Selective perception by the observer may be an additional problem. The observer is not likely to be first a neutral recorder of events and then a judge of these same events. His knowledge and criteria are likely to influence what he perceives, and thus to introduce a certain distortion into perception.

An indirect method of obtaining information is to study behaviours and opinions from which inferences may be drawn concerning quality. A sociometric approach has been reported by Maloney et al., which assumes that physicians, in seeking care for themselves and their families, exhibit critical and valid judgments concerning the capacity of their colleagues to provide care of high quality. Such choices were shown to identify classes of physicians presumed to be more highly qualified than others. But both sensitivity and specificity, using as a criterion more rigorous estimates of the quality of care, lack of validation.

Georgopoulos and Mann used what might be called an auto reputational approach in assessing the quality of care in selected community hospitals. This grew out of previous studies showing that people are pretty shrewd judges of the “effectiveness” of the organisations in which they work. The hospitals were rated and ranked using opinions concerning the quality of medical care, and other characteristics, held by different categories of managerial, professional and technical persons working in, or connected with, each hospital, as well as by knowledgeable persons in the community. The responses were sufficiently consistent and discriminating to permit the hospitals to be ranked with an apparently satisfactory degree of reliability. This is in spite of the generally self-congratulatory nature of the responses that classified the quality of medical care in the hospitals as “very good”, “excellent”, or “outstanding” in 89 per cent of cases, and “poor” in almost none. This provides much evidence that the several opinions, severally held, were intercorrelated to a high degree. But little evidence supports the validity of the judgments by using truly external criteria of the quality of care.
8.5 Sampling and Selection

The first issue in sampling is to specify precisely the universe to be sampled, which, in turn, depends on the nature of the generalisations that one wishes to make. Studies of quality are ordinarily concerned with one of three objects:

- The actual care provided by a specified category of providers of care
- The actual care received by a specified group of people
- The capacity of a specified group of providers to provide care

In the first two instances representative samples of potential providers or recipients are required, as well as representative samples of care provided or received. In the third instance a representative sample of providers is needed, but not necessarily a representative sample of care.

A more important aspect is to select, uniformly of course, significant dimensions of care. Perhaps performance should be studied in certain clinical situations that are particularly stressful and therefore more revealing of latent capacities or weaknesses in performance. Hypothetical test situations may even be set up to assess the capacity to perform in selected dimensions of care. The distinctions made above, and especially those between the assessments of actual care provided and of the capacity to provide care, are useful in evaluating the sampling procedures used in the major studies of quality. By these criteria, some studies belong in one category or another, but some seem to combine features of several in such a way that generalisation becomes difficult. For example, in the first study of the quality of care received by Teamster families, the findings are meant to apply only to the management of specific categories of hospitalised illness in a specified population group. In the second study of this series, somewhat greater generalisability is achieved by obtaining a representative sample (exclusive of seasonal variation) of all hospitalised illness in the same population group. Neither study is meant to provide information about all the care provided by a representative sample of physicians.

The degree of homogeneity in the universe to be sampled is, of course, a matter of great importance in any scheme of sampling or selection. The question that must be asked is to what extent the care provided by a physician maintains a consistent level. Do specific diagnostic categories, levels of difficulty or dimensions of care exist in which a physician performs better than in others? Can one find, in fact, an “overall capacity for goodness in medical care,” or is one dealing with a bundle of fairly disparate strands of performance? One might, similarly, ask whether the care provided by all subdivisions of an institution is at about the same level in absolute terms or in relation to performance in comparable institutions. Makeover, for example, makes an explicit assumption of homogeneity when Rosenfeld writes, “No attempt was made to relate the number of records to be studied to the size of enrollment of the medical groups”.

The medical care provided to one or another individual is valid evidence of quality and there should be little or no chance variation which is affected by adjusting the size of the sample. Rosenfeld began his study with the hypothesis “that there is a correspondence in standards of care in the several specialties and for various categories of illness in an institution.” The empirical evidence concerning homogeneity is not extensive. Both the Peterson and Clute studies of general practice showed a high degree of correlation between performance of physicians in different components or dimensions of care (history, physical examination, treatment, etc.).

Rosenfeld demonstrated that the differences in quality ratings among several diagnoses selected within each area of practice (medicine, surgery and obstetrics-gynaecology) were not large. Although the differences among hospitals by area of practice appeared by inspection to be larger, they were not large enough to alter the rankings of the three hospitals studied. The two studies of care received by Teamster families arrived at almost identical proportions of optimal and less than optimal care for the entire populations studied. This must have been coincidental, since the percent of optimal care, in the second study, varied greatly by diagnostic category from 31 per cent for medicine to 100 per cent for ophthalmology (nine cases only). If such variability exists, the “diagnostic mix” of the sample of care must be a matter of considerable importance in assessment. In the two Teamster studies, differences in “diagnostic mix” were thought to have resulted in lower ratings for medicine and higher ratings for obstetrics-gynaecology in the second study than in the first.
That the same factor may produce effects in two opposite directions is an indication of the complex interactions that the researcher must consider. The most probable explanation for the ratings in medicine being lower in the present (second) study is the nature of the cases reviewed. The factor responsible is less ability to handle illness “which did not fall into a well recognised pattern.” For obstetrics and gynaecology the finding of the second study differed in one major respect from the earlier study where serious questions were raised about the management of far more patients. The earlier study consisted primarily of major abdominal surgery, whereas this randomly selected group contained few such cases and had more patients with minor conditions.

In studies such as these, where the care received by total or partial populations is under study, the variations noted stem partly from differences in diagnostic content and partly from institutionalised patterns of practice associated with diagnostic content. For example, all nine cases of eye disease received optimal care because this is a highly specialised area where physicians not trained in this field rarely venture to perform procedures.

Sampling and selection influence, and are influenced by, a number of considerations in addition to generalisation and homogeneity. The specific dimensions of care that interest one (preventive management or surgical technique, to mention two rather different examples) may dictate the selection of medical care situations for evaluation. The situations chosen are also related to the nature of the criteria and standards used and of the rating and scoring system adopted. Attempts to sample problem situations, rather than traditional diagnoses or operations, can be very difficult, because of the manner in which clinical records are filed and indexed. This is unfortunate, because a review of operations or established diagnoses gives an insight into the bases upon which the diagnosis was made or the operation performed. It leaves unexplored a complementary segment of practice, namely the situations in which a similar diagnosis or treatment may have been indicated but not made or performed.

8.6 Measurement Standards
Measurement depends on the development of standards. In the assessment of quality standards derive from two sources.

8.6.1 Empirical Standards
Empirical standards are derived from actual practice and are generally used to compare medical care in one setting with that in another, or with statistical averages and ranges obtained from a larger number of similar settings. The Professional Activities Study is based, in part, on this approach.

Empirical standards rest on demonstrably attainable levels of care and, for that reason, enjoy a certain degree of credibility and acceptability. Moreover, without clear normative standards, empirical observations in selected settings must be made to serve the purpose. An interesting example is provided by Furstenberg et al., who used patterns of prescribing in medical care clinics and outpatient hospitals as the standard to judge private practice.

In using empirical standards one needs some assurance that the clinical material in the settings being compared is similar. The Professional Activities Study makes some allowance for this by reporting patterns of care for hospitals grouped by size. The major shortcoming, however, is that care may appear to be adequate in comparison to that in other situations and yet fall short of what is attainable through the full application of current medical knowledge.

8.6.2 Normative Standards
Normative standards derive, in principle, from the sources that legitimately set the standards of knowledge and practice in the dominant medical care system. In practice, they are set by standard textbooks or publications, 10 panels of physicians, 25 highly qualified practitioners who serve as judges or a research staff in consultation with qualified practitioners.

Normative standards can be put very high and represent the “best” medical care that can be provided, or they can be set at a more modest level signifying “acceptable” or “adequate” care. In any event, their distinctive characteristic is that they stem from a body of legitimate knowledge and values rather than from specific examples of actual practice. As such, they depend for their validity on the extent of agreement concerning facts and values within
the profession or, at least, among its leadership. Where equally legitimate sources differ in their views, judgments concerning quality become correspondingly ambiguous. The relevance of certain normative standards, developed by one group, to the field of practice of another group, has been questioned.

For example, Peterson and Barsamian report that although spermatic fluid examination of the husband should precede surgery for the Stein-Leventhal syndrome, not one instance of such examination was noted, and that this requirement was dropped from the criteria for assessment. Dissatisfaction has also been voiced concerning the application to general practice of standards and criteria elaborated by specialists who practice in academic settings. The major studies of general practice have made allowances for this. Little is known, however, about the strategies of “good” general practice and the extent to which they are similar to, or different from, the strategies of specialised practice in academic settings.

8.6.3 Other Standards

Some researchers have used both types of standards, normative and empirical, in the assessment of care. Rosenfeld used normative standards but included in his design a comparison between university affiliated and community hospitals. Use of the teaching hospital as a control provides the element of flexibility needed to adjust to the constantly changing scientific basis of the practice of medicine. No written standards, no matter how carefully drawn, would be adequate in five years. Lembcke used experience in the best hospitals to derive a corrective factor that softens the excessive rigidity of his normative standards. This factor, expressed in terms of an acceptable percent of compliance with the standard, was designed to take account of contingencies not foreseen in the standards themselves. It does, however, have the effect of being more realistically permissive as well. This is because the correction factor is likely to be made up partly of acceptable departures from the norm and partly of deviations that might be unacceptable.

Standards can also be differentiated by the extent of their specificity and directiveness. At one extreme the assessing physician may be very simply instructed as follows: “You will use as a yardstick in relation to the quality of care rendered, whether you would have treated this particular patient in this particular fashion during this specific hospital admission.” At the other extreme, a virtually watertight “logic system” may be constructed that specifies all the decision rules that are acceptable to justify diagnosis and treatment. Most cases fall somewhere in between.

Highly precise and directive standards are associated with the selection of specific diagnostic categories for assessment. When a representative sample of all the care provided is to be assessed, little more than general guides can be given to the assessor. Lembcke, who has stressed the need for specific criteria, has had to develop a correspondingly detailed diagnostic classification of pelvic surgery, for example,. In addition to diagnostic specificity, highly directive standards are associated with the preselection of specific dimensions of care for evaluation.

Certain diagnoses, such as surgical operations, lend themselves more readily to this approach. This is evident in Lembcke’s attempt to extend his system of audits to nonsurgical diagnoses. The clear, almost rule-of-thumb judgments of adequacy become blurred. The data abstracted under each diagnostic rubric are more like descriptions of patterns of management, with insufficient normative criteria for decisive evaluation. The alternative adopted is comparison with a criterion institution.

Obviously, the more general and nondirective the standards are, the more one must depend on the interpretations and norms of the person entrusted with the actual assessment of care. With greater specificity, the research team is able, collectively, to exercise much greater control over what dimensions of care require emphasis and what the acceptable standards are. A great deal appears in common between the standards used in structured and unstructured situations as shown by the degree of agreement between “intuitive” ratings and directed ratings in the Rosenfeld study, and between the “qualitative” and “quantitative” ratings in the study by Peterson et al. Indeed, these last two were so similar that they could be used interchangeably.

When standards are not very specific and the assessor must exercise his own judgment in arriving at an evaluation, very expert and careful judges must be used. Lembcke claims that a much more precise and directive system such as his does not require expert judges. It is said that with a cookbook, anyone who can read can cook. The same is true, and to about the same extent, of the medical audit using objective criteria; anyone who knows enough medical
terminology to understand the definitions and criteria can prepare the case abstracts and tables for the medical audit. However, the final acceptance, interpretation and application of the findings must be the responsibility of a physician or group of physicians. The “logic system” developed by Peterson and Barsamian appears well suited for rating by computer, once the basic facts have been assembled, presumably by a record abstractor.

The dimensions of care and the values that one uses to judge them are, of course, embodied in the criteria and standards used to assess care. These standards can, therefore, be differentiated by their selectivity and inclusiveness in the choice of dimensions to be assessed. The dimensions selected and the value judgments attached to them constitute the operationalised definition of quality in each study. The preselection of dimensions makes possible, as already pointed out, the development of precise procedures, standards and criteria. Lembcke has put much stress on the need for selecting a few specific dimensions of care within specified diagnostic categories rather than attempting general evaluations of unspecified dimensions which, he feels, lack precision. He uses dimensions such as the following: confirmation of clinical diagnosis, justification of treatment (including surgery) and completeness of the surgical procedure. Within each dimension, and for each diagnostic category, one or more previously defined activities are often used to characterise performance for that dimension as a whole.

Examples are the compatibility of the diagnosis of pancreatitis with serum amylase levels or of liver cirrhosis with biopsy findings, the performance of sensitivity tests prior to antibiotic therapy in acute bronchitis, and the control of blood sugar levels in diabetes. In addition to the extent to which preselection of dimensions takes place, assessments of quality differ with respect to the number of dimensions used and the exhaustiveness with which performance in each dimension is explored. For example, Peterson et al. and Rosenfield use a large number of dimensions. Peterson and Barsamian, on the other hand, concentrate on two basic dimensions, justification of diagnosis and of therapy, but require complete proof of justification. A much more simplified approach is illustrated by Huntley et al., who evaluate outpatient care using two criteria only: the percent of work-ups not including certain routine procedures, and the percent of abnormalities found that were not followed up.

Judgments of quality are incomplete when only a few dimensions are used and decisions about each dimension are made on the basis of partial evidence. Some dimensions, such as preventive care or the psychological and social management of health and illness, are often excluded from the definition of quality and the standards and criteria that make it operational. Examples are the intentional exclusion of psychiatric care from the Peterson study and the planned exclusion of the patient-physician relationship and the attitudes of physicians in studies of the quality of care in the Health Insurance Plan of Greater New York. Rosenfeld made a special point of including the performance of specified screening measures among the criteria of superior care; but care was labelled good in the absence of these measures.

In the absence of specific instructions to the judges, the study by Morehead et al., includes histories of cases, considered to have received optimal care, in which failure of preventive management could have resulted in serious consequences to the patient. Another characteristic of measurement is the level at which the standard is set. Standards can be so strict that none can comply with them, or so permissive that all are rated “good.” For example, in the study of general practice reported by Clute, blood pressure examinations, measurement of body temperature, otoscopy and performance of immunisations did not serve to categorise physicians because all physicians performed them well.

### 8.7 Measurement Scales

The ability to discriminate different levels of performance depends on the scale of measurement used. Many studies of quality use a small number of divisions to classify care, seen as a whole, into categories such as “excellent”, “good”, “fair” or “poor”. A person’s relative position in a set can then be further specified by computing the percent of cases in each scale category. Other studies assign scores to performance of specified components of care and cumulate these to obtain a numerical index usually ranging from 0–100. These practices raise questions relative to scales of measurement and legitimate operations on these scales. Some of these are described below.

Those who adhere to the first practice point out that any greater degree of precision is not possible with present methods. Some have even reduced the categories to only two: optimal and less than optimal. Clute uses three, of which the middle one is acknowledged to be doubtful or indeterminate. Also, medical care has an all-or-none aspect
that the usual numerical scores do not reflect. Care can be good in many of its parts and be disastrously inadequate in the aggregate due to a vital error in one component. This is, of course, less often a problem if it is demonstrated that performance on different components of care is highly intercorrelated.

Those who have used numerical scores have pointed out much loss of information in the use of overall judgments and that numerical scores, cumulated from specified sub scores, give a picture not only of the whole but also of the evaluation of individual parts. Rosenfeld has handled this problem by using a system of assigning qualitative scores to component parts of care and an overall qualitative score based on arbitrary rules of combination that allow for the all-or-none attribute of the quality of medical care. As already pointed out, a high degree of agreement was found between intuitive and structured ratings in the Rosenfeld study and between qualitative and quantitative ratings.

A major problem, yet unsolved, in the construction of numerical scores, is the manner in which the different components are to be weighted in the process of arriving at the total. At present this is an arbitrary matter. Peterson et al., for example, arrive at the following scale: clinical history 30, physical examination 34, and use of laboratory aids 26, therapy 9, preventive medicine 6, clinical records 2, and total 107. Daily and Morehead 24 assign different weights as follows: records 30, diagnostic work-up 40, treatment and follow-up 30, total 100. Peterson et al., say, “Greatest importance is attached to the process of arriving at a diagnosis since, without a diagnosis, therapy cannot be rational. Furthermore, therapy is in the process of constant change, while the form of history and physical examination has changed very little over the years.” Daily and Morehead offer no justification for their weightings, but equally persuasive arguments could probably be made on their behalf. The problem of seeking external confirmation remains.

The problem of weights is related to the more general problem of value of items of information or of procedures in the medical care process. Rimoldi et al., used the frequency with which specified items of information were used in the solution of a test problem as a measure of the value of that item. Williamson had experts classify specified procedures, in a specified diagnostic test setting, on a scale ranging from “very helpful” to “very harmful.” Individual performance in the test was then rated using quantitative indices of “efficiency,” “proficiency” and overall “competence,” depending on the frequency and nature of the procedures used.

A problem in the interpretation of numerical scores is the meaning of the numerical interval between points on the scale. Numerical scores derived for the assessment of quality are not likely to have the property of equal intervals. They should not be used as if they had.

8.7.1 Reliability
The reliability of assessments is a major consideration in studies of quality, where so much depends on judgment even when the directive types of standards are used. Several studies have given some attention to agreement between judges. The impression gained is that this is considered to be at an acceptable level. Peterson et al., on the basis of observer revisits, judged agreement to be sufficiently high to permit all the observations to be pooled together after adjustment for observer bias in one of the six major divisions of care. In the study by Daily and Morehead, “several cross-checks were made between the two interviewing internists by having them interview the same physicians. The differences in the scores of the family physicians based on these separate ratings did not exceed 7 per cent.” Rosenfeld paid considerable attention to testing reliability, and devised mathematical indices of “agreement” and “dispersion” to measure it. These indicate a fair amount of agreement, but a precise evaluation is difficult since no other investigator is known to have used these same measures. Morehead et al., in the second study of medical care received by Teamster families, report initial agreement between two judges in assigning care to one of two classes in 78 per cent of cases. This was raised to 92 per cent following re-evaluation of disagreements by the two judges.

By contrast to between-judge reliability, very little has been reported about the reliability of repeated judgments of quality made by the same person. To test within-observer variation, Peterson et al., asked each of two observers to revisit four of his own previously visited physicians. The level of agreement was lower within observers than between observers, partly because revisits lasted a shorter period of time and related, therefore, to a smaller sample of practice.
The major mechanism for achieving higher levels of reliability is the detailed specification of criteria, standards and procedures used for the assessment of care. Striving for reproducibility was, in fact, a major impetus in the development of the more rigorous rating systems by Lembcke and by Peterson and Barsarmian. Unfortunately, no comparative studies of reliability exist using highly directive versus nondirective methods of assessment. Rosenfeld’s raw data might permit a comparison of reliability of “intuitive” judgments and the reliability of structured judgments by the same two assessors. Unreported data by Morehead et al., could be analysed in the same way as those of Rosenfeld to give useful information about the relationship between degree of reliability and method of assessment. The partial data that have been published suggest that the post-review reliability achieved by Morehead et al., using the most non-directive of approaches, is quite comparable with that achieved by Rosenfeld who used a much more directive technique.

Morehead et al., raised the important question of whether the reliability obtained through the detailed specification of standards and criteria may not be gained at the cost of reduced validity. Frequently, such criteria force into a rigid framework similar actions or factors which may not be appropriate in a given situation due to the infinite variations in the reaction of the human body to illness. The study group rejects the assumption that such criteria are necessary to evaluate the quality of medical care. It is their unanimous opinion that it is as important for the surveyors to have flexibility in the judgment of an individual case as it is for a competent physician when confronting a clinical problem in a given patient.

The reasons for disagreement between judges throw some light on the problems of evaluation and the prospects of achieving greater reliability. Rosenfeld found that “almost half the differences were attributable to situations not covered adequately by standards, or in which the standards were ambiguous. In another quarter differences developed around questions of fact, because one consultant missed a significant item of information in the record. It would therefore appear that with revised standards, and improved methods of orienting consultants, a substantially higher degree of agreement could be achieved.” Less than a quarter of the disagreements contain differences of opinion with regard to the requirements of management. This is a function of ambiguity in the medical care system and sets an upper limit of reproducibility. Morehead et al., report that in about half the cases of initial disagreement “there was agreement on the most serious aspect of the patient’s care, but one surveyor later agreed that he had not taken into account corollary aspects of patient care.” Other reasons for disagreement were difficulty in adhering to the rating categories or failure to note all the facts. Of the small number of unresolved disagreements (eight per cent of all admissions and 36 per cent of initial disagreements) more than half were due to honest differences of opinion regarding the clinical handling of the problem. The remainder arose out of differences in interpreting inadequate records, or the technical problems of where to assess unsatisfactory care in a series of admissions.

A final aspect of reliability is the occasional breakdown in the performance of an assessor, as so dramatically demonstrated in the Rosenfeld study. The question of what the investigator does when a well defined segment of his results are so completely aberrant will be raised here without any attempt to provide an answer.

8.7.2 Bias
When several observers or judges describe and evaluate the process of medical care, one of them may consistently employ more rigid standards than another, or interpret predetermined standards more strictly. Peterson et al., discovered that one of their observers generally awarded higher ratings than the other in the assessment of performance of physical examination, but not in the other areas of care. Rosenfeld showed that, of two assessors, one regularly awarded lower ratings to the same cases assessed by both. An examination of individual cases of disagreement in the study by Morehead et al., reveals that, in the medical category, the same assessor rated the care at a lower level in 11 out of 12 instances of disagreement. For surgical cases, one surveyor rated the care lower than the other in all eight instances of disagreement. The impression is gained from examining reasons for disagreement on medical cases that one of the judges had a special interest in cardiology and was more demanding of clarity and certainty in the management of cardiac cases.

The clear indication of these findings is that bias must be accepted as the rule rather than the exception, and that studies of quality must be designed with this in mind. In the Rosenfeld study, for example, either of the two raters used for each area of practice would have ranked the several hospitals in the same order, even though one was
consistently more generous than the other. The Clute study of general practice in Canada, on the other hand, has been criticised for comparing the quality of care in two geographic areas even though different observers examined the care in the two areas in question.

The author was aware of this problem and devised methods for comparing the performance of the observers in the two geographic areas, but the basic weakness remains. Predetermined order or regularity in the process of study may be associated with bias. Therefore, some carefully planned procedures may have to be introduced into the research design for randomisation. The study by Peterson et al., appears to be one of the few to have paid attention to this factor. Another important source of bias is knowledge, by the assessor, of the identity of the physician who provided the care or of the hospital in which care was given. The question of removing identifying features from charts under review has been raised, but little is known about the feasibility of this procedure and its effects on the ratings assigned. Still another type of bias may result from parochial standards and criteria of practice that may develop in and around certain institutions or “schools” of medical practice. To the extent that this is true, or suspected to be true, appropriate precautions need to be taken in the recruitment and allocation of judges.

8.7.3 Validity

The effectiveness of care as has been stated, in achieving or producing health and satisfaction, as defined for its individual members by a particular society or subculture, is the ultimate validator of the quality of care. The validity of all other phenomena as indicators of quality depends, ultimately, on the relationship between these phenomena and the achievement of health and satisfaction. Nevertheless, conformity of practice to accepted standards has a kind of conditional or interim validity which may be more relevant to the purposes of assessment in specific instances. The validation of the details of medical practice by their effect on health is the particular concern of the clinical sciences. In the clinical literature one seeks data on whether penicillin promotes recovery in certain types of pneumonia, anticoagulants in coronary thrombosis, or corticosteroids in rheumatic carditis; what certain tests indicate about the function of the liver; and whether simple or radical mastectomy is the more life-prolonging procedure in given types of breast cancer.

From the general body of knowledge concerning such relationships arise the standards of practice, more or less fully validated, by which the medical care process is ordinarily judged. Intermediate, or procedural, end points often represent larger bundles of care. Their relationship to outcome has attracted the attention of both the clinical investigator and the student of medical care organisation. Some examples of the latter are studies of relationships between prenatal care and the health of mothers and infants and the relationship between multiple screening examinations and subsequent health. An interesting example of the study of the relationship between one procedural end point and another is the attempt to demonstrate a positive relationship between the performance of rectal and vaginal examinations by the physician, and the pathological confirmation of appendicitis in primary appendectomies, as reported by the Professional Activities Study.

Several of these studies have shown, for example, a relationship between the training and qualifications of physicians and the quality of care they provide. The relationship is, however, a complex one, and is influenced by the type of training, its duration and the type of hospital within which it was obtained. The two studies of general practice have shown additional positive relationships between quality and better office facilities for practice, the presence or availability of laboratory equipment and the institution of an appointment system. No relationship was shown between quality and membership of professional associations, the income of the physician or the presence of x-ray equipment in the office. The two studies do not agree fully on the nature of the relationship between quality of practice and whether the physician obtained his training in a teaching hospital or not, the number of hours worked or the nature of the physician’s hospital affiliation. Hospital accreditation, presumably a mark of quality conferred mainly for compliance with a wide range of organisational standards, does not appear, in and of itself, to be related to the quality of care, at least in city.
Although structure and process are no doubt related, the few examples cited above indicate clearly the complexity and ambiguity of these relationships. This is the result partly of the many factors involved and partly of the poorly understood interactions among these factors. For example, one could reasonably propose, based on several findings that both hospital factors and physician factors influence the quality of care rendered in the hospital, but that differences between physicians are obliterated in the best and worst hospital and express themselves, in varying degrees, in hospitals of intermediate quality.

An approach particularly favoured by students of medical care organisation is to examine the relations between structure and outcome without reference to the complex processes that tie them together. Some examples of such studies have been cited already 6–9. Others include studies of the effects of reorganising the outpatient clinic on health status, the effects of intensive hospital care on recovery, the effects of home care on survival and the effect of a rehabilitation program on the physical status of nursing home patients. The lack of relationship to outcome in the latter two studies suggests that current opinions about how care should be set up are sometimes less than well established.

This brief review indicates the kinds of evidence pertaining to the validity of the various approaches to the evaluation of quality of care. Clearly, the relationships between process and outcome, and between structure and both process and outcome, are not fully understood. With regard to this, the requirements of validation are best expressed by the concept, already referred to, of a chain of events in which each event is an end to the one that comes before it and a necessary condition to the one that follows. This indicates that the means-end relationship between each adjacent pair requires validation in any chain of hypothetical or real events. This is, of course, a laborious process. More commonly, as has been shown, the intervening links are ignored. The result is that causal inferences become attenuated in proportion to the distance separating the two events on the chain.

Unfortunately, very little information is available on actual assessments of quality using more than one method of evaluation concurrently. Makeover has studied specifically the relationships between multifactorial assessments of structure and of process in the same medical groups. It was found that the medical groups that achieved higher quality ratings by the method used in this study were those that, in general, adhered more closely to HIP’s Minimum Medical Standards. However, the exceptions were sufficiently marked, both in number and degree, to induce one to question the reliability of one or the other rating method when applied to any one medical group. It would seem that further comparison of these two methods of rating is clearly indicated.
Summary

- The assessment of quality must rest on a conceptual and operationalised definition of what the “quality of medical care” means.
- The outcome of medical care, in terms of recovery, restoration of function and of survival, has been frequently used as an indicator of the quality of medical care.
- The validity of outcome as a dimension of quality is seldom questioned.
- Many factors other than medical care may influence outcome, and precautions must be taken to hold all significant factors other than medical care constant if valid conclusions are to be drawn.
- The first issue in sampling is to specify precisely the universe to be sampled, which, in turn, depends on the nature of the generalisations that one wishes to make.
- The degree of homogeneity in the universe to be sampled is, of course, a matter of great importance in any scheme of sampling or selection.
- The medical care provided to one or another individual is valid evidence of quality and there should be little or no chance variation which is affected by adjusting the size of the sample.
- “The most probable explanation for the ratings in medicine being lower in the present (second) study is the nature of the cases reviewed.”
- Sampling and selection influence, and are influenced by, a number of considerations in addition to generalisation and homogeneity.
- The practicing physician often knows a great deal about the patient from previous contacts with him hence the need to select for observation “new” cases and situations that require a thorough examination irrespective of the patient’s previous experience.
- An indirect method of obtaining information is to study behaviours and opinions from which inferences may be drawn concerning quality.
- Standards can also be differentiated by the extent of their specificity and directiveness.

References


Recommended Reading

1. Which of the following consideration is not the base for judgments of good medical care?
   a. Appropriateness
   b. Completeness
   c. Redundancy of information
   d. Inadequacy

2. An indirect method of obtaining information is to study behaviours and opinions from which inferences may be drawn concerning _______.
   a. quality
   b. quantity
   c. issues
   d. problems

3. The hospitals were rated and ranked using opinions concerning the quality of _______.
   a. hospitals
   b. medical care
   c. environment
   d. infrastructure

4. The first issue in sampling is to specify precisely the ________ to be sampled.
   a. universe
   b. item
   c. numbers
   d. hospitals

5. ________ test situations may be set up to assess the capacity to perform in selected dimensions of care.
   a. Empirical
   b. Normative
   c. Hypothetical
   d. Hierarchical

6. ________ depends on the development of standards.
   a. Measurement
   b. Infrastructure
   c. Administration
   d. Management

7. ________ standards are derived from actual practice and are generally used to compare medical care in one setting.
   a. Measurement
   b. Empirical
   c. Normative
   d. Hypothetical
8. _______ standards derive, in principle, from the sources that legitimately set the standards of knowledge and practice in the dominant medical care system.
   a. Measurement
   b. Empirical
   c. Normative
   d. Hypothetical

9. The ability to discriminate different levels of _________ depends on the scale of measurement used.
   a. performance
   b. quality
   c. appraisal
   d. quantity

10. Match the following

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1. Reliability</td>
<td>A. Depends, ultimately, on the relationship between these phenomena and the achievement of health and satisfaction.</td>
</tr>
<tr>
<td>2. Bias</td>
<td>B. Depends on the development of standards.</td>
</tr>
<tr>
<td>3. Validity</td>
<td>C. The impression is gained from examining reasons for disagreement on medical cases.</td>
</tr>
<tr>
<td>4. Measurement</td>
<td>D. Depends on judgment even when the directive types of standards are used.</td>
</tr>
</tbody>
</table>

a. 1-D, 2-C, 3-A, 4-B
b. 1-C, 2-B, 3-D, 4-A
c. 1-B, 2-C, 3-B, 4-A
d. 1-A, 2-C, 3-B, 4-D
Case Study I

Priority Setting and Hospital Strategic Planning

Although priority-setting occurs at all levels of the health system, most priority-setting research has focused on the macro (i.e., health system) or micro (i.e., bedside) policy-making levels. Although there is an emerging literature focused on priority-setting at the ‘meso’ level of policy-making, which includes hospitals, no study has focused on priority-setting in the context of hospital strategic planning. Describing the process of strategic planning in a hospital is a necessary first step towards understanding and improving the process. As a second step, because what hospitals do may not be what they should do, it is necessary to go beyond description to evaluate the quality of the priority-setting process. ‘Accountability for reasonableness’ (AFR) has been recognised internationally as an appropriate ethical framework for evaluating priority-setting in health care institutions. To date, it has not been used to evaluate priority-setting in the context of hospital strategic planning. The purpose of this study was to describe priority setting in the context of a hospital strategic planning initiative and to evaluate it against the conditions of AFR. The specific question addressed was how well does this hospital’s strategic planning initiative comply with the conditions of AFR?

Methods: Design
To describe priority-setting, we undertook a qualitative case study. A case study is ‘an empirical inquiry that investigates a contemporary phenomenon within its real life context. The case study method is appropriate because priority-setting in hospitals is complex, context dependent and involves social processes. To evaluate priority-setting, we compared the descriptive findings with the ethical framework of AFR described below.

Setting
Our study focused on a strategic planning initiative at Sunnybrook & Women’s College Health Science Centre (S&W) in 2001. S&W is a tertiary-care teaching hospital, affiliated with the University of Toronto, and is the result of a recent amalgamation of three hospitals. It includes 612 acute-care beds, 543 long-term care beds, 74 nursery beds and 22 rehabilitation beds, with a total budget of CAN$455 million.

Sample
We included all key documents and meetings, and sampled key people using a combination of theoretical sampling (people who were involved in some significant aspect of the priority-setting initiative as identified by participants) and convenience sampling (people who were available).

Data collection
The dataset consisted of three sources: key documents (strategic planning documents), interviews with key informants (senior management) and observations of group deliberations (so-called ‘decision days’). Key documents were obtained in electronic form when possible. Key informant interviews were audio taped and transcribed. Observations of meetings were described in field notes taken by the researchers. An initial interview guide was developed based on the relevant literature and previous research. Participants were asked to describe the priority-setting process, their role and their reflections about the process (interview guide available upon request). The interview guide was revised during data collection and analysis to exploit emerging findings. In addition, participants were asked to refine the recommendations for improvement to make them more relevant in their context. We collected over 200 pages of documents, including e-mails regarding the two decision days, written responses or comments, minutes of meetings of senior management, operations committee, medical advisory committee and board, a decision tree diagram and the executive summary of the operating plan. We conducted ten individual and four focus group interviews with a total of 45 people, including board members, senior management, operational and clinical programme managers and medical chiefs/directors. We observed two decision days and one post hoc forum of senior management.

Data analysis
Analysis of the data consisted of a modified thematic analysis organised into two phases: open and axial coding. In open coding, the data were read and then fractured by identifying chunks of data that related to an idea (decisions, participants, agreement mechanism, objectives, timing, information). In axial coding, similar ideas were organised
into overarching themes, which were the four conditions of AFR. We addressed the validity of our findings in six ways. First, we triangulated data from three different sources (documents, interviews and observations) to maximise comprehensiveness and diversity. Second, two primary researchers coded the raw data. Third, along with the primary researchers, a third researcher participated in the development of the coding framework. Fourth, members of an independent interdisciplinary research group, consisting of a philosopher, nurse, hospital administrator and bioethicist, enhanced the ‘reflexivity’ in the analysis by becoming familiar with the data and participating in the data analysis. Thus, the role of prior assumptions and experience, which can influence any inquiry, were acknowledged and examined. Fifth, all research activities were rigorously documented to permit a critical appraisal of the methods. Sixth, a draft report was distributed throughout the organisation and comments were invited. The participants verified the accuracy of the report and the reasonableness of the findings. Furthermore, at a subsequent strategic planning meeting involving the top managers in the organisation, the participants were asked whether the case study description adequately captured the 2000–2001 priority-setting initiative. Forty voted ‘yes’, one voted ‘no’.

**Conceptual framework**

To evaluate the case study description we used the AFR framework developed by Daniels and Sabin. According to AFR, an institution’s priority-setting decisions may be considered fair if they satisfy four conditions: relevance; publicity; appeals; and enforcement (As described in the below table).

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
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<tr>
<td>Relevance</td>
<td>Priority-setting decisions must rest on reasons (including information and principles) that fair-minded parties can agree are relevant to meeting context-specific needs under resource constraints. Fair-minded parties are stakeholders who are predisposed to decision-making according to rules of mutual cooperation.</td>
</tr>
<tr>
<td>Publicity</td>
<td>Priority-setting decisions and their rationales must be publicly accessible.</td>
</tr>
<tr>
<td>Appeals</td>
<td>The priority-setting process must include a mechanism for challenge and dispute resolution regarding priority setting decisions.</td>
</tr>
<tr>
<td>Enforcement</td>
<td>There must be voluntary or public regulation to ensure that the first three conditions are met.</td>
</tr>
</tbody>
</table>

**Research ethics**

The board and senior management of S&W agreed to participate in the project and approval was obtained from the University of Toronto Human Subjects Review Committee. Written informed consent was obtained from each individual before they were interviewed. All raw data were protected as confidential and available only to the research team. No individuals have been identified in dissemination without their explicit agreement.

**Results: Description of the strategic planning process**

In 2001, in the wake of the amalgamation of three organisations, the senior management of S&W launched an innovative priority-setting exercise to guide future decision-making. In the background were three issues: the organisation and management structure was still perceived as fragmented, the hospital had a major budget deficit ($30M) and there was pressure from the board for the organisation to become more focused by deciding what its core activities should be. The cornerstones of the priority-setting initiative were two ‘decision days’, six weeks apart. Decision day 1 involved members of senior management, clinical operations, programme administrative and medical leaders, nurses, other clinicians and other corporate managers. For decision day 2, the list of participants grew to include medical chiefs and heads not necessarily involved in senior management activities.

Most participants were invited by senior management and some were recommended by programme leaders. In preparation for the first decision day, an extensive information-gathering exercise assembled statistics for each clinical management grouping, including patient data. The information was distributed to all participants between one and five days before decision day 1. E-mail correspondence was sent 24 hours before decision day 1 with the agenda and expectations for the day. A decision tree was created by members of the senior management team to facilitate decisions about clinical service priorities (CSP). Decision day 1 focused on a major reorganisation of
hospital programmes. The primary task was to select, from nine existing programmes, five priority programmes or CSPs that would get preferential treatment in subsequent allocation of resources. The five programmes selected were cardiac care, musculoskeletal care, perinatal and gynaecological care, trauma care and cancer care; these accounted for approximately one-half of the total hospital services. During decision day 1, decision makers were to vote openly (show of hands) with no abstentions. Participants agreed that the next steps involved developing a plan to implement the CSPs and finalising the 2001/2002 operating budget.

Between decision days, a CSP workbook was created to assist individual programmes to prioritise their work according to the five CSPs and to address the deficit problem. Programme consultation meetings were held over a one-week period to review the CSP workbooks and generate feasible solutions for reducing the deficit. At the end of the consultations, 78 CSP workbooks were completed and a budget strategy was developed. Decision day 2 focused on the development of the 2001/2002 operating budget. Seventy decisions were made: 47 initiatives for expense reductions (e.g., eliminate 100 hours per year of cystoscopy time), operational efficiency (e.g., consolidation of laboratories, clinics and inpatient units) and increased focus (e.g., potential transfer of adolescent psychiatry to another institution), 14 initiatives that would not proceed without additional funding and nine initiatives that would be targeted for investment within the 2001/2002 budget. The voting mechanism was the same as on decision day 1. The next steps included a communication strategy to present the decisions.


Questions
1. Why is the case study method appropriate?
   **Answer**
   The case study method is appropriate because priority-setting in hospitals is complex, context dependent and involves social processes.

2. What does dataset contain?
   **Answer**
   The dataset consisted of three sources: key documents (strategic planning documents) interviews with key informants (senior management) and observations of group deliberations (so-called ‘decision days’).

3. What are the five priority programmes?
   **Answer**
   The five programmes priority programmes are cardiac care, musculoskeletal care, perinatal and gynaecological care, trauma care and cancer care.

4. Who are the members involved in decision day 1?
   **Answer**
   Decision day 1 involved members of senior management, clinical operations, programme administrative and medical leaders, nurses, other clinicians and other corporate managers.
Case Study II

A Wing and a Prayer: Hospital’s New Wing Shaped Building Features Custom Floor Designs

What began as a small, wood framed building 100 years ago is today the largest medical center between Denver, Colorado and Salt Lake City, Utah. St. Mary’s Hospital provides premier medical services to thousands of regional patients annually. The hospital’s newly opened Advanced Medical Pavilion spreads its wings over the high plains of Grand Junction, creating a healing environment against a beautiful backdrop of nature. Designed to be a place of comfort and support for patients and their families, the Pavilion exudes a warm and welcoming atmosphere. An integrated combination of Natural Options luxury solid vinyl, Marmorette Linoleum and Standard Excelon Imperial Texture vinyl composition tile from Armstrong proved critical to the nature-inspired design theme, while providing the physical performance that this busy health care facility requires.

The new Pavilion houses the facility’s original cancer care plus centers for radiation, ambulatory care, imaging, blood donation and several medical offices. Colorado based Boulder Associates Inc. designed the structure. Architect Curtis Chong says, “The design draws imagery from the landscape of the Grand Junction area.” The visually striking structure is composed of two, three-story angled wings that represent rocky mesas. The wings meet in a central, wedge-shaped atrium that represents a cool, shaded canyon. The metaphor is expressed in masonry, brick, glass and metal. Chong explains, “We employed light and space, simple forms and local natural materials to affect a non-institutional atmosphere.”

Designer Aneile Hise says, “We wanted to continue the building’s design on the floor to create a harmonious setting.” Natural Options was selected for its combination of aesthetics and performance. Wing-shaped insets of Natural Options echo the striations of geological forms. The two colours used represent the nearby canyons, creating a clever, contemporary floor scape while respecting the colour palette of the existing campus. The floor is used in the blood infusion and diagnostic imaging centers, as well as the ultrasound and mammography rooms. “The wood pattern is especially comforting for patients in these high visibility areas. It evokes a warm and homey feeling, which is so important for psychological wellbeing,” says Hise.

Hise emphasises, “Our firm is very focused on sustainability, and we like to use linoleum wherever possible.” Boulder Associates specified Marmorette made with natural, renewable raw materials, for the main nurses stations and corridors. Four colours of Marmorette provide aesthetics plus excellent durability for traffic resistance. The rich colour pigments and broad colour palette encourage creative design. “The flooring composition and colours foster a connection between inside and out, and between the human and natural worlds,” says Hise.

A good balance of value, durable performance, aesthetics and installation ease drove the flooring selection for the exam rooms and service areas. Standard Excelon Imperial Texture appealed to the design firm on both practical and conceptual levels. Vinyl Composition Tile (VCT) embodies the physical attributes these spaces need. Boulder Associates used five colours in earth-based hues for visual interest and to reinforce the friendly, navigable environment.

Carpetime, the flooring contractor, saw the custom designs at St. Mary’s as an interesting challenge. Commercial salesperson, Dave Blehm, says the architect supplied CAD drawings to assist with the installation process. He explains, “To ensure a tight fit, we used templates instead of free-hand cutting to create the arc and wing shapes. Paper templates were made for the linoleum designs, but we used stamped steel templates for the vinyl planks because of the size and complexity of the designs.’ The technicians on the job installed the field floor covering first, and then fitted the custom insets and shapes. Blehm says, “We owe a lot to the experience and skill of our craftspeople they are the guys that make it happen.” The end result met the expectations of both the design firm and the hospital.

St. Mary’s values emphasise a collaborative approach to improving the whole health of patients emotional, spiritual and physical. At St. Mary’s, even the floors in the new Pavilion contribute to their mission.
The St. Mary’s hospital challenge
The challenges of St. Mary’s hospital are as follows:

• Specify flooring that enhances a nature-influenced design concept.
• Flooring must meet the aesthetic and physical demands of a busy health care facility in a multitude of treatment, public and administrative spaces.
• Flooring must be easy to custom cut and install.
• Colours must respect the existing facility palette while embodying the spirit of the new design.

Armstrong solution
Armstrong solutions are as follows:

• Natural Options and Marmorette feature naturally-inspired visuals and earth-based colours.
• Vinyl and linoleum flooring have excellent health care performance attributes including resilience, durability, stain traffic resistance and very good maintenance.
• Vinyl and linoleum flooring can be cut to tight tolerances to facilitate custom installations.
• Multiple colours of VCT allow for a custom design without custom cutting.
• Colour-integrated product portfolio provides greater design flexibility.

Product specs
The Product specs are as follows:

Natural options
Flexible solid vinyl construction. The appeal of naturally influenced designs with the benefits of resilient flooring including lower installed cost, easier installation, easier maintenance and comfort.

Marmorette
Natural linoleum construction with a classic marbleised pattern and rich colours. The product is offered in a wide range of colours and gauges to meet a variety of performance needs and installed costs. Linoleum is environmentally friendly, is comfortable to walk on and absorbs impact sound.

Standard excelon imperial texture
Vinyl Composition Tile featuring decades of proven performance, durability, value, quality and installation ease. Sturdy through-pattern construction offers great looking colour and design that will last for the lifetime of the floor.


Questions
1. What is the saying of Architect Curtis Chong?
2. What will the four colours of Marmorette provide?
3. What are the challenges of St. Mary’s hospital?)
Case Study III

Hospital Based Integrative Medicine

Stakeholder analysis
Stakeholders are presumed to have an agenda vis-à-vis the topic in question. Stakeholder analysis employs two basic approaches to determine the stakeholders’ agendas (Weiss 1986, Hengstberger-Sims and McMillan, 1991). The first involves establishing conceptually the characteristics thought to constitute the agenda and then determining if the shareholders agree with those characteristics. This is normally done with structured questionnaires. The difficulty with this approach is establishing criteria that are general enough to cover the range of activities the stakeholder may wish to include but specific enough to distinguish one group from another.

The researcher, in effect, creates an agenda by presenting characteristics the respondents might not have mentioned on their own. This approach generates objectively comparable data. It has been successfully used in the health system to understand emerging/evolving systems such as health maintenance organisation (HMOs) (Whitehead et al., 1989; Widra and Fottler, 1992) and urban rural hospital alliances (Savage et al., 1992). The second approach, called grounded theory research, sets aside the agenda and instead explores with the respondents, in their own words, what they perceive to be the important issues.

By empirically documenting the opinions of the respondents, we can establish the agenda that is important to the stakeholders. Qualitative researchers assume that the meaning of any observed behaviour depends on the context in which it occurs, and they prefer “grounded” concepts and theories (Glaser and Strauss, 1967). In practical terms, this means approaching the field with a minimum of predetermined concepts and theories; those that are used must be amenable to constant revision as the research proceeds. The objective is to generate concepts that do not distort the phenomena under study (Van Maanen, 1979). When the focus is on operationalising quantitative measures (particularly if this is done prematurely), it is possible to overlook relevant variables or oversimplify them (Mullen and Reynolds, 1978).

Another advantage of grounded theory is that it is immediately available to the social participants it is both comprehensible and self obvious, because it is based on the participant’s perspective. In our case, the IM center brings together those who offer a service (CAM providers), those who are in a position to refer patients to a service (medical physicians), those who seek a service (CAM patients), and those who regulate integration (administrators). However each of these is locked into other systems with other stakeholders. For the CAM provider, it may be a particular profession, as in the case of chiropractors or acupuncturists, or it could be the community of CAM providers as a whole. If the CAM provider is a biomedical physician, the medical or hospital community could be part of his or her system. Each stakeholder will have a distinct stake in integrative medicine, and they may be in conflict.

Social network analysis
Individual stakeholders (both providers and patients) are linked together in complex webs of association. The analysis of such networks social network analysis provides a rich and systematic understanding of the relationships among people, teams, departments, or even entire organisation (Wasserman and Faust, 1994). Integration can take various shapes and forms:

- Client-based links (client referrals and the sharing of client information)
- Program-based links, which can be formal (sharing staff, invited presentations, coordinating efforts) or informal (friendship networks, serving together on committees or boards, professional affiliations)
- Indirect program links (funding sources, regulatory bodies, hospital hierarchies)

The integration can be horizontal (among similar types of services) or vertical/functional (among varied but related services). Links can be analysed in terms of organisational level (e.g., between agency heads, among frontline staff or intermediary program managers), scope of the linkage (i.e., the number of system members included in the relationship), how they are linked (informal versus formal relationships; written or binding agreements by authorised agents and informal network relations based on interpersonal familiarity and trust), degree of coupling; stability (as measured by length/duration of a relationship) and reliability.
A social network approach can be used to characterise systems of care and the extent and type of coordination and integration in these networks (Morrissey, Tausig, and Lindsey, 1985). Network analysis (Scott, 1991; Wasserman and Faust, 1994) allows various levels of analysis (Morrissey, Johnsen, and Calloway, 1997). It allows the researcher to determine the intensity and complexity of interdependencies among organisations, parts of organisations, or individuals (Van de Ven, 1976, Van de Ven and Ferry, 1980); and the degree of coordination among these organisations/parts. Network analysis has been used extensively to understand mental and physical health care systems from an organisational perspective (Morrissey, Tausig, and Lindsey, 1985; Wright and Shuff, 1995; Morrissey, Johnsen and Calloway, 1997).

An exploratory qualitative network analysis explores the multiple relationships among actors and groups. Like the “embedded” case study design described by Caronna, Pollack, and Scott (1997), the qualitative approach uses in-depth interviews to analyse links among social systems, individuals, organisations, and environments. In our case, this approach helps us understand referral patterns, cooperation in planning, sharing of resources, coordination of services, and sharing of information (Eisenberg and Swanson, 1996; Jinnett, Coulter, and Koegel, 2002).

In addition, the social network approach allows us to make sense of the structural (formal) organisational features as seen in a hospital organisation chart as well as the informal relationships that people negotiate as they try to secure care for their clients. Once this range of relationships has been mapped, a more quantitative analysis can be applied. Through the use of this dual framework, we can draw attention to the importance of stakeholder beliefs and attitudes as well as the network of relationships that are established in a social system. The approach allows us to delineate the important factors that facilitate or hinder integration.

**Overview of study design**

We used a case study methodology to examine how a centre for integrative medicine fits into a large hospital and community of stakeholders (Yin, 1984). Unlike large-scale survey methods, case studies are particularly effective for discovering the key factors that facilitate and inhibit desired outcomes and understanding the process and mechanisms through which these factors interact (Patton, 1990). Case studies are one of the few techniques that provide in-depth information about how programs are working (or not working) in the larger social and organisational contexts in which they are embedded (Jinnett, Coulter, and Koegel, 2002). As part of the case study approach, we drew on both qualitative and quantitative data collection and analysis techniques. Most of our data come from structured and semi structured interviews with six stakeholder group.

- Key hospital administrators
- Non-CAM clinicians in the hospital (attending physicians)
- Non-CAM clinicians in the community (private attending)
- CAM providers in the IM centre
- CAM providers in the adjacent community
- Patients

In each interview, we asked people to report on their own experiences with CAM and the IM centre, as well as their relationships with other persons and stakeholder groups associated with the centre. Qualitative data collection techniques have several key advantages over standard survey techniques:

- Respondents describe their experiences, beliefs, and choices in the way they think about them.
- They are not limited to investigators’ predetermined concepts and theories.
- They provide a more dynamic picture of processes and mechanisms that regulate social phenomena (Van Maanen, 1979; Patton, 1990; Miles and Huberman, 1994).

To complement our qualitative data, we also collected quantitative data from patient files and more structured patient questionnaires. By combining the many different stakeholder perspectives, we get a more nuanced and complete understanding of the evolution of the IM centre and all the people who played roles in its growth and demise. Finally, to place our case study in a larger framework, we held a one-day workshop with key personnel from other IM programs (successful and unsuccessful) throughout the country.
Study setting
The hospital-based Integrative Medicine Medical Group (IMMG) is a multispecialty practice delivering primarily outpatient medical care in a collaborative fashion that coordinates complementary and alternative medicine with conventional western medicine. The IM centre was established by the hospital in the summer of 1998 to coordinate integrative medicine activities throughout the hospital’s health system. It was located in a community-based academic medical centre with the full services of a teaching hospital. The IM centre included two board certified internists, an osteopath certified in family practice and geriatrics, two traditional Chinese medicine practitioners, a chiropractor, and a massage therapist.

Services included western medical diagnosis and treatment, botanical medicine, nutritional counselling, mind-body interventions, acupuncture, Chinese herbal medicine, manual adjustments, craniosacral therapy, relaxation training, tai chi, limited homeopathy, and massage therapy. Patients were seen initially by a biomedical physician, who coordinated their treatment plans. Close affiliations with other practitioners in the area extended the range of services to include chiropractic care, energetic healing techniques, classical homeopathy, Ayurvedic medicine, aromatherapy, and Rolfing. The IM centre also assisted other academic departments that were interested in using CAM modalities or research in the application of these modalities to their patient populations.


Questions
1. What are the two basic approaches that stakeholder analysis employs to determine the stakeholders’ agendas?
2. What is the advantage of grounded theory?
3. Who are the six stakeholders forming a group?
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Recommended Reading


Self Assessment Answers

Chapter I
1. b
2. b
3. a
4. d
5. a
6. c
7. b
8. d
9. a
10. a

Chapter II
1. a
2. d
3. c
4. a
5. b
6. a
7. c
8. a
9. b
10. b

Chapter III
1. a
2. b
3. d
4. c
5. c
6. d
7. a
8. b
9. b
10. a

Chapter IV
1. b
2. a
3. c
4. b
5. a
6. c
7. d
8. a
9. d
10. a
Chapter V
1. d
2. c
3. a
4. a
5. a
6. c
7. b
8. a
9. b
10. b

Chapter VI
1. a
2. b
3. c
4. c
5. b
6. b
7. d
8. a
9. b
10. a

Chapter VII
1. a
2. b
3. d
4. c
5. b
6. d
7. a
8. b
9. d
10. a

Chapter VIII
1. d
2. a
3. b
4. a
5. c
6. a
7. b
8. c
9. a
10. a