

**THE RELATIONSHIP BETWEEN  
HOSPITAL MANAGEMENT PROCESSES AND  
HEALTH MANAGEMENT INFORMATION  
SYSTEMS**

**DOCTORAL THESIS**

**Prepared by / Ashraf AlhajAli**

**Thesis Advisor / Dr. Altay Akturk**

**Istanbul 2021**

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## **DECLARATION**

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree except where due acknowledgment has been made in the text.

Ashraf ALHAJ ALI

## **DEDICATION**

I would like to dedicate my thesis to my beloved wife Basma ALHAJ ALI, to my great sons Saleh ALHAJ ALI & Salem ALHAJ ALI and my dear daughter Sara ALHAJ ALI.

## **ACKNOWLEDGMENTS**

I would like to express deepest appreciation and thanking to Dr. Altay AKTURK who makes this project possible. I am extremely grateful to him for providing me great opportunities.

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# LIST OF CONTENTS

<a href="#">DECLARATION</a> .....	2
<a href="#">DEDICATION</a> .....	4
<a href="#">ACKNOWLEDGMENTS</a> .....	5
<a href="#">LIST OF CONTENTS</a> .....	<b>Error! Bookmark not defined.</b>
<a href="#">LIST OF TABLES</a> .....	<b>Error! Bookmark not defined.</b>
<a href="#">LIST OF FIGURES</a> .....	<b>Error! Bookmark not defined.</b>
<a href="#">ABBREVIATIONS</a> .....	<b>Error! Bookmark not defined.</b>
<a href="#">ABSTRACT</a> .....	<b>Error! Bookmark not defined.</b>
<a href="#">ÖZET</a> .....	<b>Error! Bookmark not defined.</b>
Introduction .....	1
2. The Concept of Management .....	2
2.1. Characteristics of the Management Process.....	3
2.2. Management as a Process .....	5
2.3. Management as a Science.....	7
2.3.1. Pre-Classical Management and Contributors.....	9
2.3.2. Classical Management Thinking .....	10
2.3.3. Contemporary Approaches in Management.....	10
2.3.3.1. System Approach .....	11
2.3.3.2. Contingency Approach .....	12
2.3.3.2.1. Burns and Stalker's Research .....	12
2.3.3.2.1.1. Mechanistic Management System .....	13
2.3.3.2.1.2. Organic Management System .....	13

2.3.3.2.2. Lawrence and Lorsch's Studies .....	14
2.3.3.2.2.1. Differentiation .....	14
2.3.3.2.2.2. Completion .....	15
2.3.3.2.3. Leawitt's Studies .....	15
2.3.3.3. General Conclusions from the Contingency Approach.....	16
3. General Information About Hospitals .....	17
3.1. Definition .....	17
3.2. General Characteristics of Hospital Operations .....	18
3.3. Functions of Hospital Businesses .....	19
3.4. Classification of Hospital Businesses .....	20
3.5. Hospital Organizations .....	21
3.5.1. Public Hospitals (State) .....	22
3.5.2. Public Hospitals (State) .....	23
3.5.3. Public Hospitals (University) .....	24
3.5.4. Public Hospitals (University) .....	25
4. Health Services Management .....	27
5. The Concept of Management Information Systems .....	29
5.1. Definition of Management Information System .....	30
5.2. Features of Management Information System .....	31

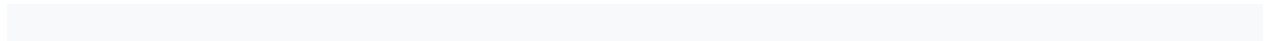
5.3. Management Information System Structure .....	32
5.4. Elements of Management Information Systems .....	35
6. The Concept and Use of Computers in Hospitals .....	38
6.1. Computers in Hospitals and Its Benefits .....	40
6.2. The Historical Development Process of the Hospital Management Information System and the Need for Management Information .....	45
6.3. General Limitations on the Development of the Hospital Management Information System .....	48
6.4. Development Hierarchy of Hospital Management Information System .....	50
7. Hospital Management Information Systems .....	55
7.1. Systems to Support Management .....	57
7.1.1. Resource Utilization and Programming Systems .....	58
7.1.2. Financial Management Information Systems .....	59
7.1.3. Material and Facility Management Systems .....	61
7.1.4. Personnel Management Information Systems .....	61
7.1.5. Systems to Support Diagnosis and Treatment .....	62
7.1.6. Computer Aided Diagnosis and Treatment Information Systems.....	64
7.1.7. Computer Aided Patient Tracking Information System.....	67

7.1.8. Computer Aided sease Record Keeping Information System.....	69
7.1.9. Computer Aided Laboratory and Pharmacy Information Systems.....	71
7.1.10. Fully Integrated Systems .....	72
7.1.11. Fully Integrated Systems Based on Diagnostic Groups.....	73
8. Processes and Management Information Systems in Hospitals.....	75
8.1. Medical Processes .....	76
8.1.1. Patient Registration and Admission Procedures .....	78
8.1.1.1. Appointment Procedures .....	80
8.1.1.1.1. Classification of Outpatient Clinic Appointment Systems.....	81
8.1.1.1.1.1. Single Block Appointment Systems .....	82
8.1.1.1.1.2. Individual Appointment Systems .....	83
8.1.1.1.1.3. Open Office Programming .....	84
8.1.1.1.1.4. Variable Spacing Appointments .....	85
8.1.1.1.1.5. Starting with Low Variation .....	86
8.1.1.1.1.6. Proportional Programming .....	87
8.1.1.1.1.7. Block Appointment Systems .....	88
8.1.1.1.1.8. Wave Programming .....	89
8.1.1.1.1.9. Group Programming .....	90
8.1.1.1.1.10. Advance Acceptance .....	92

8.1.1.1.1.11. Individual-Block Appointment Systems .....	93
8.1.1.1.2. Current Situation in Outpatient Queuing and Appointment Systems in Turkey .....	95
8.1.1.1.3. Functions Required in Appointment Systems.....	98
8.1.1.2. Entitlement Transactions (Medula Transaction).....	100
8.1.1.2.1. Medula System Components .....	102
8.1.1.2.2. Service Provider-GSS Communication .....	103
8.1.1.2.3. GSS Information System Architecture .....	105
8.1.1.3. Private Health Insurances .....	106
8.1.2. Polyclinic Process .....	107
8.1.2.1. Consultation Procedures .....	109
8.1.2.2. Polyclinic Examination Procedures .....	112
8.1.2.2.1. Laboratory & Radiology Procedures .....	113
8.1.2.2.1.1. PACS Systems .....	113
8.1.2.2.1.1.1. PACS History .....	114
8.1.2.2.1.1.2. Advantages of PACS .....	115
8.1.2.2.1.1.2.1. Advantages for the patient .....	116
8.1.2.2.1.1.2.2. Advantages for the Hospital .....	117
8.1.2.2.1.1.3. PACS Architecture .....	118

8.1.2.2.1.1.4. Integration .....	120
8.1.2.2.1.1.5. PACS and RIS Scheme .....	122
8.1.3. Clinical Processes .....	125
8.1.3.1. Hospitalization Procedures .....	127
8.1.3.2. Operating Room Operations .....	129
8.1.3.2.1. Anesthesia Procedures.....	130
8.1.3.2.2. Wake-up Halls .....	132
8.1.3.3. Intensive Care Operations .....	133
8.1.3.4. Delivery Room Procedures .....	135
8.1.3.5. Clinical Laboratory Procedures .....	137
8.1.3.6. Clinical Radiology Procedures .....	138
8.1.3.7. Discharge Procedures .....	140
8.1.3.8. Ex Transactions .....	142
8.1.4. Pharmacy Services .....	144
8.1.4.1. Pharmacy Warehouse Control Transactions .....	147
8.1.4.1.1. Ordering Medication .....	149
8.1.4.1.2. Majistral Drug Loading .....	150
8.1.4.1.3. Prescription Processes .....	152
8.1.5. Emergency Service Operations .....	154

8.1.6. Blood Bank Transactions .....	156
8.1.7. Hemodialysis Procedures .....	159
8.1.8. Nursing Operations .....	160
8.1.9. Administrative Transactions .....	162
8.1.9.1. Staff management .....	165
8.1.10. Purchasing (State Hospital) .....	167
8.1.11. Purchasing (Private Hospital) .....	169
9. CONCLUSION .....	170
10. References .....	174



# LIST OF FIGURES

Figure.1.1 Environmental Factors .....	21
Figure.2.1 Management of Processes.....	26
Figure.2.2 Team Members Inputs and Outputs.....	27
Figure.2.3 Distribution of Hospitals by Institutions in Turkey.....	30
Figure.2.4 Medical Organization Structure (State).....	31
Figure.2.5 Administrative Organization Structure (State).....	32
Figure.2.6 Medical Organization Structure (University).....	32
Figure.2.7 Administrative Organizational Structure (University).....	33
Figure.3.1 Information Systems Model.....	54
Figure.3.2 Introduction of Information Technology to Hospital Environments....	55
Figure.3.3 UCLA Hospital Financial Management Information System.....	66
Figure.4.1 Patient Registration and Admission Procedures.....	80
Figure.4.2 Appointment Procedures.....	81
Figure 4.3 GSS System.....	96
Figure 4.4 Medula System Components.....	97
Figure 4.5 Service Provider-GSS Communication.....	98
Figure 4.6 GSS Information System Architecture.....	99
Figure.4.7 Outpatient Clinic Process.....	102

Figure 4.8 Consultation Process.....	105
Figure.4.9 Inspection Process.....	108
Figure 4.10 PACS and RIS Chart.....	115
Figure 4.11 Hospitalization Process.....	120
Figure 4.12 Operating Room Process.....	125
Figure 4.13 Anesthesia Process.....	127
Figure 4.14 Intensive Care Process.....	130
Figure 4.15 Delivery Room Process.....	133
Figure 4.16 Discharge Procedures Process.....	137
Figure 4.17 Ex Transactions Process.....	140
Figure 4.18 Procurement Process (State Hospital).....	154
Figure 4.19 Procurement Process (Private Hospital).....	158

# ABBREVIATIONS LIST

GHI	General Health Insurance
IAIMS	Integrated Academic Information Management Systems
AAMC	Association of American Medical Colleges
MIS	Management Information Systems
ITIR	Inpatient Treatment Institutions Regulation
SII	Social Insurance Institution
ISC	International Statistical Classification
IACS	Image Archiving and Communication Systems
DICOM	Digital Imaging and Communications in Medicine
RIS	Radiology Information Systems
VPN	Virtual Private Network
SSL	Secure Sockets Layer

## **ABSTRACT**

In the contemporary world, thanks to technological development, violent competition recognizing no limit, and globalization; what mostly matter for companies are knowledge and the rate of knowledge-acquisition. This is what made the early 21st century an epoch of knowledge. Moreover, due to the fact that the internet has become widespread worldwide, companies use IT not only in order to adjust basic management processes to automation, but also for the sake of improving decision-making and decision-control processes; and also for the sake of acquiring, processing, storing, and delivering knowledge. Information technologies provide companies with those means to help management to analyze any problem one may encounter with no matter how complex it is, and to produce new products. It is the hospitals that have the most resistant and complex working-processes to be administered in the contemporary world. For one cannot have the second chance after the first mistake.

Therefore, it is necessary for them, during the process of activity-planning, to do those regulations to serve patients most effectively in accordance with the available resources. This is the reason why hospitals and other medical establishments need to be administered according to scientific standards. Thus, in hospital-managements, an efficient use of information technologies paves the way for working-processes to function flawlessly, and medical and executive agencies to give right decisions in a fastest way possible.

In this essay, the possible use of "Management Information Systems" in medical establishments will be analyzed; and it will be determined if the knowledge acquired through processing data within this systems have any effect on decision-making.

## ÖZET

Günümüz dünyasında hızlı teknolojik gelişim, sınır tanımayan rekabet ve küreselleşme sonucu, bilgi ve bilginin elde edilme hızı işletmeler için sahip olunmak istenilen en önemli değer haline gelmiştir. Bu gelişim 21. Yüzyılın ilk yıllarının bilgi çağı haline gelmesini sağlamıştır.

İnternetin de dünya genelinde yaygınlaşması ile birlikte şirketler bilgi teknolojilerini sadece temel işletme proseslerin otomasyona uyarlanması amacı ile değil, karar desteğini ve kontrolünü sağlamak amacı ile bilginin elde edilmesi, işlenmesi, depolanması ve dağıtılması için kullanmaktadırlar.

Bilgi sistemleri işletmelerde görülebilecek her türlü problemin analiz edilmesinde, karmaşık yapılarıdaki sorunların çözülmesinde ve yeni ürün geliştirmede yönetime katkı sağlamaktadır.

Özellikle tarihi gelişim içerisinde en eski organizasyonlardan olan hastaneler, günümüzün karmaşık ve yönetilmesi en zor olan iş süreçlerine sahip kurumlardır. Öyleki sağlık sektörü hata kabul etmeyen bir sektördür. Zira, ikinci kez hata yapma şansı yoktur. Bu amaçla, faaliyetleri planlarken hastaya eldeki olanaklar çerçevesinde en mükemmel hizmeti verecek düzenlemenin yapılması şarttır. Bu nedenle hastanelerin ve diğer sağlık kurumlarının bilimsel yönetim anlayışı ile ele alınmaları ve yönetilmeleri gerekmektedir.

Bu amaçla hastane yönetiminde bilgi sistemlerinin efektif bir şekilde kullanılması, iş süreçlerinin hatasız işlemesine; tıbbi ve idari kadronun hızlı ve doğru karar almasına yol gösterir.

Bu tez kapsamında Yönetim Bilişim Sistemleri' nin sağlık işletmelerine kazandırılması ve verilerin bu sistemlerde işleme tabi tutularak elde edilen bilginin karar almaya katkılarının olupolmadığı incelenmeye çalışılmıştır.

# 1. Introduction

In the health sector, especially private hospitals and health services such as clinics increasing number of institutions day by day; from the institutions providing health services of these institutions. The fact that it has become a profit-oriented business has brought competition with it. Ensuring the competitiveness of the business and continuing its way in this competitive environment. One of the most important factors for to follow the developing technology, to use this technology to use it in line with its objectives and to make fast and accurate decisions of the management with technology elements to help you get it. One of the factors that affect the decision-making of the management in health institutions is Health Management Information Systems. Patient care with the use of Health Management Information systems process is followed as a whole and the quality of the service given to the patient increases (1).

On the other hand, other administrative processes operating in parallel with the service provided; buy pharmacy or accounting transactions can be tracked from the system. All kinds of medical services provided from the system and administrative reporting, making the right decision of the management and planning its targets more healthily is taking place.

In the content of the thesis, first of all, it is the management that determines the institution's target and strategic roadmap (2). Conceptual dimension and structure of hospitals will be explained. Health after conceptual definitions services management and the importance of management information systems will be stated. management information systems its use in hospitals and other health institutions, the result of using the system advantages will be examined under the heading of hospital management information systems. In the last part the medical and administrative business processes in hospitals will be determined by diagrams, these processes will be detailed. definitions will be made. Business processes and hospital management information systems requirements will be explained.

## 2. Management Concept

Many definitions have been made about the concept of management from past to present. However, this When we examine the definitions one by one, we see that each definition has its own specific shortcomings. We see. For example, “Management is directing a group of people towards goals, division of labor among them, definition as “the sum of efforts to ensure cooperation and coordination” or Management is “the processes of doing business through other people and reaching the set goals (3)

“Management aims to achieve goals that people cannot achieve individually. is a group activity. Combining the body and mind powers of more than one person requires. To be able to continue this activity in a certain order and trust environment, some rules are required necessitates obedience.” (4)definitions define management as a human (human) process only.

So the management; to achieve certain goals, especially people,monetary resources, equipment, fixtures, raw materials, auxiliary materials and timethe processes of making and implementing decisions that are compatible with each other, and that can be used efficiently and effectively.is the total. What is

important in this definition is to implement the management process effectively and efficiently to achieve the goals. It is the process of resource use, and most often this resource use is planning, organizing, leadership and should be performed by performing the control functions. (5)

Some American writers examine the elements of production by dividing them into five and their management is based on these five.

counts in the element. These elements are: (6)

\*Human

\* Material

\*Machines

\*Money

\*Management (Dispatch and administration).

## 2.1. Features of the Management Process

Continuity of an enterprise, the quality of the product or service provided to international standards appropriately, together with these, both customer satisfaction and employee satisfaction, Ensuring satisfaction is the main goal of management.

Therefore, management is directed towards achieving one or more objectives, is working. All material and human resources are freely available for the realization of the objectives (7).

. Optimum compatibility between these resources, It can be said that resource use is efficient if there is cooperation and cooperation, In order to talk about a management concept, a manager must at least

There must be a managed person. In order to talk about the concept of management, items should also be mentioned (8)

1. Management, the thoughts of the person who is the manager and the decisions he makes to the governed obliges him to establish a personal authority that can enforce it.

2. Management requires harmony, harmony and communication between the ruler and the ruled, This is the basic condition for achieving the goal together.

3. Management also has a very special and important place in this process, and requires careful use. As time is the essence of planning,

It is a basic tool used to measure the effectiveness and efficiency of management activities.

4. In the essence of management, the resources, opportunities and time available in the most economical way and most.

it is to use it in a way that will provide more benefits. In other words, management is rational and is a process. (8,5)

## **2.2. Management as a Process**

Management is first and foremost a business and activity process. work in organizations and It is necessary to divide the activities into two parts as managerial and non-managerial activities.

Because administrative activities and non-managerial activities, in terms of purpose, scope they differ in their skills and the concepts and techniques they carry. managerial activities, especially These activities are carried out by the managers and these activities are closely related to the life and development of the

organizations. related activities. These activities include planning, organizing, directing, coordinating and controlling. as possible. At the same time, these activities include the functions of managers as this body, forms the stages of the management process (9).

Process nature is one of the most prominent features of management. Indeed, many researchers bases the definition of management on this feature. This means that management as a process; joint effort that no single person can achieve. It consists of all efforts related to the activities of people who have come together for the purpose. Partner group of people who have collaborated to achieve goals effectively and efficiently.

planning, organizing, executing, coordinating and controlling the activities of all related efforts constitute the management process. Management uses money, especially people, to achieve certain goals, resources, equipment, fixtures, raw materials, auxiliary materials and time It is the sum of the processes of making and enforcing harmonious, efficient and effective decisions (10).

The universality of management is the theoretical basis between business management and state management, that the distinction is now invalid, and that the principles and problems in private workplaces are also applicable in public institutions, that it is repeated without change and that the analysis

methods at hand do not speak of a single management science. indicates that it has reached a level of development that will be considered (6,10)

### 2.3. Management as a Science

Management is not only a set of activities or a process, but also a learnable knowledge is a discipline. It has its own concepts, principles and theories. From this point of view when received; planning for the effective and efficient realization of organizational goals, concepts, principles, theories, models and as a collection of all activities related to the systematic and conscious application of techniques is defined (11).

Management has become a branch of science after many phases. Each first of all, management has existed since people started working together. This From this point of view, administrative practices are as old as social life and for societies. The management of families, groups and societies was pre-eminent in the early periods of history. has come to the fore. Later, studies were carried out on the management of the state and armies. Education of princes and princes to be trained as statesmen, successful in administration. The most prominent of these works are the books written to statesmen in order to belt is scientific in examining the concept of management and solving organizational problems (11,12).

With the application of the method, a movement called "Scientific Management" started, this movement started in the 20th century. At the beginning of the century, management has become a trend in thought and practice. This In the period, explanations about management concepts and functions, determined principles, developed techniques emerge systematically and scientifically to guide management practices, started to emerge. Information on management and organizations after the First World War began to be systematized in the form of theories (7,12). Scientific management, which has developed since the beginning of the 20th century, has been in several different phases. It is possible to examine. These developments are described in the following sections (7)

### 2.3.1. Pre-Classical Management and Contributors

The views that form the basis of business thought began in the mid-1800s and the 19th century. It is based on pre-classical ideas that emerged at the end of the century. Robert Owen, Charles Babbage and Henry Towne is one of the founders of this school.

Robert Owen (17 71- - 1858): Understanding the importance of human resources, Owen Working and living conditions of its employees at Cotton Mill in Scotland,

education system and health tried to improve its services. Robert Owen, employers to treat workers better claimed that they would provide an increase in efficiency by 50% or even 100%. Owen 13-hour work hours were reduced to 10.5 hours, night shifts with children under the age of 10 Child labor is prohibited during shifts.

Charles Babbage (1792- - 1871): Charles Babbage's calculator and modern computer its design and use; He believed in the benefits of specialization. Group work and rewards focused on the subjects. Babbage believed in the benefits of specializing in businesses. In businesses He says that both physical and mental specialization will be possible. (8.13)

Henry Towne (1844- - 1924): Henry Towne is as important as the engineering of business and its a science that claims to be an equally scientific research topic is a man. Engineers should think like an economist and make their production profit in the market. pointed to their efficiency. (9,13)

### 2.3.2. Classical Management Thinking

Classical management thought; Examining and researching the formal structure of the busyness. The field as the field of organization is the first theory to emerge about organization. This view was taken up by Fayol in France.(1916),

Taylor (1911) in America, Mooney and Reiley (1932), Allen (1958), Urwick in England (1928 and 1943) and Brech's (1957) works stand out.

In classical theory, organization is seen as a tool for the realization of goals and objectives. organization, making maximum use of available resources.

realization of the objectives is taken into consideration(9,14). In Classical Organization Theory, jobs and positions and the relations between them are at the forefront. While evaluating, the human element is accepted as data and its psycho-social character and psychological and social working conditions are not taken into account. This means that this theory is what, how, when and what It should be determined clearly and precisely that what will be done in return for this work, rule,those who do not strictly comply with the method and discipline, such as cutting their wages, firing asserts the necessity of redress by punitive measures. Because of these features, Classical doctrine has been criticized as narrow, limited, mechanical and bureaucratic. (10,15)

**Frederick Taylor:** Scientific Management approach pioneered by Frederick Taylor determine exactly what employees need to do and get things done in the most efficient way. It can be defined as overseeing its implementation. For this,

science instead of experience; conflict instead of harmony; cooperation rather than individualism; maximum production instead of restricted production.

Developing people should be emphasized in a way that can provide efficiency (11,16)

**Henry Fayol:** The "Management Theory" approach pioneered by Henry Fayol As opposed to Taylor, who is concerned with the job design and the way the job is done, more management , He focused on the levels of the organization and researched a good organization design and management principles.

According to Henry Fayol, business activities are examined under six headings:(12,16)

\*Commercial Activities

\*Technical Activities

\*Financial Activities

\*Security Activities

\*Accounting Activities

\*Management Activities

a. Forecasting and Planning

b. Organizing

c. Command-Control-Communication-Execution

d. Coordination

e. Inspection-Evaluation

### 2.3.3. Contemporary Approaches in Management

The theory of contemporary approaches to management consists of two different approaches. Of these. The first is the System Approach and the other is the Contingency Approach. In the following headings, the system and the general features of the contingency approach are explained. (13,15)

#### 2.3.3.1. System Approach

The systems approach emerged with the application of General Systems Theory to social sciences. The system concept was originally developed in biology, mathematics and cybernetics. to explain human behavior, social opportunities and organizations over time. It has started to be used in determining and interpreting cause-effect relationships. in social sciences When system is said, it is understood as a whole consisting of certain parts.(14,16)

Each part of a system forms a whole in itself. Thus every the property of being a part of a larger system while at the same time being a set of parts carries. What is important here is the unique functioning of each of the parts that make up

the whole. While they exist, they must also be dependent on each other. For this reason, there is a very tight interaction between the parts subject.(15)

The general features of the systems approach are generally given below.(16,17)

- \*A system can be open or closed.

- \*The open system must relate to the external environment in order to live: it is a dynamic necessary for balance.

- \* Every system has a purpose and purposes: Every social system achieves a specific goal.

- \*It was established for the purpose and this is what gives the system its identity.

Systems interact with the environment.

- \*There is a feedback relationship in the system: In this way, the system detects its deficiencies and faults, can learn.

- \*The system has no definite boundaries. However, in order to talk about the existence of a system, It must have boundaries separating it from the external environment. Distinguish the organization from the external environment should be done (17)

- \* The system has subsystems one.

### 2.3.3.2. Contingency Approach

The contingency approach focuses on the inadequacy of classical and neo-classical theories. It started to appear after the 1970s. Earlier organizational theories were often the most. He focused on a good organizational structure and the universal rules to be followed for this.

In the contingency approach, the organizational structure is shaped by the influence of various internal and external factors.

See it as an item. In other words, according to the contingency approach, the organizational structure is a dependent one. It is variable and depends on a number of internal and external conditions. Thus, with a dynamic approach, the activity, Only the strict and mechanistic rule of classical theories can be addressed to the problems of organizations in and its assumptions or the general and abstract relations of the systems approach, has been abandoned. According to the contingency approach, different situations and conditions are successful in management (18)

It requires different concepts, techniques and behaviors to be. Contributors to the contingency approach are outlined below. Chandler's environment-strategy-structure like

- \*relationship model

- \*Research by Burns and Stalker

- \*Research by Lawrence and Lorsch

- \*Leawitt's model of interpersonal relations and intra-business interaction

- \*James Thompson's Approach

- \*Farmer-Richman's Model

\*Nefandhi-Prasad approach

\*Aston Group Approach

\*Khandwalla Approach

#### 2.3.3.2.1. Burns and Stalker's Research

Contributing to the systems approach and leading to the emergence of the contingency approach. psychologists and sociologists. How environmental factors affect business management and different, In the light of the information obtained from these organizations with environmental conditions, management systems are based on two basic collected in the group. (19,20)

\*Mechanistic Management System

\*Organic Management System

#### 2.3.3.2.2. Lawrence and Lorsch's Studies

From Harvard University in 1966, they conducted research in 10 companies. This is according to the findings of the researches, the structure of the organizations depends on the nature of the demand in the market.

Changes according to the rate of change in the environment. The best organizational structure does not exist, showed that the best varies according to environmental conditions. (21,22)

Lawrence and Lorsch,

1. the nature of demand.
2. the rate of change in the technological environment

They pause and introduce two concepts.

\*Differentiation

\*Completion

#### 2.3.3.2.3. Leawitt's Research

Studies have shown that Leawitt mostly focuses on four variables within the enterprise. We see you stop. Accordingly, the number of employees includes knowledge, experience and expertise, and the arrival of a new technology affects the structure. people of new technology, It has an effect on the quality and quantity of the works accordingly.(23, 24)

#### 2.3.3.3. General Conclusions from the Contingency Approach

As a result of the contingency approach, general, close, intra-organizational environment and organizational effectiveness factor category titles appear. Close environment and organizational effectiveness are among these factors interact.

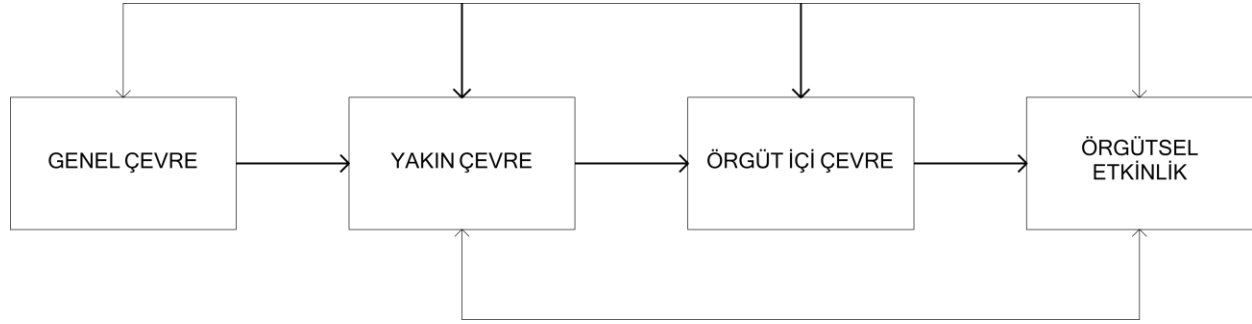


Figure 1/ Error! No text of specified style in document and Environmental Factors

It is extremely difficult or even impossible for the general environment to be affected by the organization. General environments are environments that consist of issues that affect other organizational and immediate environment elements (25). General circles consist of the following headings /

- \*Social-Cultural
- \*Political
- \*Economic
- \*Legal
- \*Educational
- \*Foreign pressures
- \*Ecological pressures

## \*Religious and moral

Possibility of strong influence, which is not under the control of the close environment organization as a whole is the type of environment. The immediate environment is affected by the activities and results of the organization, on the other hand, The organization is also greatly influenced by the immediate environment. Neighborhoods are under the following headings consists of /

\*Competitors

\*Customers

\*Labor organizations

\*Employer organization

\*Funding organizations

\*Shareholders

\*State

\*Municipality

\*Agents and dealers

\*Neighborhood people

The intra-organizational environment is the type of environment that the organization is under its own control. Momently are the internal

environmental elements that can be changed. Intra-organizational environments are from the following headings:

consists of these things (25, 26)

- \*Purpose and strategy of the business
- \*Size of the business
- \*Age of business
- \*Management style and philosophy of the business
- \*Legal form of business
- \*Technology used by the business
- \*Behavior of organizational members (individuals and groups)
- \*Organizational communication structure (internal and external)
- \*Organizational structure
- \*Authority and responsibility structure
- \*Degree of specialization, standardization and formality
- \*Control system
- \*Workflow
- \*Business Calendar
- \*Staff morale
- \*Internal conflict

- \*Work accidents

Organizational effectiveness features are as follows /

- \*Balanced profitability in the long run

- \*Increase in sales

- \*Increase in income and growth

- \*Financial resource creation and liquidity power

- \*Increase in goodwill and certificates (26)

### 3. General Information about Hospitals

Hospitals are service enterprises that produce health services.

Hospitals in general, The following functions are explained.

- \*Description of hospitals

- \*General characteristics of hospital enterprises

- \*Functions of hospital businesses

- \*Classification of hospital businesses

- \*Hospital organizations

### 3.1. Definition

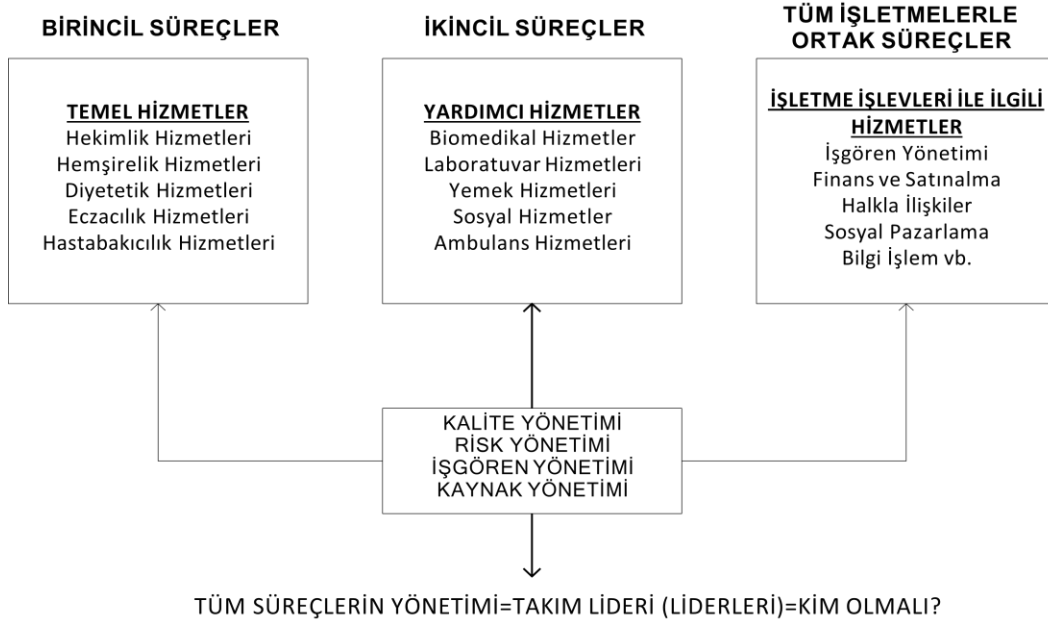
Hospitals are one of the oldest organizations in terms of historical development. shapes can be defined. A medical establishment, economics under their management, because they perform therapeutic services an economic enterprise, physicians and other health personnel a research institution and a professional organization because of their role in education, social benefit therefore, it can be defined as a social institution and methodically treats the sick and injured. treating, normalizing or optimizing, various business and business administration to achieve this It can be defined as a complex modern organization using the techniques of (27)

World Health Organization (WHO) hospitals; observation, diagnosis, treatment and rehabilitation long-term or short-term treatment of patients, providing health services that can be grouped as defines them as institutions with beds they see. Since health institutions work with special permission, they should also be legally defined. Legal definitions are structural. Structural definitions, other useful for their differentiation from institutions and organizations, Since it has a classification-oriented nature, it limits their use in the context of rapid

change. Therefore, functional definitions are of greater importance in hospital procedures (28,30)

### 3.2. General Characteristics of Hospital Businesses

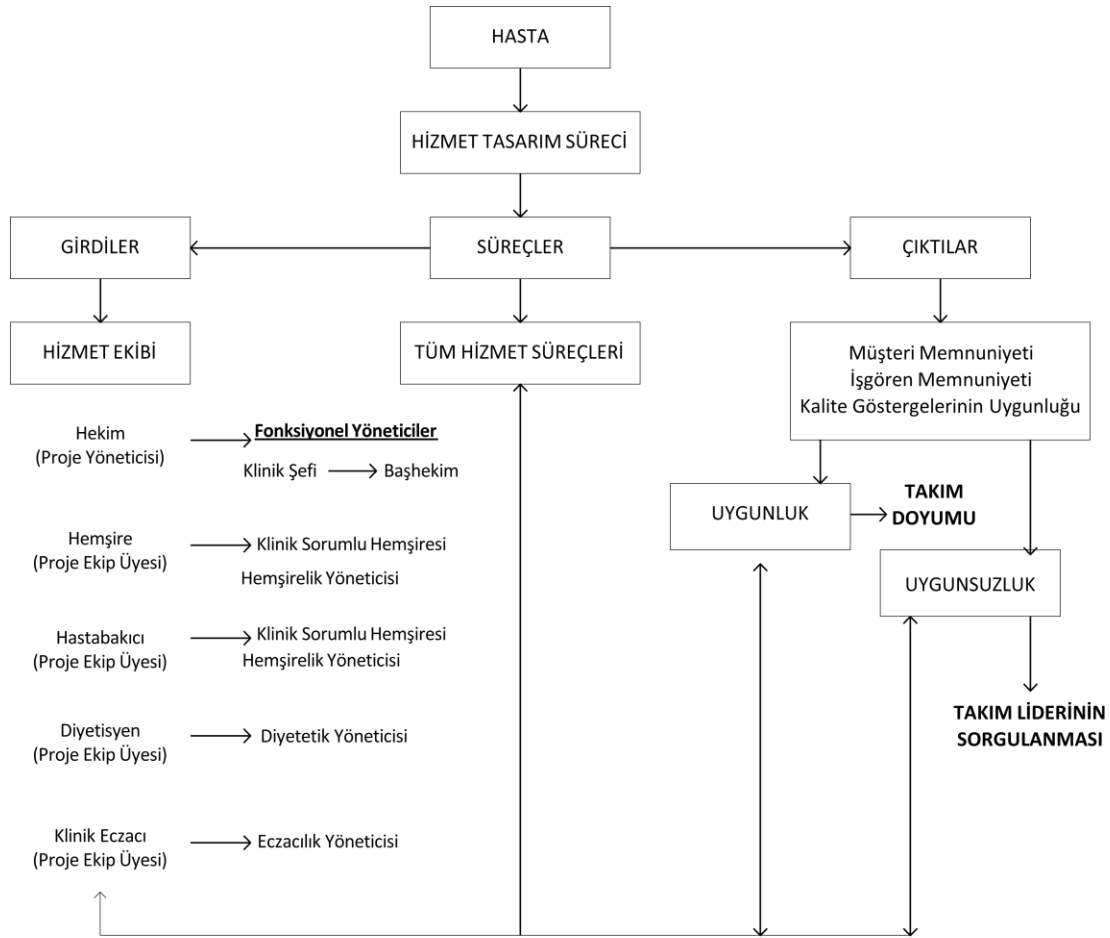
Healthcare facilities in terms of service production quality and health expenditure, They form the most important subsystem of the system, manpower working in the health sector. Most of them are employed here. (29,31)



Şekil 2.1 Süreçlerin Yönetimi

Accordingly, if we explain the health system; “health system; social, economic, medical, organizational and It is a technology that has

technological qualities and aims to raise public-personal health to an acceptable level. is whole. health system; with other systems such as economy, ecology, education, transportation and communication.



Şekil 2.2 Takım Üyeleri Girdi ve Çıktılar

### 3.3. Functions of Hospital Businesses

Depending on the purpose and mission of hospital businesses, four basic functions exist.

1. Treatment services
2. Preventive and improving health services
3. Education
4. Research

Treatment services have been the most important function of hospitals from past to present. In hospitals, diagnosis and treatment services are provided to the sick and injured, outpatient and inpatient.

Preventive and improving health services are also among the functions of hospitals. This healthy children units in hospitals can be given as an example of these services, Education or expected education services provided in hospitals, education of patients and their relatives, education of medical students, education of patient personnel, and education of the public on health issues can be sorted, Another function of hospitals is research. Hospitals, research in the field of medical science are centers (32).

### 3.4. Classification of Hospital Businesses

Hospitals are dependent on the type of services they provide, their management, the type of financial resources, (type of property), size (bed capacity), length of hospital stay of patients, education status, accreditation status, vertical integration level and permanent staff classified according to its composition. However, in the classifications made, generally “given type of treatment service”, “hospital stay of patients”, “type of financial resources, ie. property type” and “size” are taken as basis. (33,34)

1. Hospitals according to the type of treatment services; There are two general and special branch hospitals, gathered in the group. General hospitals, all kinds of emergency cases and age, gender difference in which patients related to the current specialties within the body are accepted, regardless of are hospitals. Private branch hospitals are specific gender (gynecology and obstetrics, child), limited to certain types of diseases (cardiovascular diseases, oncology hospital) service providing hospitals(35).

2. Hospitals by financial source (ownership); which institution and they are classified according to whether they belong to institutions or the nature of institutions and organizations.

Ministry of health, foundations, municipalities, associations, social security institution, minority hospitals and private hospitals are included in this group.

3. According to their size; in determining the size of hospitals, the number of beds and The number of personnel can be taken as a criterion.

25, 50, 100, 200, 400, 600, 800 and more bedded classified as hospitals.

Hospitals in Turkey according to institutions When we look at the distribution of the Ministry of Health hospitals in number compared to other hospitals, We see that it is quite a lot.

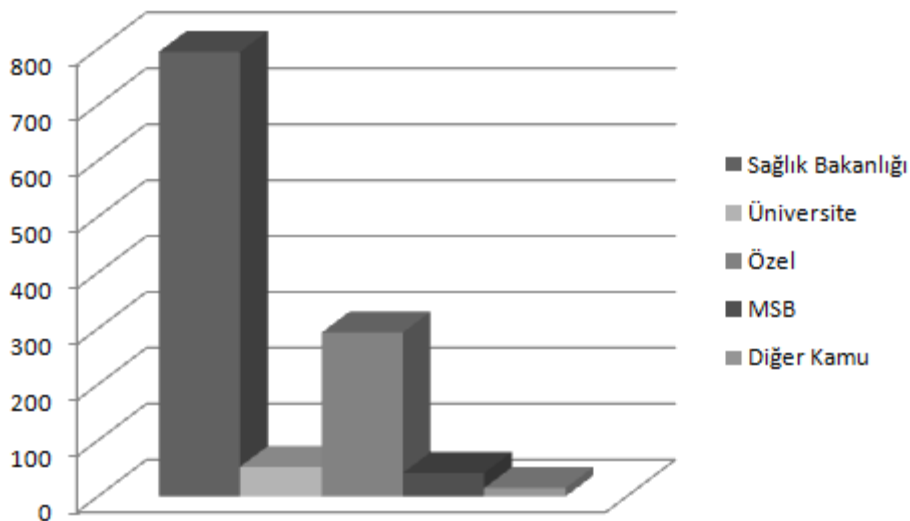


Figure 2.3 3 Distribution of Hospitals by Institutions in Turkey

4. According to their accreditation status; accredited and non-accredited they can be classified. This classification has just started to be applied in Turkey.

5. According to education status; Specialization training of general and private branch hospitals is a criterion for classification.

6. According to vertical integration; the hospital's position in vertical integration or it is a classification criterion according to its place in a comprehensive health plan.

The important point here is that the criteria used to classify hospitals are not alone.

It is not sufficient to classify hospitals. (36)

### 3.5. Hospital Organizations

Hospitals in our country are divided into two categories as public hospitals and private hospitals are separated. (37)

#### 1. Public Hospitals

##### a. State Hospitals

##### b. Military Hospitals

##### c. Private Branch Hospitals

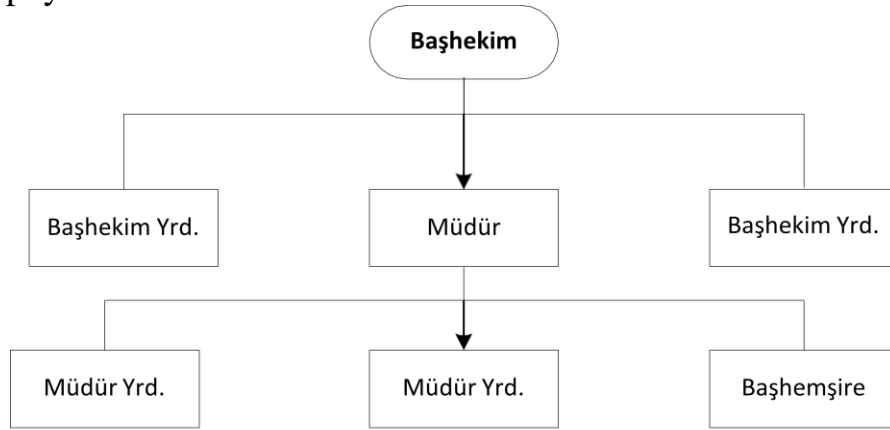
##### d. University Hospitals

## 2.Private Hospitals

### 3.5.1. Public Hospitals (State)

In public hospitals, chief physicians are at the highest level of management.

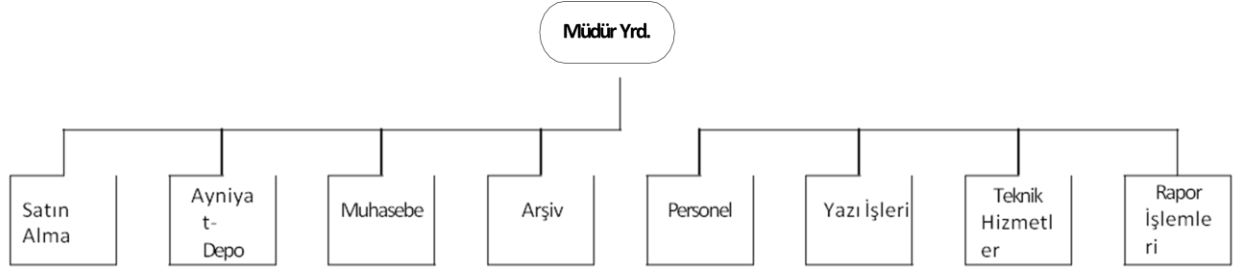
The deputy chief physician and the hospital director work under the chief physician.



Şekil 2.4 Tıbbi Organizasyon Yapısı (Devlet)

### 3.5.2. Public Hospitals (State)

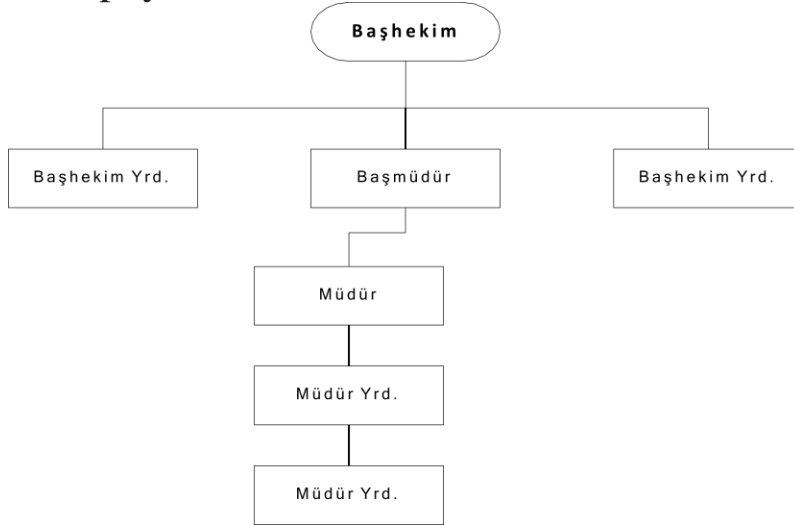
Purchasing, stock-warehouse, accounting, archive, subordinate to the deputy director of personnel, editorial, technical services and reporting units is working.



Şekil 2.5 İdari Organizasyon Yapısı(Devlet)

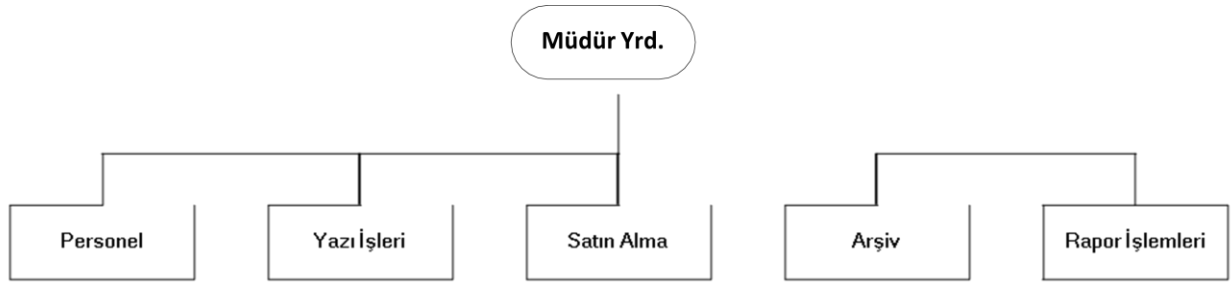
### 3.5.3. Public Hospitals (University)

In university hospitals, chief physicians are at the highest level of management. Deputy chief physicians and chief director work under the chief physician.



### 3.5.4. Public Hospitals (University)

The personnel in the administrative structure in university hospitals, editorial, purchasing, archive and reporting units work under the assistant manager (38).



şekil2.7 idari organizasyon yapısı

## 4. Health Services Management

Today, hospital administrators who play an active role in the management of health services, often operating a very complex organization, bearing the responsibility of a very large budget and face-to-face to ensure the harmony of close various professional, semi-professional and auxiliary personnel has to. When it comes to the management of hospitals as a business, it primarily focuses on hospitals. Defining specific features becomes a necessity.

Interacting with hospitals, institutional authority and social pressure groups are organizations. The services provided in hospitals are guaranteed by all nations as a constitutional right. It is the services related to health, which is a concept that is very difficult to define and received. If this feature This complicates the management and functions of hospitals even more(39, 40).

Hospitals are the most complex enterprises in the service production process. Service production of hospitals. The most important factor that complicates the process is the complexity of the service spectrum. Hospitals, which are the enterprises with the most complex production of today, at the same time, they are organizations in a matrix structure. The matrix organizational structure was first created in space enterprises. It is a form of organizational model. Later in other businesses and then in other services in their businesses; It has started to be applied especially in hospitals and vocational consultancy companies.

The matrix organizational structure is built on two separate relationships. These; vertical and horizontal are relationships. Vertical relationships in the form of command and command are essential in other organizational structures, horizontal relationships are essential. is

the exception and its application has been specifically described, On the other hand, in a matrix structure, both vertical and horizontal relationships are equally important. and is not superior to the other (41,42).

There are two types of managers in a matrix organization: the functional manager and the case manager. exists. functional manager; by whom, where and how is your job professionally concerned with the topics to be covered. The case manager is what to do, when and why. determines. Because; personnel working in specialization departments, on the one hand, to the manager of the relevant department; on the other hand, they can use their expertise in a particular case. They will be accountable to the administrator of this case for doing so. This is the feature that distinguishes the matrix structure from the others. In this structure, the case manager not the command-command authority we see in structures, but the "case" which is a feature of the matrix structure. has “authority”. In addition, the subordinate-superior relationship between the case manager and the specialization departments there is none. However, these managers need to work together with the specialization departments for the realization of the project. All these

features also express the work in the study of the matrix structure.is doing (43).

However, the application of the matrix structure in hospitals differs. Hospitals Case managers of patient care services are physicians. So other members of the case team Pharmacists, dietitians, and nurses with multiple case managers team up in one working day.

They have to work. Therefore, these team members have the management approach of each case manager, faced with the job situation. In addition, horizontal relationship in project management while it should be; Physicians, who are project managers in our country, are vertically opposed to their team members, They also use the relationship directly and very tightly.(44,45 ) The main features of the matrix structure in terms of hospitals can be listed as follows:

1. Responsible for the realization of the work that constitutes the case with the functional managers, manager jointly.
2. There is no hierarchical link between the case manager and other team members. hence one cannot give orders to the other.
3. The members of the case team are subordinate to two separate supervisors, and these members must also satisfy.

## 5. Management Information Systems Concept

Management, which provides the processing and transmission of information used in the management of an organization, The following titles of Information Systems are explained (45).

- \*Definition of management information system
- \*Features of management information system
- \*Management information system structure
- \*Elements of management information systems

### 5.1. Definition of Management Information System

Although organizations are created by people, it is still human for people are established to meet their needs. 40 The biggest capital started to be knowledge and Globalization increases competition among organizations. The continuation of the existence of the organization

Depends on whether you can keep it or win. Correct use of resources, especially organization, The correct use of the human resource, which forms the basis of the organization, gives a plus point in

the competition so It is clear that it will pay off. Organizations can basically be divided into two groups as management and employee. To sun in a broad sense, The concept of management is defined as “a group of people who want to achieve common goals in cooperation, orderly and conscious effort”. Employees, on the other hand, are “associated with management in an organization.

It is the name given to the sum of male and female employees.” (46)

**Accordingly, the management information system;**

An organization that processes and transmits information used in the management of an organization, is the system. The general features of this system are that it supports Data/Record processing functions (registration), storage, etc.), the use of an integrated database and the diversity of functional areas, support. Operational, tactical and strategic level managers have easy and timely access to information, providing access. Providing services especially for tactical level managers. Partially flexible and adaptable to changes in the organization's information needs. only authorized providing system security that allows access by individuals. with daily operations not caring. Usually aimed at supporting

structural decisions. Different to managers reports and is largely internal to events, not primarily environmental or external events. (44,46)

The main purpose of management information system is to provide information to senior management, rather than preventing unnecessary information from going to senior management's desk. (45)

The Management Information System provides the manager with a summary of the information to be used in the decision-making process and selector creates an additional digit. Too much to provide a structure for the manager in decision making can be defined as a system containing data. (46)

## Management information system for medicine and health;

The mission and goals of a medical or health institution, mainly for patient care, systematically using all information assets to reach and improve performance, determine, acquire, regulate, develop, evaluate and make available, their an integrated approach that enables its dissemination, sharing, use or application, is the process.

Today, academic medical centers, in addition to patient care, develop research, it aims to improve the quality of education. Academically or not, all

medical and Among the purposes of health institutions, it is aimed to diagnose and treat diseases in clinical settings.

laying the groundwork for making sound decisions; new knowledge generation, new diagnosis and treatment support the discovery of methods; ensuring the application of new research findings; medicine and contribute to the development of health; organization and transmission of information to ensure; There are some that support learning and collaboration. To achieve these purposes organizations, by addressing the processes related to information assets with a holistic approach, carry out their management. The main purpose of the information system for medicine and health is to value the health business, is to add (47).

Knowledge management requires organizational managers and employees to embrace it. medicine and The first condition of successful knowledge management practices in health institutions is that administrators, physicians, especially clinicians, professionals in various health fields and other workers, environment to adopt. A knowledge management job is a specialized team usually led by a knowledge manager performed by system (47)

Integrated Academic Information Management" launched in the field of medicine and health in the USA Systems" (Integrated Academic Information Management Systems-IAIMS), actually in the country

It is a widely used information management initiative. Information on medicine and health in the USA management had the opportunity to develop on the foundations of this system.

IAIMS by Matheson and Cooper (1982) at the "Academic Health Sciences Center" It was proposed in a report titled "Academic Information" and was published by the American National Library of Medicine.

It was started to be applied in academic health sciences centers in 1983 with the initiative of 1990' The system, which continued its development in the years, was also put into practice in hospitals. IAIMS records patient records, laboratory test findings, clinical information and decision-making, systems, research results, health-related data and management information, bibliographic data It is a system that can offer by integrating with its bases. Its purpose is information about medicine and health (48, 49)

To improve research, education and patient care through systems of Initially, the library was centrally located within the IAIMS, while librarians by coordinating the production, organization and distribution of information, They

have become indispensable members of the program. Libraries, due to their new responsibilities and roles, have been restructured (50). In the 1990s, the library gradually lost its central role. However, the system could not ignore his important contribution. According to Darymple, it leads to the development of knowledge management practices for medicine and health.

In another study that opened the American College of Colleges “21. Physicians of the Century” (in 1998) is the report. In this report, it is aimed to provide medical students with access skills in electronic environment and on the importance of acquiring the habit of using the accessed information in practice. has been focused. The report provides medical librarians with the intricacies of use and access to the systems, took on the role of teacher. In the knowledge management process, the skills of accessing electronic information Learning how to gain access to meaningful literature and ways to access meaningful literature is crucial. AAMC's (2000) Better Health Project for IAIMS and information access, It is possible to evaluate these two reports as a work that improves them by updating them. Touching on the important role of librarians in information management, AAMC's country, This project, which was implemented throughout the while showing the importance given to the dissemination of

indicates that knowledge management will develop further in the future. A targeted, powerful knowledge carries out the management(50), As for the knowledge management strategies followed in the management of explicit and implicit knowledge; There are two knowledge management strategies to choose from, namely institutionalization and individualization strategy. The institutionalization strategy is appropriate for managing explicit knowledge, technology, recording and storing information, indexing, coding, It is a strategy that focuses on the creation of databases and electronic document management. In this type of strategy, which is chosen when it is desired to focus on bringing knowledge to the institution, Employees are provided with the opportunity to use the stored information for different purposes over and over, “Individual to Document” approach is valid. Since the information is made independent from the individual who has it, those who want to access the information must meet the information owner and no connection required (51). Availability of open information to employees or selected team members ready and they apply the knowledge to solve routine problems. The individualization strategy is suitable for managing tacit knowledge. Computers of knowledge, It is used in interpersonal communication rather than storage. Importance of gaining knowledge to the individual. In this type of strategy, which is chosen when it is wanted to be

given, the “individual-to-individual” approach is valid to information, The tacit knowledge is shared through those who want to access it directly contact the person who has it. This In organizations that follow the strategy type, individuals are in a constant mind-giving action (51,52).

Creative problem-solving abilities of individuals with tacit knowledge gain importance. From them, They are expected to produce solutions to very special, creative and extraordinary problems rather than routine events.

When this strategy is chosen, the same information can be reused, creating special conditions. it depends. (51)

Wyatt conflates the two types of knowledge with these two knowledge management strategies. Based on the article, it points out which strategy health institutions can choose. Accordingly, for most of the problems of health institutions, uniform, quality, more traditional and it aims to find short-term solutions; type of problem targeted by the organization if the routine is for low-risk cases; The stated purpose of knowledge management is the acquisition of explicit knowledge coded, edited and ready for access at any time for every unit of the organization. if it is intended to ensure that it is used repeatedly; intelligent in the knowledge management process, physicians, healthcare professionals and others willing to practice what has been found by others , if the teams it creates are

important; for healthcare organization information technology and knowledge management, if he can afford to make a high investment, etc. The choice of institutionalization strategy is appropriate, It is possible (53).

On the other hand, health organizations are dealing with the problems in the medium and long term in a very unconventional way. if it aims to bring creative solutions; type of problem targeted by the organization, if it is for unusual, specific, high-risk cases; The stated purpose of knowledge management, implicit laying the groundwork for the sharing of knowledge, that is, to creative individuals, especially to creative individuals, whenever the staff wishes on the other hand, in the direction of providing access through various electronic channels; found by others priority is given to employing high-paid creative people who are not very willing to implement recognition is intended; For medical and health organizations that want to implement Health Information management It is understood that the way is shown in the choice of strategy. However both strategies have limitations, It is not considered appropriate to select and follow only one in the field of medicine and health. Wyatt, (52,53) two considers that the strategy should be pursued together, but at different rates; i.e. a healthcare provider or unit deals more with routine cases, eg 80% institutionalization, 20% may follow

the individualization strategy. Most patients require creative solutions they can do the opposite.

No matter how important it is to be able to access explicit knowledge repeatedly in medical practices, tacit knowledge, Sharing is just as important. By exchanging views among physicians, especially sharing their implicit knowledge by observing each other's skills in surgeries, It is not a new phenomenon. With the adoption of the institutionalization strategy, physicians the habit of consulting each other does not disappear. Monitoring the individualization strategy.

In this case, it is ensured that the sharing of views is placed on a systematic basis. Institutionalization, If the strategy is followed, explicit knowledge can be easily adapted to solve everyday health problems. Like this approaches strengthen the thesis that it would be appropriate to use both together (54).

On the other hand, both in information and communication technologies, medicine and health medicine and health sciences, which always restructure themselves according to developments in their fields libraries have now entered a process of renewal in line with knowledge management. Themselves Medical librarians, who always develop in line with innovations, are responsible for knowledge management for medicine and health. They make an effort to acquire knowledge and skills that are valid for them. Librarians open.

The most sought-after key in coding and organizing information in accordance with the institutionalization strategy are persons. As such, they become leading members of knowledge management teams. The medical and health world will eventually become interested in knowledge management. Medicine and health in our country (54,55).

What can be done to initiate knowledge management in organizations? To find the exact answer to this question, Undoubtedly, their long work, patience and effort, health workers, the technology dimension of the work interested parties, librarians, archives, etc. A team of representatives can be formed. This team's first job will be done by reading and assimilating the literature on the subject and from the "Knowledge Management" (2002) website. to produce ideas suitable for the conditions of our country. After evaluating the current situation maybe an initiative like IAIMS can be designed first. A project can be prepared in this direction (55).

Beginner applications will open new horizons by gaining experience, after trial and error, The right way will be found with the right approaches. First narrowly, then broadly, that is, nationwide, Information management will be carried out in our medical and health institutions with the support of the Ministry of Health. We believe that what will be achieved at the end of a difficult process,

will affect the health of millions of people, It will be worth the effort as it will make a difference in your care. Management Information Systems (MIS), "information that contributes to decision-making processes, optimally "integrated man-machine", which provides economic and correct management within the time frame systems". MIS is a tool to enable functionally complex information age organizations and is considered important in terms of simplifying operations. MIS, information in organizations (56). Because of its approach to the managerial dimension of the use of technology, today's vital in raising the institutional efficiency and service quality levels of organizations, considered as a factor. Managers today are often not out of lack of knowledge.

They experience problems arising from the abundance of information. In this context, unnecessary and Information systems that present unrelated sets of information are characterized as systems without management information. The achievement of an organization's goals, the changes it provides against changes in the internal and external environment, in the right time and in a timely manner that management needs in the face of compliance and emerging changes closely and directly with the realization of effective decision-making activities by providing meaningful information(57,58).

Considering that it is relevant, the importance of MIS for information age organizations is better understood. Traditionally, sales, inventory, and production information can be quickly delivered to decision-makers. Until it integrates with all organizational units, MIS, which is a way of transferring can be expanded. In order to reflect the role of senior managers in decision making, MIS the concept of management support systems is used.

With the developments in computer and communication technologies, the increasing use of decision-making tools. The possibilities provided by wealth are for the compromise solutions of these conflicting problems. It provides great convenience to decision makers. As can be seen, these problems are These are general problems that can be encountered at all levels. On the other hand, specific features, There are also problems that have and require the use of certain techniques. Production schedule, sales estimation, inventory policy, or renewal decision issues are of this type (59)

general quality and While structural problems play an important role in management information system outputs, non-structural and specific Models related to decision support systems are more useful for problems with features.

Effective and rational decision making based on scientific management decision-making processes that start with information systems and are used as tools of decision support systems. The role of approaches that result in models is undeniable. Within this approach process, the management information system collects the data obtained from the database. It tries to fulfill the reporting function for transformation and management. in a broad sense (60).

The definition of management information system is as follows. internal and environmental aspects of an organizational structure. Obtaining past, present and future information about activities in an organized manner method. This method is suitable for helping the decision-making process in the organizational structure. support planning, control and operational functions with timely and appropriate form of information aims. (53, 60). Management effectiveness as a result of understanding the importance of information in managerial functions and decisions. With the application of the system approach to the management, the concept of MIS has emerged. Management Information System, interdependent and operating in line with a certain purpose. management functions such as decision making, coordination, control and analysis. To collect, process, store and make available information in order to support (54, 60)

## 5.2. Features of Management Information System

The features of the Management Information System are listed in the following items.

1. Provides support for structured rules at the business and management levels.
2. It is the control and reporting center. MIS aims to report current operations acquires.
3. Relies on existing common data and data flow.
4. Has little analytical ability.
5. Usually continues to make decisions with the use of past and present data.
6. It is relatively inflexible.
7. It should have internal routing, not external.
8. Information needs are recognized and committed.
9. Requires lengthy analysis and design processes. (55, 60)

MIS provides reports to managers and in some cases the organization's latest, They grant instant access to their performance and historical records. YBS provides to senior management, It takes the information from the database, which is also used by functional information systems.

MIS usually provides executives with weekly, monthly, yearly results. These are daily activities they are not. MIS already structures the problems that

may occur in the future. These systems are usually very, they are not flexible systems and have little analytical capacity. First, a typical MIS internal includes data. Secondly, many routine summary tables are prepared and comparisons are made. It provides support for the creation of statistical and mathematical models. Third, YBS Users can organize and benefit from the data according to different projections (61)

Newly designed MISs are more flexible and provide managers with their own reports. They can include software that allows them to shape, combine other data. For example, sales manager looking at key customers this year's sales and reporting last year's sales may want to compare and get the profit margin. The need of YBS to perform all these functions operational data of the units that can be defined as subsystems of the system. will consist of the data they process at the level. At the end of the transformation process, these data It is presented as a reporting output in different formats for the manager at the top level (55,60)

At this point, MIS has established a suitable infrastructure for the manager's decisions and has been used. It is ready made system (55,56). Today, businesses are increasingly concentrated. They encounter a flow of information. As a result of this information flow becoming more and more complex and versatile,

classification and interpretation of the information network, this is information network.

The use of technology has now become a necessity. So this efficiency plays an important role in both minimizing costs and optimizing efficiency. is playing. This should be the main target of YBS today. The main purpose of the organization is to aims of MIS, which is to shorten the decision-making process by increasing the processing capacity, are possible to summarize as follows: (57,60 )

1. Information, which is one of the most important keys to success in competition today, is easily to reach.
2. Processing the information obtained from internal and external sources and making it usable to bring.
3. New strategies by instantly tracking business-related statistics, report type information to create.
4. To save time and effort,
5. To have the opportunity to increase their market share,
6. To provide better quality service to customers (information flow with technology). to closely follow the needs and demands of customers.

In parallel with the above objectives, an MIS that is established and operates effective, (61) The benefits are:

1. It increases operational efficiency in the business. Operational efficiency, more routine work means fast and cheap.
2. It gives the opportunity to provide better service to customers. This is particularly true of banking and common in the tourism industry.
3. It helps in creating and developing new products based on knowledge. knowledge-based, The importance of management information systems in businesses that produce products and market information becomes even more important increasing.
4. It provides competitive advantage. Processing information in the best way and transforming it into production companies gain significant advantages over their competitors.
5. With the help of the technological foundations of YBS, it is possible to realize new opportunities in the market and allows capture. The success of a business is its adaptation to the changes in the internal and external environment or the outcome. effectively by providing the correct, timely and meaningful information needed by the management in the face of changes.

This measured by its transformation into a decision-making activity. Will be successful in today's rapidly changing conditions managers, who can use computers and technologies in the most effective way, and who can use

information to produce. There will be managers who achieve competitive advantage by transforming Managers' access to data in the easiest way and in the shortest time, as well as new strategies, It is necessary for it to be able to produce and use the existing capacity efficiently. In businesses establishing an MIS and operating it efficiently is both very expensive and very difficult (62).

However, in the business world that is developing at a dizzying pace, not to lag behind the competitors and in order not to lose the market and to respond instantly to changing customer demands. Having systems is now inevitable.

As it is known, in all management levels and functions, decision making is a driving force. In other words, the management believes that it will be the most effective in achieving the objectives among the various alternatives.

chooses someone. For this reason, management is constantly planning future activities, auditing the results according to the plan and responsible for the activities and activities accordingly Responsible for evaluating the success of individuals. Here the management fulfills this obligation (63).

To investigate and obtain information about these activities in order to perform them properly. has to Management; logical and accurate information regarding planning, auditing, and success appraisal functions. to be able to make

valuations (decisions); It depends on good perception of environmental (internal and external) variables.

This is only in direct proportion to obtaining accurate, relevant and timely information. In short, the best decision, To arrive at a destination requires more accurate, timely and relevant information. Well-organized MIS in businesses, They ensure the successful realization of planning, supervision and success appraisal functions. MIS saves time and money in the processing of basic data covering complex activities of enterprises. minimizing the costs and providing the most efficient and accurate information within the supply-production-sales triangle. represents a systematic approach. The key element here is in all of the management functions decision making, operating activities in the shortest time and at the lowest cost. is to achieve the most efficient result (63).

### 5.3. Management Information System Structure

Management information systems in organizations are more than formal systems as well as informal systems. occurs. In fact, it is possible to divide the management information system into four. These are:

1. General official systems
2. General informal systems

3. Private official systems

4. Private informal systems

Information exchange in organizations takes place within the functional units themselves. If the more functional units, the greater the exchange of information. Functional units they make they are controlled in terms of business as well as in terms of management. Management in a business information systems as a whole consisting of sub-systems based on the functions performed (63,64). also possible to see. There are many information subsystems in a system. This information is below systems are generally formed according to business functions. In the structure of the management information system information systems of the enterprise such as finance, marketing, production, as well as from the general data file. It takes place in the general programs with the created database. General programs; database management system, general application programs, model bank is divided into three. in this style. The structure of the management information system is shown below. (65)

Information, which is a competitive element, is within the framework of its characteristics in the enterprise. It is very important for businesses to survive.

The importance of management information systems day by day in terms of helping management, There are several reasons for the increase. These reasons can be listed as follows.

1. An increasingly complex problem of decision-making situations faced by managers, increase in the number of factors to be taken into account.
2. Change in factors that need to be considered in addition to these complexities increasing rate of problems.
3. Businesses; major markets, economic conditions, social responsibilities and so on to be in large organizations and to maintain their continuity in these conditions.
4. Managers; sub-systems such as people, machinery, equipment, raw materials and money that they manage Decreased opportunities to establish adequate relations with rates.
5. The need for an information source to adequately support the manager in this regard.
6. These and similar reasons, besides the adequate flow of information within the enterprise, providing the manager with concise and easy, understandable information in a timely manner requires. The studies carried out in this way are in the management information system in enterprises. makes the concept stronger and more important.

## 5.4. Elements of Management Information Systems

It is very difficult to determine what the management information system consists of. However, this It is possible to group the elements roughly under three headings.

1. Physical parts of the system
2. Information processing functions
3. Outputs obtained by users

The physical parts that make up the management information system are the visible and tangible parts of the system., are parts. These; hardware, software, data files, rules and personnel. Now to the computer Supported management information systems are the first to come to mind when it comes to hardware, as there are businesses, coming computers. Information processing functions; normal operations of the business ensures that the process is done, prepares the files related to the transactions and updates the relevant files, prepares reports and performs human-machine communication. By looking at the outputs obtained by the user, the necessary measures are taken or forwarded, forward planning stages. These outputs are; documents of normal transactions, scheduled reports and scheduled inquiries responses, in the form of reports and responses in emergencies,

and human-machine communication, sorted. Murdick and Ross; elements of the management information system, procedures, hardware, it say it consists of (tools and equipment), methods of knowledge, people, money, and organization (64)

## 6. The Concept and Use of Computers in Hospitals

Technological developments experienced today are also used in hospitals and other health institutions, made the use of computers compulsory. for computer use in hospitals, The headings are described below.

\*Computers in hospitals and their benefits, The historical development process of the hospital management.

\*information system and the need for management information.

\*General limitations in the development of the hospital management information system.

\*Development hierarchy of hospital management information system.

### 6.1. Computers in Hospitals and Its Benefits

In parallel with the rapidly advancing developments in the world in recent years, hospitals also. The need for computer use has increased. From hospital admission to discharge a large amount of information is collected and this

information is recorded and various actions are taken on it. execution is provided. Handling, organizing and locating records as needed consolidation takes a lot of effort and resources. Patients in hospitals monitoring and control, as well as planning, policy making and determination of information related to management, to be combined and analyzed, to create management information systems suitable for the purposes required. As it is known, performing numerical operations manually is both a waste of time and a waste of time, and causes more errors .However, all these complex operations can be performed with a small workforce and low cost thanks to computer support. can be done instantly and accurately. 65 The use of computers in hospitals its importance is known. It is possible to list the specific purposes of this use as follows. (65, 66)

1. All information about the patient's history and disease (from the patient's admission to the hospital) All operations until exit) are instantly recorded on the computer and these information are available when requested accessible. In this way, it is possible to provide better service to patients.

2. It will provide rapid access to the patient's resume and previous information.

prevention of waste of time within the framework of the establishment of a modern archiving system and Fast and reliable results will be obtained in the diagnosis of the disease.

3. All information about the hospital management is followed on the computer system and this information can be accessed quickly and easily. Thus, all administrative It is possible to carry out the operations more healthily and properly.

4. Invoicing and preparation of official documents in hospitals can be done quickly and reliably way, revenues can be increased. For this, paid patients on demand, the debt can be calculated and a single file containing the expenses in all units invoice is available. In the same way, the invoices of the patients of the institution are quickly available from the system. Thus, the collection of paid patients or patients coming from institutions. keeping up-to-date records of the money received on the computer and information can be accessed instantly.

5. All purchasing, selling and material distribution processes in hospitals are carried out by computers, is executed. In this way, the invoice for each purchased material is saved on the computer. Medicine, Stock quantities of medical, non-medical and other materials are followed.

The quantity and purchase prices of the materials can be examined.

It is immediately determined from which company the material is taken, the material taken from the hospital, A record is kept to whom it is given to, with a certain fixture number, to which unit the material is delivered.

It is easy to find when it is given, the goods are received, and the pick-up processes can be made from the computer at the time of request. and all accounting information can be controlled by the system (67).

1. Laboratory, x-ray, ultrasound, endoscopy, surgery reports etc. reports are requested can be retrieved from the system.

2. Registry records of hospital staff (manager, doctor and assistant staff, etc.) and

It is possible to make payroll transactions from the system.

3. It is wider than the system in producing healthy information on all administrative and disease-related issues benefited to a large extent.

Today, factors detrimental to human health and the number of patients are increasing. New diseases are emerging, diagnosis and treatment methods are developing, health is affected by individuals and states, is given more importance.

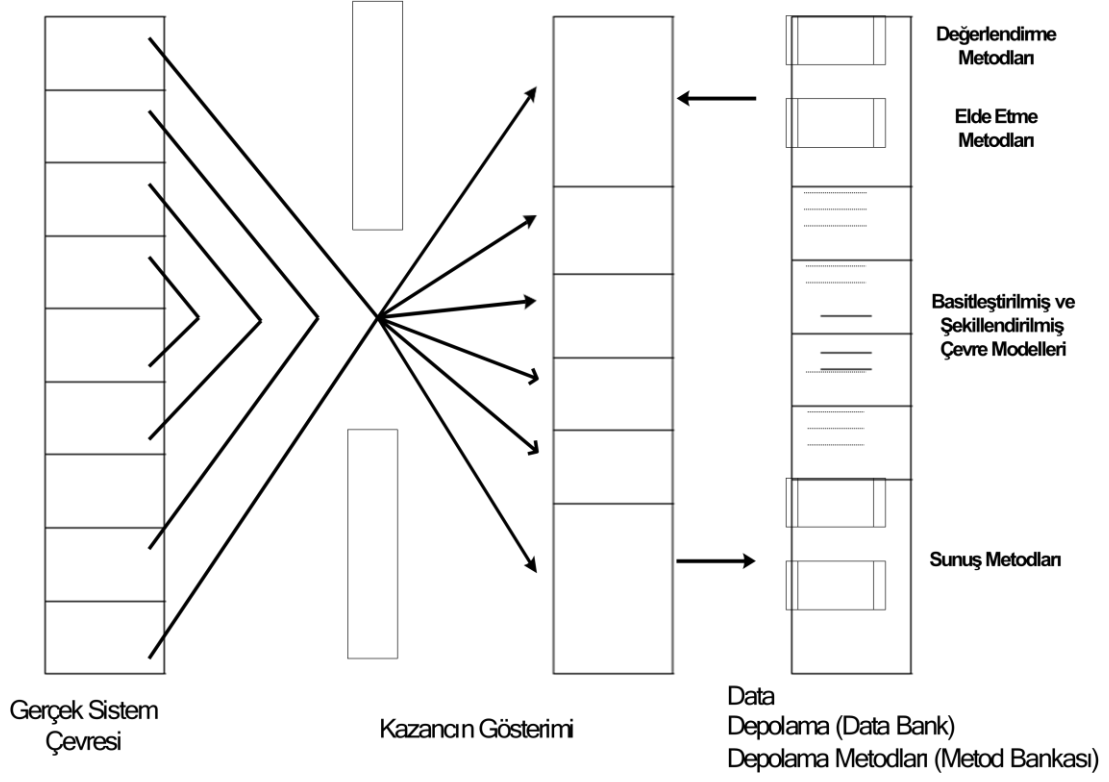
## 6.2. Historical Development Process of Hospital Management Information System and Management Information Need

Management information systems in hospitals have been around 35 years ago until today. is coming. Therefore, it is possible to talk about the history of the system. Such a distinction consciously in order to examine the development process and to satisfy the future from its current situation, was made as Some of

the hospital operations on the optimal use of resources and functions It should not be forgotten that there will also be conflicts of interest. 72 Impact and efficiency by reducing cost the hospital system can be transformed into an industrial enterprise. Patients no doubt They want good care and treatment using the most advanced technologies. These requests they do not take part in the same parallel in reducing costs. Hospital information systems are undoubtedly the second level in the list of functions above (76,68).

Reaching the third levels with better organized hospital information systems possible. The biggest driving force of hospital information systems is hospital operations. in the field of optimization. Finally, hospital information systems can be used more effectively. available. Maybe problems with optimization can increase the cost. But in the hospital information systems can come between two different interests such as optimization and costs. sixties and Even in the hardware and software deficiencies of the seventies, unifying views and features was available. In the seventies, the hospital information system was more focused on hospital finance and management views focused on (69,70).

Bilgi sistemlerine ait bir modelin gösterimi aşağıdaki gibidir. 73



Şekil 3.1 Bilgi Sistemleri Modeli

Another point of view of providing good service to the patient in hospitals is; if you have information incorporating those appropriate for the patient's status and creating new resources within the hospital, is to be created. In the seventies, separate support for management and private laboratory operations given (70).

In 1978, with the results from three important hierarchies, it became popular in private medical care circles. the concrete expression of the views on real information systems as follows: possible to show. (71,72)

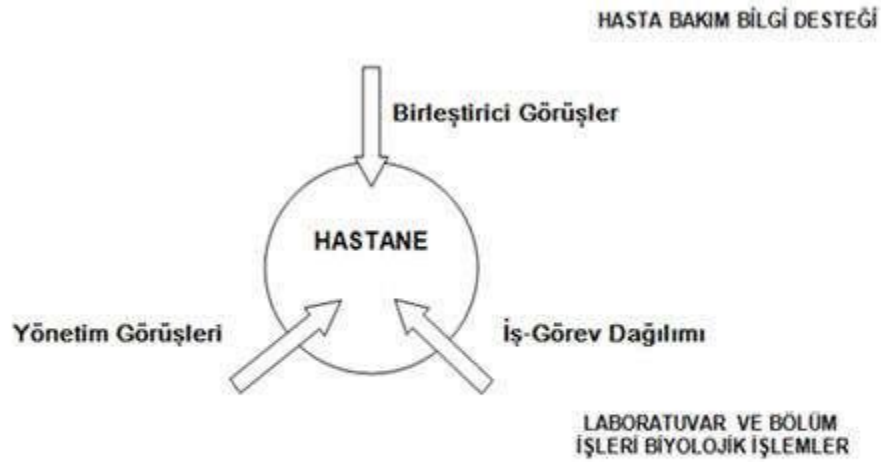


Figure 3.2 Introduction of Information Technology to Hospital Environments

Most of the developments in hospital information systems started in universities. But The industry has made the first impact in these developments and has been used to market hospital information systems.

It has taken over most of the protatives available. Some of them are successful, some has failed. Naturally, old industries have been replaced by new ones in the process of development, they have given. These transactions are either progress towards existence or participation in existing companies (73). it has brought. In addition, with the studies or developments of hospitals and universities such as cooperatives. It is also possible for them to transform into new industries. The main impact has shifted from the now existing industry and cooperatives to hospitals, and this routine applications in hospitals have a great impact on systems developed and strengthened for the market. caused effects. Industries still rely heavily on new ideas and developments in universities.

allocate resources. In addition, the interest in university hospitals is moving towards joint hospitals, showed slip. This is a situation that does routine work, stores information, and requires adaptation and promotion, increases the demand for systems. Computer systems were first used in American hospitals. Therefore Since the early 1960s, there has been an interest in the development of total hospital information systems. However, in studies on this subject in the USA, a

hospital was faced with bad beginnings and despair. completed experiments. To summarize the work done during this period, SINGER follows: explained way. “Highly developed computer-based hospital information systems generally not of general use. But in the coming years, general use will be improved. facilities are available. This will have a high cost (74).

The system developed mainly as a result of the work done during the 1970s. new technologies have reduced the cost of communication systems within the framework of online computerization. A few The firm developed comprehensive, fully integrated hospital information systems. Marion Ball, 1973 Commenting on some of the fifteen systems available in commercial markets, he wrote in he did (75). However, due to earlier high demands and in some hospitals, serious declines were observed.

Due to the disappointments, many administrators acted cautiously and installed computers in their own organizations. remained silent about the deployment of assisted hospital information systems. But nowadays this silence has been removed. Now all hospital managers where these systems are of vital importance. known by The first hospital information systems developed in the late 1960s; financial needs and to bring together cost statistics and accounting in order to eliminate invoicing obligations, made it easy to arrive. The IBM/360 computer

system, which was the technology of that period, was an unsuccessful applied to clinical systems (76).

Terminal devices were insecure and quite expensive. Still In the same years, the hardware and software required for hospital information systems were limited and their costs were it was also expensive. During this period, some hospitals offer service clinics to do their private work. They used independent computer systems in their departments. The most general clinical example in this field reports made in laboratories. Starting these clinical programming systems supported by most hospitals, federal funds, and other research institutions.

In the early periods when hospital information systems were tried to be established, independent department The need to connect the computers of the central system to the central system computers was not felt much. But, With the spread of network systems over time, multi-terminal hospital information systems found to be established (77).

The need for management information systems in hospitals is increasing day by day. Each First of all, the longevity of systems is something that managers desire. For this, most helpful in maintaining long-term planning and establishing management goals. The important factor is the accumulation of knowledge and the need for knowledge. Hospitals provide information in meeting the health needs of

the public and determining efficient goals. it needs. Indicators of current problems; these needs, both directly and indirectly. existing service programs designed to meet the needs of the community, both in the hospital and resources that can be added in another environment in response to the needs of the society added to the programs. (76,77)

### 6.3. General Limitations in the Development of Hospital Management Information System

Many factors in hospitals are moving towards the development of effective management information systems.

limited progress. General development in practice for the solution of existing problems. The limitations can be identified as follows.

1. Technological limitations
2. Economic factors
3. External factors
4. Thematic limitations
5. Administrative deficiencies

Technological limitations: The development of management information systems in hospitals is essentially technological, directly related to progress. At the stage of

system building with technical level skills Due to the limitations of computer technology, there are some pauses in the hospital information over time.

systems have slowed down. Analyzing inadequate systems is both a waste of time and a waste of time, also resulted in labor loss. User needs of using information systems, It must be analyzed and determined before it is designed and installed.

Oriented design will not be fully realized. The technology factor of the problems encountered It should be possible to develop the system by overcoming it on the basis of Hospital information systems organized as computer aided.

It solves problems easily and has been developed for hospital information systems as a result of great efforts. contributes to the shaping of security. (78)

Economic factors: The main problem in developing hospital management information systems is development, effort has been used. Before system designs interpret new systems, the hospital must provide accurate cost estimates to management. Hospital manager this and similar should analyze the estimates very carefully and adapt them to the hospital's management policy.

External factors: The demands on hospitals are increasing day by day. Hospital. If we consider that the industry is an increasing and regulated industry, these demands. We can speculate that it will continue. External reporting costs in

hospitals are an important, It also brings about a budget increase. Therefore, it is important to minimize these factors. is of vital importance.

PHILIPS is responsible for external reporting requests in hospitals that have the following effects: it had mentioned. It is possible to summarize these demands as follows. (79)

1. Needs to expand databases.
2. For data structures from multiple users at local level in regions and states uncoordinated requests and demands.
3. Increasing demands for data resulting from the integration of data sources and bases.
4. Demand to broaden expectations involving data processing capacities.
5. Interest in increasing costs of data processing.

Thematic Limitations: Management information systems in hospitals are the subject of their design, suffers from its limitations. Hospital information systems as decision support systems an organizational structure for consolidating and collecting data as well as serving in view. A standard format for organizing information for decision making in hospitals. SCOTT provided its use.

This format is a concrete expression of achieving the goal; meet your resource needs instantly available resources, costs and assistance, possible alternatives,

programs, decision, The stages in interpretation include a target statement as a result of the decision. There are conceptual problems in the way the data is processed in the hospital decision mechanism.

Information systems designed to produce periodically processed statistics in hospitals, they enable and facilitate the collection of data instead of frequently separating them. Distribution of information and standardized data definitions in inter hospital comparisons is essential for public health planning. Increasingly, standards, regulatory agencies is established by Administrative Deficiencies: In the planning and control phase of management, all of the organization's Clinical and administrative information from the parts is needed. No communication between systems (80).

The integrated information needed for time management decisions will not be produced. Senior management, Although his time is valuable, he should contribute to the development effort of the system and must show willingness. How to help each individual should be known and accordingly should be treated. The main reason for system errors in hospitals is the upper management in system development processes due to inadequate management control.

According to HARVERY's studies, successfully interpreted hospital information development of systems; experienced managers in organizations,

directed them to the future, obliged to make appropriate decisions, sensitive to changing environmental conditions and open to innovations has done (80,81)

#### 6.4. Development Hierarchy of Hospital Management Information System

To summarize the development stages of information systems in hospitals as follows possible. Development levels of information systems in hospitals; both leading institutions and organizations, can be limited within the framework of advancing industrial software. fundamentals of information systems, It is possible to say that the structure is in the position of a tool to reach the goal. These systems may exhibit different appearances according to the local and regional framework. Patient; an acceptance (82).

It enters the system with the step of step, and leaves the system as a result of certain operations. Central editing principles and the necessary integration of information as a result of this integration to various points, It is necessary to ensure its distribution. At this stage; that is, in the distribution of knowledge to different units. Hospital management has great responsibilities. The central data structure is essentially the hospital's bidirectional serves its purposes. Concerning the storage of central revenues in data banks It is also possible to develop a

chronological hierarchy. Hierarchies shown in the figure above must be developed as a whole. For example, within the systems hierarchy, health care management, planning. According to the technological hierarchy, the medical treatment to be carried out in the hospital, It is possible to think of tasks and scientific research and development activities. Therefore, these hierarchical structures and activities are an integrated part of the hospital information system. also allows it to be considered in context (82).

## 7. Hospital Management Information Systems

So far, approaches have been focused on the development of hospital information systems. Summarize the historical development of these information systems, albeit briefly, information system; collection, storage, processing of information sets within the framework of a system, It is defined as a system of information sets necessary for the distribution, decision making and communication.(Emin Aydın; Encyclopedia of basic computer concepts) An information system; collects data, records, classes, calculates, stores, recalls, prints and reproduces them for the benefit of users. This systems are actually some of the routine operations related to management in hospitals, billing, operations such as calculation, patient follow-up, as well as executive operations of managers (83,84).

It can also be used as a decision-making tool. So management information. It should be known that there are collective systems including database management as well as systems. Information the main functions of the systems, the information needs of the organizations they are in, accurately, on time, fully, concisely and appropriately. All hospital information systems of a hospital must be organized, hospital information system; from patient records and treatments, accounting, personnel, materials It includes all functions of the hospital up to management. For this reason, hospital information systems (84).

It is expected that it is not limited to recording and tracking daily transactions only. This system should be established in hospitals such that; both routine operations and management, control and planning. coordinate their functions. Within the framework of these explanations, hospital information systems; to support management, fully integrated, based on diagnostic groups, to support diagnosis and treatment systems can be grouped(82,83).To support management from these systems, The emphasis will be on information systems and fully integrated information systems. General information about the systems will be presented.

FETTER, THOMPSON, and MILLS, an information system that fuses administrative data with patient data they have designed. (82,83,84) Their systems include the following components and capabilities /

1. A single accounting that provides regulatory and standard data on cost and budget accounts, reporting system.
2. A system that performs an exemplary budget analysis and generates financial reports.
3. Obtaining individual results by comparing hospital performance and usage reporting and for classification.
4. Information to agencies and hospitals to help assess quality of care

It is a system to provide.

5. Equity and a fundamental basis for paying the cost to third party payers, backers and consumers.

A reporting and information system to support rate adjustment, Hospital management information systems should include and have these capabilities.

very important for management. Because, thanks to management information systems, hospitals have a better become the service industry.

WASSERMN; distributed by multi-purpose mini computers of hospital information systems, focused on information processing and system integration

problems, only intelligent planning and good equipment stated that it can be reduced by choice. (85)

## 7.1. Systems to Support Management

In many hospitals, computer systems are used to provide information to the management, The installation of these systems can take different forms. General purpose medium in first applications and large size computers were used, and later microcomputers entered the market and some hospitals have chosen these systems. With these computer systems; taken from the patient.

Doing many things together, from invoicing wages to material tracking. possible. For this, ready-made package programs were used. Besides, businesses In some hospitals, the computer rental process, which is one of the policies they implement, appears to have been done. Payroll accounting and reporting processes in U.S. hospitals (84,85).

It has been determined that computer systems are used at the level of 95%. Collection of accounts and patient receipt applications are at the level of 80%. Computer systems are widely used; patient follow-up is used as the number of patient beds. To a lesser extent, patients attend pre-admission and outpatient clinical appointments, used in programming. Computers are also used to support

material management, systems are used. List of fixtures and equipment in central warehouses. There is a 20% usage level. In a study conducted in the United States in 1976, computer in developing management systems in hospitals and clinical studies with the study of the status of computer use in helping (85)

Hospital financial management association in the USA is also responsible for management information systems. It has also shown the alternative paths followed by hospitals in its development. 1976 for management purposes In the last years, 60% of hospitals using computers were installed with in-home computers. In 25% to 30% of these, mini computers were used for office work applications. Back the remaining 45% used external data processing services for their management applications. Rental etc.

It also enabled hospitals to work with computer aided processes.

Marion Ball; explains hospital information systems at two levels (86).

First-level information systems; data collection and transmission, message exchange, requests for service processing, keeping patient expenses, keeping financial data and daily reports performs operations such as preparation. E.g; payroll receipts, daily bed count, collection dating of accounts to be made, etc. are to be made. It costs around 1-2 dollars a day for this, cost reported. The second-level information system includes those listed above, as well as costs, service

needs, keeping clinical information on hand, processing disease records, It contains computerized patient medical records with a programmed system and It costs between dollars (87).

According to Marion Ball's estimation, most of the major hospitals in the United States did not exist until 1991. second level systems have been installed and will be in development.

Regina Herzlinger; computing within unprofitable organizations including hospitals pointed out that the use of systems would create great dangers. According to Herzlinger many managers in hospitals; He has trouble with numbers. These managers do not have sufficient technical skills, they lack.

Especially in the control of management techniques and understanding financial data. Managers have often shown that they are not relevant to the design of information systems. Hospitals and other unprofitable institutions initially tended to reduce or minimize their information systems.

The settling of the system and the higher-than-expected cost caused these managers to be shocked. caused. Many systems are tested before they are put into operation due to serious problems. should be done. As a result, management information systems senior managers in many hospitals is underestimated (87)

Hospital management information system generally; resource use and programming systems, financial management systems, material and facility management systems, personnel It is an integrated information system consisting of management systems. These subsystems are Let's examine.

### 7.1.1. Resource Utilization and Programming Systems

In an era of rapid inflation, needs involve enormous costs and the gradual reduction of resources, the full use of all possibilities and available resources, It is an important subject of every hospital, in USA and In many hospitals in Turkey, the rate of full beds, clinical and emergency service activities, many computer systems to program and monitor material and device usage developed. Thus, it provides an effective resource distribution in hospitals and also provides benefits to patients. creates conveniences. This is especially true in determining the patient's hospitalization day and surgery day (87).

The system has many benefits. Monitoring, scheduling of resource use, hospital enables you to make the most of its possibilities. Budgeting, long and medium term It guides the managers in the hospital in making the planning. Computer programs; such as diagnosis, treatment procedures, age,

gender of patients in the past, to use the average hospitalization and processing times calculated based on the information can be arranged for evaluation.

A similar system is in Boston, Massachusetts, in the department of eye and ear diseases. It has been in operation since 1968. 88 System; several identified problems with the use of facilities, It was started after being acquired under a specific business name. Bed occupancy limit is between 30% and 100% has been considered. This rate is even lower on weekends (88).

Similarly, the lower limit of use in the surgical field is 25% and the upper limit is 79%. was designed. This system provides two-month pre-registration estimates of patients after they enter the hospital, doing it on the computer . Long Island Jewish Hill medical center is a sort of medical center found in many modern hospitals, developed a computerized bed counting system (89).

Pre-registration and time notification are even more important and useful in outpatient clinics. The computer system is arranged in such a way as to notify the date and time of admission in each application. Also By means of analysis, the patient types in the clinics according to the days of the week and the hours of the day, time rates can be calculated. This information is used to distribute tasks to hospital managers. It helps with programming. Likewise, patients to be admitted

one day in advance It is also used in keeping patient records of clinics by automatically taking their lists (90)

## 7.1.2. Financial Management Information Systems

Development of one or more financial information systems caused sudden situations in their systems and computers. costs and In an age of demand where counting responsibility grows like an avalanche, hospital administrators they strongly feel the need for a reliable, financial management system.

Generally, computer use in hospitals was first developed as a financial information system. has been applied. Even in the United States, hospitals are the most important problem today. as in the past, it is expected to expand in a solid financial oil by ensuring the income-expenditure balance.

known. Financial information helps manage the guidance of transaction performance in hospitals. It also occupies an important place in being an element.

The objectives of a financial management program include the following. (91)

1. Carrying out daily accounting transactions.
2. To provide the necessary numerical data to minimize the expense in investment decisions.
3. Developing efficient and effective functional financial subsystems.

4. To provide management information for the evaluation and control of transactions.

In order to develop a financial information system, a good hospital accounting system is required. Berman and Weeks define accounting as follows. The art of assembling, collecting, summarizing, analyzing, reporting and interpreting in monetary terms, information about investments “ (92).

In a sense, the first system presents an individual structure and the second system a collective structure.

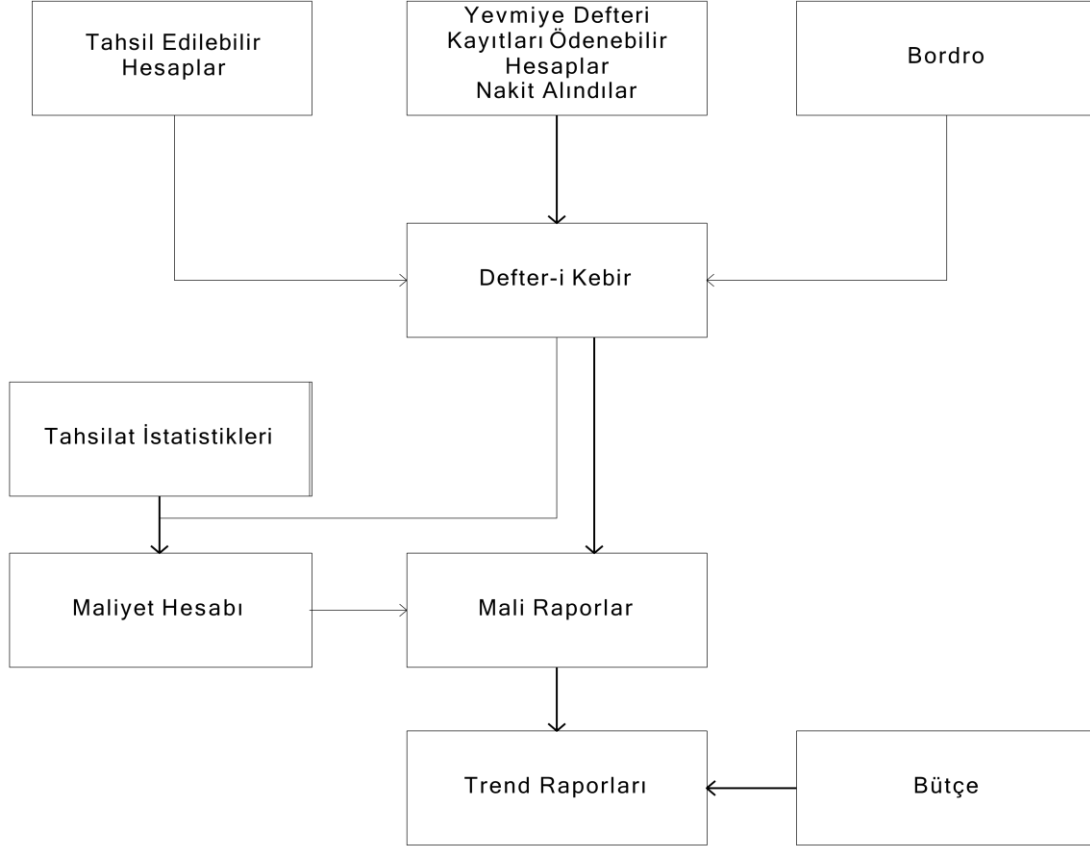
Developed individual financial subsystems in hospitals include:

1. Payroll preparation and accounting (a possible link to a personnel data system with link).
2. For accounts payable (with a purchase order, the appropriate link to the purchase system).
3. Collection of expenses, account and collection of patient and third party debts.
4. General ledger account.
5. Expense distribution system for apportionment of overheads.
6. Financials to be presented to the relevant persons (financier, hospital management, board of trustees and auditors) preparing reports.

## 7. Budgeting and budget control, budget control.

Apart from these, the integrated financial information system is necessary at all levels of management. It is developed to provide timely and meaningful financial information. Comprehensive financial information from Los Angeles hospitals, the University of California, and clinics to create an integrated financial information system to provide full on-site management of decided and established such a system. This system contains 65 mainframe programs. and can prepare 36 different types of reports(93). At the same time, other major, All integrated financial information systems have been developed specifically within hospitals.

A.B.D de UCLA Hastanesinin mali yönetim bilgi sistemleri aşağıdaki gibidir.



Şekil 3.3 UCLA Hastanesi Mali Yönetim Bilgi Sistemi

### 7.1.3. Material and Facility Management Systems

Computers provide hospitals with more efficient management of physical facilities and materials. they are helping. Computerized reception-counting is an example of such systems. timetable control systems, computerized menu planning and food service management, energy management, project programming and control systems, purchasing and inventory management, possible to show (68,93). Computer-aided purchasing of equipment and material requests in hospitals can be processed as input to the system. By entering these requests into the computer, the necessary financial Order instructions can be prepared after obtaining permission.

A note of receipt of the material is entered into the computer and the comparison is made. can be done. Accurate to hospital pay order account in most automated purchasing systems addiction exists. "Phoenix Baptist" hospital 1000 from medical and surgical supplies to office supply, An automatic revenue control system operates for the standard stock item (94).

In this hospital, An integrated computer system is available. So it will be spent on developing the system time can be minimized. The system provides a weekly income analysis report. This is the report includes the daily cost for each

item, the nature of the purchases, the current stock on hand, the repeat the points, out-of-stock conditions automatically on the computer and which are required to give including information (94). As a result of this system, the relevant hospital monetary earnings reported to be \$2000 per month. Computer-aided menu planning has been used more frequently in hospitals in recent years.

In order to prepare balanced and delicious meal menus for the patients, it is necessary to have sufficient calories and diet. The required material quantities, unit prices and preparation rules are entered into the computer, Thus, computer-assisted food menus that comply with diet conditions with the least expense. can be prepared. At the same time, computer-aided meal planning for hospitals, It is also possible to purchase special package programs.

Albany medical center in late 1972 reporting and protective developed a computerized system for maintenance programming (95)

Programming the maintenance work of hospital equipment and devices and reporting on this subject Computer systems have been developed for the purpose of preparation. These systems are; auditor reports, It undertakes functions such as spare parts inventory control and maintenance expense account. In addition, labor distribution from the hospital manager material facility management system, and control of resource use (96)

Consumables can generally be for medical purposes, but they can be used in units such as kitchen and laundry. There may also be food and cleaning supplies purchased. What kind of material is the material, It is not important for material management. The important thing is that this material is appropriately requested and appropriate. the realization of its use. Within the framework of the desired criteria of this use control, with the establishment of a computer-aided material management system possible.

This system is an automation system that quickly controls all materials in a hospital system. A material management information system has two types of functions. These are the hospitalization of the material are the functions of using the material with acceptance (97).

Acceptance of the material is an appropriate procedure for the materials that the hospital determines as a need. It includes the functions of being purchased and admitted to the hospital. Use of the material the module is; The materials taken to the hospital are both stocked in the hospital and stockpiled, It contains functions that manage its use without database management information system principles are used.

## 7.1.4. Personnel Management Information Systems

Staff is the most important resource of a hospital. Based on hospital staff When evaluated, 60-70% of the budget is spent on personnel expenditures and social benefits are separated. Therefore, a good personnel information system; from manpower planning, productivity. It is very important in helping the hospital management until the analysis good in hospitals, For this reason, the establishment of a personnel information system is essential. Hospital staff management information, It is possible to list a few important functions of the system as follows (98,99)

1. Keeping and keeping the continuous file records of hospital staff
2. When necessary, obtaining information from these files and correcting information
3. Providing automatic mission control
4. Preparing study analysis reports for each cost center of the hospital
5. Generating reports to analyze personnel problems
6. Knowing the special abilities and document status of the officers
7. Cost distribution of worker expenses depending on the hospital payroll system. calculation
8. Generating knowledge on quality control and worker productivity.

The Youngtown hospital association is a two-unit unit serving an 832-bed system established an automatic personnel information system. The aims of this system are as follows:

1. Entering the correct workmanship information for use in the competition.
2. To ensure that labor costs are kept constant, balanced and reduced.
3. Realize reduction of paper expenditure, especially at departmental levels
4. Making budgetary forecasts, worker analysis, quality control and production standards.

Development of the necessary numerical data as the personnel department for the analysis of attendance to ensure immediate receipt.

Computer files of central personnel records can be accessed by on-line terminals.

they update. The reports produced by the computer system; from online computer terminals, can be requested upon request. That this system is better and cheaper than manual systems ,we can say. At Hutzel Hospital in Detroit Michigan, a hospital is connected to the payroll system, personnel management information system has been designed. (100,101)

The biggest aim of this system is to provide managers and to make cost analyzes of labor expenses to department supervisors in the services and to make a cost analysis data group creation. From the analysis of the hospital system and

worker performance, Hutzler data structures in many areas, from obtaining a summary of the use of aids to their workers. provides control, makes personnel budget analyzes and provides the necessary statistical periods instantly, helps to get it. As a result of the determinations made in this hospital, the total number of workers in 1970 compared to the previous year In 1971, when there was a 10% increase in working hours, after the operation of the new system, Only a 2.7% reduction in working hours has been reported.

One particularly interesting use of personnel data is the Mount Sinai hospital in New York City has done. This hospital has a dedicated manpower for use during workers' strikes developed the system (102).

### 7.1.5. Systems to Support Diagnosis and Treatment

Even if this issue is not directly related to the hospital management, it is a part of the hospital information system will be briefly reviewed. Computer use and information communication from diagnosis and treatment issues, The issue of establishment of the system has not been given as much attention as the hospital management. However, in the 1980s After years, generalized clinical information in some university and research hospitals in the USA Efforts to develop systems have intensified and the desired success in this regard has been achieved (103).

However, in the development of clinical information systems, there are some problems compared to management information systems. There have been adversities and difficulties. Because such studies are a great source of finance and requires labor power. The fact that these systems are very reliable and the product of careful design is essential. Fulfillment of some special conditions in order to ensure the reliability of these information systems. These conditions can be listed as follows.

1. The personnel to use these systems should be carefully selected and well-trained to be.
2. Security and confidentiality must be ensured in the use of computer systems and software providing.
3. Establishment of a coding system that identifies the user and authorized persons from the terminals prevent entry outside; establishment of a security system network.

In addition to the technical difficulties in the development of the clinical information system, social and psychological available in barriers. Adaptation to rapid developments in computer technology in social life. There are some difficulties in providing Although this situation is Although it is tried to be prevented with obstacles, it shows itself in the field of medicine.

Clinical information systems mainly: computer aided diagnosis and treatment, computer aided patient follow-up, keeping computer-assisted disease records, computer-assisted laboratory and pharmacy can be classified as information systems. It is possible to summarize these systems as follows (104).

### 7.1.6. Computer Aided Diagnosis and Treatment Information Systems

The general framework of this system is determined by the system that collects patient data and transmits it to the doctor. medical information, including patient data, to help the doctor make decisions It is possible to think of them as systems that make comparisons. computer aided diagnosis, Two different methods can be applied in the system. These methods are:

1. The method by which direct signal processing is applied
2. The method that makes decisions with medical thought

Among these systems, the second method is not completely reliable compared to the first method, and it is a specialist. Can't replace the doctor. A number of systems have also been developed for monitoring the treatment of patients. These; treatment protocol and warning systems, radiation therapy systems and computerized patient follow-up systems (102, 103).

### 7.1.7. Computer Aided Patient Tracking Information System

In the patient follow-up system, the computer monitors the patients' life functions continuously.

and periodically displays its physiological data. In this system, such as heart rate, blood pressure, patient temperature, etc. , functions can be viewed instantly on the computer screen. In a sense, this system is intensive care It can also be run as a unit.

### 7.1.8. Computer Aided Disease Record Keeping Information System

Keeping disease records during treatment and care is, in a sense, in all hospitals. The ease of the system here is far away from the hospital from the time the patient stays by creating an archive system on the computer of the medical records until the is to be kept. Some hospitals delete these archive records from the created file, some hospitals Even if the patient makes a final exit within the framework of the policies applied by the hospital, they will not keep their records.

It records to hardware in computer environment. computer of disease records management , It also brought great conveniences. This system; in general

Identity information of patients, classification of the disease, records within the framework of demographic factors. includes indexing. Thus, to recall records in any investigation and control possible. Some systems have a recall facility as a linked system. In this way the disease record summaries in terminals in the emergency room, outpatient clinics, and referral offices. can be seen on the screen. (103,104)

#### 7.1.9. Computer Aided Laboratory and Pharmacy Information Systems

In the laboratory information system, the test processes are performed automatically and the laboratory information can be processed instantly into the patient's file. Testing lab instruments into computer, By connecting it, the results of the findings are obtained and processed into the patient file. a hospital The laboratory information system can work independently as well as to the automation system of the laboratories.

It can also work by connecting. Information processing with instrument automation of the desired laboratory information system, It is known that it is a management information system in which functions are carried out together.

Connecting the hospital's automatic laboratory information system to the hospital system is necessary. Also, test results should be found in the central patient data

file and. The numbers and types of the tests were recorded in the patient accounting records, and monetary calculations were also made.

should be done(104)

It is necessary to go to a wide computerization in the pharmacies of the hospitals. Because; drugs keeping secure records from ordering to distribution; and A pharmacy information system is needed to store it. Thus, both records

It will be ensured that they are kept and stored correctly, as well as in keeping the accounting records of the drugs. A more reliable system will be created. Pharmacy information systems can also be independently can work and can be integrated into the hospital information system. In general independent pharmacy information systems, toxic drug control, storage of drug indexes and, They have been developed for the calculation of the debts of the patients.

In pharmacy information systems connected to hospital computer center, hospital administrators or Authorities have the opportunity to instantly see and control the drugs given through the monitor used has. In pharmacy systems connected to computer centers, drug orders, maintenance, It is given by logging in from the terminals in the services and the orders placed are automatically registered to the patient's identity. recorded and forwarded to the pharmacy. In

these systems, correcting the drug stock and reducing the patient debt Extraction is done automatically (105).

### 7.1.10. Fully Integrated Systems

The main purpose of these information systems is to connect all information system functions together, as being carried out.

The term hospital information system can have several different meanings. Surrounding terminology, In order to reduce the confusion, authors named VEAZIE and DANKMYER have given the following definitions, they have done. (105)

1. Total hospital information system: with the aim of facilitating daily operations, all It is a connected information system designed for the hospital.
2. Medical Information System: To make medical comments on issues such as diagnosis and treatment and to It is a system that allows the processing of data.
3. Management Information System: for decision making, planning and hospital activities, is the processing and storage of data to assist management in control.
4. Database management system: independent of the programs to be used, interconnected.

To collect as much data as possible and to return this data when necessary, It is a tool that performs the operations of storing and storing in a general format by calling is the system. In fully integrated hospital information systems, both medical and management information systems must be together. However, the elements of both information systems are more or less in the system. extent involved. Because creating and storing data files in every hospital information system A database technique is used (106). The following conditions are expected to be fulfilled in integrated hospital information systems, This the conditions are:

1. Online via special terminals located in key areas in hospitals Providing, recalling and displaying data directly with the system.
2. Automatic switching message to transmit information to all parts of the hospital. Sending.
3. Combining daily operations in hospitals and forming a whole system.
4. In the establishment of a fully integrated system; regularity of data files the use of definitions, information processing and computing methods between subsystems. automatic execution within an integrity framework.

### 7.1.11. Fully Integrated Systems Based on Diagnostic Groups

This system is in the USA. medical records and accounting data of patients in hospitals in were combined and used to obtain the averages for the diagnostic groups. front in this country average expense accounts on the basis of diagnosis groups due to the implementation of the payment system has been made. The data obtained thanks to this system; marketing, budgeting, sourcing, It provides the necessary information to the management on issues such as quality assurance.

Discrimination according to diagnostic groups is made from discharged patient summaries. For every patient All information, from identity to treatment and care expenses, is given to the computer as data.

This data is then classified and put into a format that the user can benefit from. Diagnostic groups The outputs of the mixed event information system are generally descriptive, comparative, aggregated reports and is in the form. Descriptive reports are mixed of patients at hospital group or district level, contains information about their status. Comparative reports contain information about patients. reports prepared for comparison. Summary reports are the average, rate, percentage of the information. It means summarizing with values such as,

(106,107)

## 8. Processes and Management Information Systems in Hospitals

The health sector is a sector that does not accept mistakes. Because there is no chance of making a mistake a second time, For this purpose, while planning these activities, the patient is given the best possible opportunity within the framework of the available resources. It is necessary to make arrangements to provide the service. While providing this service, what kind of manufacturer company considers customer satisfaction criteria, the patient in a hospital as soon as possible should aim to get the best service available.

Both in the production sector and in the service sector related to the management of business processes all over the world, Many techniques and theories have been developed to be used in the industry. On the basis of these theories, It is based on changing the existing process as necessary. Therefore, the development of processes improvement and documentation works are among the most important assets of the enterprise (107)

It is possible to collect the processes in hospitals in three main categories. Main categories and Sub-categories related to these are listed below (108)

These processes, their general functions and their connection with hospital management information systems are general as specified below.

- Medical processes
- Outpatient clinic
- Clinic
- Operating room
- Delivery room
- Intensive Care
- Laboratory
- Radiology
- Blood Bank
- Hemodialysis
- Administrative processes
- Hospitality Services
- Cleaning-Maintenance
- Cuisine/Food
- Laundry / Tailor / Ironing Room
- Human Resources Management (Personnel Management)
- Purchase

- Pharmacy
- Inventory-Warehouse
- Appointment Procedures
- Data Processing
- Report Transactions
- Patient Admission / Admission / Discharge
- Public Relations
- Support Services

\*Collection and storage of medical and household waste

\*Hairdresser, Barber

\*Social Workers

\*Security Services

\*Technical Services

\*Medical Technical Services

\*Maintenance and Repair Services

\*Archive

\*Transportation Services

\*Consultation

\*Environmental Arrangement-Maintenance

\*School-Kindergarten, Occupational Therapy

\*Cafeteria, market, etc.

\*Switchboard, communication services

\*Patient Rights

\*Financial processes

A. Accounting

B. Medical Accounting

C. Revolving Fund

## 8.1. Medical Processes

According to the health course of the patient, from applying to the health institution to receive health care. All of the treatment services to be provided constitute medical processes. medical process The following items are explained.

\*Patient Registration and Admission Procedures

o Appointment Procedures

o Entitlement Transactions (Medula)

o Private Health Insurance Systems

\*Polyclinic Procedures

o Consultation Procedures

o Polyclinic Examination Procedures

\*Clinical Procedures

o Hospitalization Procedures

o Operating Room Operations

o Anesthesia Procedures

o Patient Wake Up

o Intensive Care Procedures

o Delivery Room Operations

o Clinical Laboratory Procedures

o Clinical Radiology Procedures

o Discharge Procedures

o Ex Transactions

\*Pharmacy Transactions

\*Emergency Service Operations

\*Blood Bank Transactions

\* Hemodialysis Procedures

\*Nursing Operations

### 8.1.1. Patient Registration and Admission Procedures

Patient admission procedures; patient admission procedures in inpatient treatment institutions, patient hospitalization, the registration and other works of the deceased and the born, and the transfer of the deceased to other institutions.

It covers the transactions of sending the goods to the estate judgeship (108). In the diagram below. The patient admission process operating in a hospital is described.

The patient admission process starts with the appointment process. When the patient comes to the health institution, First of all, it is checked whether there is a record from the Health Information Management Systems. If there is no registration in the system, pre-registration is done. If the patient has received service in this health institution before and if there is a patient card, this card will be added to the system. is read. Thus, the general personal and medical information of the patient is displayed on the screen. If a change will be made in the patient's identity information at this stage, the necessary revisions will be made. and its current state is recorded in the system. After the identification procedures are completed, which unit and It is determined that he will receive service from the doctor. If the patient is a SSI patient, entitlement control is made from the medula system. every health, Although it varies according to the institution, the amount to be given for the pre-examination service if the institution wishes. collects.

### 8.1.1.1. Appointment Procedures

The appointment system arranges the patients to be cared for in a planned manner according to a predetermined set of rules. admission to the outpatient clinic. Patients who will be examined are scheduled at certain times. Programming is about the effective allocation of resources over time (109), The aim of the strategy of making appointments with patients is to create a regular workload in outpatient clinics. It is to spread the flow of patients to outpatient clinics over time in order to remove them .

The operation of the appointment process for Personal application for examination, telephone, internet, etc. requesting an appointment from the hospital is found. The hospital fulfills these demands within the framework of its appointment policies and for physicians. evaluates the patterns in a way that creates a workload. As a result of this evaluation, different appointment types are scheduled at various times, and patients are scheduled for appointments spread over certain days. distributed. Physician, support staff, patient flows so that patients can be examined times, examination rooms, support areas, and various resources are needed. These components It can be used to measure the effectiveness of the outpatient clinic.

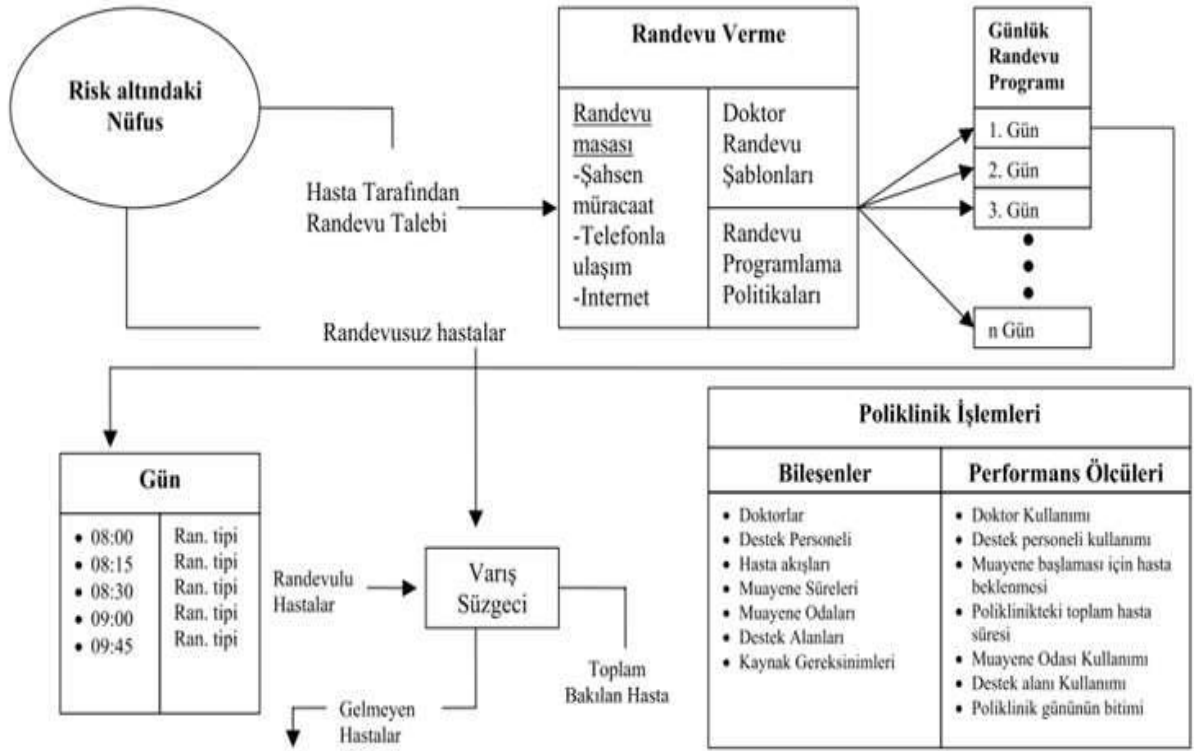


Figure 4.2 Appointment Procedures

According to Stuart (110), switching to an appointment system in polyclinics, better service to patients; medicine provides better education to their students, and doctors are able to provide for the number of patients they need to care for. will also prevent the decline of health services standards. appointment systems, allows doctors to complete their work at a normal working pace while at the same time. It also significantly reduces the waiting time of patients (111). A good appointment

system, patients a moderate compromise between long waits for medical care and reasonable use of doctor's time requires provision(112). In other words, a good appointment system is both patients' doctors should minimize the waiting time.

### 8.1.1.1.1. Classification of Outpatient Clinic Appointment Systems

It is possible to classify outpatient appointment systems as follows:

1. Single block appointment systems
2. Individual appointment systems
3. Block appointment systems
4. Individual-block appointment systems

#### 8.1.1.1.1.1. Single Block Appointment Systems

All patients to be cared for on any designated day a joint appointment time is given at the beginning of the (112). All patients are present at the opening of the polyclinic and are ordered by the doctor in their order of arrival are viewed accordingly. The cost of patients having excessive waiting times in these systems It is aimed to get a high efficiency from doctors at all costs. Single block appointment systems, Although it is the oldest known dating application, it continues to be used today.

is being done. Physicians and hospital administrators agree that the length of a medical exam can vary widely, and that this time will often be difficult to predict, and that patients' presence of all patients at the outpatient clinic opening, claiming that they often arrive late. They advocate single-block appointment systems, thinking that it is necessary.

#### 8.1.1.1.2. Individual Appointment Systems

In individual appointment systems, each patient is given at various intervals during the polyclinic session, a different appointment time is given. In these systems, the aim is to set the average waiting times in the range of longer service life and shorter waiting times not obtaining times. The main applications of individual appointment systems are: open office scheduling (open-office scheduling), variable spacing, low variation initiation and proportional programming.

#### 8.1.1.1.3. Open Office Programming

There are three types of appointments in open office scheduling, (113) same-day appointments (same-day adds), return checks, and prescheduled appointments (appointments). In this scheduling, only a certain amount of the total time allocated for all appointments a percentage is allocated to same-day

appointments. Check-up appointments during a course of treatment includes regular visits of patients, as well as pre-scheduled appointments, health checkups and Includes annual tests for chronic diseases. Check-in appointments and pre-scheduled appointments It is not scheduled beyond two weeks.

#### 8.1.1.1.4. Variable Spacing Appointments

In variable interval appointments, patients are given equal intervals between appointment times. Instead of time slots, variable time slots are used. In this system, patients at shorter intervals than an average examination time in their early parts; late session in sections, at intervals longer than an average inspection period.

they are programmed(114), Making appointments with variable intervals, as a result of applying different appointment intervals has the idea that there will be no patients waiting too much in outpatient clinics.

#### 8.1.1.1.5. Starting with Low Variation

To start with low variation, the probability distribution of inspection times is used. Appointments are scheduled according to the coefficient of variation of examination times. rendezvous, low deal with the service times that he believes

will have a coefficient of variation; high coefficient of variation, He distributes appointments in a way that puts the service times he believes he will have to an end(115) Low starting with variation, staying empty of outpatient clinic through variation information about customers , It aims to minimize the waiting times of the patients.

#### 8.1.1.1.1.6. Proportional Programming

In proportional programming, examinations are divided into three types as short, medium and long. classified. Short exams, 15 minutes or less; intermediate exams 15 minutes to 30 minutes Intermediate and long examinations are examinations that take longer than 30 minutes. Proportional in scheduling appointments are usually distributed daily; short, medium for patients to be cared for in one day and long appointments are scheduled at certain rates. Proportional program, The key to success is the right number of short, medium and long exams in a given time frame. is to spread.

#### 8.1.1.1.1.7. Block Appointment Systems

In block appointment systems, instead of giving a different appointment time to each patient, Block programming is done for a certain number of patients. In other words, the polyclinic session. It is divided into blocks and appointments

are made with a series of patient predictions that will arrive at the beginning of each block. is programmed. In these systems, the same appointment is given to more than one patient at the same appointment time.

Patients given time form blocks. Generally, block lengths and patients in blocks their numbers are equal. The risk of a patient not coming, arriving late, or taking a long examination is blocked. spread throughout.

Major applications of block appointment systems are: wave programming (wave scheduling), clinical scheduling, and advance access.

#### 8.1.1.1.8. Wave Programming

Wave programming is simply the start of a certain number of patients each hour, the system in which it is programmed. Each new wave of patients is scheduled for the next hour, and this status continues until the session ends (115) Since patients come in waves, waves, The system, which is called programming, sometimes schedules patients to the beginning of every half hour. is also applied. Patients forming the same wave are usually ordered according to their arrival order. they are admitted to the outpatient clinic.

### 8.1.1.1.1.9. Group Programming

In group programming, the doctor takes care of patients with a specific disease at the same time appointments are made. This system; programming the patients to be cared for at the same time to the same blocks. Covers (116) The rationale underlying group programming, possible similar examination, evaluation and concurrently by the doctor of a certain group of patients who need services examination will be more effective.

### 8.1.1.1.1.10. Advance Acceptance

Bringing the acceptance forward is also called the same day appointment system. Calling for an appointment for the same day, for the patients who do not want an appointment for the same day, for the next day at the most.

It is an appointment system. In this system, all appointments are made in blocks of 15 or 20 minutes, is programmed (117) Prioritizing admission is a breeze thanks to appointment scheduling that lasts no more than two days. On the one hand, it aims to approximate the access times of the patients to the system, and on the other hand, the patients It is aimed to reduce the risk of not coming to their appointments.

### 8.1.1.1.11. Individual- - Block Appointment Systems

In these systems, a block is usually reserved for a certain number of patients at the beginning of the outpatient session. appointments; Individual appointments are scheduled for subsequent patients(117). Both block and individual Although appointment rules are applied together, in individual-block appointment systems, blocks are or two is limited. These appointment scheduling systems add a workload to the outpatient clinic start-up. It aims at an effective programming based on the storage strategy.

### 8.1.1.1.2. Outpatient Queue and Appointment Systems in Turkey Current state

More than 95% of outpatient services in Turkey are provided by the public. 2005 Approximately 55-60% of outpatient services provided by the public until Health units affiliated to the Ministry of Health; Health units, 30-36% of which are affiliated to SSK; 7-8% university hospitals and 0.5-1% by health units belonging to other public institutions. Outpatient clinic services offered by inpatient treatment institutions affiliated to the Ministry of Health. It regulates the “Regulation on Operation of Inpatient Treatment Institutions” (YTKİY). According to this regulation, Patients who apply to the polyclinics are given a sequence number and

the examination is performed according to this number. A polyclinic book is kept in outpatient clinics and all patients examined are recorded in this book. Polyclinic days, start and end times are determined and announced by the hospital head doctor. continues continuously during these hours. Polyclinic service areas are located in our country's hospitals where patients are dense and long. These are the places where waiting is experienced. During the presentation of outpatient services, both institutions Inadequacy in their existing physical structures and more than one specialist doctor in the same branch

Although there is an attempt to carry out these services by a single specialist doctor, and For similar reasons, long waits and crowds occur in front of the polyclinic, Appointments are given for dates. (118) In our country, in the late 1990s, There was almost no referral chain application in health insurance systems such as patients were not given the right to choose a physician and hospital . Health manpower and infrastructure dormitory unevenly distributed throughout, adequate cooperation between health institutions and service levels. and coordination was lacking(119). With the rapid urbanization, the increasing urban population is the first An effective model has not been developed to meet the demand for primary health care services, and almost no An appointment system could not be established in the first step.

Therefore, the development of standards for the delivery of outpatient services Reducing the deadlines was shown among the important planning targets in those years. In order to achieve these goals from the late 1990s to the present day, our country has The work done is discussed below. Social Insurance Institution (SSK) in 1999, for the patients who will be examined within the scope of the "SSK Health Information System" project carried out by“appointment system” application was launched. It was implemented as a pilot in SSK Kartal Hospital. This system, which was put in place, was used in the same year by many SSK health services where the demand for health services was high.

was put into operation at the facility(120).

With the telephone appointment system application, patients or their relatives are queued at the hospital. Instead of queuing by entering and making an appointment by phone, They also had the opportunity to e-mail (120) SSK, in the provision of health services with a telephone appointment system.

In health facilities with high density, it will be much higher than the capacity at certain times of the day. to prevent patient accumulations and to keep the current density within the day within a certain order (120,121).

In 2000, according to the Prime Ministry High Supervisory Board, by telephone, Regarding the appointment system application, patients cannot make an

appointment by phone or that they had difficulty in getting an appointment or that they could not be examined at the given appointment time. It was stated that the complaints could not be prevented (120). SSK for hospitals in 2000 started a voluntary work practice. According to this practice, at 17.00 on weekdays in polyclinics – Voluntary overtime is planned between 20:00 and 09:00 – 13:00 on Saturday. This is the purpose of the application is to reduce the serious patient density experienced in health facilities. to ensure the rational use of physical space and opportunities, and to work to overcome the problems that arise with its application. Telephone appointment system and volunteering in 2001.

According to the minutes of the Assembly regarding the overtime practice, the telephone appointment system and With the activation of the voluntary working practice, SSK hospitals and dispensaries your tails; without hiring a new member and making a new addition to the existing physical conditions. It is thought to be reduced by half compared to the previous year. Parliamentary Minutes, Parliamentary Minutes Journal, (121) According to Öztürk, outpatient services did not increase by half, and SSK the queues at the hospitals did not decrease and the quality of the medical service provided did not increase either. The patient organized by the Ministry of Health in 2001 with 13 hospitals in Ankara.

In the meetings to investigate the reasons for the queues, participating hospitals. They gave various reasons for this. Seven of these hospitals had insufficient physical space for their outpatient clinics; three technical devices and due to lack of equipment; One of them complained about the shortage of doctors. If a hospital by making use of the patient agglomeration in the polyclinics of some doctors who have private examinations, It is noteworthy that he stated that they directed patients to their own practice (122)

In 2004, the Ministry of Health made it easier for the public to access polyclinic services and “Direction of Neighborhood Polyclinics” to prevent crowding in outpatient clinics has prepared. In this directive, hospitals in hospitals, especially in big cities, Determination of buildings suitable to be polyclinic where needed in order to eliminate the density, It was decided to put them into service as district polyclinics without delay. This depending on polyclinics, state hospitals and training and research hospitals, the hospital's offer and with the approval of the Health Directorate (123) In the same year, the Ministry of Health introduced a new regulation on polyclinic services. This regulation briefly includes the following issues.

- Informing, directing and guiding patients in places where outpatient services are provided, sufficient medical staff to carry out the patient-related secretariat of

specialist doctors, health personnel who will provide counseling and guidance services with the secretary will be assigned.

- Informing, directing and guiding patients in places where outpatient services are provided, sufficient medical staff to carry out the patient-related secretariat of specialist doctors, health personnel who will provide counseling and guidance services with the secretary will be assigned.

- Secretariats, where relevant polyclinics are located so that the density is not gathered in one place. locations will be established.

- Considering how many outpatient clinics the staff in the secretariat will see, will be determined.

- In the areas where polyclinics are located, patients can sit comfortably, rest or Ministry of Health, “Circular on the Opening of Neighborhood Polyclinics”, Appropriate environments will be provided to enable them to sit and wait their turn.

- Guiding the patients, following their order and making the necessary announcements. arrangements will be made to allow.

Controlling the patient flow and referral process in hospitals and outpatient clinics At the end of 2004, as a solution to the bottlenecks in healthcare services,

“Family Medicine Pilot, The Law on its Implementation” was adopted and put into effect. According to this law, family medicine

In the places where the application is passed, people are registered with a family doctor. For each family doctor, the number of registered persons; minimum 1000, maximum 4000. Working hours of the family doctor, provided that they are not less than forty hours a week, at his own request.

It is determined with the approval of the health administration to which it is affiliated. Family medicine services are free; This Regardless of which social security institution the patients are subject to, They can apply to health institutions and organizations only with the referral of their family doctor (124).Institutional performance measurement concepts and practices applied worldwide in healthcare institutions.

“Ministry of Health Inpatient Treatment” in order to apply its methods in hospitals in our country. Institutions Institutional Quality Improvement and Performance Evaluation Directive” has been prepared. It was put into effect on 01/01/20015. Institutional performance measurement methods in the Directive are grouped under four headings, and the process under each heading is measured and evaluated to set a target. coefficient is determined. One of these titles is outpatient services. polyclinic services, It is evaluated with the “outpatient clinic services coefficient”.

This coefficient, outpatient services in the hospital It is the ratio of the number of doctors who can do it to the number of polyclinic rooms. If this ratio is large, the patient the success of meeting the demand, the increase in the quality of patient care and the waiting period of the patients. It is considered as an indicator of shortening time. The coefficient of outpatient services, whatever Although it has not been recommended as a performance measurement method by the World Health Organization until now, It is initially accepted as a suitable indicator for our country by the Ministry of Health (125). Submission of health units belonging to some public institutions and organizations to the Ministry of Health. A legal process was initiated in 2004 for the transfer of No. "Some Public Institutions and Organizations' Health Units to the Ministry of Health Ministry of Health, Inpatient Treatment Institutions Institutional Quality Improvement and Performance Evaluation directive,

The Law on the Transfer of In accordance with this law, other public authorities on 20/02/20015 Many health units belonging to institutions and organizations have been transferred to the Ministry of Health. As a result of the transfer, outpatient services offered by the Ministry of Health It is estimated to reach about 90%. "Health Transformation Program"

Within the framework of the transfer, the health services in our country have been reconstructed with a contemporary understanding. intended to be regulated. Based on the principle of "one room for each physician", all available services in the outpatient clinic using facilities and spaces and increasing the number of actively operated examination rooms As a result, crowding, queues and long waiting times in standing service areas are avoided. intended to be passed.

Parliament in 2015 before the transfer of health units affiliated to SSK to the Ministry of Health. According to the minutes, by switching to the phone appointment system of SSK, the hospital eliminating the queues in front of them; but this time, limited quota of SSK members It was stated that they started to struggle to make an appointment on the phone at home because of (125)

Finally, according to the amendment made by the Ministry of Health in YTKİY in 2015, Every clinician working in treatment institutions is obliged to provide outpatient services to specialist physicians. and physician selection practice was encouraged. Today, the biggest bottleneck in our country's health services is in outpatient services. is happening. The demand for an undelayable patient for hospital outpatient clinics continues to increase.

As the referral chain application has not been implemented yet, patients have the right to choose a physician and hospital. has not been fully achieved. between health institutions and service levels.

Lack of coordination and cooperation continues. Primary, secondary and tertiary health care Appointment systems for services have just started to be implemented. Our country hospital which reduce the quality and effectiveness of service in outpatient clinics and cause great complaints. A significant portion of crowd problems (about 80-90 percent) are in primary care. It is thought that it can be solved (124,125) Information transformation in health services the need continues.

#### 8.1.1.1.3. Functions That Should Be in Appointment Systems

Both the Central Hospital Appointment System study of the Ministry of Health, and Making an appointment with the currently used phone, internet, text message, kiosk device or WAP must have the following functions.

1. Within the scope of appointment procedures; defining a new appointment, deleting the defined appointment, It should have registered appointment search, appointment confirmation and appointment closing functions.

2. Appointment systems, outpatient clinic, clinic, laboratory, physical therapy, operating room, delivery room and radiology etc. units should be covered.
3. When entering an appointment, the types of appointments (outpatient clinic, clinic, operating room ) must be specified.
4. The calendar of doctors serving on a unit basis should be followed. blank by calendar appointments can be made.
5. Closing the appointment times of doctors during leave, temporary duty and lectures should be possible.
6. Appointment start and end time should be determined.
7. Whether the appointment took place on time, if not, the reason should be followed.
8. If the appointment is to be canceled, the reason must be stated.
9. The patient should not be given an appointment to the same unit at the same time on the same day.
10. Appointment without the valid phone number of the patient in appointment systems should not be given.
11. It should have the feature of making private, scheduled and non-scheduled appointments.

12. After the appointment has been registered, all previously registered appointments of the patient should be viewable.

13. Create a new appointment with the copy and paste function to a saved appointment must be registered.

14. Patient information should be accessible from the appointment entry screen.

15. According to the service to be given to the patient, medical personnel planning should be possible from the system.

#### 8.1.1.2. Entitlement Transactions (Medula Transactions)

With MEDULA, the information regarding the use of health services is transferred to the electronic environment, individuals to benefit from health services in the best way and health institutions and organizations producing quality data in processes, speed and accuracy in payment transactions is intended.

In the MEDULA system, for the transfer of information from health institutions and organizations The following processes are included;

1. Rights ownership and contract verification,
2. Dispatch and prescription notification,
3. Payment inquiry,
4. Invoice inquiry,

5. The term used by the chief physician or manager of the health institution and organization terminating and getting a cover letter.

In general, the system interferes with the internal business processes of health institutions and organizations.

It works as web services to be integrated into the hospital management system without “General Health Insurance (GSS) Retired Social Security Institutions in Turkey Fund, Bağkur, Social Insurance Institution (SSK), Yeşilkart under one roof, GSS roof aimed to collect Medula is the informatics leg of this study. public hospitals, private hospitals, university hospitals, dialysis centers and many other health institutions payment by the reimbursement institution of the cost of the service, medical supplies and drugs used They need to use GSS Medula web services(139), Health facilities with social security institution via GSS Medula web services It performs the following main and secondary operations (125).

#### 8.1.1.2.1. Medula System Components

Health facilities with social security institution via GSS Medula web services can perform the following operations:

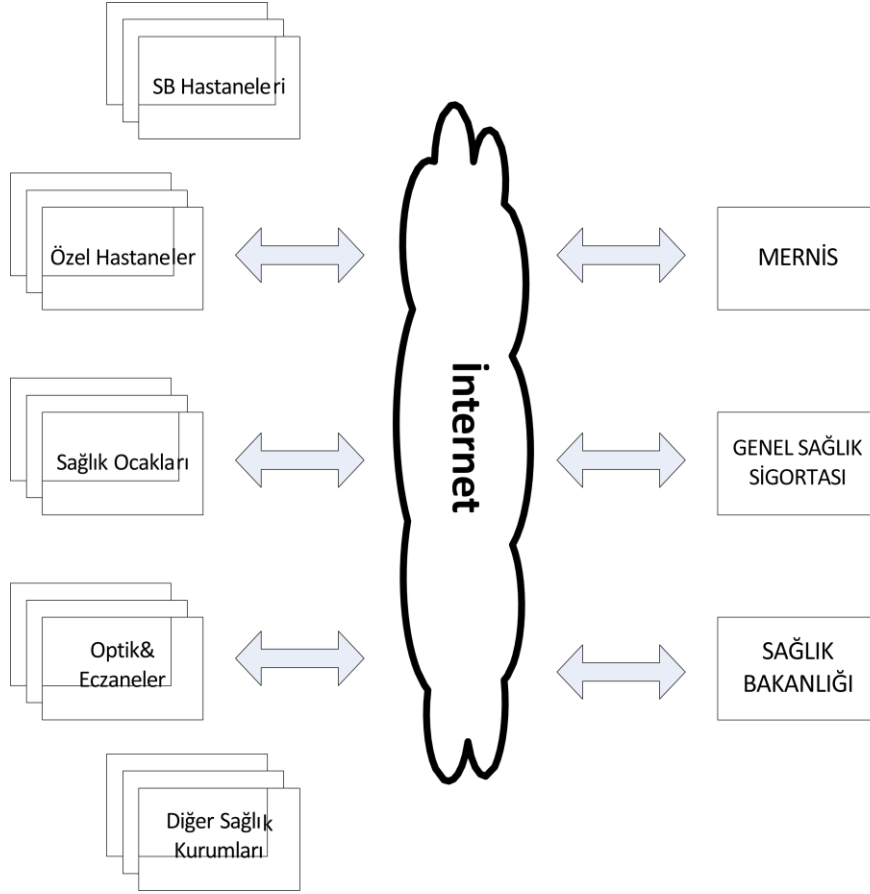
Owner thread and Contract Verification - A00 (Provisioning), With this web service, it is possible to query appropriation, patient admission and referral

procedures. can be done. After a patient admission process, the patient receives a tracking number and The whole next process continues over this tracking number. Prescription, Inspection, Shipment Tracking -- B00 (Dispatch Notification) If a healthcare facility wishes to refer a patient to another healthcare facility, use this web service. uses. Payment Inquiry - - C00 (Payment Information Registration)

The service provided by the healthcare facility to the patient, the medical supplies and drugs used for the patient notifies the reimbursement agency of its costs via this web service. Invoice Inquiry - - E00 (Invoice Information Registration) An invoice will be sent for tracking numbers with an error-free payment status. delivery invoice is the sending of a group of invoices in a list.

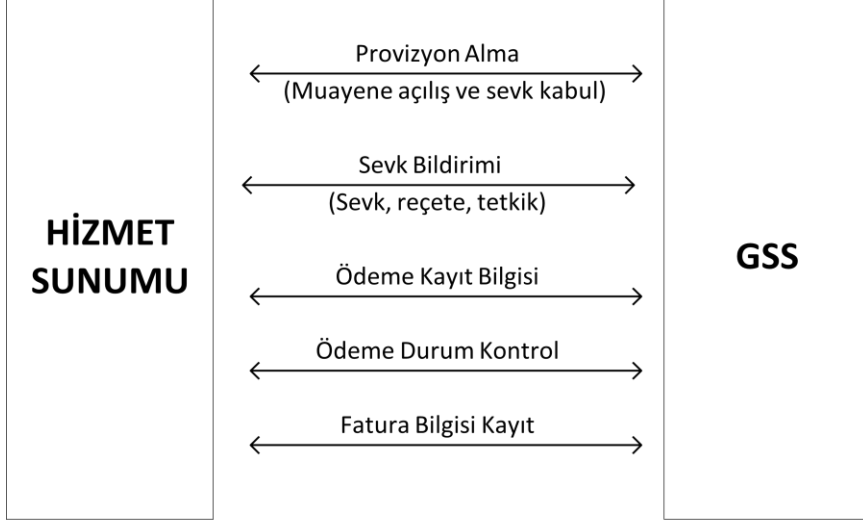
Payment Status Check - - C01, After the payment information is saved, that payment has a status. The status of the payment is as follows: 0 : First record 1 : no error 2 : wrong 3 : invoiced 4 :term ended 5 : reviewed, The tracking number, whose payment status check is faultless, can be billed. Incorrect payment information must be checked and payment information must be sent again. payment status check payment information can be applied at every step from registration., Report Information Record – – F00 It is one of the GSS side processes. Processes related to patient reports are performed.

Figure / Sestems of GSS

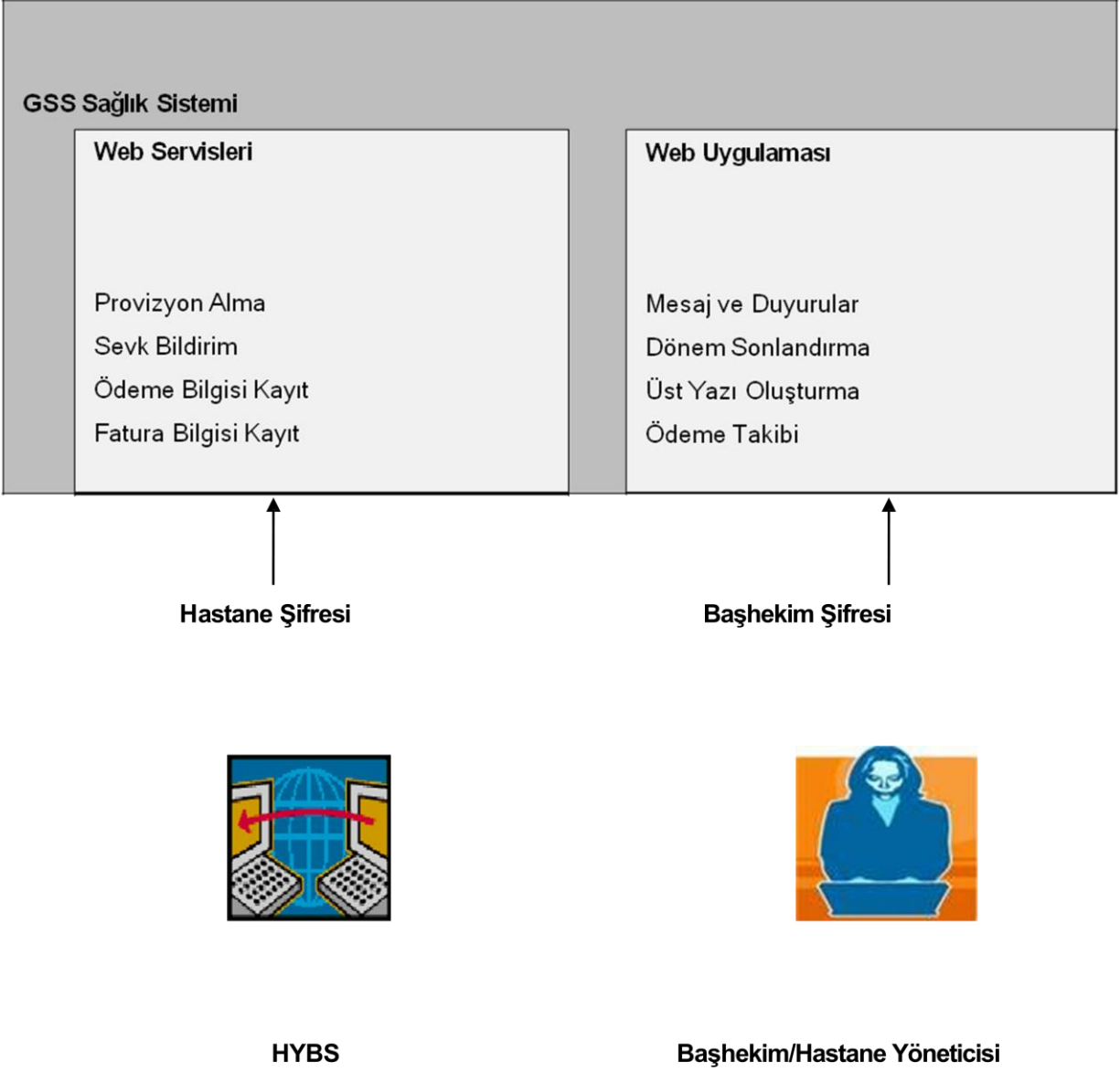


#### 8.1.1.2.2. Service Provider- - GSS Communication

In service delivery via GSS Medula web services; provision, dispatch notification, payment registration information, payment status control and invoice information registration processes are performed.



**Şekil 4.5** Hizmet Sunucu-GSS İletişimi



Şekil 4.4 Medula Sistem Bileşenleri

### 8.1.1.3. Private Health Insurances

Health insurance means that when a so-called illness actually occurs, it is remedied. insurance intended to bear the financial burden of restoring health and well-being type(126) , Health insurance can be done separately or by adding to life insurance. form of insurance. The subject of the Health Insurance is basically all the cases that are not caused by the accident. Although it is the payment of the expenses incurred for the treatment of diseases, It includes the payment of costs incurred in the treatment of conditions such as injuries sustained (127). Special insurance; securing the private interests of individual persons against various risks It is a voluntary risk guarantee that they have created by their own free will through an agreement called an insurance contract. By bringing together those under the threat of the same risk, on the basis of mutual solidarity, to compensate for the damage that may be caused by the commercial is an organization of nature. (127). In the event of a loss, the needs of the injured party are within the insurance organization, covered by premiums collected from individuals. That is, dissemination of the financial consequences of risk to a community based on the principle. The insured is protected in proportion to the premiums paid at his own risk. There is no redistribution of income from premiums paid in private insurance.

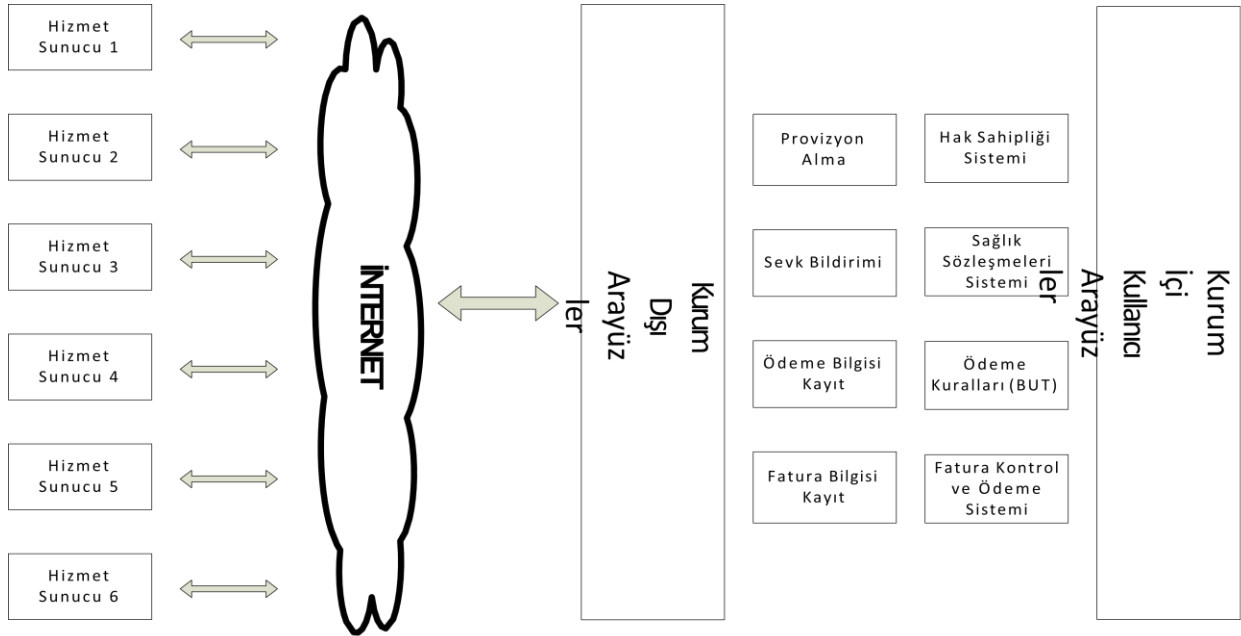
and each insured is protected in return for the premiums paid in accordance with his own risk.

There is a direct relationship between the amount of premium paid by the insured and the amount of risk covered by the private insurance. are available. Private insurances; In addition to being used as a social security method, basically, it has the feature of taking a complementary role rather than being a substitute for social insurance carries (128).

The first application of private health insurance in Turkey “Hospital Daily Compensation It started in 1976 with “Insurance”. For two years, Ziraat Bank depositors are entitled to personal accident in addition to the insurance. Later, under the name of "Treatment Costs Insurance", it mostly 80% and 100% paid health insurances applied to the groups were made (127)

Later on, in the 1980s, Şark Insurance Company moved closer to today's practice. prepared the tariff, again based on SSK statistics, but this time as a life insurance package. started to apply to groups. Many insurance companies followed this event and entered the market. they started to sell the tariffs they prepared both as a group and individually(128). In parallel with this development in health insurance and to follow this issue more closely. The Under secretariat of Treasury decided to make it a separate insurance branch and "Sickness Insurance Branch"

with the Council of Ministers Decision dated 01.02.1990 and numbered 90/55. Created While 10 insurance companies were working in the health branch in 1990, this number increased to 41 in 2000 has risen. In 2003, there were 44 insurance companies operating in this branch (129)



Şekil 4.6 GSS Bilgi Sistem Mimarisi

## 8.1.2. Polyclinic Process

Outpatient clinics, outpatient examination, examination, diagnosis and treatment services of patients, They are the first application units in inpatient treatment institutions(128,129), In inpatient treatment institutions such as general hospital, special branch hospital, medical center, Arrangements were made for the clinician specialist to provide outpatient services, service from a physician is provided. When we look at training hospitals, polyclinic chief, assistant chief, performed by the chief assistant and experts.

The diagram below describes the outpatient process operating in a hospital. Polyclinic procedures begin with the completion of patient registration procedures. Physical examination of the patient by the doctor of the relevant unit after these procedures are completed makes. During the physical examination, the doctor takes the patient's history and this history information registers in the system. As a result of the physical examination, a preliminary diagnosis of the disease is made. This pre-diagnostic information again, it is selected from the ICD-10 codes defined in the system and registered in the system.

As a result of the examination, the doctor requests an examination; same or different unit if deemed necessary You can request a consultation from your

doctor. After all these procedures are completed, the definitive diagnosis of the disease is made. Patient control If it is necessary to come to the examination, an appointment is made from the system and the process is terminated. Polyclinic systems should have the following functions (129).

1. All examination and treatment recorded in patient files by patients' nurses and doctors information, special health information (allergies, diabetes, etc.) and consultation information are available electronically from this module. This information should be transferred to the media, and an crisis should be arranged automatically by using this information.

2. Diagnostic codes of the patient must be available in the International Disease Coding ICD-10 system (130)

3. Except for paid patients; civil servant, privately insured, Retirement Fund (transferred), SSK (transferred)' Boundary (transferred), green card holder, etc. of patients who are invoiced to the institution; examination and treatment information, with laboratory, x-ray etc. examination request procedures should be performed and the completed procedures should be performed by the patient, invoices (financial records) should be automatically posted.

4. In the doctor's examination requests, the clinic, the doctor, the user who performed the examination, the doctor who requested the examination, the Information such as date and time should be automatically included in the request.

5. Examination requests to be made from the polyclinic module can be directly entered in the laboratory module, should be viewable. The results of the requested examinations should also be visible in the polyclinic module. This laboratory test results in the patient file together in integrity and simplicity should be traceable.

6. The procedures and examination requests of paid patients should be able to be made from the polyclinic module in any case, control of patients who have not paid, prior to sampling or examination here must be controlled and prevented.

7. Medical supplies and drugs that need to be processed in the files of postpaid patients are also included in this module. should be processed. Emergency service, intensive care, operating room to prevent loss and leakage etc. Stock control processes should be carried out in the pharmaceutical and material warehouses of all clinics and places, Materials in these warehouses should only be processed by authorized persons.

8. Appointments should be made for control examinations of patients, patients who will come within a certain period of time. control inspection procedures should be

carried out. Control examinations and treatment sessions are also should be properly reflected in patient bills.

9. In polyclinics; who have taken the order of examination, on the basis of polyclinic or doctor patient lists should be easily viewable by the outpatient nurse or doctor; This lists should be arranged in such a way that they can be reflected on “digital boards” when necessary. Same way Inpatient lists in clinics can also be easily accessed by service nurses and doctors. should be viewable.

10. The patient's billing information at any time can be accessed from this module screens, if desired can be viewed and/or printed.

#### 8.1.2.1. K Consultation Procedures

al. Consultation (f), Fr. Consultation (f), Eng. Consultation. Specialist in various branches of medicine, The actions of physicians who have a disease in the face of an ill-defined case or a disease that is difficult to diagnose. exchange of ideas. Consultation. The immense increase in knowledge in medicine requires a physician to have maximum knowledge on every subject. made it impossible to have. Specialization branches were born from here, and even specialization branches were born are divided into sections.

Consultation is a way used in various situations. Psychiatric (mental) disorders Diagnosis and opinions of an internist physician may be insufficient in a

patient with The patient's symptoms may surprise him. The work of the physician in such a situation is in the request for a 'psychiatric consultation'. is to exist. Going to the diagnosis by exchanging ideas with a mental health specialist, In this case, it is the surest way. Such examples can be multiplied among many branches. Consultation. Another situation is the consultation of physicians on the treatment to be applied. in the patient surgeons will decide whether the operation to be performed will be performed or what the surgical technique will be determined in consultation. In various diseases other than surgeries.

The treatments to be applied are also determined by consultation among physicians (130). The following diagram describes the consultation process operating in a hospital. During the polyclinic or clinical examination, the doctor may examine the patient in the same or different unit.

After the consultation doctor performs the physical examination of the patient, the examination or different may request a doctor's consultation examination. After these procedures are completed, the consultation doctor or doctors will examine the patient's primary informs the doctor about the condition of the patient and the disease. The system of consultation procedures must have the following functions.

1. Consultation doctor's appointment and work by doctors for consultation procedures plan should be followed from the system.
2. Consultation request; The requested branch, doctor and explanation should be able to be done from the system.
3. The examination result of the consultation doctor should be entered into the system and the result should be written by the primary doctor should be controlled
4. Consultation requests should be made to doctors in more than one different branches at the same time.
5. When the consultation doctor approves the request, the doctor's examination planning is automatic in the system should be done.
6. Examination with the permission of the primary doctor in case of more than one consultation result results should be displayed.
7. The consultation doctor can check the patient's entire medical history from the system when necessary should be able to.
8. The consultation doctor should be able to enter examinations from the system for the patient.
9. All transactions charged to the patient file by the consultation doctor are recorded on the patient invoice should be reflected.

## 8.1.2.2. Polyclinic Examination Procedures

Radiology or laboratory examination request by the doctor to the patient receiving outpatient clinic service can be done. The details of these processes are described in the following sections.

### 8.1.2.2.1. Laboratory & Radiology Procedure

laboratory services; outpatient clinic and service patients, and when necessary, public consultation of the Ministry of Health It is qualified to meet other laboratory needs such as health care and also an outpatient laboratory.

It is organized in a central place compared to services and polyclinics in inpatient treatment institutions that do not exist (130). Examination materials for laboratories in health institutions, related polyclinics and clinical doctors laboratory request papers duly filled by the Institutions are sent with official documents and are recorded in hospital automation systems. Laboratory services are recorded in a book to be kept. The following diagram describes the laboratory process operating in a hospital, As a result of the polyclinic or clinical examination, the doctor can diagnose the disease. Laboratory tests may be requested. Appointment planning can be made in the pre-examination system. Likewise, if the patient needs to take medication before the examination, medication is prescribed.

Although it is pre-examination in public hospitals, the work of the institution in private health institutions, According to the process, a service fee is charged before or after the examination. This information is recorded in the system when the test result is obtained. Thus, the patient's primary or can be followed from the system by the consultation doctor. Planning in the system for control inspection if the inspection result will not be given on the same day makes. Thus, the laboratory process is terminated.

#### 8.1.2.2.1.1. PACS Systems

Image archiving and transmission system (PACS) image and data retrieval, storage and It consists of the combination of the digital network and application software that provides the visualization. a small as simple as an image acquisition device interconnected with a workstation with an image database, or can be as complex as very large image management systems. PACS was developed in the 1980s, a in small subunits called modules that will do all the operations of the radiology department. It is designed to do basic operations. Each of these PACS modules communicates with other units.

They were assigned as independent islands that could not establish themselves. be represented as a PACS concept and Although they work well in

each of the radiology and clinical services, there is no difference between the modules. The complexity of connectivity and collaboration could not be expressed in a step-by-step approach. This fault is more It appeared when the PACS module was connected to the hospital network. care, guiding decisions, co-ordination of machines, fault tolerance, and system extensibility are increasing. have become problems. This inadequacy in early design concepts is due to large-scale PACS. partial understanding of the complexity of its implementation and the associated PACS at the time due to the inaccessibility of many technologies PACS design is an easily expandable and flexible hospital information system (HIS) and It is a general multimedia data management system suitable for many jobs within the PACS infrastructure. From a management perspective, a hospital-wide or large-scale PACS is attractive to managers because Implementation of the system provides economic opportunities. Only in radiology departments, The goodness of the cost-benefit ratio should not be considered as the balance of the exchange of resources.

However, PACS can be persuaded by expanding it to all hospitals and all operations. This is the concept has given strength to movement. Many hospitals around the world and large-scale healthcare units have installed large-scale PACS systems and the effectiveness of PACS in health units. They presented tangible

evidence that it increases the cost of hospitalization and reduces hospital costs.

Engineering In terms of standardization, open architecture, extensibility, connectivity, reliability, fault tolerance and cost for future growth. It includes features of PACS such as efficiency. PACS infrastructure design provides for the imperative nature of distributed and heterogeneous display devices and makes it possible for all patient-related information to be made by an appropriate database management. In addition, in terms of viewing, analyzing and documenting study results and It is a fast and efficient working institution in terms of communicating the results to the relevant doctor with a fast method in the system.

#### 8.1.2.2.1.1.1. PACS History

Computed tomography images of Prof. Dr. Heinz Lemke published in 1979, The precursor of PACS applications is seen as. Steve C. Horii, co-creator of the DICOM standard, for Lemke “Lemke's project was actually PACS. In this study, Lemke, up to the HIS interface, PACS's . He created a project that included its components.” Says Paul Capp and Sol Nudelman of the University of Arizona in the early 1970s A community led by DSA (Digital Subtraction) achieved the first computerized image. They developed the Angiography device. Capp, reduction of chemical solutions used in angiography, He says that they have embarked on such a study for In 1973, in defense ministry projects, After Nudel

man's visit to Capp at the University of Arizona, Capp's views were more became apparent: "Nudel man convinced me that there could be radiology without film. That was clever, because film technology was expensive, cumbersome and useless.

This situation was turning every hospital in the world into a mess. During this period, electronic and Advances in the computer field have rapidly removed the obstacles to the digital processing of images.

Lifted In 1982, he was an electrical engineer working for the ultrasound device company.

Duerinckx and Samuel, an electrical engineer working on digital imaging J.Dwyer held a landmark PACS conference in Los Angeles. This More than 400 radiologists, researchers and companies from the imaging industry attended the conference. employee attended. At the time of the conference, the PACS dictionary was not yet available in these circles. was not widespread.

Duerinckx said that the interest at the conference was huge and that PACS is now a milestone He realized he was on point. Viewing images from different sources side by side, It started to arouse great excitement in everyone. Kansas in the mid-1980s A system costing \$700,000 was installed at his university. Computed tomography, ultrasound and This system, which consists of a digital converter that converts movies to digital images, has several tasks.

There was a station. The transfer was very slow and the image was in low resolution. However, the images rooms had begun to circulate.

Later, on the integration of RIS (Radiology Information System) and PACS

While working for a mini PACS project in the 1980s, CR Conversion of non-digital images to digital media with (Computed Radiology) plates. they succeeded.

CR was opening all the closed doors for PACS to spread.

#### 8.1.2.2.1.1.2. Advantages of PACS

The advantages of PACS Systems are under two headings as patient and hospital, we can collect.

##### 8.1.2.2.1.1.2.1. Advantages for the patient

1. Patients do not have to carry a film with them when they go to the doctor's control. Image With the transfer, the use of film in the hospital has disappeared.

2. There is no problem of storing movies at home, so previously recorded footage will not be lost there is no risk.

3. Images are stored in the same quality and can be manipulated. movies time

It deforms inside due to environmental conditions. However, digital images are always of the highest quality. can be stored as Because there is no loss of quality in

the image, the physician is accurate even after many years, evaluation can be made.

4. The previous images of the patient and the images recorded later in the computer environment can be examined comparatively. It is especially important in chronic diseases and cancer cases.

Historical records and images can be compared with each other. Thus, more successful results are obtained in the evaluation. Displays when needed can be sent to centers abroad. If the patient wishes, they can save their digital images on CD can be saved.

#### 8.1.2.2.1.1.2.2. Advantages for Hospital

1. The most important benefit of the PACS system for especially busy hospitals is the reduction of film costs is reduced.

2. It provides convenience in the archiving system. It has shrunk the archive spaces in hospitals and the problem has ceased to exist. Millions of images are stored on a disc, theoretically forever.

can be stored without deformation. In addition, with the advantage of the archiving system, the current images of the patient and the previous images in the archive can be evaluated together and comparative results are obtained.

3. Digital images can be synchronized across all departments with a network connection can be distributed. This helps speed up the evaluation. Likewise, the image quality ,The evaluation made by radiologists is more accurate due to the increase in.

4. It is environmentally friendly as no chemical solutions are used for the film and the development of these films.

### 8.1.2.2.1.1.3. PACS Architecture

Typically, a PACS network connects to a host server over a LAN or WAN and consists of clients that provide or use images to the main server.

More and more PACS systems use the Internet for communication and based interfaces. VPN (Virtual) to ensure security in data communication Private Network) and SSL (Secure Sockets Layer) technologies are used. Some apps They run on JavaScript or Java.

Although there are many different definitions, many authorities consider that a PACS system is completely, To be said to be web-based, each image must have its own URL agrees on.

Client workstations can scan films and transfer them to the system, directly to the workstation for printing and interactive viewing of digital images.

they can have connected interfaces. PACS workstations basically involve manipulating images systems that provide.

State-of-the-art radiology equipment and modalities can directly transfer patient images to PACS systems can be transmitted in digital form. In terms of backward compatibility, many hospitals imaging and radiology departments also include a film digitizer (152).

#### 8.1.2.2.1.1.4. Integration

A complete PACS, single point access to images and associated data be able to provide (for example, support multiple modalities). At the same time, available, It should also be integrated with hospital information systems. Hospital Information Systems, with the abbreviation HIS, Radiology Information Systems are referred to by the abbreviation RIS. Interfacing with multiple systems also results in the creation of more stable and consistent data, It helps:

1. Reduced risk of incorrectly entering patient ID or exam information - DICOM work list The modalities that support the (work list) feature provide relevant patient information (patient name, patient number, protocol number) from the hospital information system so that the data avoiding the need to enter the modality a second time, avoiding the risk of making mistakes, can reduce. When the

imaging process is completed, the PACS system acquires the image, can compare the information registered in the RIS system with the information registered in the RIS system and can warn the user.

2. The data recorded in the PACS system, the individual identifiers (TC) that can be retrieved from the HIS environment, It can be labeled with (such as ID Number). In this way, even the information systems of different hospitals they can be seamlessly integrated.

3. Dictation of reports can be incorporated into the PACS system. Recorded audio reports, can be sent automatically to the reporter's workstation and simultaneously access may also be provided. In this way, reports of results that are urgently needed, The risk of errors that are not expected to be written and that may occur during writing is minimized, has been done.

4. A single tool is used for quality control and inspection processes. rejected Images can be flagged and analyzed later to find the source of the problem. Business load can also be tracked through this system (131).

The laboratory system should have the following functions.

1. The examination request process is carried out by doctors or personnel authorized by the doctor should be carried out.

2. The doctor who requested the examination should be known and the examination performed by the doctors within the defined period should be requested, Types should be reported together with their numbers.
3. All tests required for patients (radiology result reports, other laboratories, examination , interventions, inspection, etc.) should be available on a single output.
4. It should be possible to group audits.
5. When necessary, the requested examinations should be recorded and given to the patient.
6. Audits should be leveled as urgent, priority and routine; urgent examination request with color code should be included in the system.
7. Examination requests of patients sent from other institutions for examination should be made.
8. Rules to be followed by the patient for the examination (for example, the patient is hungry for blood sugar) It should be taken as a printout and given to the patient when the examination request is made.
9. The physician concerned should be able to create his own examination request panels/packages and should be able to update.

10. A special barcode specific to the patient given to the patient and the sample to be studied for laboratory procedures, it must have an access number (or other solution to be developed), its label can be printed, and should be readable.

11. Each laboratory unit should have its own entry screens for test results.

12. It should work in harmony with devices that can automatically give test results. This feature, The capabilities required for the devices should be specified with the offer.

13. In which reference centers, with which devices, the brand, model, laboratory and contact person information should be given with the offer.

14. Entry of the inspection results should be done by selecting from the coded lists.

15. Breakdowns from the audit result records daily, weekly, monthly and between the desired date periods should be taken.

16. Normal values should be provided automatically at the test entry. First for routine re-examinations an automatic supply program should be created at the entrance, the same patient should not be entered repeatedly.

17. Requests that are not reviewed should be recorded and canceled due to non-examination.

18. Soft and hardcopy laboratory results from non-hospital laboratories are added to the system must be entered.

19. It should allow alphanumeric test coding.
20. Repeated request control and warning should be made.
21. When requested, reports should be sent to e-mail, fax, server and printer.
22. Tests requested as a profile, as a profile or selected from within the profile separately should report.
23. Technician, doctor, device based work lists should be created.

The radiology system should have the following functions /

1. Authorized doctors should make radiology requests and the relevant radiology units should make these requests should provide assessments.
2. Obtaining the patient's social security status, demographic and clinical information from the records in the system, should automatically receive (age, gender, institution, requesting physician, etc.) and use it. Equipment, Room and Staff should make appointments and management according to resources.
3. It should be able to warn of repetitive requests. In addition, mistakes are made to be repeated after correcting should be allowed.
4. Additional procedures deemed necessary by the doctor during the procedure (USG during CT needs) should be scheduled and managed.
5. When necessary, an emergency request can be made for emergencies.

6. Working hours for making an appointment, doctor detail information, device detail information, consumables material relations should be defined dynamically on the basis of radiology unit and appointments should be made using this information. It should be based on. The clinical and identity information of the patient in the system is automatically must be viewable; there should be no need for re-definition/data entry in this module.

7. Appointments should be made on the basis of date-time, doctor and device, they can be canceled and, if desired, emergency, In such cases, it should be possible to make an instant appointment.

8. Change the system appointment status or cancel the appointment.  
should be available to users.

9. Commands and detailed data as a result of appointment processes, if any, can be sent to the PACS system should be transferred.

10. Commands and detailed information that can be generated as a result of any change in appointment information data should be automatically transmitted to the PACS system, if any.

11. Appointment processes should be integrated throughout the system and should not allow double appointments.

12. With the permission of the Radiology Department, specific time periods, specific units or specific applications must be reserved for

13. Due to the characteristics of the patient, different conditions such as isolation requirement, need for anesthesia, transport conditions If there is a situation that requires application, it should be monitored.

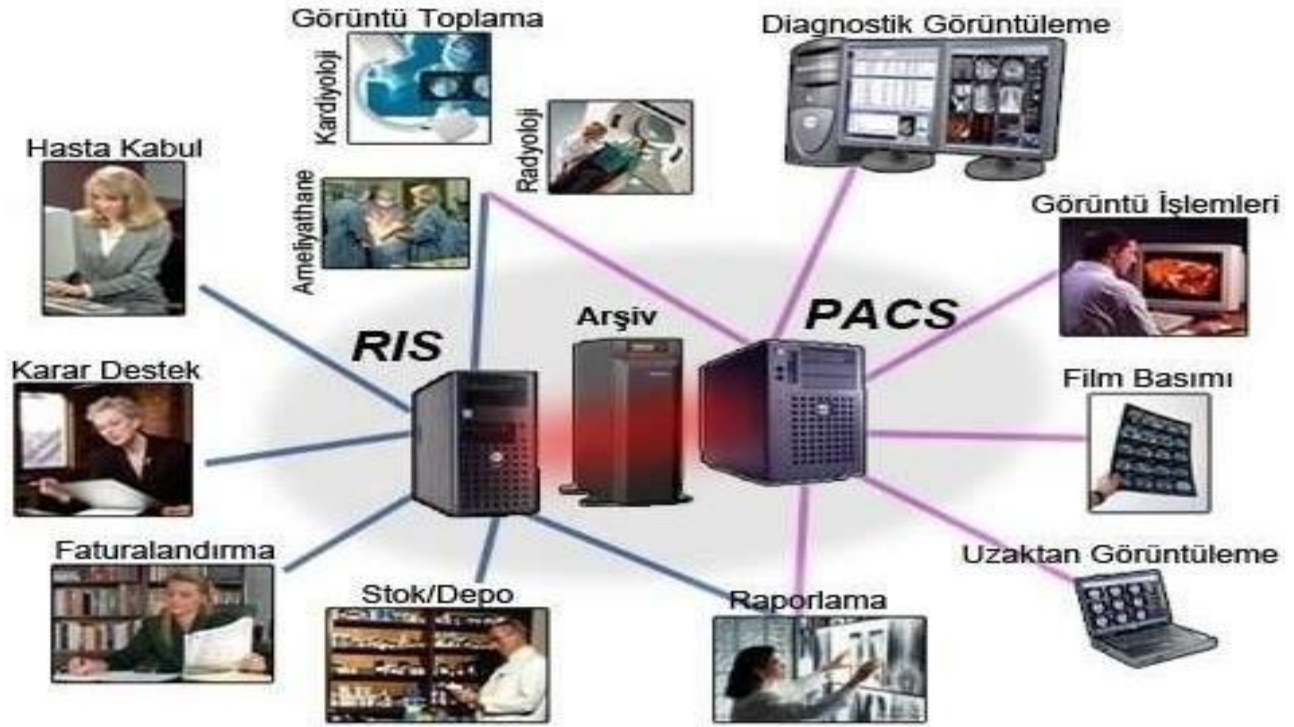
14. In cases where patients need to make preliminary preparations such as bowel cleansing before the procedure, The doctor and the patient should be warned about the preparations and explanations to be made and the necessary prescription must be prepared.

15. The doctor who made the request for radiology reports for the radiology requests that have been concluded automatically routed and reports integrated into the electronic patient file should be stored.

16. If available in the hospital, the patient radiological image available in PACS, resolution should be forwarded to the requesting doctor together with the radiology report and these images should be should be associated with the electronic patient file.

17. Job status, job step, result, performer, device etc. basis should be followed.

Examination status follow-up (patient came, results were obtained, report was written, etc.) should be followed on a status basis.



### 8.1.3. Clinical Processes

Service specialists, specialists, nurses and pharmacists, dietitians, Physiotherapist, psychologist, etc., carried out jointly by other professionals related to the branch. It is a team work, by making an accurate diagnosis with reliable tools in the best conditions, providing care and treatment as soon as possible, in training hospitals and in-service It also aims to provide bedside training (153,154).

The following diagram describes the clinical hospitalization process operating in a hospital, The doctor writes the "patient entry paper" and the Health

Information, It writes the possible diagnosis of the patient to the Management Systems. Definitive diagnosis is “observation” should be written on the paper.

If the patient does not come from the outpatient clinic or the emergency department, the doctor fills in the patient's anamnesis. Appropriate determines the patient care plan. Accordingly, by filling in the patient sign, the patient can be told internally or externally.

All medicines and measures to be given, used and applied, as well as daily food items are written. The doctor informs the patient/relative about the treatment to be applied, according to the treatment type. Obtains "Informed Consent".

During the clinical process, the patient's drugs are requested from the hospital pharmacy and these drugs and other consumables are charged to the system.

In addition to providing nursing services to the patient during the clinical process, the following available in services.

- \* Laboratory and radiology clinical procedures

- \*If the patient needs blood, blood bank procedures

- \*Consultation procedures if necessary

- \*If the patient is to be operated on, the surgical procedures

- \*If the patient was admitted to the clinic for delivery, delivery room procedures

- \*Intensive care procedures, if necessary, according to the patient's health status

At the end of the clinical process, the patient may die, in this case, ex procedures are performed. Clinical process When it is completed, the patient is discharged and the process is terminated.

The following functions should be present in the system of hospitalization procedures.

1. Procedures related to admission from outpatient clinic, emergency room or delivery room to all services should be realizable.
2. Companion procedures should be possible. Companion fees, the patient's financial should be automatically reflected in their records.
3. All procedures related to the hospitalization of the patient (Patient information, hospitalization confirmation information, etc.) should be realizable.
4. Fee differences according to the characteristics of the patient bed should be automatically recorded in the records.
5. Bed assignment by selecting from the list of empty beds in the bed assignment process should be carried out.
6. Beds must be reserved for a future date.
7. The admission form should be produced electronically.
8. Hospitalization approval forms should be produced electronically.

9. When the patient is admitted, the hospitalizing doctor, preliminary diagnosis and discharge time should be seen.
10. Reports from clinical records daily, weekly, monthly and between desired date periods should be taken.
11. The hospitalization record of the patients should be confirmed.
12. Preparing the reports that should be given to the patient and written to the relevant referral unit should provide.
13. Daily, weekly, monthly reports according to the criteria requested from inpatient records should be available.
14. Information about the patient's health progress, drug dosage information, surgery information, etc. when needed should be reported.
15. Appointment requests should be made for the operating room and further examination.
16. According to the services provided to the patients in the clinic, the patients were given partial questioning criteria Viewing and/or reporting the file and all kinds of services applied should be provided.
17. All medical requests for inpatients in the clinic should be viewed and/or should be reported.

18. Outpatient information and previous hospitalization information of inpatients should be accessed as desired.

19. Patient information as user-designed for study sample and other requirements label must be printed.

20. In physician requests; standard physician request packages, tailored to the needs of the patient, individualized requests, unrestricted requests, and blank physician request forms and their Physician prompt menus should be created to enable access. Standard physician request packages Easy access should be provided with the help of a button.

21. It should be ensured that all items in the physician's request go to the relevant sections automatically.

22. Cancellation and renewal of physician orders should be ensured only by authorized persons.

23. Automatic work list for nurse's work following the physician's orders should be created.

24. The previous physician orders of the patient should be followed retrospectively on the basis of time and date.

25. Prospective physician prompt for patient at user defined times should be provided.

26. Physician orders that need to be signed within 24 hours (narcotic and psychotropic orders, A warning tracking system should be established for
27. Automatic stop should be provided for some medication orders.
28. Based on user-defined criteria, clinical priorities (urgent, priority, routine) should be allowed to be determined.
29. Making an appointment for examinations that require appointment and preliminary preparation and preparing the examination for the patient should be able to report information.
30. Operations to be applied, material list to be used, standard consumables list are easy must be made accessible.
31. The physician should be provided with the opportunity to write epicrisis and surgery notes and this should be done after the physician's approval. reports should be included in the system.
32. A consultation request should be made for the patient and the consultation status should be monitored.
33. Repetitive procedures or treatments to prevent duplication of services/materials provided warning should be provided.
34. The patient should automatically create a physician request as soon as he/she lies down.

35. Access to the preliminary and final diagnosis of the patient should be provided.
36. Comparison of the patient's hospitalization day and the planned hospitalization time should be done.
37. The status of the patient's room (full, empty, clean/ready, etc.) should be monitored from the system.
38. This module should be able to use Disease codes (ICD-10).
39. With the cancellation of the procedure or the physician's request in line with the authorized persons, the patient's bill Cancellation should be done automatically.
40. Provide message facility between departments or individuals as defined.
41. It should provide a preliminary and re-evaluation (anamnesis) of the patient by the doctor.
42. Patient overnight should be billed automatically.
43. Midnight (daily) inpatient occupancy rates, real time overnight stay and occupancy should make the projection.
44. The patient room must be reserved in advance.
45. It should be possible to keep the patient room on the floor while the patient is in the intensive care unit.

46. The doctor of the patient whose hospitalization is requested should be questioned; registered or authorized, Hospitalization requests made by the doctor who is not available should not be carried out.

47. By which user the records are entered should be followed as year/month/day/hour.

48. In addition to the examination and treatment units of inpatient lists, room maintenance/cleaning officers should be seen by dieticians.

49. Transfer information of the patient from one service to another should be carried out electronically.

50. The system must generate inpatient armband identification information.

51. The duty orders of the transport personnel who will serve (transfer, etc.) outpatients and inpatients, should be created and monitored.

52. It should ensure the transition of the outpatient or emergency patient to inpatient status.

53. It should be ensured that the information that the patient room is ready is notified to the relevant departments.

54. It should be monitored by which doctor the requests made for the patient were made.

55. The system can treat isolated patients and private patients as needed (with an additional nickname to the code number or also by number).

56. The system should be able to give the necessary warnings to the user by keeping a record of the patients' allowed exits.

57. After all reports (such as surgery or epicrisis note) are approved by the doctor then it should be in the system. No one other than the approver changes the approved report. should not. If changes are made within the scope of authorization, the log of this change will be on my site. should be kept.

58. The patient list of the department should be displayed active and the patient lists of other departments should be inactive, should be viewable.

59. When information about the patient's health progress, drug dosage information and surgery information is required from the printers.

60. Appointment requests must be made for the operating room.

61. Patients in the clinic were given partial questioning criteria according to the services provided.

It should be ensured that the file and all kinds of services applied are displayed.

62. All medical requests for inpatients in the clinic should be viewed at any time.

63. All services (overnight, meal, etc.) received by the patient's attendants are monitored and automated from the system, should be written to the patient's account.

### 8.1.3.2. Operating Room Operations

The place where a patient is operated is called the operating room.

155 Operating Rooms management, keeping them always ready for service, providing tools and materials, maintenance, repair notifying the relevant persons to determine their needs, and informing the personnel working there General surgery specialist is responsible for the management and training of He is directly responsible to the head doctor (130,131)

The diagram below describes the operating room process operating in a hospital, The doctor decides on surgery according to the patient's medical course. What date, what time for this, He decides with which team he will do the surgery and makes his planning in the system. Before the operation, the patient or his relatives are informed and the informed consent of the patient is obtained. As a result of the information, the patient may not want to have surgery, in this case, the surgical procedures not performed.

If the decision for surgery is made, anesthesia procedures are performed in case of general anesthesia is performed. Pre-operative post-op. Nursing services are provided and surgery is performed. The following procedures can be performed after the surgery. If general anesthesia is applied to the patient, the patient is taken to the

\*recovery room after the operation. According to the result of the surgery, the patient can continue his treatment in the intensive care unit.

\*As a result of the operation, the patient may die.

If the above conditions do not occur after the operation, the patient is taken to the service and treatment is continued with nursing services. The operating room system should have the following functions /

1. The surgery appointment request made from any terminal in the system should be recorded and the appointment should be made. approval should be able to be viewed in this module by the person who requests it.

2. It is designed to be used in the delivery room, anesthesia units and recovery rooms, information regarding the operating room log should be kept. Who participated in the surgery (surgeon, anesthetist, nurse, technician, etc.) information should also be recorded.

3. The procedures performed in the operating room, as in the clinic and outpatient clinic modules, file/invoice should be processed. Services and materials used, entry/exit/stock/request operations must be done.
4. It should be ensured that the appointment requests of the operating rooms are displayed and arranged.
5. It should be ensured that the detailed surgery fee is automatically transferred to the patient's financial invoices.
6. Work schedule of operating room rooms, anesthesia, nurses and support staff should create. It should be possible to create a duty schedule of the personnel.
7. The operator performing the surgery should be able to save the surgery by selecting it from the coded list.
8. The materials used in the surgery should be selected from the list and added to the patient services.
9. Provide monitoring of operating room equipment.
10. Inquiries according to disease codes, groups or user-defined fields should do. The patient should be followed up before, during and after anesthesia.
11. Applied processes, materials, sets and package lists should be displayed.

12. The times of the patient entering and exiting the operating room should be monitored, postponement and It should be possible to record and query waiting times.

13. Anesthesia type, department or defined criteria should create an operation list.

### 8.1.3.2.1. Anesthesia Procedures

The following diagram describes the anesthesia process operating in a hospital. Anesthesiologist is informed about the decision of surgery. Anesthesiologist examining patient After the operation, they can request a test or consultation before the surgery.

According to the results of the examination or examination, the anesthesiologist is appropriate to perform the surgery.

may not find it. In this case, the surgical procedures are cancelled. Anesthesiologist performing surgery If there is no inconvenience in the patient's health, surgery is performed. The following functions should be in the system of anesthesia procedures.

1. Anesthesia requests made from different units are followed up by the anesthesiologists from the system. should be possible.
2. The anesthesiologist should record all the procedures performed on the patient and the result of the anesthesia in the system.

3. The procedures performed by the anesthesiologist should be controlled by the primary doctor.

#### 8.1.3.2.2. Wake Up Rooms

Awakening of patients after surgery before transfer to the service and short-term surgery, They are inpatient care units where they stay for a maximum of 24 hours for the correction of complications.

Here, nurses and nurses will be able to serve 24 hours a day with sufficient devices and materials .necessary personnel are available. Anesthesiology from the unit's management and medical care services specialist, or the general surgeon, who is in charge of the operating room, is responsible. This responsible is required, In such cases, it cooperates with the specialist performing the surgery. This service is provided if the personnel, tools, equipment and physical structure of the institution do not allow. carried out in conjunction with the intensive care unit (132).

#### 8.1.3.3. Intensive Care Procedures

Places where intensive care and reanimation services are provided; with medical and nursing services under constant observation and control in terms of other technical, health and laboratory services. inpatient care, where life-threatening patients who need to be cared for are units. Here, devices that will

monitor vital functions and support them when necessary are kept. The work of the nurse and other necessary personnel will be on duty for 24 hours. arranged in such a way.

From the regular execution of services in intensive care, that intensive care

The clinic and a specialist of this clinic are responsible for its function. If in intensive care, If there are beds belonging to the clinics, then one or more specialists to be chosen by the head doctor assigned here. These are the follow-up and follow-up of the patients together with the relevant branch specialist when necessary they do the treatment.

The following diagram describes the intensive care process operating in a hospital. The patient; after the surgery, as a result of coming from the emergency or outpatient clinic, Intensive care treatment may be required.

In this case, a treatment plan is created by the primary doctor of the patient and nursing services are provided. The following services can be provided to the patient receiving intensive care treatment.

- \*Laboratory and radiology clinical procedures

- \*If the patient needs blood, blood bank procedures

- \*Consultation procedures if necessary

- \*If the patient will be operated on, the surgical procedures

Intensive care treatment is terminated according to the patient's health status and clinical treatment continues. or the patient will die after the intensive care service. The following functions of intensive care operations should be in the system.

1. Information about the patient's health progress, drug dosage information, surgery information, etc. when needed should be reported.
2. Appointment requests should be made for the operating room and further examination.
3. According to the services rendered to the patients in the clinic, partial questioning criteria are given to the patients. Viewing and/or reporting the file and all kinds of services applied should be provided.
4. In physician requests; standard physician request packages, tailored to the needs of the patient individualized requests, unrestricted requests, and blank physician request forms and their Physician prompt menus should be created to enable access. Standard physician request packages Easy access should be provided with the help of a button.
5. Patient information label as user designed for study specimen and other requirements should be printed.

6. It should be ensured that all items in the physician's request go to the relevant sections automatically.
7. Physician requests should be canceled and renewed only by authorized persons.
8. Automatic work list for the nurse's work to be done after the physician's orders are given should be created.
9. The previous physician orders of the patient should be followed retrospectively on the basis of time and date.
10. Prospective physician prompt for patient at user defined times should be provided.
11. Physician orders that need to be signed within 24 hours (narcotic and psychotropic orders) A warning tracking system should be established for
12. Automatic stop should be provided for some medication orders.
13. A consultation request should be made for the patient and the consultation status should be monitored.

#### 8.1.3.4. Delivery Room Operations

The following diagram describes the delivery room process operating in a hospital. If the date of birth is certain, the patient is admitted to the clinic before birth and clinical services are provided.

If it is not planned, the patient comes from the emergency room and direct delivery is performed.

If the date of delivery is certain, delivery room planning is made and patient clinical service is provided, starts to take. Birth may occur before the planned day, in which case the planning is revised.

Nursing and midwife services are provided to the patient before birth. sick for birth. taken to the delivery room. If a normal delivery has occurred, the patient returns to the clinic after delivery and clinical service continues.

\* If normal delivery does not occur, the following services can be provided for the patient.

\* If the patient needs blood during delivery, blood is requested from the blood bank.

\* If examination is required during birth, examination procedures are performed.

\* If surgery is required, the patient is taken from the delivery room to the operating room. Mean while operating room planning is done, anesthesiologist and other health personnel is informed. After the operation, the patient can receive intensive care service, may continue to receive the service or become ex. The system of delivery room operations should have the following functions.

1. The procedures regarding the acceptance of all services from the delivery room must be carried out.
2. Delivery room planning should be possible from the system.
3. The planning of doctors, midwives, nurses and other health personnel who will participate in the birth is excluded from the system. should be done.
4. Access to the patient's medical information regarding the course of health should be provided through the system.

#### 8.1.3.5. Clinical Laboratory Procedures

The system of Clinical Laboratory operations should have the following functions.

1. The examination request process should be performed by physicians or personnel authorized by the physician.
2. The printouts of all the tests requested for the patients should be taken from the system.
3. The examinations entered into the system should be grouped.
4. Audits should be leveled as urgent, priority and routine; system with emergency inspection request color code should be included in it.

5. Rules to be followed by the patient for the examination (for example, the patient is hungry for blood sugar) It should be taken as a print out when the examination request is made.
6. The concerned physician should be able to create their own examination request panels/packages and should be able to update.
7. A special barcode specific to the patient given to the patient and the sample to be studied for laboratory procedures. it must have an access number (or other solution to be developed), its label can be printed, and should be readable.
8. Each laboratory unit should have its own entry screens for test results.
9. It should work in harmony with the devices that can automatically give the test results.
10. Requests that are not reviewed should be recorded and canceled due to non-examination.
11. Repeated request control and warning should be made.
12. Technician, doctor, device based work lists should be created.

### 8.1.3.6. Clinical Radiology Procedures

The system of clinical radiology procedures should have the following functions.

1. Authorized doctors should make radiology requests and the relevant radiology units should make these requests should provide assessments.
2. The patient's social security status, demographic and clinical information from the records in the system should automatically receive (age, gender, institution, requesting physician, etc.) and use it. Equipment, Room and Staff should make appointments and management according to resources.
3. It should be able to warn of repetitive requests. In addition, mistakes are made to be repeated after correcting should be allowed.
4. Additional procedures deemed necessary by the doctor during the procedure (USG during CT needs) should be scheduled and managed.
5. When necessary, an emergency request can be made for emergencies.
6. Working hours for making an appointment, doctor detail information, device detail information, consumables material relations should be defined dynamically on the basis of radiology unit and appointments should be made using this information.

should be based on. The clinical and identity information of the patient in the system is automatically must be viewable; there should be no need for re-definition/data entry in this module.

7. Appointments should be made on the basis of date-time, doctor and device, they can be canceled and, if desired, emergency In such cases, it should be possible to make an instant appointment.

8. Change the system appointment status or cancel the appointment.

should be available to users.

9. Commands and detailed data as a result of appointment processes, if any, can be sent to the PACS system should be transferred.

10. Commands and detailed information that can be generated as a result of any change in appointment information data should be automatically transmitted to the PACS system, if any.

11. Appointment processes should be integrated throughout the system and should not allow double appointments.

12. With the permission of the Radiology Department, specific time periods, specific units or specific applications must be reserved for

13. Due to the characteristics of the patient, different conditions such as isolation requirement, need for anesthesia, transport conditions, If there is a situation that requires application, it should be monitored.

14. In cases where patients need to make preliminary preparations such as bowel cleansing before the procedure, The doctor and the patient should be warned about the preparations and explanations to be made and the necessary prescription must be prepared.

15. The radiology reports for the concluded radiology requests will automatically be sent to the doctor who made the request and reports should be kept integrated into the electronic patient file.

16. If available in the hospital, the patient radiological image available in PACS, resolution should be forwarded to the requesting doctor together with the radiology report and these images should be should be associated with the electronic patient file.

17. Job status, job step, result, performer, device etc. basis should be followed. Examination status follow-up (patient came, the result was obtained, the report was written, etc.) should be followed on a status basis.

### 8.1.3.7. Discharge Procedures

The following diagram describes the discharge process operating in a hospital. The doctor decides to discharge the patient who receives clinical service. sick for it to the signboard; diagnosis, release date, ICD-10 code of the disease, and necessary explanation of discharge author and sign. The floor nurse or secretary informs the patient that the patient will be discharged before noon. forward it to the relevant department.

If the patient is a paid patient, the patient discharge paper is written. All the information given to the patient on the discharge paper medical services are written. This paper is sent to the units serving the patient and is informed that the services are provided.

approval is received. The discharge paper is given to the patient/relative and payment is made. The service provided if the patient received service in the state hospital and was not associated with the revolving fund.

The excess amount is refunded, and the missing amount is collected from the patient. If the patient cannot be dismissed from the revolving fund, the patient or his legal representative, Discharge procedures are carried out by being informed about the content of the invoice.

## Discharge Procedures Process

The system of discharge procedures should have the following functions.

1. A list of patients who were discharged within certain date ranges should be obtained.
2. Patient discharge and discharge procedures and related information should be entered.
3. When the patient leaves the clinic, referral to other institutions should be possible.
4. It should be ensured that all kinds of information about the patient's hospitalization go to the hospitalization and discharge department.
5. The patient's discharge invoice will be timed and the service entries to be made after this moment must be prevented. Cancellation or change of invoice must be done by authorized persons. In such cases, a justification should be written. Records of such transactions are recorded in the system should be kept.

### 8.1.3.8. Ex Transactions

The diagram below describes the ex process operating in a hospital.

Patients who become aggravated in the wards are referred to the service physician or the working hours by the staff. Otherwise, the duty doctor is informed.

If the patient enters agoni, the patient is taken to a separate room from other patients. Even if the orphan is sick, The last request of the patient is determined by the report. Religion that seems possible to do in the isolation room tasks are accomplished. When the patient expires, the cause and time of death are written on the patient's sign. To the dead gas station sent. The funeral is delivered with the signature of the deceased relative. Mernis death certificate is prepared. This terminates the ex process.

## Ex. Transactions Process

The following functions must be present in the system in order to carry out the patient's death procedures.

1. The status of the patient's file should be closed, and the patient's ex status should be recorded in the system.
2. The reason for the patient's death should be recorded in the system by the doctor.
3. In order to take the patient with Ex to the morgue, the relevant health personnel will be informed through the system should be done.
4. Financial transactions of the patient with Ex must be done through the system.

## 8.1.4. Pharmacy Services

Institutional pharmacies work with inpatients in accordance with laws, regulations, regulations and orders. These are the places where drugs and sanitary materials are provided to patients who need to be given medication without being hospitalized.

The pharmacy system should have the following functions.

1. It is the function that includes patient drug requests coming to the pharmacy. Software module, barcode support the application.
2. Viewing the drug requests prepared by the doctors and scanning on these requests should provide the opportunity to do so. System; approved standard physician orders, canceled orders, amended orders, discharge orders, and prescriptions that are not on the updated drug list. monitor the prescribed drugs.
3. During the physician request period; drugs and their doses, the use of which has been discontinued on a patient basis and postponed drugs, changed drugs, start and end times of current physician orders, should be able to monitor the patient's allergies.
4. He/she should follow up the drugs specific to the departments.
5. The system should have a drug dose calculation infrastructure.

6. The system will automatically alert when there is any interference at the defined levels should do.
7. Flexibility to ignore some interactions depending on the user's security and authorization level should be.
8. The system should generate reports of drug interactions.
9. The system should display each patient's drug therapy profile when requested.
10. An updated drug list should be created on the basis of formulary, generic and traditional names, and should be displayed.
11. The drug list should be supported by existing drug use guidelines.
12. The system should automatically update the price.
13. The system should produce the drug records applied to the patients in the desired time frame and classification.
14. Must be able to transfer recurrent drug administrations to the invoice per procedure.
15. The system daily; all verified and unconfirmed physician orders, all drug treatment record the list of discontinued requests and missed or missed doses and their reasons, and should provide reporting.
16. The system should produce the drug usage information document during the discharge process for the inpatient floors.

17. Medicines used, diagnoses, drug classifications, doctor names and branches reports must be made.

18. The system should display the drugs used by inpatients during the outpatient clinic.

19. Displaying the drug prescription given during the discharge procedures in the system should be provided.

20. Labels should be produced in the desired scope for drugs; patient name surname, department-room-bed, patient The protocol number, drug name, dose amount, drug form, the person requesting the drug and the date and time should be specified.

21. The system should display the person who ordered the medication and the department.

22. The system should display discontinued or canceled drugs.

23. When the patient is transferred to another department, the previous planned drugs and administration times should transfer.

24. System, intravenous (IV) admixtures, pediatric drug administrations, Total Parenteral Nutrition (TPN) within the scope of drug applications should produce solutions.

25. Controlled Drugs; tracking and monitoring of all controlled drugs,

copies of evidence for doses, legal copy forms, all authorized should make a list of doctors.

26. The return of the stopped and changed medicines to the pharmacy and the payment of the patient's bill. should be adjusted accordingly.

27. It should perform automatic deduction of the issued drugs and materials from the stock.

28. A material distribution document should be issued for the dispensed drugs.

29. drug delivery; within the scope of unit dose, floor stock medicines, wasted/wasted medicine and emergency medicine should perform.

30. For chemotherapy requests; defined standard order packages, dose calculation and patient must do the invoicing.

31. A unit charge for each billing for drug forms to be used for more than one patient should do.

32. It should classify and list the drugs that are not available in the pharmacy and that are outsourced.

33. Produce reports in defined formats for ineffective treatment or incorrect drug treatments.

34. It should produce a report in the format created for allergic reactions and drug side effects Doctor should report the most frequently used drugs by scanning their orders and prescriptions.

35. Listings from pharmacy records daily, weekly, monthly and between desired date periods should be taken.

36. Drugs used by inpatients; whatever the dose or amount of tablet, ampoule, box, etc.) automatically to the financial records of the relevant patient in the computer environment. should be processed.

#### 8.1.4.1. Pharmacy Warehouse Control Transactions

Displaying the amount, prices and expiration dates of drugs and materials in pharmacy stocks is the function to do.

1. Pharmaceutical minimum stock level indicators should be defined and minimum stock level controls should be made should do.

2. Controls and warnings regarding expiration dates of drugs should be carried out.

3. Warehouse for drug items that are distributed and returned based on predetermined parameters stocks should be updated automatically.

4. A search should be made on the drugs registered in the stock according to the query criteria.

5. The warehouse should list the stock drugs as defined (tablet, dose, box, ampoule, etc.).
6. Track and list expired, broken, or spoiled drugs.
7. It should monitor the storage shelf life of drugs.
8. Stock control transactions should be able to be done with barcodes.

#### 8.1.4.1.1. Ordering Medication

It is the function that performs the drug request from the relevant unit. Ordered medicine It should have the ability to show requests and search on requests.

1. Companies that buy drugs should be able to be tracked.
2. It should create a list of approved companies for purchasing and evaluate it periodically.
3. It should automatically provide a purchase request based on the minimum stock levels determined.

#### 8.1.4.1.2. Majistral Drug Loading

It is the function that enables the production of magistral drugs.

1. A magistral drug catalog should be created.

2. Formula definition should be made for each magistral drug.
3. Stock and price follow-up of the magistral drugs created should be done.

#### 8.1.4.1.3. Prescription Processes

1. Prescribing should be under the authority of the doctor.
2. It should support equivalent drug applications.
3. It should be possible to view prescriptions and search for prescriptions.
4. It should produce the prescriptions of outpatients in computer environment and print it out to the patient should be provided.
5. The inpatient should suggest a substitute medicine from the pharmacy stock while prescribing.
6. It is possible to transfer standard drug names to the prescription page by selecting them from the coded list should be.
7. Information about the use of drugs is also selected from standard codes and lists. should be carried out.
8. It should search and show old recipes according to the desired search criteria.
9. This module allows the pharmacy to serve in more than one location (different buildings of the hospital, etc.) should support.

10. It should be possible to obtain various statistics regarding the transactions made in the pharmacy and the records kept, queries should be able to be answered and reports should be able to be printed.

### 8.1.5. Emergency Service Operations

emergencies; In the event of a sudden illness, accident, injury or similar

In the first 24 hours after the patient's arrival, medical attention should be given immediately. life and/or health in case of no intervention or transfer to another health institution. These are situations where the risk of loss of integrity is accepted. Therefore, the health services are considered as emergency health services(132) , emergency services; Sufficient health and assistance to ensure continuity of service health personnel, vital tools, equipment and institutions that do not have a pharmacist on duty, These are the services that contain the necessary medicines (133), emergency services; emergency polyclinic or emergency service, if they are not available, doctors on call and these services are carried out uninterruptedly for 24 hours.

### 8.1.6. Blood Bank Transactions

The blood bank provides the necessary blood components to the patients, to determine the availability, to prepare, store and distribute blood products established unit. By optimizing the internal processes of the unit with blood bank information systems, process-role-source providing efficiency in the triangle, reducing the workload of the working personnel, laboratory minimizing the rate of personal error with the help of decision support systems, national and international making data distribution possible with the use of international standards, intended to be brought under control (133).

1. Requests for blood and/or blood products from any terminal in the system, It must be visible to the Blood Center employee, where it is performed by
2. Donor and source information of blood and blood products obtained from various sources should be able to enter the system.
3. The results of the tests and other examinations should be recorded, these results should be can be viewed from the services.
4. The blood coming out of the center should be followed up in the hospital.
5. Automation needed to prioritize requests from the emergency room and operating room warning must be provided.
6. Blood products should be monitored in terms of term and blood groups.

7. Cross match follow-up should be done.
8. It should warn when there is incompatibility between the patient's records and the planned blood group.
9. Various statistics can be obtained regarding the examinations and records kept at the Blood Center, should be able to be answered, queries should be able to be answered and reports should be able to be printed.

### 8.1.7. Hemodialysis Procedures

hemodialysis; fluid and solute content of the blood taken from the patient through a membrane and It is the process of rearranging it with the help of a machine and giving it back to the patient. HD principles it is simple. As blood flows from one side of a semi-permeable membrane; osmotic in water by the other As a result, the dialysis fluid containing balanced electrolytes and glucose flows. hemodialysis process For this to happen, adequate blood flow must be ensured and a machine must be used with a membrane.

The pores of the semipermeable membrane absorb water molecules and small molecular weight solutes. larger solutes such as proteins and blood cells remain in the blood. The solute passes through the membrane by diffusion or ultrafiltration.

across the membrane The net passage rates of solutes are related to the magnitude of the concentration gradient between blood and dialysate.

Depends on the direction, the gradient is greatest at this transition. maximum during HD, Blood and dialysis fluid flow in opposite directions to maintain a concentration gradient. Membrane diffusion rate of molecules across its molecular weight and diffusion versus membrane

This ratio also depends on the resistance of the membrane, increasing the molecular weight and increasing the membrane resistance.

decreases. The major components of the HD system are the blood circulation and the dialysate circulation.

Blood is pumped from the patient through the arterial segment to the dialyzer by a vascular cannula and then returns to the venous segment from the dialyzer to the patient. Heparin anticoagulation extracorporeal blood

It is essential to prevent coagulation in the circulation (134)

## 8.1.8. Business Transactions

Nursing; To protect, raise, develop and improve the health of the individual, family and society services for the purpose of healing in case of illness; planning, organizing, implementing,

Responsible for the evaluation and training of people who will perform these services, science and It is a health discipline consisting of art. (162,163)

The following functions should be performed in the system of Nursing Operations.

1. The system includes the tools, equipment, personnel and time required by each nursing intervention should be able to define.
2. Nursing interventions/applications with the module with the physician request should be associated. Thus, in addition to independent nursing practices, it is dependent on the physician's request. Nursing care practices (for example, medication, intravenous fluid therapy, etc.) should be fulfilled. The integrity and continuity of care must be maintained.
3. Nursing interventions/practices should be associated with the Pharmacy Module. Nurse physician effects and side effects of drugs, drug-drug interactions, age, breed, body weight etc. automatic drug dose and liquid amount calculations according to the features should be accessible.
4. Nursing interventions department electronically records the patient's vital signs. must be associated with environments (eg monitor).
5. Linking the system nursing care plan with daily nurse observation notes. should provide.

6. For the protection of confidentiality during the use of the system and the identity of the user / nurse,

Each nurse has a user code in order to identify the working time and the service she provides, should be. Thus, each nurse's working time and service, thus performance, must be objectively identifiable.

7. The nurse observation format for which the handover note will be written should be reached.

8. The nurse should have the opportunity to record the patient's activities of daily living.

9. Nursing interventions should be listed.

10. The nurse should be able to make the patient's discharge plans.

11. The educational needs of the patient should be evaluated.

12. Patient education document should be able to be printed.

13. Records regarding the follow-up of vital signs should be kept.

14. The patient's pain scale and pain assessment should be possible.

15. Access to previous diagnoses and treatments of the patient and other nursing information at readmission should be provided.

16. Classified diagnosis and screening, work list-appointment access and special examination preparation

It should be able to be viewed together with the 17th document and necessary printouts should be taken.

18. Drug dose calculation/age group/gender/weight/body surface should be displayed together.

19. Drug interaction lists should be displayed.

20. Automatic material demand when floor material stock decreases to determined minimum levels form should be created.

21. It should be monitored from the system that the patient's room is ready and clean.

22. The deviations between the standard shift nurse numbers and the actual ones should be displayed.

23. The nurse should create a worklist and list the departments, dates and shift/work list. Integration with the human resources department should be ensured.

24. Nurses should be provided to create their own work lists.

## 8.1.9. Administrative Procedures

### 8.1.9.1. staff management

Personnel management aims to achieve business objectives in the most efficient and economical way. obtaining the personnel who will provide pay fair and satisfactory wages to training and development personnel, their physical and mental health, by integrating the personal and business purposes of the personnel, these issues with the aim of providing job satisfaction in the personnel and benefiting from it in the most effective way. It is the planning, organization, command and control of activities aimed at (135), The personnel management system should have the following functions.

1. All information about the hospital staff is kept and the officer and contracted (revolving funds, etc.) Identity, registry, permission and personal information of the personnel should be kept. These records are from the Ministry of Health. It should be compatible with the records kept in the General Directorate of Personnel.
2. Statistics on personnel registry information and transactions should be obtained, queries can be answered and reports can be printed.
3. Appointment, promotion, penalty, leave, report, seizure etc. transactions can be made and relevant records should be kept, Temporary It should be possible to follow up the personnel on duty.

4. Personnel attendance tracking, reading personnel identification cards (proximity or barcode) integrated with this, by determining (verify) the different biometric characteristics of the personnel, can be done with biometric devices. Continuation follow-up procedures determined in this way, examination by authorized administrators in detail from the evaluation and statistics module. should be examined. The administration makes the necessary arrangements to ensure inter-system integration will do.

5. Must view the working time of the personnel and make data entries.

6. Integration of shift information into payroll and reporting processes should be possible.

7. Overtime hours should be entered, reported and transferred to the payroll when necessary.

8. Annual leave and/or report should be entered, reported and transferred to the payroll.

9. Payslip, additional difference slip, overtime payslip, etc. on staff wages

All payrolls must be prepared.

10. Pension Fund and SSK deductions, Deductions from Finance, etc. transactions should be made.

11. Distribution of shares from the Revolving Fund to the personnel in accordance with the laws, regulations and directives operations must be done.
12. Report printouts related to all these transactions should be available.
13. All payments and deductions must be calculated.
14. Seniority and notice payroll should be issued.
15. If deemed necessary, it should prepare all kinds of legal reports.
16. Calculate and report Special Expense Deduction.
17. Per diem should be calculated and reported.
18. Must prepare payroll reports.
19. The bank should prepare the remittance file.
20. Changing tax, SKK Premium, base rate and parameters should be defined and the parameters should be defined every month should be modified as changeable.
21. Collective wage increase or adjustment should be made.
22. When necessary, it should make a difference payroll.

#### 8.1.10. Purchasing (State Hospital)

The following diagram describes the purchasing process operating in a government hospital. Tender and pre-qualification documents are given. Tender and pre-qualification document free of charge at the administration

visible. However, the bidders who want to participate in the pre-qualification or tender can purchase this document. are required to take. The cost of the document will not exceed the cost of preparation and determined by the administrations in a way that does not prevent them. If the change in the tender document is not made as a result of the detection of technical errors and deficiencies, The reason for the change and the obligations are determined in the minutes. The advertisement is deemed invalid and the job is announced again. If the change was made as a result of the detection of technical errors and deficiencies, The change information is notified in writing by the bidders and an addendum is sent. Addendum as a result of the change, If time is needed, the tender date is postponed and the process is terminated. If there is no need for additional time, offers are prepared and submitted. Offer letter and bid bond All documents required as a condition to participate in the tender, including the tender, are put in an envelope.

On the envelope, the name, surname or commercial title of the bidder, full address for notification, The full address of the contracting authority that the job belongs to and that made the tender is written. The place where the envelope is pasted by the bidder signed and sealed. If it is necessary to extend the validity period of the offers made, the tender offer will be valid.

If there is no extension in the bid period, the bid bond is paid. In tenders, the offer

In consultancy service tenders, not less than 2% of the price paid, not more than 4% temporary, in the amount to be given by the bidder, not less than 2% of the bid price collateral is received.

Bids are given to the administration until the deadline specified in the tender document. Tender A minute is determined by the commission of the number of bids given at the time specified in the tender document. It is announced to those present and the tender begins immediately.

At the start of the tender, the bids are evaluated by the commission. of the tender commission benefit from the examination, comparison and evaluation of the proposals, upon the request of the administration. may ask the bidders to explain their bids in writing regarding unclear matters. However, this explanation does not mean that any change in the bid price or included in the tender document.

It is not requested or made in order to make the offers that do not comply with the terms and conditions. If there is a missing or improper document that will change the basis of the offer offers are not considered. If the documents are in accordance with the procedure, in the annex tables of the offer letter.

Check for arithmetic errors. Arithmetic errors are res' corrected by the tender commission corrected and notified to the bidder. If the bidder does not accept the bid, the bids are excluded from the evaluation.

If there are excessively low bids in the bids, a detailed letter is requested from the bidders. Explanation, If the texts are not sufficient, the bids are rejected.

As a result of the controls, if the bids are suitable for the tender, the tender is decided. This decision submitted to the approval of the tender authority. If the tender authority does not approve the decision, the tender is canceled and the process is terminated.

If the tender is approved, the contract is signed by the two most advantageous bidders and the bid bond is returned makes. If the bidders do not sign the contract, the bid bond is recorded as income and the process is terminated, If the contract is signed, the tender is contracted. The result of the tender is announced. accrual and accounting operations are carried out. Thus, the process is terminated.

### 8.1.11. Purchasing (Private Hospital)

The following diagram describes the purchasing process operating in a private hospital. Different unit managers or employees within the hospital request to purchase. medical or non-medical materials can be found by following the stock from the system. can be requested. For this, the purchase form is filled and this form is sent to the purchasing manager/responsible. submitted for approval. If the purchasing officer/manager does not approve, the requests are revised. If the

purchasing manager/responsible gives approval, whether the defined material in the stock will be taken or not. Is controlled. If the defined material is not in stock, the request is approved by the purchasing officer. or revised. Market research for new material to be purchased by the purchasing officer makes. If the material is to be purchased continuously/wholesale, a supplier contract can be made. Purchasing manager price offers are received by the company and these offers are submitted to the approval of the purchasing manager. When the offer is approved, the purchasing officer fills the purchase order form. Order forms are forwarded to the determined company via fax or e-mail. One of the purchase form sent to the warehouse, one filed in the purchasing unit. If the supplier company does not comply with the material supply time, the material order can be canceled. This In this case, the purchasing officer cancels the order form and the process is terminated.

If the supplier company does not comply with the material supply time, the material order can be canceled. This In this case, the purchasing officer cancels the order form and the process is terminated. If the supplier complies with the material supply period, the supplier sends the product with the delivery note. sends it to the hospital. If the requested product and its quantity are not the same as the incoming

product and its quantity, the material is returned. can be sent. Likewise, if the material price in the order form and the invoice price are not the same, The invoice is returned to the supplier for correction. If the material will not be taken to the warehouse without invoice The material is sent back and the lead time is determined. If the decision to take the material to the warehouse is made, the invoices are sent to the accounting. Accounting invoice-product delivery receipt-purchase form is compared by the responsible person. agreed maturity The payment is made to the company on the date and the process is terminated.

The following functions should be in the system of purchasing transactions.

1. Registry Numbers applied for fixtures comply with the standards determined by the Codes should be given as
2. Transfer transactions between warehouses should be possible.
3. Vehicle information belonging to the institution should be kept.
4. Fixtures and embezzlements should be tracked on the basis of institution, unit, person and material.
5. A "Durable Immovable List" should be created for fixtures to the Common Area.
6. Monthly Consumables Exit Notification List should be available.

7. Stock and/or consumable requests on the basis of departments are sent to the purchasing department electronically should be transmitted in the environment.
8. Price comparison of stock and/or consumables, comparison with past prices, equivalents Comparisons should be made with the prices quoted (comparison sheets).
9. Purchasing of the stock and consumables requested together with the comparison charts Standard form output should be produced in order to get approval.
10. The lists of suppliers on the basis of stock and/or consumables contain the latest purchase prices and conditions A list should be created.
11. Transferring the approved stock and/or consumable requests to the order and sending them to the company order should be printed out.
12. Automatic order list for stock and/or consumables at critical stock level should be prepared
13. Inventory and/or consumable entries must be made in agreement with the order list.
14. Demand reports for stock and/or consumables should be obtained on a departmental basis.

15. Information on the type of supply in stock and/or consumables should be tracked separately.
16. Identity information should be kept for each stock and/or consumable used.
17. Records of which stocks and/or consumables are produced by which companies, and Identity information about companies should be kept.
18. Quality information, on the basis of both stock and/or consumables and the company from which the material is purchased should be kept.
19. In the system, current annual/monthly stock and/or consumable consumption and possible consumption increases Inventory and/or consumable demand forecasts should be made taking this into account.
20. The module should ensure that warehouses and warehouses serve in integrity.
21. Total requests should be shown according to stock and/or consumable groups.
22. Firms/firms and pharmacies to be ordered must be added or removed from the coded list.
23. All stock and/or consumables should be displayed and search queries should be made.
24. For each stock and/or consumable; stock number, full name, shelf life if any, storage if any conditions, quantity, unit (piece, kilo, liter, package), input/output

(consumable) information, the company where it is produced, its production The manufacturer's quality certificate must be shown.

25. Regarding stock control information; maximum stock level, critical stock level, safe stock Records should be kept, such as level, estimated lead time, etc.

26. The distribution of the incoming material to the departments should be recorded.

27. Price entry and cost calculations should be made for each lot of stock and/or consumables.

28. Input and output of stock and/or consumables should be provided via barcode reader.

29. Expiry date controls and warnings of drugs and medical materials should be provided.

30. Alternative inventory costs should be established. (such as o.m. fifo, lifo) Use of stocks and materials frequency should be reported.

31. The state should be able to fulfill the requirements of the goods system.

32. Stocks should be grouped, the same material should be based on more than one unit (Package, unit, kilo, etc.)should be traceable.

33. Warehouse/warehouse definitions should be possible.

34. Services, operating room intensive care, emergency service, etc. medical supplies warehouses Medical consumables should be able to be issued according to the requests made for material outputs are automatically transferred to the patient's electronic financial records from these units. should be processed. These units should also be included in the system as intermediate storage, causing losses and leaks. It must be arranged in such a way that there is no should be questioned.

35. The warehouses in the services should be able to be monitored. Current annual/monthly material consumption of the system and possible. It should be possible to create material demand forecasts taking into account the consumption increases.

36. This module should support serving warehouses and warehouses from multiple locations. Inventory breakdown (monthly, annually) should be possible.

37. Various statistics regarding the records kept and the transactions made should be available, queries can be answered and reports can be printed. A complete list of statistics, queries and reports, and details will be determined during the System and Adaptation Requirements Analysis phase.

## 9. CONCLUSION

In this thesis study; The historical development process of the concept of management and hospital management effects, especially the importance of Management Information System for hospitals and process-based Management Information, The main functions that should be in the system are examined.

Health services are getting more complex day by day, and every year,

The amount of medical data stored is increasing rapidly. Retrieving, using and retrieving this data processing becomes more and more difficult on the one hand, and on the other hand, this requirement becomes more and more is gaining importance. As a result of this, hospitals have medical, administrative and financial Effective use of management information systems in all interrelated business processes required.

For this, the business needs of each unit should be analyzed accurately and in detail, processes should be extracted and their business and function requirements should be revealed. According to this The technical architecture of the system to be built should be created, the determined by all medical and administrative staff.

Organization/hospital structure should be shaped with strategic goals and system analysis, All functions of the hospital should be redesigned with the support

of information technologies, management information systems should be developed.

Management Information Systems; how to select the necessary information for businesses/hospitals, responding to how to save and nurture managers to make effective decisions, are integrated systems. When we look at the medical dimension, the use of Management Information Systems, Even in different locations, both the patient and his doctor can access the patient's medical information. so that you can quickly access the diagnosis and treatment service process in an accurate and fast manner. We see it working. On the other hand, Management Information Systems are the management / administrative systems of hospitals, service level. Belonging to all medical and administrative business processes with Management Information Systems.

Reports can be obtained on a weekly, monthly or annual basis. Thus, quickly and accurately the decision will increase the quality of service to be provided; hospital efficiency and costs provides a reduction.

As a result, those who want to transform their knowledge into corporate efficiency, It is an inevitable necessity for organizations/hospitals to adopt a knowledge management approach, For this reason, organizations/hospitals entering the restructuring process should primarily management should be accepted by the

managers of the institution and should ensure the knowledge management of all employees. should be made to act according to the principles laid down by them.

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