Hospital Information System Coordination

HISC

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Message from the chairman

It is vividly evident that the world witnessed the worst public health and economic crisis due to COVID-19 pandemic. This inevitably mobilized the international community to act seriously and swiftly. However, the mortalities and morbidities induced by healthcare-acquired infections (HAI) are equally fatal, but the international community did not act similarly. Consequently, we are continuously and chronically suffering from HAI.

The current intervention for HAI is merely based on passively-set standards and enforcing these standards via regulatory agencies such as the centre for disease control and prevention (CDC), joint commission international (JCI), ministries of health, and other regulatory agencies. To efficiently address HAI, we inevitably need to mobilize the international community because HAI traverses a multitude of epistemological dimensions, requiring multidisciplinary tacit knowledge, and mandates active international collaboration. Besides, we believe that we can efficiently traverse deeply into the root-causes and solution landscapes by automating the entire healthcare environmental services and infection control within healthcare institutions using the latest advancements in computational epistemology, computational infection control models, computational epidemiological models, artificial intelligence, machine learning, distributed ledger technology, collective intelligence, cognitive technologies, internet of things, ubiquitous technologies, intelligent micro-measurement frameworks, artificial life, evidence-based program implementation, patient-centric care, strategy anchored execution, and symbiotic healthcare ecosystem services. Consequently, we developed these open standards that were tailored from diverse international standards to promote the automation of healthcare environmental services and infection control processes and best practices.

The Healthcare Environmental Services Operational Map (HESOM) and other standards were developed to efficiently leverage multidisciplinary experts and practitioners to contribute towards the eradication of HAI-induced mortalities and morbidities. Using ReXcels research and innovation environment, we cultivate collective intelligence by bringing together these multidisciplinary experts to iteratively develop these standards and adaptively support the innovation of computational technology that automates the execution and enforcement of these standards. As such, we cordially invite you to use these documents and participate actively in the further development of these standards to significantly reduce HAI-induced mortalities, morbidities, and their enormous negative economic externalities.

Hamid Adem
Interim Chairman, and Chief R&D Officer

Change Control

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Purpose

1. PURPOSE

The purpose of this document is to establish Hospital Information System Coordination process that would:

- Efficiently coordination all the hospital activities
- Remove any mis-coordination that can affect the overall performance of the process.
- Lead to quality of service and hence to patient satisfaction

This process is based on international well acclaimed standards like:

- *NHS- National Health Services Standard*
- *OSHA- Occupational Safety and Health Administration standard*
- *CDC- Centers for Disease Control and Prevention standard*
- *Lean six sigma- Quality Standard*
- *JCI- Journal of Clinical Investigation standard*
- *JCAHO- Joint Commission on Accreditation of Healthcare Organizations (JCAHO)*
- *EPA- US Environmental Protection Agency*
- *HCAHPS - Hospital Consumer Assessment of Healthcare Providers and Systems*
- *HIPA- Health Information Privacy Act standard.*

*P.S: This process is a derivation from **ESM (Environmental Service Map),** which is a holistic and a comprehensive model for Environmental Services Management.*

Structure of the Document

2. STRUCTURE OF THE DOCUMENT

The Hospital Information System Coordination process document comprises the following chapters:

Chapter–3: _Scope_: This chapter describes the scope of the document and the Hospital Information System Coordination process.

Chapter–4: _General Assumptions_: This chapter describes the underlined assumptions made for both the document and Hospital Information System Coordination process.

Chapter–5: _Hospital Information System Coordination Framework_**:** This chapter exhibits the interaction of Hospital Information System Coordination process with other related processes and also describes the high level process sequence for Hospital Information System Coordination based on EMS framework.

Chapter–6: _Hospital Information System Coordination Process_**:** In this chapter Hospital Information System Coordination process and sub processes (if any) will be depicted and specified using rigorous BPMN and process specification templates.

Chapter–7: _References_**:** This chapter serves as a prime reference to Hospital Information System Coordination process and presents the details supporting it in tabular formats. The chapter describes relevant Business Rules, Risks, Quality Attributes, Data Quality Dimensions, Operation Policies, KPIs, CTQs, Abstract Time-scales and SLAs terms specific to Hospital Information System Coordination process.

The Hospital Information System Coordination process is supposed to be a living document and consists of various variable values which would frequently evolve or change as Hospital Information System Coordination process matures or changes.

Scope

3. SCOPE

The scope of this process is applicable to environmental services department.

General Assumptions

4. GENERAL ASSUMPTIONS

The following are the general assumptions made:

- Inputs to the process are accurate.
- This process is supported by automated tools that would enable detailed analysis and management capabilities for this process.
- The roles defined in this document can be attached to the existing position
- Any process or sub process related assumptions are explicitly identified in related Process Specification table in Chapter 6.

Hospital Information System Coordination Framework

5 Hospital Information System Coordination Framework

5.1 Hospital Information System Coordination Interactions

The following depiction shows the points of interaction Hospital Information System Coordination process with other related EMS processes. The arrows moving into Hospital Information System Coordination process signify the inputs from the other process to Hospital Information System Coordination process, and the arrows moving out of the Hospital Information System Coordination process signify the inputs from Hospital Information System Coordination process to other related EMS processes. All these processes depicted below are defined in their own respective dedicated documents.
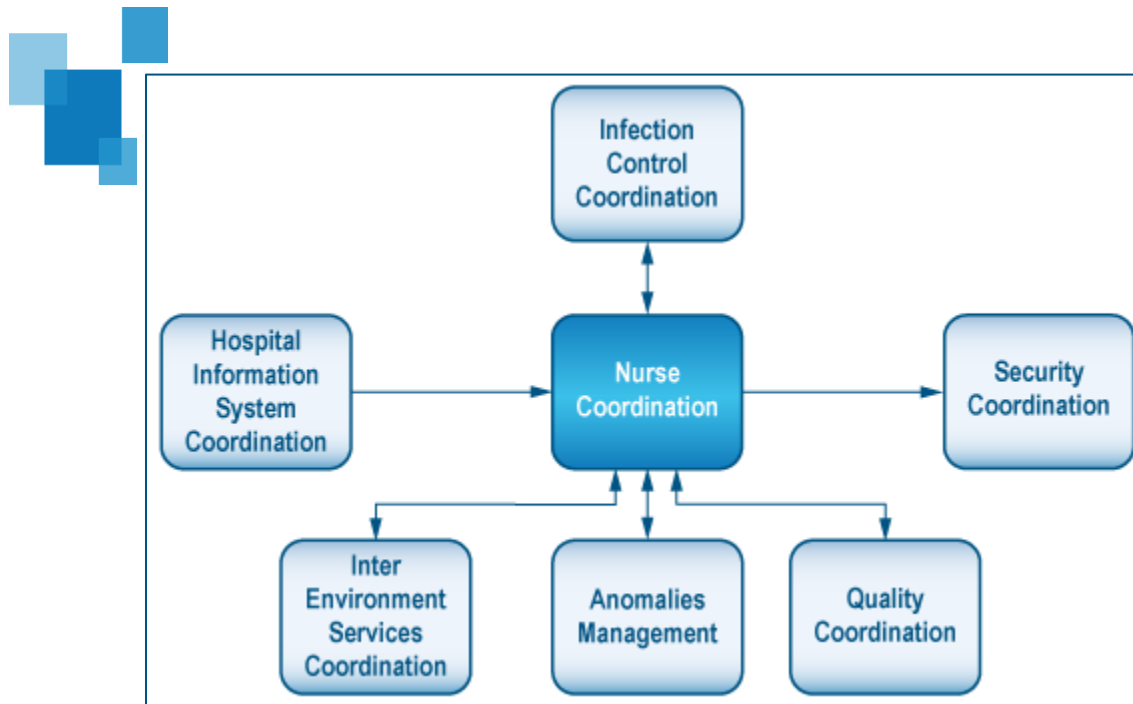
5.2 Hospital Information System Coordination Process Sequence

The Hospital Information System Coordination process comprises of following high level sequence of activities:

1. **Management of coordination Constraints**
2. **Coordinate Hospital Management processes**
3. **Perform Coordination Activities**

4. **Optimization of Coordination**
5. **Integration with Other System**
6. **Coordination Messaging and Alerting**
7. **Monitor Coordination performance**

Section 5.2.1 -5.2.7 describes the high level process sequence for Eenvironmental services department Hospital Information System Coordination based on EMS framework. **Section 6.1** Process Model sheds more light on the flow of Hospital Information System Coordination process.

5.2.1 Management of coordination Constraints

This involves identification of various coordination constraints arising because of:

- **Staff Characteristics.** This comprises of:
  - Skills
  - Working hours
  - Communication ability
- **Hospital Characteristics.** This comprises of following:
  - The size
  - Environmental behaviour,
  - Working environment
  - Technology used
- **Hospital Inventory.** This comprises of:
  - Inventory Demand
  - Consumption rate
  - Budget.
- **Patient Characteristics.** This comprise of following:
  - The type of disease
  - Patient's immunity level
  - Financial limitation.

5.2.2 Coordinate Hospital Management processes

This comprise of coordinating following:

- **Core Processes**
  - Appointment & Queue Management

- o Casualty & Emergency Management
- o In-patient Management
- o Out Patient Management
- o Pharmacy Management
- o Laboratory Information Management
- o Radiology and Medicine
- o Operation Theatres Management
- o Nursing & Ward Management
- o Blood Bank Management
- **Supportive Processes**
This comprises of management of following:
  - o Ambulance Services Management
  - o Stores and Inventory Management
  - o Medical Insurance Management
  - o Patient Referral System
  - o Duty Roster Management
  - o Physiotherapy and Rehabilitation
  - o Dietary Management
  - o House Keeping and Laundry Management
  - o Bio-Medical Waste Management

5.2.3 Perform Coordination Activities

This involves following:

- **Organizing.** Creating a structure that allows care coordination to be carried out in a safe and timely way. This involves:
  - o Prioritizing
  - o Scheduling
  - o Task Management
  - o Projecting
  - o Forecasting.

- **Assisting.** Providing or giving help to carry out one or more steps in care coordination. This involves:
  - o Automated asking for assistance
  - o Automated Offering assistance

- Responding for assistance requests
- **Checking.** Evaluating accuracy, timeliness and completion of steps required in the sequence to carry out care coordination processes. This involves:
  - Monitoring
  - Synchronizing
  - Follow up
- **Mobilizing.** Directly and indirectly getting others to take actions for which they are accountable and are required to carry out care coordination. This involves:
  - Prompting
  - Requesting consult
  - Alerting
- **Managing information.** Giving and receiving information needed to carry out care coordination. this comprise of following:
  - Documenting
  - Communicating

5.2.4 Optimization of Coordination

This comprise of following:

- **Waste Minimization**. This comprises of using quality lean six sigma process to remove any wastes that can occur in the coordination process.
- **Aligning goals**. Aligning goals so that each actor and activity has accountability and are free from conflicts.
- **Removal of interaction complexity**. This involves resolving conflicts arising from unexpected task interactions.
- **Ensuring Information sharing.** This ensures that a free information flow happens across all the activities so that the activities can operate in harmony with each other. This can be achieved via having frequent meetings.
- **Enabling Synchronization.** Some activities need to be synchronized with other activities so as to ensure that they do not impact the overall process goal.
- **Establish Behavior Harmony.** This activity ensures that all the actors/ agents involved in the coordination process trust each other, and see the entire process as one.
- **Use of Automation**. Using automated tools to facilitate coordination would ensure that the process remains accurate and free from error.
- **Ensure Mutual Exclusiveness.** This activity ensures that two coordinating activities do not share a resource at the same time. This ensure that the processes do not suffer from:

- o **Deadlock**. Deadlock is a situation where by two activities are waiting for each other and neither can proceed.
- o **Starvation**. Starvation occurs when a blocked activity is consistently not allowed to proceed

5.2.5 Integration with Other System

This involves integration with other systems (internal or external) so as to provide authentic, accuracy, reliable and free from error vital information. This comprises of following:

- **Internal.** For example
  - o Supply chain management
  - o Human Resource management
  - o Finance management.
  - o Knowledge Management systems.

- **External.** For example
  - o Researcher networks,
  - o Medical bodies (CDC, etc),
  - o Health insurance companies.

5.2.6 Coordination Messaging and Alerting

This comprises of following:

- **Passive Alerts**. Are mainly used to remind clinicians of tasks which are fairly routine, discrete and things that are somewhat easy to remember. This comprises of:
  - o Email
  - o Fax
- **Active Alerts.** An alert is active and is fairly intrusive to the receiver. It often demands more immediate attention than a passive reminder
  - o Sms
  - o Phone Calls
  - o Pager
  - o Announcements

5.2.7 Monitor Coordination performance

This process involves monitoring the performance of the entire process to identify:

- **Conflicts**. If any conflicts are identified, they are highlighted to senior management, who would draft resolution plan to optimize the Quality Coordination process
- **Improvisations**. If any improvisation needs are identified, they are highlighted to senior management, who would draft improvisation plan to optimize the Quality Coordination process
- **Anomalies**. The anomalies found in the process are escalated to the anomalies management process.

Hospital Information System Coordinaton Process

6 Hospital Information System Coordination Process

6.1 Process Model

6 Hospital Information System Coordination Process
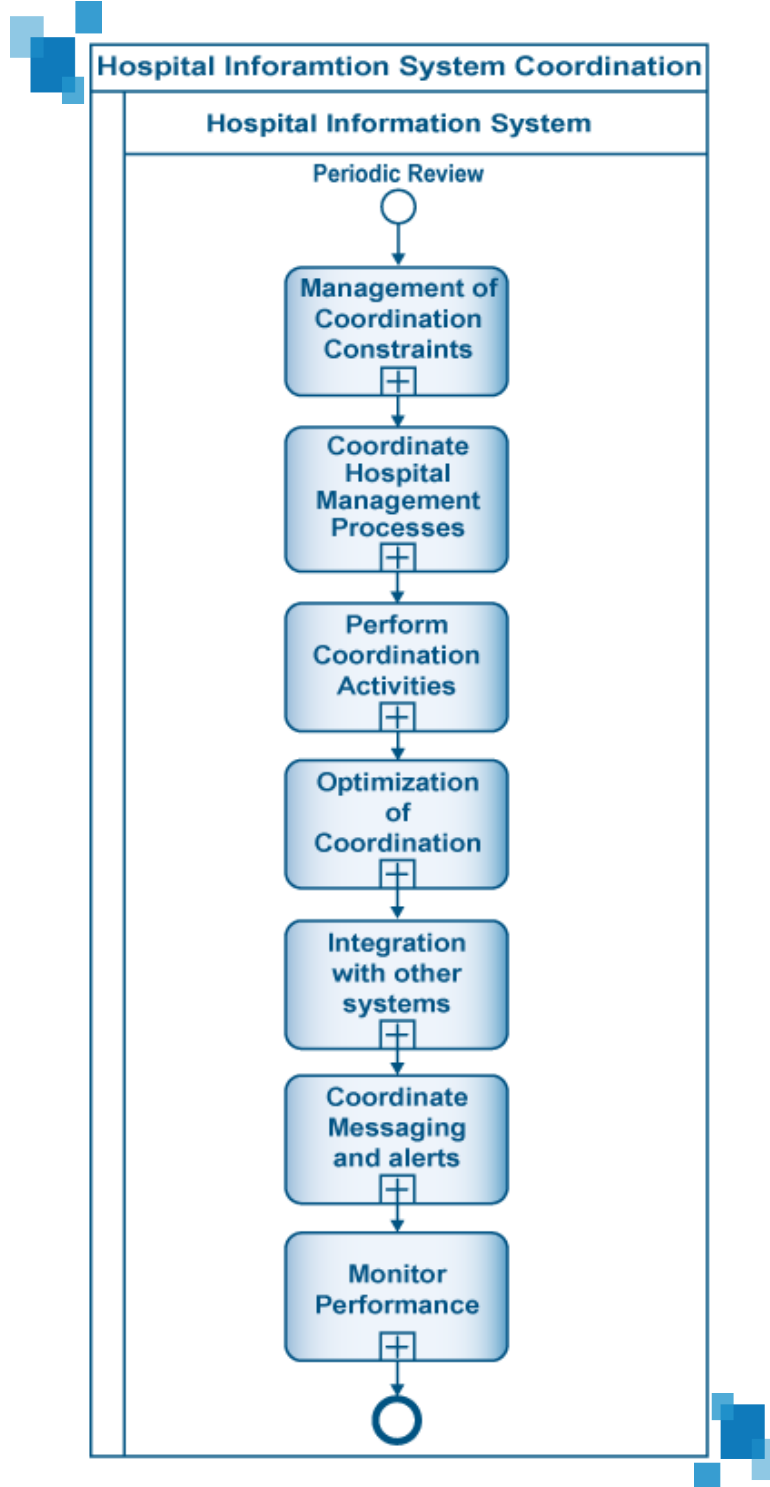
6.2 Process Specification

Specification	Description
Summary/Purpose	The purpose of this process is to create Hospital Information System Coordination process for environmental services.
Scope	This is a Level 1 Process Specification.
Primary Reference	Lean Six Sigma Standard, OSHA, NHS
Related ESM Practices	Quality coordination, Infection control coordination, security coordination, hospital information system coordination, inter environment services coordination, Anomalies Management.
Related Business Driver	Coordination of Hospital information system activities across organization.
Related Operational Policies	OP-001, OP-002, OP-003, OP-004,OP-005, OP-006 (Ref. 7.5)
Assumptions	• Inputs to the process are accurate. • Top level management commitment exists.
Voice of Customer	Hygiene, High and Consistent Quality of standards, Free of Infections, Timely Services, High Coordinating, Remove Waste, Excellent Ergonomic, Safety, Appearance, Excellent Worker Attitude. (Ref 7.10)
Customer Satisfaction Measure	Customer satisfaction index
COI Correlation	None
Raw Materials	None
Equipment & Accessories	Automated System for Hospital Information System

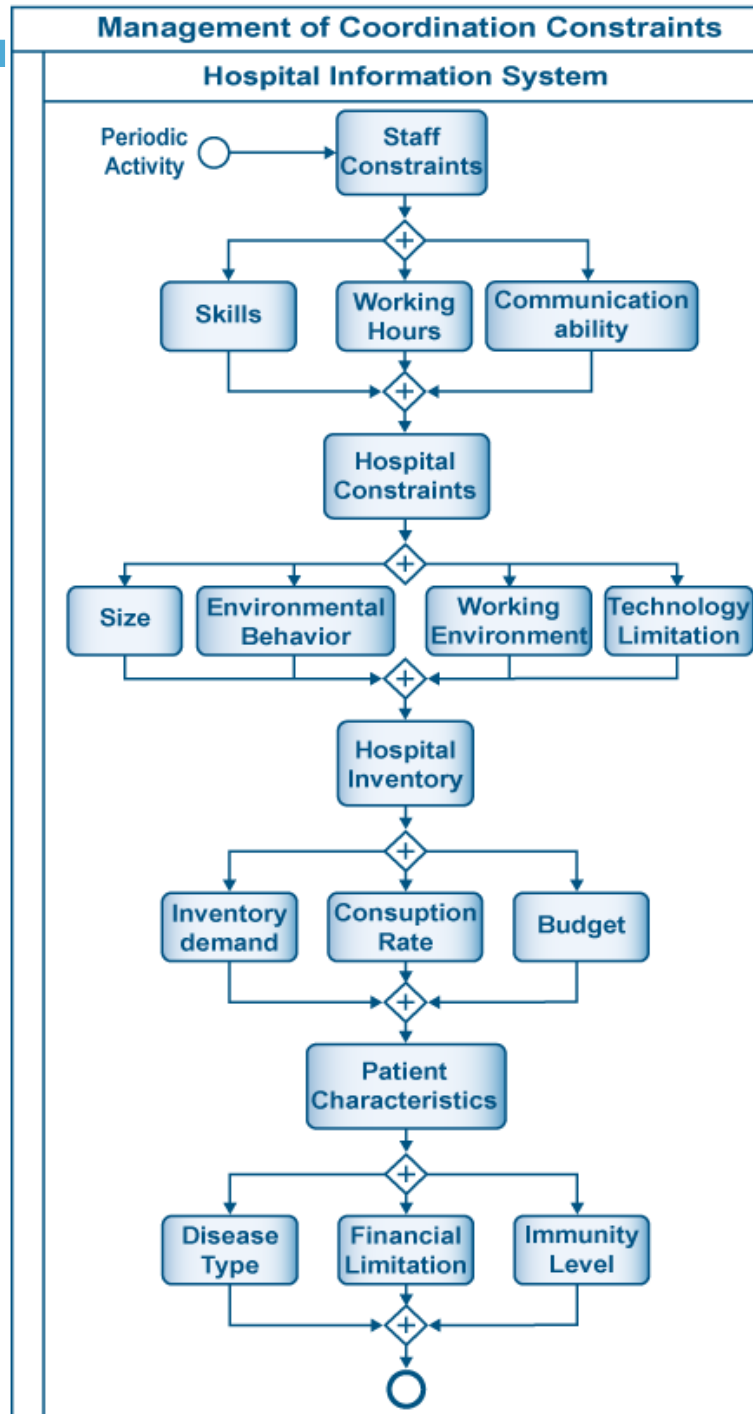# 6 Hospital Information System Coordination Process

MSD Management	Lifting/carrying, Disability, Force, Loaded motion, Physical ergonomics, Posture change, Excessive force, Scarceness, Noise, Concentration, Floor hazards, Clothing, Psychosocial factors. (Ref 7.12)
EBC Procedures	None
Timing Dimensions	<table><tr><td>Type</td><td>Normal</td></tr><tr><td>Average</td><td>30 min</td></tr><tr><td>Std</td><td>12 min</td></tr></table>
Trigger	• Periodic Activities.
Basic Course of Event	**Hospital Information System Coordination** 1. Hospital Information System performs management of coordination constraints 2. Hospital Information System coordinates hospital management processes. 3. Hospital Information System performs coordination activities 4. Hospital Information System optimizes coordination 5. Hospital information system integrates with other systems 6. Hospital Information System coordinates messaging and alerts 7. Hospital Information System performs monitor performance 8. End
Alternative Path	None
Exception Path	**System Down** 1. Keep paper track until system is up and running 2. Update the System and clear all logs. 3. End.
Extension points	Anomalies Management
Preconditions	Automated tools are provided to the process to ensure smooth and effective operations.
Post -conditions	Hospital Information System Coordination process is established.
Related Business Rules	BR-001, BR-002, BR-003, BR-004, BR-005, BR-006 (Ref 7.1)

6 Hospital Information System Coordination Process

Related Risks	RR-001, RR-002,RR-003, RR-004, RR-005, RR-006(Ref. 7.2)
Related Quality Attributes	Reliability, Availability, Accountability, Performance, Auditability, confidentiality, non repudiation, adaptability (Ref 7.3)
Related Data Quality Dimensions	Accuracy, Reputation, Objectivity, free of error, Relevance, completeness, timeliness, understandability, concise representation (Ref 7.4)
Related Primary SLA Terms	(Ref 7.9)
Related KPIs	CAR, CA, CR, CPR, DR IPR, SR, CRR(Ref 7.6)
Related CTQs	CARV, CAV, CRV, CPRV, DRV IPRV, SRV, CRRV, MOM, PWOM, CTQ, IOM, TOM, WRM, DRM (Ref 7.7)
Actors/Agents	Hospital Information System
Delegation	Delegation Rule -1: Agent Not Available 1. Delegate the task to the agent with same role 2. Update the task 3. Log the delegation Delegation Rule -2: Agent Overloaded 1. Delegate the task to the agent with same Role 2. Update the task 3. Log the delegation
Escalation	Rule 1: Performance, operational legal Issues 1. Escalate to environmental services department head. 2. Log Escalation
Process Map	5.1
Process Model	6.1
Other References	Appendix A: Business Process Modeling Notation Reference Appendix B: Chain of Infection

6.3 Roles and Responsibilities

Roles	Responsibilities
Hospital Information System	• Hospital Information System performs management of coordination constraints • Hospital Information System coordinates hospital management processes. • Hospital Information System performs coordination activities • Hospital Information System optimizes coordination • Hospital information system integrates with other systems • Hospital Information System coordinates messaging and alerts • Hospital Information System performs monitor performance

6.4 Sub process – Management of Coordination Constraints

Management of Coordination Constraints

Hospital Information System

- Periodic Activity → Staff Constraints
  - Skills
  - Working Hours
  - Communication ability
- Hospital Constraints
  - Size
  - Environmental Behavior
  - Working Environment
  - Technology Limitation
- Hospital Inventory
  - Inventory demand
  - Consuption Rate
  - Budget
- Patient Characteristics
  - Disease Type
  - Financial Limitation
  - Immunity Level

6.5 Sub Process – Management of Coordination Constraints Specification

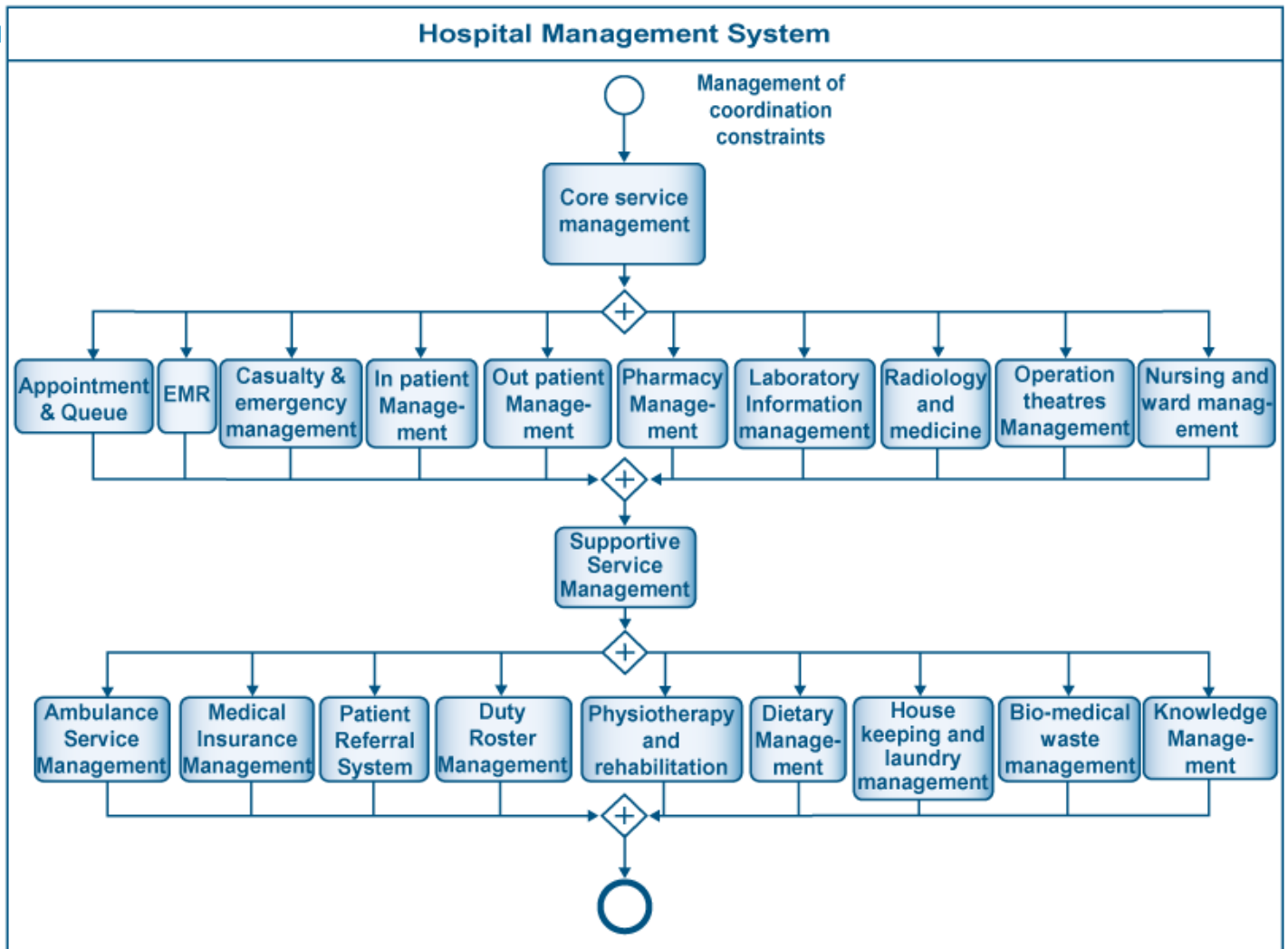| Specification	Description
Summary/Purpose	To manage coordination constraints.
Scope	This is a Level 2 Process Specification.
Primary Reference	Lean Six Sigma standard, NHS, OSHA
Related ESM Practices	Quality coordination, Infection control coordination, security coordination, hospital information system coordination, inter environment services coordination, Anomalies Management.
Related Business Driver	Comprehensiveness
Related Operational Policies	OP-001 (Ref. 7.5)
Assumptions	• Inputs to the process are accurate.
Voice of Customer	Hygiene, High and Consistent Quality of standards, Free of Infections, Timely Services, High Coordinating, Remove Waste, Excellent Ergonomic, Safety, Appearance, Excellent Worker Attitude. (Ref 7.10)
Customer Satisfaction Measure	Customer satisfaction index
COI Correlation	None
Raw Materials	None
Equipment & Accessories	Automated System for Hospital Information System

MSD Management	Lifting/carrying, Disability, Force, Loaded motion, Physical ergonomics, Posture change, Excessive force, Scarceness, Noise, Concentration, Floor hazards, Clothing, Psychosocial factors. (Ref 7.12)
EBC Procedures	None
Timing Dimensions	<table><tr><td>Type</td><td>Normal</td></tr><tr><td>Average</td><td>30 min</td></tr><tr><td>Std</td><td>12 min</td></tr></table>
Trigger	• Periodic Activity
Basic Course of Event	**Management of coordination constraints.** 1. Hospital Information System identifies staff constraints (skills working hours, communication ability) 2. Hospital Information System identifies hospital constraints (size environmental behavior, working environment, technology limitations). 3. Hospital Information System identifies hospital inventory constraints inventory demand, consumption rate, budget) 4. Hospital information system patient characteristics disease type, financial limitations immunity level) 5. End
Alternative Path	None
Exception Path	**System Down** 1. Keep paper track until system is up and running 2. Update the System and clear all logs. 3. End.
Extension points	Coordinate hospital management processes
Preconditions	The senior management is very committed to ensure that this process is well governed.
Post -conditions	Hospital Information System Coordination constraints are formulated.

6 Hospital Information System Coordination Process

Related Business Rules	BR-001 (Ref 7.1)
Related Risks	RR-001(Ref. 7.2)
Related Quality Attributes	Reliability, Accountability, Performance, Auditability, Extensibility (Ref 7.3)
Related Data Quality Dimensions	Accuracy, Reputation, Objectivity, free of error, Relevance, completeness, Value added, Believability (Ref 7.4)
Related Primary SLA Terms	(Ref 7.9)
Related KPIs	CAR(Ref 7.6)
Related CTQs	CARV (Ref 7.7)
Actors/Agents	Hospital Information System
Delegation	Delegation Rule -1: Agent Not Available 1. Delegate the task to the agent with same role 2. Update the task 3. Log the delegation Delegation Rule -2: Agent Overloaded 1. Delegate the task to the agent with same Role 2. Update the task 3. Log the delegation
Escalation	Rule 1: Performance, operational legal Issues 1. Escalate to environmental services department head. 2. Log Escalation
Process Map	5.1
Process Model	6.4
Other References	Appendix A: Business Process Modeling Notation Reference

	Appendix B: Chain of Infection

6.6 Sub Process – Management of Coordination Constraints Roles and Responsibilities

Roles	Responsibilities
Hospital Information System	• Hospital Information System identifies staff constraints (skills working hours, communication ability) • Hospital Information System identifies hospital constraints (size environmental behavior, working environment, technology limitations). • Hospital Information System identifies hospital inventory constraints inventory demand, consumption rate, budget) • Hospital information system patient characteristics disease type, financial limitations immunity level)

6.7 Sub process – Coordinate Hospital management processes

Hospital Management System

Management of coordination constraints

Core service management

- Appointment & Queue
- EMR
- Casualty & emergency management
- In patient Management
- Out patient Management
- Pharmacy Management
- Laboratory Information management
- Radiology and medicine
- Operation theatres Management
- Nursing and ward management

Supportive Service Management

- Ambulance Service Management
- Medical Insurance Management
- Patient Referral System
- Duty Roster Management
- Physiotherapy and rehabilitation
- Dietary Management
- House keeping and laundry management
- Bio-medical waste management
- Knowledge Management

6.8 Sub process – Coordinate Hospital management processes Specifications

Specification	Description
Summary/Purpose	To establish process for hospital process coordination
Scope	This is a Level 2 Process Specification.
Primary Reference	• NHS- National Health Services Standard • OSHA- Occupational Safety and Health Administration standard • CDC- Centers for Disease Control and Prevention standard • Lean six sigma- Quality Standard • JCI- Journal of Clinical Investigation standard
Related ESM Practices	Enterprise Information system, Finance Management, HR Management, Standard Management, Risk Management.
Related Business Driver	• Efficient hospital coordination
Related Operational Policies	OP-002 (Ref 7.5)
Assumptions	Senior Management support is available throughout this process.
Voice of Customer	Hygiene, High and Consistent Quality of standards, Free of Infections, Timely Services, High Coordinating, Remove Waste, Excellent Ergonomic, Safety, Appearance, Excellent Worker Attitude. (Ref 7.10)
Customer Satisfaction Measure	Customer satisfaction index
COI Correlation	None
Raw Materials	None

6 Hospital Information System Coordination Process

| Equipment & Accessories	Automated System for Hospital management.
MSD Management	Lifting/carrying, Disability, Force, Loaded motion, Physical ergonomics, Posture change, Excessive force, Scarceness, Noise, Concentration, Floor hazards, Clothing, Psychosocial factors. (Ref 7.12)
EBC Procedures	None
Timing Dimension	<table><tr><th>Type</th><th>Normal</th></tr><tr><td>Average</td><td>30 min</td></tr><tr><td>Std</td><td>12 min</td></tr></table>
Trigger	• Management of coordination constraints
Basic Course of Event	**Hospital Service Management** 1. Hospital Management system performs core service coordination (appointment and queue, EMR, causality and emergency management, in patient management, out patient management, pharmacy management, laboratory information management, radiology and medicine, operation theatre management, nursing and ward management) 2. Hospital management system performs supportive service coordination (ambulance service management, medical insurance management, patient referral system, duty roster management, physiotherapy and rehabilitation, dietary management, housekeeping and laundry management, bio-medical waste management, knowledge management) 3. End.
Alternative Path	None
Exception Path	**System Down** 1. Keep paper track until system is up and running 2. Update the System and clear all logs. 3. End.
Extension points	Perform coordination activities

6 Hospital Information System Coordination Process

Preconditions	All the information stored in the system is accurate and free from error.
Post –conditions	Hospital processes are well coordinated.
Related Business Rules	BR-002 (Ref 7.1)
Related Risks	RR-002 (Ref 7.2)
Related Quality Attributes	Reliability, Confidentiality, Authenticity, Data Integrity, Availability, Non-repudiation, Accountability, Security Integration, Performance, Scalability, Extensibility, Adaptability, Testability, Auditability, Operability and Deployability (Ref 7.3)
Related Data Quality Dimensions	Accuracy, Reputation, Objectivity, Free-of-Error, Relevance, Completeness, Timeliness, Appropriate Amount, Understandability, Interpretability, Concise Representation (Ref 7.4)
Related Primary SLA Terms	(Ref 7.9)
Related KPIs	CA (Ref 7.6)
Related CTQs	CAV (Ref 7.7)
Actors/Agents	Hospital information system.
Delegation	Delegation Rule -1: Agent Not Available 1. Delegate the task to the agent with same role 2. Update the task 3. Log the delegation Delegation Rule -2: Agent Overloaded 1. Delegate the task to the agent with same Role 2. Update the task 3. Log the delegation
Escalation	Rule 1: Performance, operational legal Issues 1. Escalate to environmental services department head. 2. Log Escalation

6 Hospital Information System Coordination Process

Process Map	Section 5.1
Process Model	Section 6.7
Other References	Appendix A: Business Process Notation Reference

6.9 Sub process – Coordinate Hospital management processes Roles and Responsibilities

Roles	Responsibilities
Hospital information system.	• Hospital Management system performs core service coordination (appointment and queue, EMR, causality and emergency management, in patient management, out patient management, pharmacy management, laboratory information management, radiology and medicine, operation theatre management, nursing and ward management • Hospital management system performs supportive service coordination (ambulance service management, medical insurance management, patient referral system, duty roster management, physiotherapy and rehabilitation, dietary management, housekeeping and laundry management, bio-medical waste management, knowledge management)

6.10 Sub Process – Perform Coordination Activities
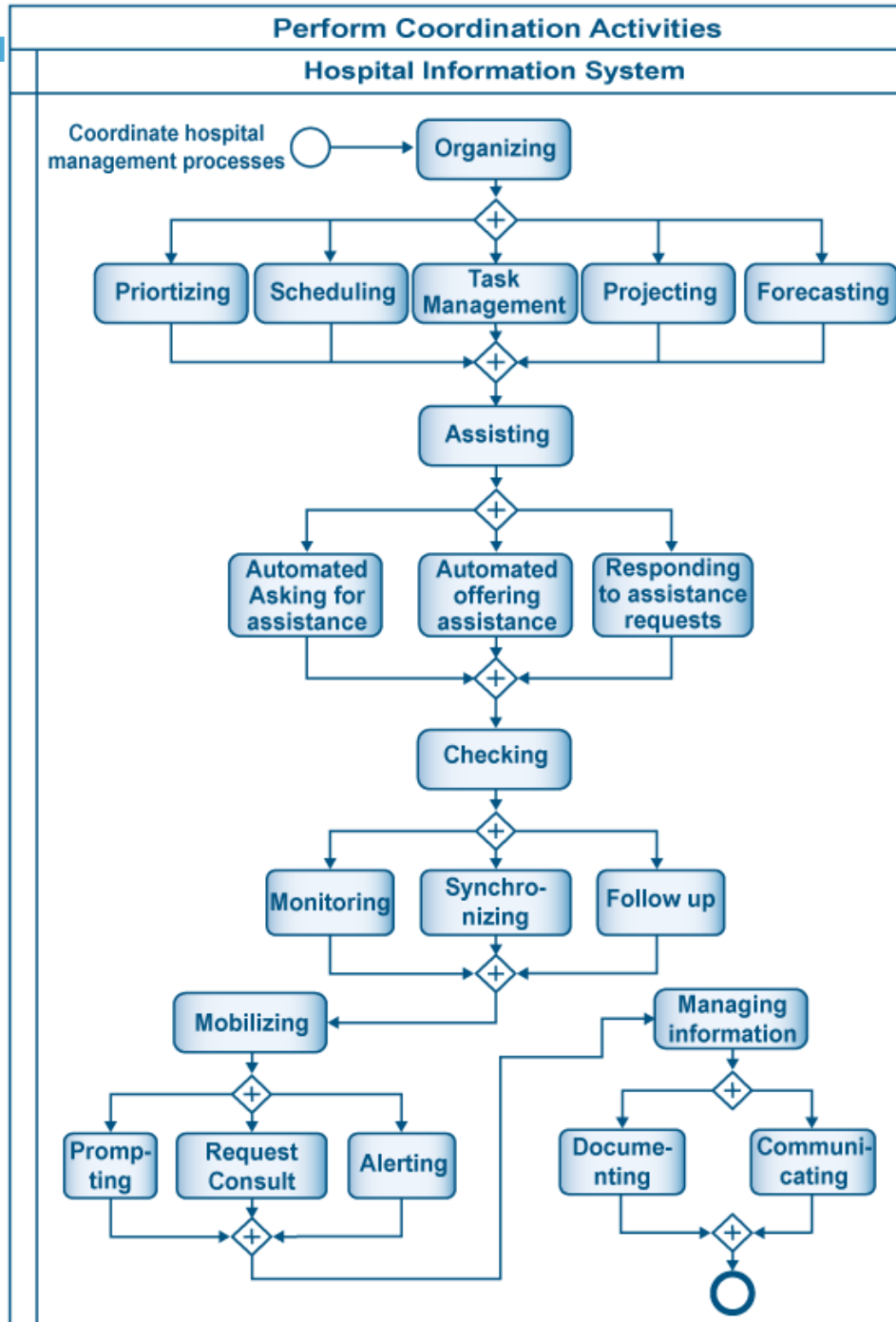
6.11 Sub Process – Perform Coordination Activities Specification

Specification	Description
Summary/Purpose	To identify Hospital Information System Coordination activities.
Scope	This is a Level 2 Process Specification.
Primary Reference	Lean Six Sigma standard, NHS, OSHA
Related ESM Practices	Quality coordination, Infection control coordination, security coordination, hospital information system coordination, inter environment services coordination, Anomalies Management.
Related Business Driver	Better understanding of the coordination activities.
Related Operational Policies	OP-003 (Ref. 7.5)
Assumptions	• Inputs to the process are accurate.
Voice of Customer	Hygiene, High and Consistent Quality of standards, Free of Infections, Timely Services, High Coordinating, Remove Waste, Excellent Ergonomic, Safety, Appearance, Excellent Worker Attitude. (Ref 7.10)
Customer Satisfaction Measure	Customer satisfaction index
COI Correlation	None
Raw Materials	None
Equipment & Accessories	Automated System for Hospital Information System

6 Hospital Information System Coordination Process

MSD Management	Lifting/carrying, Disability, Force, Loaded motion, Physical ergonomics, Posture change, Excessive force, Scarceness, Noise, Concentration, Floor hazards, Clothing, Psychosocial factors. (Ref 7.12)
EBC Procedures	None
Timing Dimensions	<table><tr><td>**Type**</td><td>**Normal**</td></tr><tr><td>**Average**</td><td>30 min</td></tr><tr><td>**Std**</td><td>12 min</td></tr></table>
Trigger	• Coordinate hospital management processes
Basic Course of Event	**Perform Coordination activities** 1. Hospital Information System performs organizing (Prioritizing, scheduling, task management, projecting, forecasting) 2. Hospital information system performs assisting activity (automated assistance asking, respond to assistance request, automate offering assistance), 3. Hospital information system performs checking activity (monitoring, synchronizing and follow up), 4. Hospital information system performs Mobilizing (prompting, requesting consult, alerting), 5. Hospital information system manages information (documenting and communicating 6. End
Alternative Path	None
Exception Path	**System Down** 1. Keep paper track until system is up and running 2. Update the System and clear all logs. 3. End.
Extension points	Optimization of Coordination
Preconditions	This process is supported by automated tools.

| Post -conditions	Hospital Information System Coordination activities are identified.
Related Business Rules	BR-003(Ref 7.1)
Related Risks	RR-002(Ref. 7.2)
Related Quality Attributes	Reliability, Accountability, Performance, Auditability, Extensibility (Ref 7.3)
Related Data Quality Dimensions	Accuracy, Reputation, Objectivity, free of error, Relevance, completeness, , Value added, Believability (Ref 7.4)
Related Primary SLA Terms	(Ref 7.9)
Related KPIs	CR(Ref 7.6)
Related CTQs	CRV (Ref 7.7)
Actors/Agents	Hospital Information System
Delegation	Delegation Rule -1: Agent Not Available 　1. Delegate the task to the agent with same role 　2. Update the task 　3. Log the delegation Delegation Rule -2: Agent Overloaded 　1. Delegate the task to the agent with same Role 　2. Update the task 　3. Log the delegation
Escalation	Rule 1: Performance, operational legal Issues 　1. Escalate to environmental services department head. 　2. Log Escalation
Process Map	5.1
Process Model	6.10

Other References	Appendix A: Business Process Modeling Notation Reference
	Appendix B: Chain of Infection

6.12 Sub Process – Perform Coordination Activities Roles and Responsibilities

Roles	Responsibilities
Hospital Information System	• Hospital Information System performs organizing (Prioritizing, scheduling, task management, projecting, forecasting)
	• Hospital information system performs assisting activity (automated assistance asking, respond to assistance request, automate offering assistance),
	• Hospital information system performs checking activity (monitoring, synchronizing and follow up),
	• Hospital information system performs Mobilizing (prompting, requesting consult, alerting),
	• Hospital information system manages information (documenting and communicating

6.13 Sub Process – Optimization of Coordination
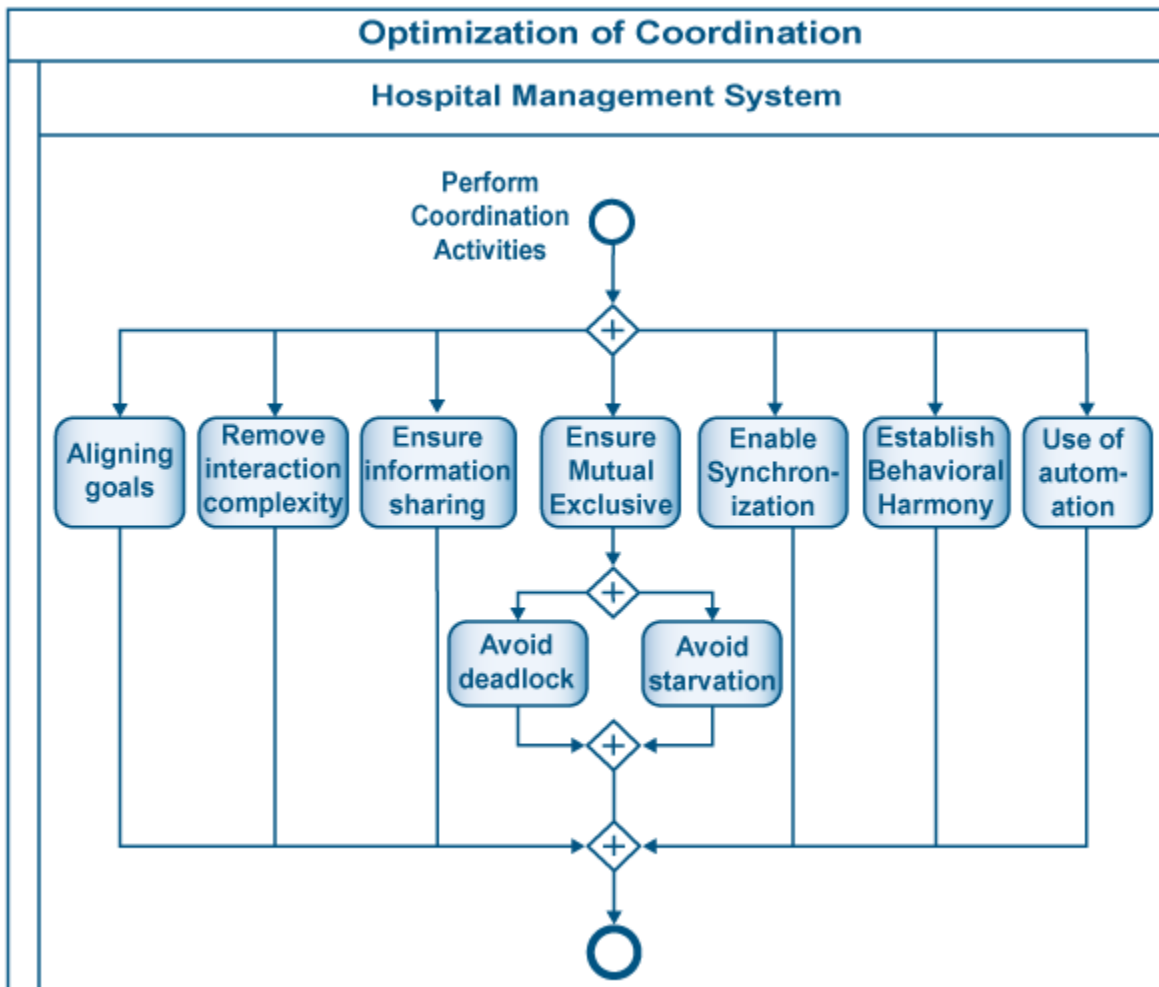
6.14 Sub Process – Optimize of Coordination Specification

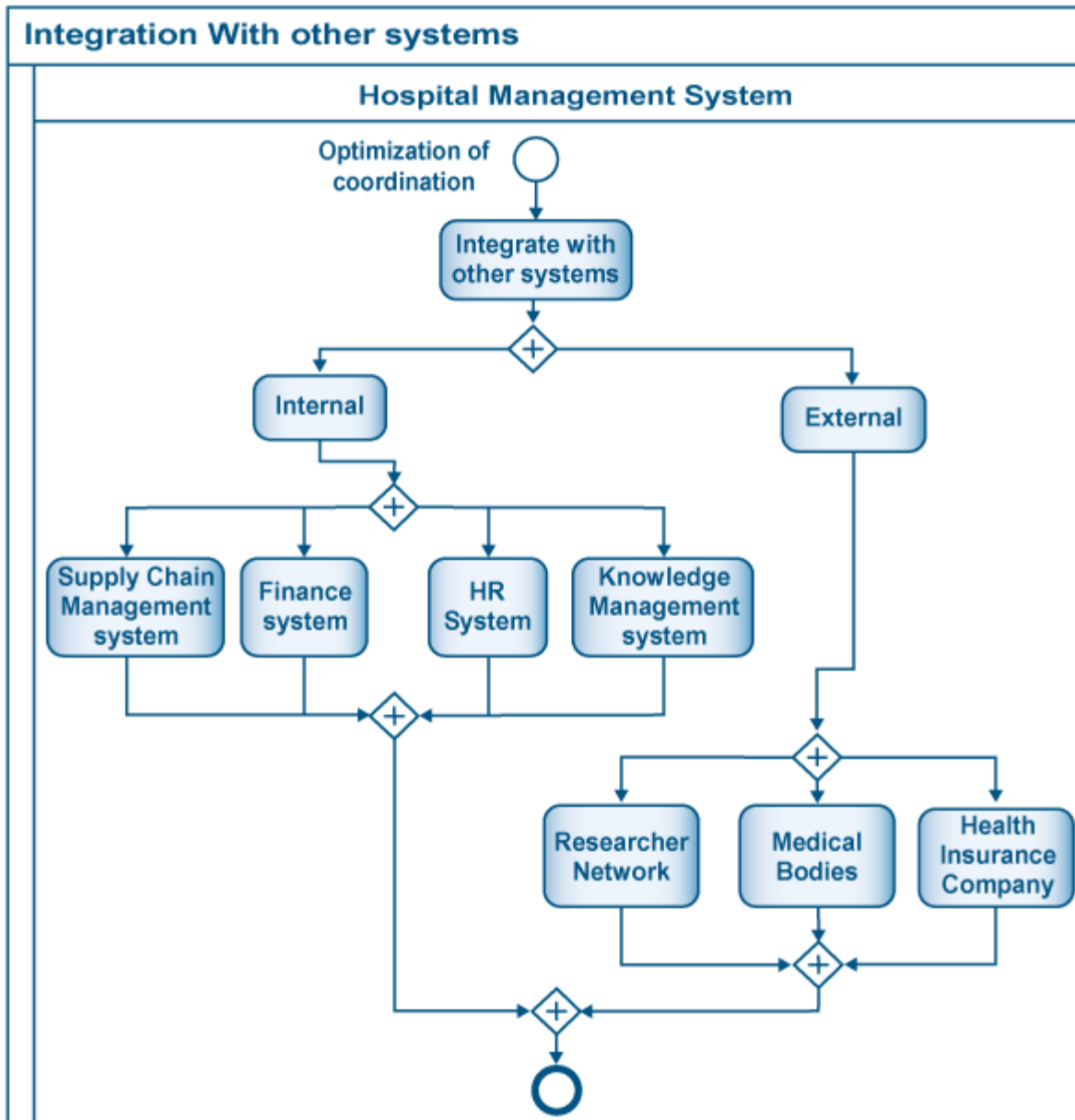| Specification	Description
Summary/Purpose	To establish the process to optimize coordination
Scope	This is a Level 2 Process Specification.
Primary Reference	Lean Six Sigma standard, NHS, OSHA
Related ESM Practices	Quality coordination, Infection control coordination, security coordination, hospital information system coordination, inter environment services coordination, Anomalies Management.
Related Business Driver	Optimization of the coordination process.
Related Operational Policies	OP-003 (Ref. 7.5)
Assumptions	• Inputs to the process are accurate.
Voice of Customer	Hygiene, High and Consistent Quality of standards, Free of Infections, Timely Services, High Coordinating, Remove Waste, Excellent Ergonomic, Safety, Appearance, Excellent Worker Attitude. (Ref 7.10)
Customer Satisfaction Measure	Customer satisfaction index
COI Correlation	None
Raw Materials	None
Equipment & Accessories	Automated System for Hospital Information System

6 Hospital Information System Coordination Process

MSD Management	Lifting/carrying, Disability, Force, Loaded motion, Physical ergonomics, Posture change, Excessive force, Scarceness, Noise, Concentration, Floor hazards, Clothing, Psychosocial factors. (Ref 7.12)
EBC Procedures	None
Timing Dimensions	<table><tr><td>**Type**</td><td>**Normal**</td></tr><tr><td>**Average**</td><td>30 min</td></tr><tr><td>**Std**</td><td>12 min</td></tr></table>
Trigger	• Perform coordination activities
Basic Course of Event	**Optimization of coordination** 1. Hospital Information aligns goals, removes interaction complexity, ensures information sharing, ensures mutual exclusiveness (avoid deadlock and starvation), enable synchronization, establish behavioral harmony, ensure use of automation. 2. End
Alternative Path	None
Exception Path	**System Down** 1. Keep paper track until system is up and running 2. Update the System and clear all logs. 3. End.
Extension points	Integration with other systems
Preconditions	This process is supported by automated tools.
Post -conditions	Coordination process is optimized.
Related Business Rules	BR-003 (Ref 7.1)
Related Risks	RR-002(Ref. 7.2)

6 Hospital Information System Coordination Process

Related Quality Attributes	Reliability, Accountability, Performance, Auditability, Extensibility (Ref 7.3)
Related Data Quality Dimensions	Accuracy, Reputation, Objectivity, free of error, Relevance, completeness, , Value added, Believability (Ref 7.4)
Related Primary SLA Terms	(Ref 7.9)
Related KPIs	CPR, DR(Ref 7.6)
Related CTQs	CPRV, DRV(Ref 7.7)
Actors/Agents	Hospital Information System
Delegation	Delegation Rule -1: Agent Not Available 1. Delegate the task to the agent with same role 2. Update the task 3. Log the delegation Delegation Rule -2: Agent Overloaded 1. Delegate the task to the agent with same Role 2. Update the task 3. Log the delegation
Escalation	Rule 1: Performance, operational legal Issues 1. Escalate to environmental services department head. 2. Log Escalation
Process Map	5.1
Process Model	6.13
Other References	Appendix A: Business Process Modeling Notation Reference Appendix B: Chain of Infection

6.15 Sub Process – Optimize of Coordination Roles and responsibilities

Roles	Responsibilities
Hospital Information System	• Performs optimization

6.16 Sub Process – Integrate with other systems

Integration With other systems

Hospital Management System

6.17 Sub Process – Integrate with other systems Specification

Specification	Description
Summary/Purpose	To establish the process of integration with other systems
Scope	This is a Level 2 Process Specification.
Primary Reference	Lean Six Sigma standard, NHS, OSHA
Related ESM Practices	Quality coordination, Infection control coordination, security coordination, hospital information system coordination, inter environment services coordination, Anomalies Management.
Related Business Driver	Total solution
Related Operational Policies	OP-004 (Ref. 7.5)
Assumptions	• Other systems provide capability for integration
Voice of Customer	Hygiene, High and Consistent Quality of standards, Free of Infections, Timely Services, High Coordinating, Remove Waste, Excellent Ergonomic, Safety, Appearance, Excellent Worker Attitude. (Ref 7.10)
Customer Satisfaction Measure	Customer satisfaction index
COI Correlation	None
Raw Materials	None
Equipment & Accessories	Automated System for Hospital Information System

# 6 Hospital Information System Coordination Process

MSD Management	Lifting/carrying, Disability, Force, Loaded motion, Physical ergonomics, Posture change, Excessive force, Scarceness, Noise, Concentration, Floor hazards, Clothing, Psychosocial factors. (Ref 7.12)
EBC Procedures	None
Timing Dimensions	<table><tr><td>**Type**</td><td>**Normal**</td></tr><tr><td>**Average**</td><td>30 min</td></tr><tr><td>**Std**</td><td>12 min</td></tr></table>
Trigger	• Optimization of coordination
Basic Course of Event	**Integration with other systems** 1. Hospital Information System integrates with other external systems (research network, medical bodies, health insurance company) and internal systems (supply chain management system, finance system, HR system, Knowledge management system) 2. End
Alternative Path	None
Exception Path	**System Down** 1. Keep paper track until system is up and running 2. Update the System and clear all logs. 3. End.
Extension points	Coordinate messaging and alerts
Preconditions	This process is supported by automated tools.
Post -conditions	Integration with other external and internal systems happens.
Related Business Rules	BR-004 (Ref 7.1)
Related Risks	RR-004(Ref. 7.2)

6 Hospital Information System Coordination Process

Related Quality Attributes	Reliability, Accountability, Performance, Auditability, Extensibility (Ref 7.3)
Related Data Quality Dimensions	Accuracy, Reputation, Objectivity, free of error, Relevance, completeness, , Value added, Believability (Ref 7.4)
Related Primary SLA Terms	(Ref 7.9)
Related KPIs	IPR(Ref 7.6)
Related CTQs	IPRV (Ref 7.7)
Actors/Agents	Hospital Information System
Delegation	<u>Delegation Rule -1: Agent Not Available</u> 　1. Delegate the task to the agent with same role 　2. Update the task 　3. Log the delegation <u>Delegation Rule -2: Agent Overloaded</u> 　1. Delegate the task to the agent with same Role 　2. Update the task 　3. Log the delegation
Escalation	<u>Rule 1: Performance, operational legal Issues</u> 　1. Escalate to environmental services department head. 　2. Log Escalation
Process Map	5.1
Process Model	6.16
Other References	Appendix A: Business Process Modeling Notation Reference Appendix B: Chain of Infection

6.18 Sub Process – Integrate with Other systems Roles and responsibilities

Roles	Responsibilities
Hospital Information System	Hospital Information System integrates with other external systems (research network, medical bodies, health insurance company) and internal systems (supply chain management system, finance system, HR system, Knowledge management system)

6.19 Sub Process – Coordinate message and alerts
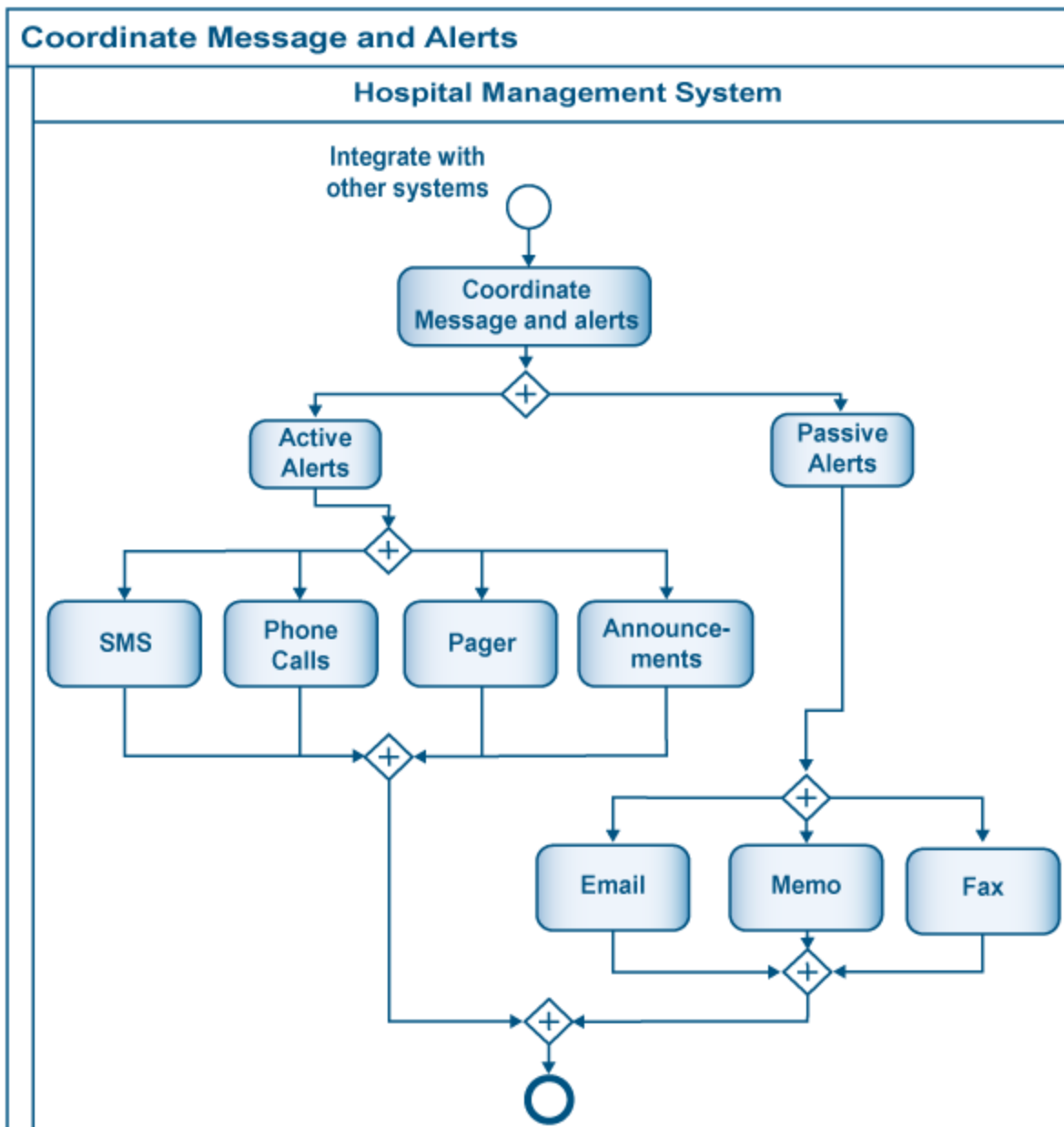
6.20 Sub Process – Coordinate message and alerts Specification

Specification	Description
Summary/Purpose	To establish the process for coordinating message and alerts
Scope	This is a Level 2 Process Specification.
Primary Reference	Lean Six Sigma standard, NHS, OSHA
Related ESM Practices	Quality coordination, Infection control coordination, security coordination, hospital information system coordination, inter environment services coordination, Anomalies Management.
Related Business Driver	Efficient coordination.
Related Operational Policies	OP-005(Ref. 7.5)
Assumptions	• Inputs to the process are accurate.
Voice of Customer	Hygiene, High and Consistent Quality of standards, Free of Infections, Timely Services, High Coordinating, Remove Waste, Excellent Ergonomic, Safety, Appearance, Excellent Worker Attitude. (Ref 7.10)
Customer Satisfaction Measure	Customer satisfaction index
COI Correlation	None
Raw Materials	None
Equipment & Accessories	Automated System for Hospital Information System

6 Hospital Information System Coordination Process

MSD Management	Lifting/carrying, Disability, Force, Loaded motion, Physical ergonomics, Posture change, Excessive force, Scarceness, Noise, Concentration, Floor hazards, Clothing, Psychosocial factors. (Ref 7.12)
EBC Procedures	None
Timing Dimensions	<table><tr><td>**Type**</td><td>**Normal**</td></tr><tr><td>**Average**</td><td>30 min</td></tr><tr><td>**Std**</td><td>12 min</td></tr></table>
Trigger	• Integrate with other systems
Basic Course of Event	**Coordinate Message and alerts** 1. Hospital Information System coordinate message and alerts performs active alerts (SMS, phone calls, pager, announcements) and passive alerts (email, Memo, fax) 2. End
Alternative Path	None
Exception Path	**System Down** 1. Keep paper track until system is up and running 2. Update the System and clear all logs. 3. End.
Extension points	Monitor performance.
Preconditions	This process is supported by automated tools.
Post -conditions	Coordination messaging and alerting process is established.
Related Business Rules	BR-005 (Ref 7.1)
Related Risks	RR-005(Ref. 7.2)
Related Quality Attributes	Reliability, Accountability, Performance, Auditability, Extensibility (Ref 7.3)

Related Data Quality Dimensions	Accuracy, Reputation, Objectivity, free of error, Relevance, completeness, , Value added, Believability (Ref 7.4)
Related Primary SLA Terms	(Ref 7.9)
Related KPIs	SR(Ref 7.6)
Related CTQs	SRV (Ref 7.7)
Actors/Agents	Hospital Information System
Delegation	Delegation Rule -1: Agent Not Available 1. Delegate the task to the agent with same role 2. Update the task 3. Log the delegation Delegation Rule -2: Agent Overloaded 1. Delegate the task to the agent with same Role 2. Update the task 3. Log the delegation
Escalation	Rule 1: Performance, operational legal Issues 1. Escalate to environmental services department head. 2. Log Escalation
Process Map	5.1
Process Model	6.19
Other References	Appendix A: Business Process Modeling Notation Reference Appendix B: Chain of Infection

6.21 Sub Process – Coordinate message and alerts Roles and responsibilities

Roles	Responsibilities
Hospital Information System	Hospital Information System coordinate message and alerts performs active alerts (SMS, phone calls, pager, announcements) and passive alerts (email, Memo, fax)

6.22 Sub Process – Monitor Performance
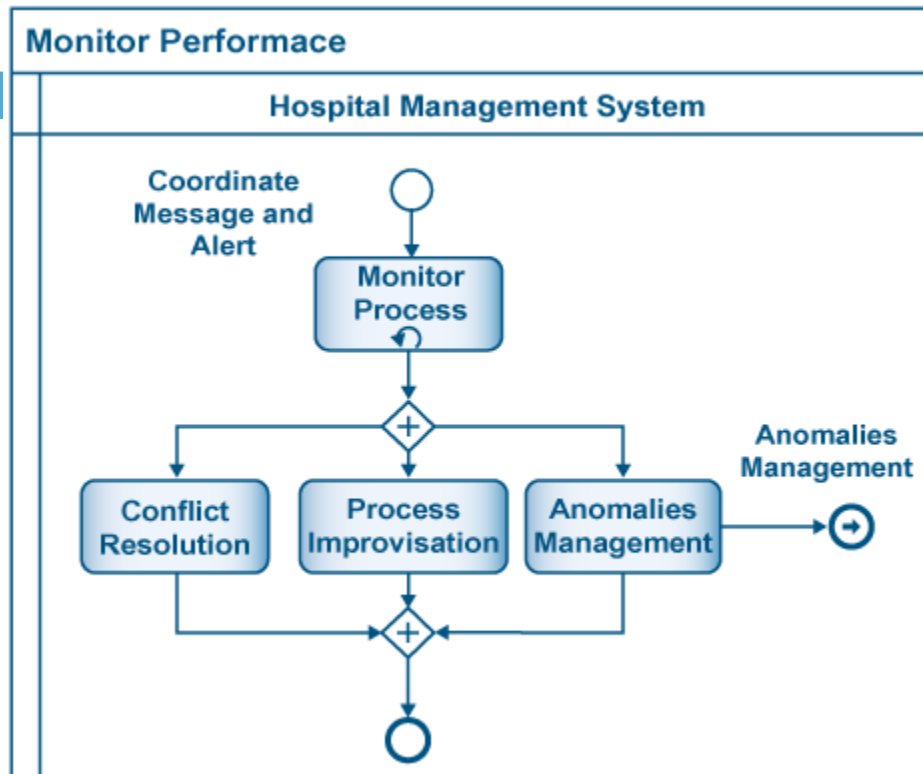
6.23 Sub Process – Monitor Performance Specification

Specification	Description
Summary/Purpose	To establish the process of monitoring the coordination performance.
Scope	This is a Level 2 Process Specification.
Primary Reference	Lean Six Sigma standard, NHS, OSHA
Related ESM Practices	Quality coordination, Infection control coordination, security coordination, hospital information system coordination, inter environment services coordination, Anomalies Management.
Related Business Driver	Process improvement.
Related Operational Policies	OP-006 (Ref. 7.5)
Assumptions	• Inputs to the process are accurate.
Voice of Customer	Hygiene, High and Consistent Quality of standards, Free of Infections, Timely Services, High Coordinating, Remove Waste, Excellent Ergonomic, Safety, Appearance, Excellent Worker Attitude. (Ref 7.10)
Customer Satisfaction Measure	Customer satisfaction index
COI Correlation	None
Raw Materials	None
Equipment & Accessories	Automated System for Hospital Information System

MSD Management	Lifting/carrying, Disability, Force, Loaded motion, Physical ergonomics, Posture change, Excessive force, Scarceness, Noise, Concentration, Floor hazards, Clothing, Psychosocial factors. (Ref 7.12)
EBC Procedures	None
Timing Dimensions	<table><tr><td>**Type**</td><td>**Normal**</td></tr><tr><td>**Average**</td><td>30 min</td></tr><tr><td>**Std**</td><td>12 min</td></tr></table>
Trigger	• Alerts and message
Basic Course of Event	**Monitoring performance** 1. Hospital Information System monitors process continuously for conflict resolution, process improvisation, and anomalies management. 2. End
Alternative Path	None
Exception Path	**System Down** 1. Keep paper track until system is up and running 2. Update the System and clear all logs. 3. End.
Extension points	Anomalies Management
Preconditions	This process is supported by automated tools.
Post -conditions	Coordination process is monitored.
Related Business Rules	BR-006 (Ref 7.1)
Related Risks	RR-006(Ref. 7.2)
Related Quality Attributes	Reliability, Accountability, Performance, Auditability, Extensibility (Ref 7.3)

Related Data Quality Dimensions	Accuracy, Reputation, Objectivity, free of error, Relevance, completeness, , Value added, Believability (Ref 7.4)
Related Primary SLA Terms	(Ref 7.9)
Related KPIs	CRR(Ref 7.6)
Related CTQs	CRRV (Ref 7.7)
Actors/Agents	Hospital Information System.

Delegation	Delegation Rule -1: Agent Not Available
	  1. Delegate the task to the agent with same role
	  2. Update the task
	  3. Log the delegation
	
	Delegation Rule -2: Agent Overloaded
	  1. Delegate the task to the agent with same Role
	  2. Update the task
	  3. Log the delegation

Escalation	Rule 1: Performance, operational legal Issues
	  1. Escalate to environmental services department head.
	  2. Log Escalation

Process Map	5.1
Process Model	6.22
Other References	Appendix A: Business Process Modeling Notation Reference Appendix B: Chain of Infection

6.24 Sub Process – Monitor Performance Roles and responsibilities

Roles	Responsibilities
Hospital Information System	• Hospital Information System monitors process continuously for conflict resolution, process improvisation, and anomalies management.

Reference

7 Reference

This chapter serves as a prime reference to Chapter 6 and presents the details supporting Chapter 6 in tabular formats. This chapter consists of various variable values which would frequently evolve or change as organization's Environmental Services' Hospital Information System Coordination process matures or changes.

At minimal this document can be updated biannually. However, if need arises this document may be updated earlier than its prescribed revision period.

7.1 Business Rules

BR ID	Description	Context	Rule	Source
BR-001	Hospital Information System should take into account all the possible Coordination constraints	Operations	TBD	NA
BR-002	Hospital information system should inter coordinate all the hospital related processes.	Operations	TBD	NA
BR-003	Automated tools should be used everywhere possible for optimizing the process.	Operations	TBD	NA
BR-004	Hospital information system should be well integrated with other systems	Operations	TBD	NA
BR-005	The alerts should be provided immediately to the intended personal.	Operations	TBD	NA
BR-006	All coordination activities would be monitored for improvement	Operations	TBD	NA

7.2 Risk

Risk ID	Description	Source	Severity Level	Status	Resolution
RR-001	All coordination constraints are not taken into consideration.	NA	High	NA	The constraints should be well taken into consideration to ensure the comprehensiveness and total coordination.
RR-002	All the processes are not well coordinated with each other.	NA	High	NA	the business processes should be re-engineered to make them easily coordinated with each other.
RR-003	Lack of accuracy	NA	High	NA	Employ automated tools and techniques wherever possible.
RR-004	Integration with other systems is not possible	NA	High	NA	The Hospital information system should be designed in a ways that it would be robust and well compatible with other systems.
RR-005	Some personal won't have pagers with them always	NA	High	NA	Carrying of pagers should be made a operational rule.
RR-006	Monitoring of the process is not adequate	NA	High	NA	A person should be appointed to facilitate this requirement.

7 Reference

7.2 Quality Attribute

QA ID	Description	Threshold
QA-001	Interoperability	TBD
QA-002	Reliability	TBD
QA-003	Service Reliability	TBD
QA-004	Availability	TBD
QA-005	Usability	TBD
QA-006	Normal Usability Operations	TBD
QA-007	Confidentiality	TBD
QA-008	Authenticity	TBD
QA-009	Data Integrity	TBD
QA-010	Availability	TBD
QA-011	Non-repudiation	TBD
QA-012	Accountability	TBD
QA-013	Security Integration	TBD
QA-014	Performance	TBD
QA-015	Scalability	TBD
QA-016	Extensibility	TBD
QA-017	Adaptability	TBD
QA-018	Testability	TBD
QA-019	Auditability	TBD

QA-020	Operability and Deployability	TBD

7.4 Data Quality Dimensions

DQ ID	Description	Threshold
DQ-001	Accuracy	TBD
DQ-002	Believability	TBD
DQ-003	Reputation	TBD
DQ-004	Objectivity	TBD
DQ-005	Free-of-Error	TBD
DQ-006	Value Added	TBD
DQ-007	Relevance	TBD
DQ-008	Completeness	TBD
DQ-009	Timeliness	TBD
DQ-010	Appropriate Amount	TBD
DQ-011	Understandability	TBD
DQ-012	Interpretability	TBD
DQ-013	Concise Representation	TBD

7 Reference

7.5 Operation Policy

Policy ID	Description	Context	Importance (1-5)
OP-001	All the technological coordination constraints would be taken into consideration for improving the hospital information system coordination process	Operations	TBD
OP-002	All hospital related processes should be coordinate at a micro level	Operations	TBD
OP-003	Coordination Optimization should be done via automated tools	Operations	TBD
OP-004	If required specialized software should be utilized for enhancing total coordination with other systems.	Operations	TBD
OP-005	SMS alerts would be provided to intended people for rapid communication	Operations	TBD
OP-006	All coordination anomalies identified should be escalated to the anomalies management process.	Operations	TBD

7.6 KPI

Name	Acronym	Description	Context	Importance	Soft Threshold	Hard Threshold
Constraint accuracy rate	CAR	Percentage of identified constraint accuracy	TBD	TBD	TBD	TBD
Coordination accuracy	CA	Increase or decrease in the	TBD	TBD	TBD	TBD

		coordination task accuracy				
Coordination rate	**CR**	Number of coordinated activities	TBD	TBD	TBD	TBD
Coordination performance rate	**CPR**	Performance change due to coordination	TBD	TBD	TBD	TBD
Deadlock rate	**DR**	Number of deadlock encounter per process	TBD	TBD	TBD	TBD
Integration problem rate	**IPR**	The number of problems encountered per system integration	TBD	TBD	TBD	TBD
SMS rate	**SR**	Number of coordination sms send per day	TBD	TBD	TBD	TBD
Conflict resolution rate	**CRR**	Number of conflicts resolved per month	TBD	TBD	TBD	TBD

7.7 CTQ

Name	Acronym	Description	Context	Importance	Soft Threshold	Hard Threshold
Constraint accuracy rate	**CARV**	Standard Deviation of CAR	TBD	TBD	TBD	TBD

Coordination accuracy	CAV	Standard Deviation of CA	TBD	TBD	TBD	TBD
Coordination rate	CRV	Standard Deviation of CR	TBD	TBD	TBD	TBD
Coordination performance rate	CPRV	Standard Deviation of CPR	TBD	TBD	TBD	TBD
Deadlock rate	DRV	Standard Deviation of DR	TBD	TBD	TBD	TBD
Integration problem rate	IPRV	Standard Deviation of IPR	TBD	TBD	TBD	TBD
SMS rate	SRV	Standard Deviation of SR	TBD	TBD	TBD	TBD
Conflict resolution rate	CRRV	Standard Deviation of CRR	TBD	TBD	TBD	TBD
Motion Optimization Measure	MOM	Management of motion optimization measure	NA	TBD	TBD	TBD
Paper work Optimization Measure	PWOM	Management of Paper work Optimization Measure	NA	TBD	TBD	TBD
Correction reduction measure	CRM	Management of Correction reduction measure	NA	TBD	TBD	TBD

Materials Optimization Measure	IOM	Management of Materials Optimization Measure	NA	TBD	TBD	TBD
Transportation Optimization Measure	TOM	Management of Transportation Optimization Measure	NA	TBD	TBD	TBD
Waiting Reduction Measure	WRM	Management of Waiting reduction Measure	NA	TBD	TBD	TBD
Delays reduction measure	DRM	Management of delays reduction measure	NA	TBD	TBD	TBD

7.8 Abstract Time – Scale

Name	Acronym	Description	Quantification
TBD	TBD	TBD	TBD

7.9 SLA Terms

SLA ID	Description	Context	KPI	CTQ
TBD	TBD	TBD	TBD	TBD

7 Reference

7.10 Voice of Customer

VOC	Customer	Description	Perceived Value
Hygiene	Doctors, Patients, Nurses, Housekeeping Supervisors, Housekeepers, Clerks, Visitors, Environmental Services Management, Laundry worker, Transportation worker, Maintenance worker, Waste management worker.	The environment should be attributing with great hygiene level.	• High quality healthcare services • Safe environment • Low infection rate • Low risk
High and Consistent Quality of standards	Doctors, Patients, Nurses, Housekeeping Supervisors, Clerks, Environmental Services Management, Laundry worker, Transportation worker, Maintenance worker, Waste management worker, Housekeepers	High and Consistent Quality of standards.	• Reputation of organization or hospital • Professionalism • Trust • Positive psychological bias
Free of Infections	Doctors, Patients, Nurses, Housekeeping Supervisors, Clerks, Visitors, Environmental Services Management, Laundry worker, Transportation worker, Maintenance worker, Waste management worker, Housekeepers	Infections free and healthy environment.	• Safe environment • Reputation of hospital or organization • Trust • Quick healing • Positive psychological bias • Low risk

Timely Services	Doctors, Patients, Nurses, Housekeeping Supervisors, Visitors, Environmental Services Management, Laundry worker, Transportation worker, Maintenance worker, Waste management worker, Housekeepers	The response time for any request should be very short.	• Professionalism • Trust • Positive psychological bias • Reputation of hospital or organization • Safe environment
High Coordinating	Doctors, Patients, Nurses, Housekeeping Supervisors, Clerks, Environmental Services Management, Laundry worker, Transportation worker, Maintenance worker, Waste management worker, Housekeepers	There should be high level of coordination between hospital employees and departments.	• Professionalism • Trust • Low risk • Excellent Ergonomic
Remove Waste	Patients, Nurses, Housekeeping Supervisors, Clerks, Visitors, Environmental Services Management, Laundry worker, Transportation worker, Maintenance worker, Waste management worker, Housekeepers	Wastes should be either removed or minimized.	• Safe environment • Low infection rate • Low risk • Reputation of hospital or organization • Low cost • Timely response • High quality
Excellent Ergonomic	Doctors, Patients, Nurses, Housekeeping Supervisors, Clerks, Visitors, Environmental Services	The hospital environment and policy should comply with physical, organization	• Professionalism • Trust • Job accuracy • Excellent communication

	Management, Laundry worker, Transportation worker, Maintenance worker, Waste management worker, Housekeepers	and cognitive ergonomics.	• Low risk • Reputation of hospital or organization
Safety	Doctors, Patients, Nurses, Housekeeping Supervisors, Clerks, Visitors, Environmental Services Management, Laundry worker, Transportation worker, Maintenance worker, Waste management worker, Housekeepers	Hospital environment should comply with occupational health and safety procedures.	• Safe environment • Professionalism • Low risk
Appearance	Housekeeping Supervisors, Environmental Services Management, Laundry worker, Transportation worker, Maintenance worker, Waste management worker, Housekeepers	The appearance of the workers, supervisors and manager should induce positive biases.	• Professionalism • Reputation of hospital or organization • Trust • Positive psychological bias
Excellent Worker Attitude	Housekeeping Supervisors, Environmental Services Management, Laundry worker, Transportation worker, Maintenance worker, Waste management worker, Housekeepers	The environment service employee should be free from negative attitudes.	• Professionalism • Reputation of hospital or organization • Trust • Positive psychological bias • Minimum disputes • Less employee turn over

7 Reference

7.11 Customer Context Matrix

Name of Customer	Acronym	Context of Customer	Coordination Process Area
Doctors	DOC	Direct	HIS Coordination
Patients	PAT	Direct	HIS Coordination
Nurses	NUR	Direct	HIS Coordination, Nurse Coordination
Housekeeping Supervisors	HKS	Direct	Quality Coordination, Nurse Coordination, infection control coordination
Clerks	CLR	Direct	HIS Coordination
Visitors	VIS	Indirect	HIS Coordination
Environmental Services Management	ESM	Direct	Nurse Coordination, infection control coordination
Other hospital workers	OHW	Indirect	Security coordination
Laundry worker	LDW	Direct	Nurse Coordination, HIS Coordination
Transportation worker	TRW	Direct	Quality Coordination, HIS Coordination
Maintenance worker	MAW	Direct	Quality Coordination, HIS Coordination
Waste management worker	WMW	Direct	Quality Coordination, HIS Coordination

Infection control professional	ICP	Indirect	infection control coordination
Housekeepers	HK	Direct	HIS Coordination, Hospital Information System Coordination

7.12 MSD Attributes

MSD Attribute	Description
Lifting/carrying	Large vertical movements, long carry distances.
Disability	Pose a risk to those with a health problem or a physical or learning disability.
Force	High initial forces to get the load moving.
Loaded motion	High forces to keep the load in motion.
Physical ergonomics	Constraints on body posture/positioning, confined spaces/narrow doorways.
Posture change	Strong force and awkward movement/posture. E.g. bent wrists.
Excessive force	Excessive force to grip raw materials, product or tools
Scarceness	Inadequate tools for repetitive use screwdrivers, pliers, hammers.
Noise	Noise which cause stress and muscle tension.
Concentration	Tasks require high levels of attention/concentration especially where the worker has little control over allocation of effect to the task.
Floor hazards	Remove slip and trip hazards through provision of appropriate floor surfaces and good keeping.
Clothing	Clothing/PPE may prevent sufficient movement for the task or reduce capability. E.g. to grip consider handling needs when selecting work wear/gloves.

Psychosocial factors	Adverse psychosocial factors can increase the potential for manual handling injuries. A workers psychosocial response to work and the workplace conditions can affect their health in general and MSDs in particular. The factors include the content, design, organization and management of the work

Glossary / Acronyms

8 Glossary / Acronyms

Terminology	Description
Abstract Time Scale	Time Scale that will be quantified both during operations and continuous process improvement. These time identifiers are correlated with the soft thresholds that are dynamically specified during life span of the process.
BPMN	**Business Process Modelling Notation** Business Process Modelling Notation is the practice of documenting an organisation's key business processes in a graphical format.
Business Rules	Business Rules are intended to assert business structure or to control or influence the behaviour of the Business. Business rules describe the operations, definitions and constraints that apply to an organization
CRR	Contract Review Rate
CRRV	Contract Review rate Variation.
CTQ	**Critical to Quality** Critical To Quality (CTQ) is continuous measuring and monitoring tool agreed between the internal processes to achieve greater customer satisfaction.
COI	Chain of infection
Data Quality Dimensions	The totality of features and characteristics of data that bears on their ability to satisfy a given purpose
EBC	Evidence Based Cleaning
ESM	Environmental services Map
KPI	**Key Performance Indicator** A metric that is used to help manage a process, IT service or activity. Many metrics may be measured, but only the most important of these are defined as KPIs and used to actively manage and report on the process, IT service or activity. KPIs should be selected to ensure that efficiency, effectiveness, and cost effectiveness are all managed.
MSD	Macro Skeleton Disorder

8 Glossary / Acronyms

OLA	**Organization level Agreement** An Agreement between an IT Service Provider and another part of the same Organization
Operational Policy	Rules defined to operate the process.
Quality Attributes	Quality attributes are non-functional requirements used to evaluate the performance of a process.
Risk	A possible event that could cause harm or loss, or affect the ability to achieve Objectives. A risk is measured by the probability of a threat, the vulnerability of the asset to that threat, and the impact it would have if it occurred.
SLA	**Service Level Agreement** An Agreement between an IT Service Provider and a Customer. The SLA describes the IT Service, documents Service Level Targets, and specifies the responsibilities of the IT Service Provider and the Customer
VOC	**Voice of Customer**

Appendix A: Business Process Modeling Notation Reference

APPENDIX.

A

9 Appendix A: Business Process Modeling Notation Reference

INTRODUCTION

Business Process Modelling ("BPM") is the practice of documenting an organisation's key business processes in a manner which:

- Is highly graphical
- Focuses on business terminology rather than technical
- Allows all business steps/tasks to be included, not just those which involve a computer system

Mentioned below are the various core concepts of BPMN with the relevant definition and graphic notation.

PROCESS START

All processes have to start somehow, general notation for a process models commence with the START event, is a circle.	◯
One can use simply the *basic unmarked* start event as above, or one of the different types of start event, to provide more detail as described below.	
If a process starts when some sort of message arrives, mail, email, text. Following notation can be used	**Message start** ✉
If a process starts by virtue of the passage of time – e.g. 1st Jan review or 4 days after the purchase order is sent, following notation can be used	**TIMER Start** 🕒
If the process starts when a rule/condition is met – e.g. when Incident Impact is more than 100,000.	**RULE Start** ▤
If a process starts when another process finishes. Following notation can be used	**LINK Start** ➡
If there is more than one 'trigger' for a process to start. Following notation can be used	**MULTIPLE Start** ✹

9 Appendix A: Business Process Modeling Notation Reference

TASK AND SUB PROCESS

Task	Task is a lowest level activity in a process map. A task is used when the work is not broken down to a finer level of detail	My Task
Sub Process	A Sub-process is a compound activity which can be broken down into finer details.	Sub-process #1
Loops	Loops task or sub process continues to iterate until the loop condition is true.	Review

INTERMEDIATE EVENTS

Following notation can be used to display the intermediate event, similar to start and end events.						
	BASIC	MESSAGE	TIMER	RULE	LINK	MULTIPLE
	⬤	✉	🕐	📋	➡	★

PROCESS END

All processes have to end somehow, general notation for a process models end will be a circle with a solid line.	◯

One can use simply use the *basic* end event as above, or you can use one of the different types of end event, to provide more detail, as described below:

If a process ends by something being sent via a message of some sort e.g., mail, email, document, following notation can be used.	**MESSAGE End** ✉
If the end of this process causes the start of another, following notation can be used.	**LINK End** ➡
If more than one consequence of the process ending, following notation can be used.	**MULTIPLE End** ✴

SWIMLANES

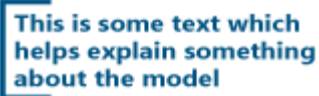|		
Pool	A *Pool* represents a participant in a Process. It is also acts as a "swimlane" and a graphical container for partitioning a set of activities from other Pools	Name
Lane	A *Lane* is a sub-partition within a Pool and will extend the entire length of the Pool, either vertically or horizontally. Lanes are used to organize and categorize activities.	Name

CONNECTORS

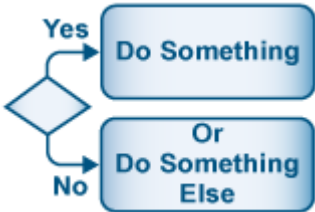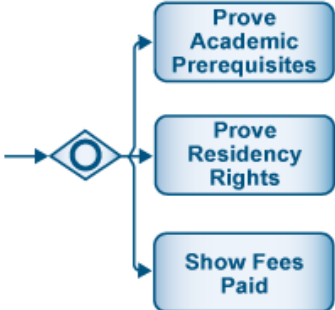|		
Sequence Flow	A *Sequence Flow* is represented by a solid line with a solid arrowhead (see the figure to the right) and is used to show the order (the sequence) that activities will be performed in a Process.	⟶

9 Appendix A: Business Process Modeling Notation Reference

Message Flow	A *Message Flow* is represented by a dashed line with an open arrowhead (see the figure to the right) and is used to show the flow of messages between two separate Process Participants. In BPMN, two separate Pools in the Diagram will represent the two Participants.	

ARTIFACTS

Annotation	The ANNOTATION shape is used to add comments to a process model. It consists of text in a square left bracket	This is some text which helps explain something about the model
Data Object	A data object represents a piece of data which is required or produced by the process eg. Customer details, output.	Application Form
Group	A grouping is purely for documentation or explanatory purposes. It has no impact on the model. It consists of a rectangle with dashed lines and rounded corners, usually enclosing other objects.	

GATEWAYS

Exclusive	The values of the process are examined to determine which path to take	Yes → Do Something / Or Do Something Else ← No

9 Appendix A: Business Process Modeling Notation Reference

Inclusive	Each branch will be evaluated and will not stop when one branch condition becomes true.	
Parallel	Provides a mechanism to synchronise parallel flow and to create parallel flow.	

Appendix B: Chain of Infection

APPENDIX.

B

In order to control or prevent infection it is essential to understand that transmission stages of a pathogen resulting in infection requires the six vital links (Refer to the table below).

Each link mentioned below must be present for infection or colonization to proceed, and breaking any of the links can prevent the infection.

The section below details out the six stages:

Stage	Link	Description
1	Infectious Agent	Any disease-causing microorganism (pathogen)
2	The Reservoir Host	The organism in which the infectious microbes reside
3	The Portal of Exit	Route of escape of the pathogen from the reservoir.
4	The Route of Transmission	Method by which the pathogen gets from the reservoir to the new host
5	The Portal of Entry	Route through which the pathogen enters its new host
6	The Susceptible Host	The organism that accepts the pathogen

Link 1: Infectious Agent

The causative agent for infection is any microorganism capable of producing disease. Microorganisms responsible for infectious diseases include bacteria, viruses, rickettsiae, fungi, and protozoa. Sometimes, microorganisms are part of patient's own body flora and can cause infection in the immunocompromised host. These infections are called endogenous infections. Infections which are acquired from external sources are called exogenous infections.

Link 2: Reservoir Host

The second link in the chain of infection is the reservoir, i.e. the environment or object in or on which a microorganism can survive and, in some cases, multiply. Inanimate objects, human beings, and animals can all serve as reservoirs, providing the essential requirements for a microorganism to survive at specific stages in its life cycle.

Infectious reservoirs abound in health care settings, and may include everything from patients, visitors, and staff members to furniture, medical equipment, medications, food, water, and blood.

Link 3: Portal of Exit

The portal of exit is the path by which an infectious agent leaves its reservoir. Usually, this portal is the site where the microorganism grows. Common portals of exit associated with human reservoirs include the respiratory, genitourinary, and gastrointestinal tracts, the skin and mucous membranes and the placenta (transmission from mother to fetus)

Link 4: Route of Transmission

The microorganism can be acquired by inhalation (through respiratory tract), ingestion (through gastrointestinal tract), inoculation (through accidental sharp injury or bites), contact (during sexual intercourse) and transplacental transmission (microbes may cross placenta from the mother to fetus). It is important to remember that some microorganisms use more than one transmission route to get from the reservoir to a new host.

Of the six links in the chain of infection, the mode of transmission is the easiest link to break and is key to control of cross-infection in hospitals.

Link 5: The Portal of Entry

The portal of entry is the path by which an infectious agent invades a susceptible host. Usually, this path is the same as the portal of exit. For example, the portal of entry for tuberculosis and diphtheria is through the respiratory tract, hepatitis B and Human Immunodeficiency Virus enter through the bloodstream or body fluids and Salmonella enters through the gastrointestinal tract. In addition, each invasive device, e.g. intravenous line, creates an additional portal of entry into a patient's body thus increasing the chance of developing an infection.

Link 6: The Susceptible host

The final link in the chain of infection is the susceptible host. The human body has many defense mechanisms for resisting the entry and multiplication of pathogens. When these mechanisms function normally, infection does not occur. However, in immunocompromised patients, where the body defenses are weakened, infectious agents are more likely to invade the body and cause an infectious disease. In addition, the very young and the very old are at higher risk for infection because in the very young the immune system does not fully develop until about age 6 months, while old age is associated with declining immune system function as well as with chronic diseases that weaken host defenses.