

# Infection Quality Management

V.01

December 2020



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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

## Change Control

Version:	Date:	Changes:

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## Purpose



# 1 Purpose

## 1. PURPOSE

The purpose of this document is to establish Infection Quality Management process for the environmental Services department environmental such that infection control related performance is well tracked, monitored and reported.

This process would be 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 Infection Quality Management process document comprises the following chapters:

**Chapter–3:** Scope: This chapter describes the scope of the document and the Infection Quality Management.

**Chapter–4:** General Assumptions: This chapter describes the underlined assumptions made for both the document and Infection Quality Management process.

**Chapter–5:** Infection Quality Management Framework: This chapter exhibits the interaction of Infection Quality Management process with other related processes.

**Chapter–6:** Infection Quality Management Process: In this chapter Infection Quality Management 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 Infection Quality Management 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 Infection Quality Management process.

## Scope



# 3 Scope

## 3. SCOPE

This process is applicable to infection control methods and process undertaken at the organization.

## General Assumptions



## 4. GENERAL ASSUMPTIONS

Following are the general assumptions made for this process:

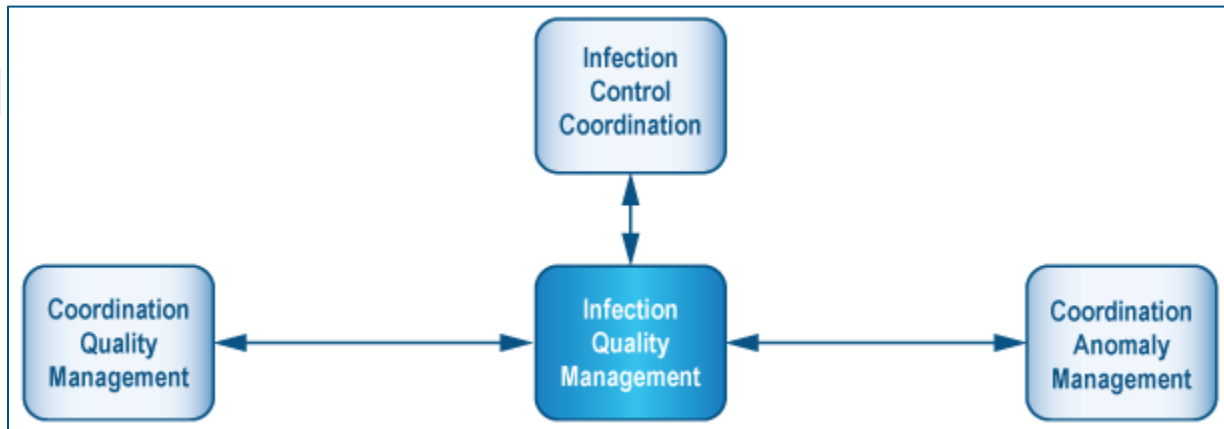
- There exists an automated capability to monitor infection management process's performance.
- The roles defined in all processes within this document can be attached to the existing position
- Any activity related assumptions are explicitly identified in related Process Specification table in Chapter 6.

## Infection Quality Management Framework



## 5.1 Infection Quality Management Interactions

The following depiction shows the points of interaction of Environmental Services Infection Quality Management process with other related processes. The arrows moving into Infection Quality Management process signifies the inputs from the other processes to Infection Quality Management Process, and the arrows moving out of the Infection Quality Management process signify the outputs from Infection Quality Management process to other related processes.



## 5.2 Infection Quality Management Process Sequence

The Infection Quality Management process comprises of following high level sequence of activities:

1. Monitor & control Infection management performance
2. Initiate performance degradation Report
3. Track & Manage performance degradation Report

Environmental Services department's Infection Quality Management process follows sequential steps mentioned below (**Section 5.2.1-5.2.5**). **Section 6.1** Process Model sheds more light on the flow of this process.



## 5.2.1 Monitor & Analyze Infection Management Performance

This process is responsible for collecting and recording of performance data for infection management and evaluating against:

- Endorsed Infection Management standards
- Relevant Infection metrics (performance target, etc)

The fact finding activity can be undertaken by:

- Audits. This comprises of performing regular audits, planned as well as unplanned and identify any deviations with regards to infection control.
- Electronic ATP Devices. Electronic Adenosine tri phosphate detection devices.
- Sampling. This involves deviation results obtained from air, water and surface sampling.

## 5.2.2 Initiate performance degradation report

This process is responsible for creating infection Management degradation report in case any deviation is identified.

This process establishes an infection Management performance degradation report which comprises of

- Report id,
- Description,
- Performance issue,
- Environmental impact,
- Time and date of report,
- Current status,
- Closure time and date.

In case the environmental impact of the infection management deviation is high, contingency plan may be kicked in for faster restoration of normalcy.

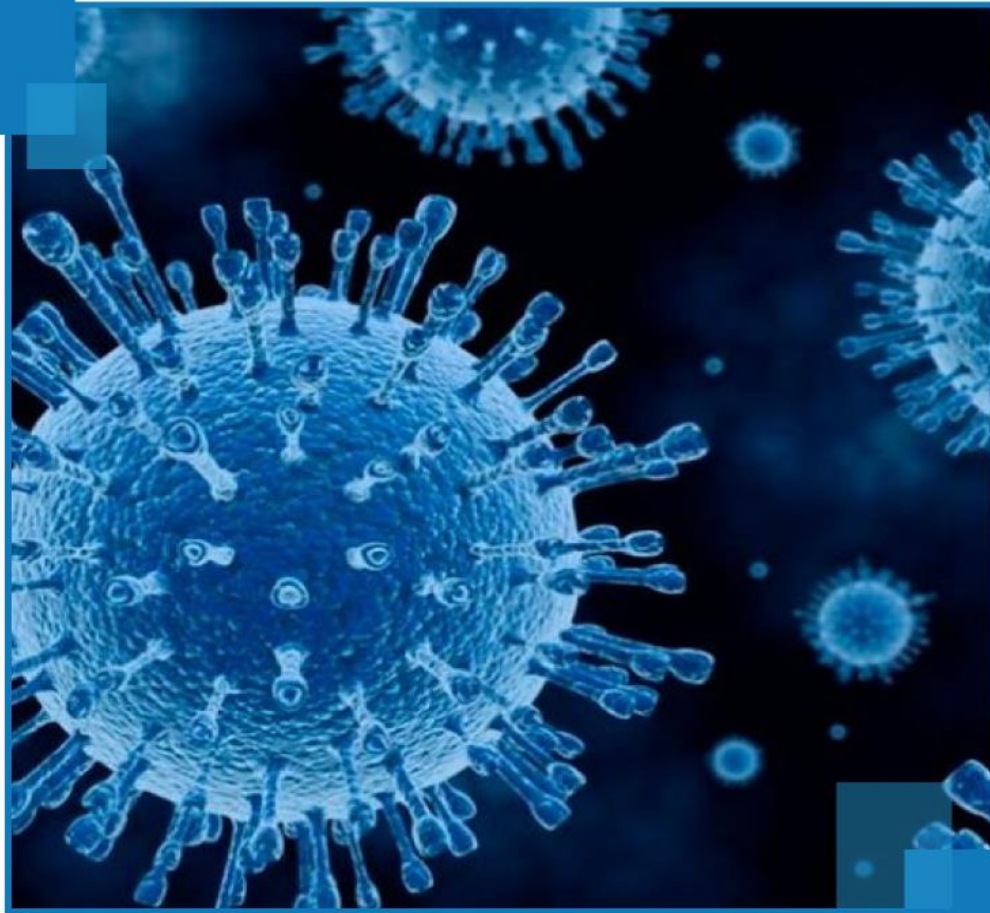
## 5.2.3 Track and Manage performance degradation Report

This process ensures that:

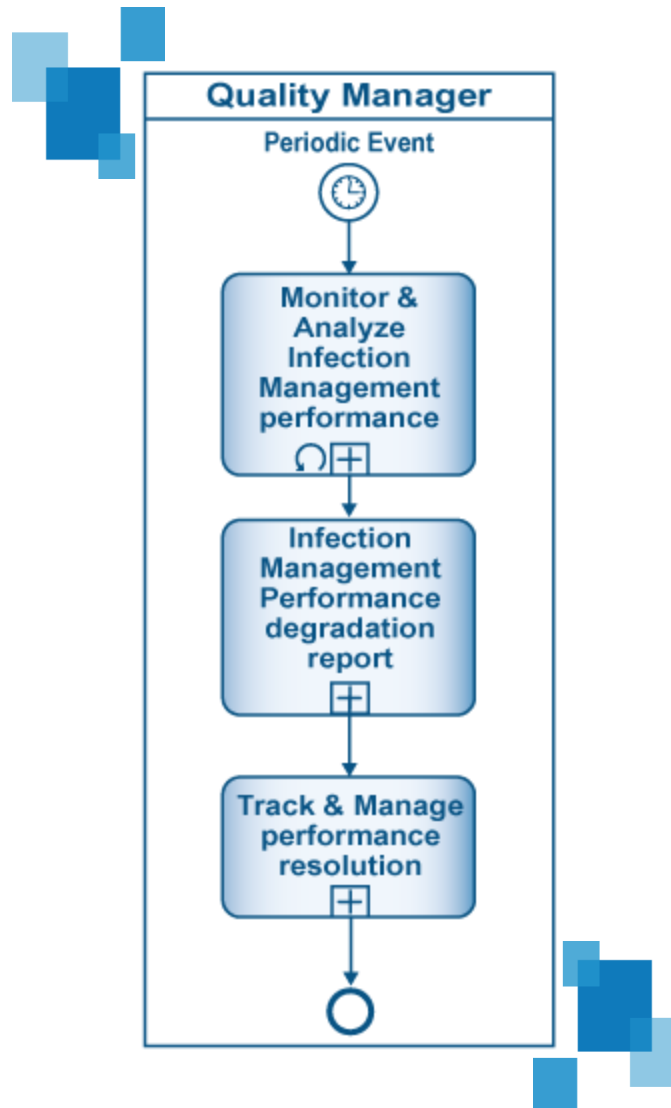
- The restoration activities are managed properly.
- This process is responsible to manage interactions with the infection Control team on the resolution progress and update the performance degradation report on the current status. Resolution can be one of the following:
  - Eradication of infection source

- Reducing the concentration
- The infection Management degradation report is closed once the problem has been resolved.
- The relevant senior management is notified on the resolution.

## Infection Quality Management Process



## 6.1 Infection Quality Management – Process



## 6.2 Infection Quality Management – Specification

Specification	Description
<b>Summary/Purpose</b>	The purpose of this process is to establish Infection Quality Management process.
<b>Scope</b>	This is a level 1 Process Specification.
<b>Primary Reference</b>	<ul style="list-style-type: none"> <li>Lean six sigma- Quality Standard</li> </ul>
<b>Related ESM Practices</b>	Infection control coordination, coordination quality management, coordination anomaly management
<b>Related Business Driver</b>	Infection Management process Performance improvisation
<b>Related Operational Policies</b>	OP-001, OP-002, OP-003 (Ref. 7.5)
<b>Assumptions</b>	There exists a capability at environmental Services department to monitor Infection performance.
<b>Voice of Customer</b>	Infection, 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)
<b>Customer Satisfaction Measure</b>	Customer satisfaction index
<b>COI Correlation</b>	Link1, Link 2, Link 4, Link 5, Link 6
<b>Raw Materials</b>	None
<b>Equipment &amp; Accessories</b>	Automated System for Infection Quality management.

<b>MSD Management</b>	Lifting/carrying, Disability, Force, Loaded motion, Physical ergonomics, Posture change, Excessive force, Scarceness, Noise, Concentration, Floor hazards, Clothing, Psychosocial factors. (Ref 7.12)						
<b>EBC Procedures</b>	None						
<b>Timing Dimension</b>	<table border="1"> <thead> <tr> <th>Type</th> <th>Normal</th> </tr> </thead> <tbody> <tr> <td>Average</td> <td>30 min</td> </tr> <tr> <td>Std</td> <td>12 min</td> </tr> </tbody> </table>	Type	Normal	Average	30 min	Std	12 min
Type	Normal						
Average	30 min						
Std	12 min						
<b>Trigger</b>	<ul style="list-style-type: none"> <li>Period event</li> </ul>						
<b>Basic Course of Event</b>	<p><b>Infection Quality Management</b></p> <ol style="list-style-type: none"> <li>Quality Manager monitors and analyzes Infection Management process</li> <li>Quality Manager initiates Infection Management performance degradation report.</li> <li>Quality Manager tracks and manages performance resolution.</li> <li>End</li> </ol>						
<b>Alternative Path</b>	None						
<b>Exception Path</b>	<p><b>System Down</b></p> <ol style="list-style-type: none"> <li>Keep paper track until system is up and running</li> <li>Update the System and clear all logs.</li> <li>End.</li> </ol>						
<b>Extension points</b>	Infection control coordination, coordination quality management, coordination anomaly management						
<b>Preconditions</b>	Infection Management process is established and regularly monitored.						
<b>Post -conditions</b>	Infection management's performance gets evaluated.						
<b>Related Business Rules</b>	BR-001, BR-002, BR-003 (Ref 7.1)						
<b>Related Risks</b>	RR-001, RR-002 (Ref. 7.2)						

<b>Related Quality Attributes</b>	Reliability, Usability, Data Integrity, Non-repudiation, Accountability, Performance, Auditability, Service reliability, confidentiality, authenticity, availability, non repudiation, testability (Ref 7.3)
<b>Related Data Quality Dimensions</b>	Accuracy, Objectivity, Relevance, Completeness, timeliness, Understandability, interpretability, Reputation, Objectivity, Free-Of Error, Relevance, Completeness, Timeliness, Concise Representation (Ref 7.4)
<b>Related Primary SLA Terms</b>	TBD (Ref 7.9)
<b>Related KPIs</b>	IMDR,IMDSR, CR, AR, DR, DRR (Ref 7.6)
<b>Related CTQs</b>	IMDRV, IMDSRV, DRV, DRRV, CRV, ARV, MOM, PWOM, CTQ, IOM, TOM, WRM, DRM (Ref 7.7))
<b>Actors/Agents</b>	Quality Manager
<b>Delegation</b>	<p><u>Delegation Rule -1: Agent Not Available</u></p> <ol style="list-style-type: none"> <li>1. Delegate the Issue to additional Agent with same Role</li> <li>2. Update the Issue</li> <li>3. Log the Delegation</li> </ol> <p><u>Delegation Rule -2: Agent Overloaded</u></p> <ol style="list-style-type: none"> <li>1. Delegate the Issue to additional Agent with same Role</li> <li>2. Update the Issue</li> <li>3. Log the Delegation</li> </ol>
<b>Escalation</b>	<p><u>Rule 1: Performance or operational or legal Issues</u></p> <ol style="list-style-type: none"> <li>1. Escalate to environmental services department head.</li> <li>2. Log Escalation</li> </ol>
<b>Process Map</b>	Section 5.1
<b>Process Model</b>	Section 6.1

**Other References**

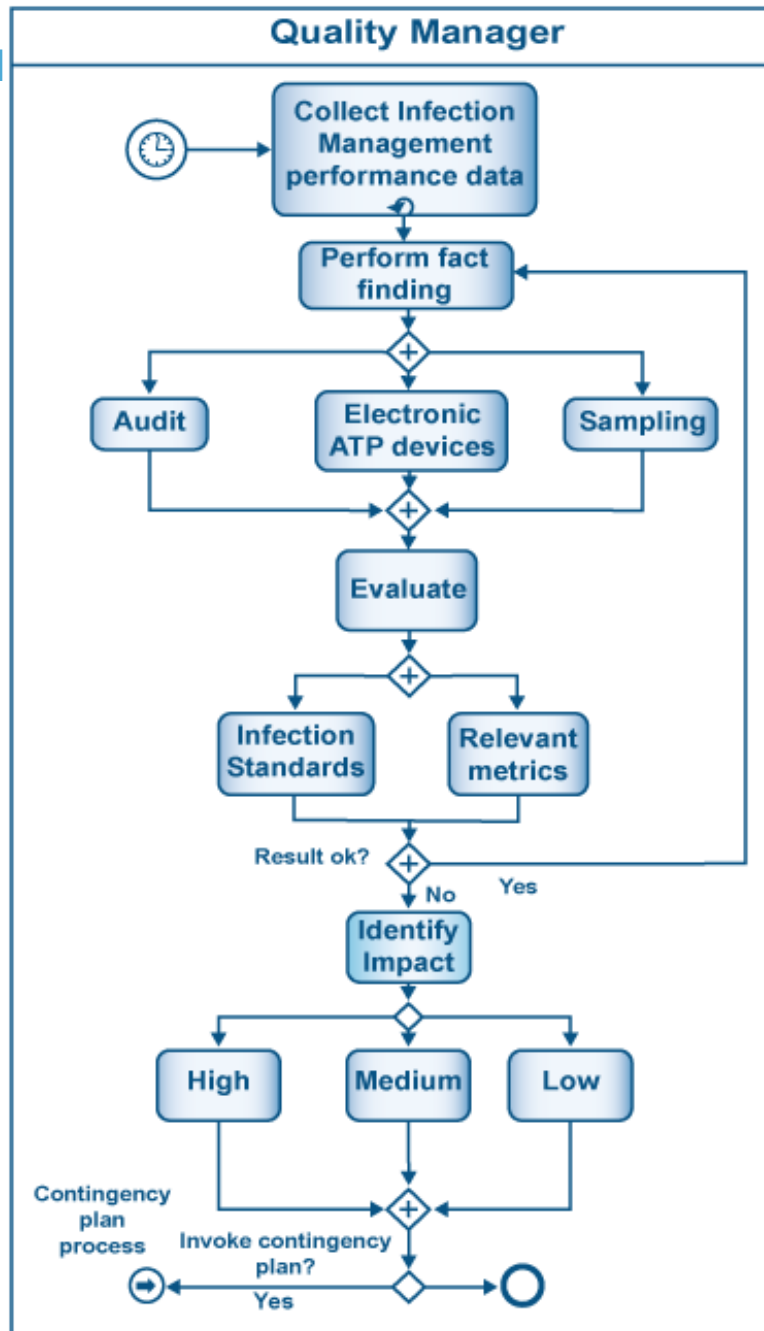
Appendix A: Business Process Modeling Notation Reference  
Appendix B: Chain of Infection

## 6.3 Infection Quality Management – Roles & Responsibilities

Roles	Responsibilities
<b>Quality Manager</b>	<ul style="list-style-type: none"><li>• Quality Manager monitors and analyzes Infection Management process</li><li>• Quality Manager identifies type of Infection hazard.</li><li>• Quality Manager tracks and manages performance resolution.</li></ul>



## 6.4 Sub Process – Monitor & Analyze Infection Management process Performance



## 6.5 Sub Process – Monitor & Analyze Infection Management Process Performance Specification

Specification	Description
<b>Summary/Purpose</b>	The purpose of this process is to monitor and analyze Infection Management Process performance
<b>Scope</b>	This is a level 2 Process Specification.
<b>Primary Reference</b>	Lean six sigma- Quality Standard
<b>Related ESM Practices</b>	Infection control coordination, coordination quality management, coordination anomaly management
<b>Related Business Driver</b>	Evaluation of Infection Management process' quality of service
<b>Related Operational Policies</b>	OP-002 (ref. 7.5)
<b>Assumptions</b>	Senior management support is available to this process.
<b>Voice of Customer</b>	Infection, 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)
<b>Customer Satisfaction Measure</b>	Customer satisfaction index
<b>COI Correlation</b>	Link1, link2, link 4
<b>Raw Materials</b>	None
<b>Equipment &amp; Accessories</b>	Automated System for Infection Quality management, Electronic hazard identification tool

<b>MSD Management</b>	Lifting/carrying, Disability, Force, Loaded motion, Physical ergonomics, Posture change, Excessive force, Scarceness, Noise, Concentration, Floor hazards, Clothing, Psychosocial factors. (Ref 7.12)						
<b>EBC Procedures</b>	None						
<b>Timing Dimension</b>	<table border="1"> <thead> <tr> <th>Type</th> <th>Normal</th> </tr> </thead> <tbody> <tr> <td>Average</td> <td>30 min</td> </tr> <tr> <td>Std</td> <td>12 min</td> </tr> </tbody> </table>	Type	Normal	Average	30 min	Std	12 min
Type	Normal						
Average	30 min						
Std	12 min						
<b>Trigger</b>	<ul style="list-style-type: none"> <li>Periodic activity.( monthly or quarterly)</li> </ul>						
<b>Basic Course of Event</b>	<p><b>Infection quality management</b></p> <ol style="list-style-type: none"> <li>Quality manager collects the infection management performance data</li> <li>Quality manager performs facts finding exercise via periodic audits electronic atp devices and sampling.</li> <li>Quality manager evaluates infection standards and infection metrics.</li> <li>Ends.</li> </ol>						
<b>Alternative Path</b>	<p><b>Infection Quality Management( not okay)</b></p> <ol style="list-style-type: none"> <li>Quality Manager identifies business Impact (high, medium, low)</li> <li>End</li> </ol> <p><b>Infection Quality Management( contingency plan)</b></p> <ol style="list-style-type: none"> <li>Quality Manager identifies business Impact (high, medium, low)</li> <li>For higher impact situations Quality Manager invokes Infection Management contingency plan.</li> <li>End</li> </ol>						
<b>Exception Path</b>	<p><b>System down</b></p> <ol style="list-style-type: none"> <li>Keep paper track until system is up and running</li> <li>Update the system and clear all logs.</li> <li>End.</li> </ol>						
<b>Extension points</b>	Infection contingency plan, degradation report						

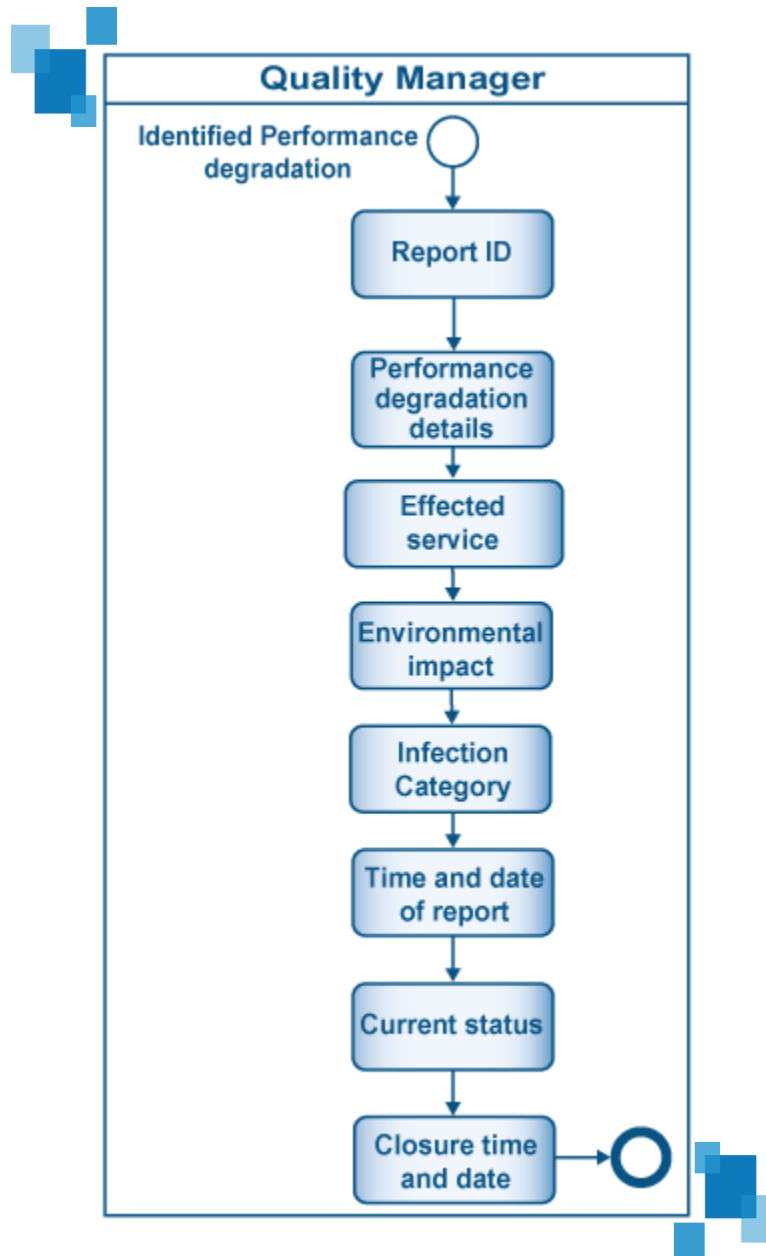
<b>Preconditions</b>	Infection Management standards already exists. Infection Management performance metrics are established.
<b>Post -conditions</b>	Infection Management performance gets analyzed.
<b>Related Business Rules</b>	Br-002, br-003 (ref 7.1)
<b>Related Risks</b>	Rr-001, rr-003(ref. 7.2)
<b>Related Quality Attributes</b>	Reliability, Usability, Data Integrity, Non-repudiation, Accountability, Performance, Auditability (Ref 7.3)
<b>Related Data Quality Dimensions</b>	Accuracy, Objectivity, Relevance, Completeness, timeliness, Understandability, interpretability (Ref 7.4)
<b>Related Primary SLA Terms</b>	Tbd (ref 7.9)
<b>Related KPIs</b>	Ar, cr, dr (ref 7.6)
<b>Related CTQs</b>	Arv, crv , drv (ref 7.7)
<b>Actors/Agents</b>	Quality manager
<b>Delegation</b>	<u>Delegation rule -1: agent not available</u> <ol style="list-style-type: none"> <li>1. Delegate the issue to additional agent with same role</li> <li>2. Update the issue</li> <li>3. Log the delegation</li> </ol> <u>Delegation rule -2: agent overloaded</u> <ol style="list-style-type: none"> <li>1. Delegate the issue to additional agent with same role</li> <li>2. Update the issue</li> <li>3. Log the delegation</li> </ol>
<b>Escalation</b>	<u>Rule 1: Performance, operational legal Issues</u> <ol style="list-style-type: none"> <li>1. Escalate to environmental services department head.</li> <li>2. Log Escalation</li> </ol>

<b>Process Map</b>	Section 5.1
<b>Process Model</b>	Section 6.4
<b>Other References</b>	Appendix a: business process modeling notation reference Appendix b: chain of infection

## 6.6 Sub process – Monitor & Analyze infection Management Process Performance – Roles & Responsibilities

Roles	Responsibilities
<b>Quality Manager</b>	<ul style="list-style-type: none"> <li>Quality Manager collects the Infection Management performance data</li> <li>Quality Manager performs fact finding</li> <li>Quality manager evaluates Infection standards and Infection metric</li> <li>Quality Manager identifies business Impact (high, medium, low)</li> <li>For higher impact situations Quality Manager invokes Infection Management contingency plan.</li> </ul>

## 6.7 Sub process – Infection Management performance degradation Report



## 6.8 Sub process – Infection Management performance degradation report Specifications

Specification	Description
<b>Summary/Purpose</b>	The purpose of this process is to create Infection Management performance degradation report.
<b>Scope</b>	This is a level 2 Process Specification.
<b>Primary Reference</b>	Lean six sigma- Quality Standard
<b>Related ESM Practices</b>	Infection control coordination, coordination quality management, coordination anomaly management
<b>Related Business Driver</b>	Establishing the record of Infection Management processes quality performance failure.
<b>Related Operational Policies</b>	OP-001, OP-003 (ref. 7.5)
<b>Assumptions</b>	Quality Performance failures have been accurately identified.
<b>Voice of Customer</b>	Infection, 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)
<b>Customer Satisfaction Measure</b>	Customer satisfaction index
<b>COI Correlation</b>	None
<b>Raw Materials</b>	None
<b>Equipment &amp; Accessories</b>	Automated System for Infection Quality management

<b>MSD Management</b>	Lifting/carrying, Disability, Force, Loaded motion, Physical ergonomics, Posture change, Excessive force, Scarceness, Noise, Concentration, Floor hazards, Clothing, Psychosocial factors. (Ref 7.12)						
<b>EBC Procedures</b>	None						
<b>Timing Dimension</b>	<table border="1"> <thead> <tr> <th>Type</th> <th>Normal</th> </tr> </thead> <tbody> <tr> <td>Average</td> <td>30 min</td> </tr> <tr> <td>Std</td> <td>12 min</td> </tr> </tbody> </table>	Type	Normal	Average	30 min	Std	12 min
Type	Normal						
Average	30 min						
Std	12 min						
<b>Trigger</b>	Identified performance degradation						
<b>Basic Course of Event</b>	<p><b>Infection quality management</b></p> <ol style="list-style-type: none"> <li>1. Quality manager establishes a report id</li> <li>2. Quality manager establishes performance degradation details</li> <li>3. Quality manager identifies the effected service</li> <li>4. Quality manager identifies environmental impact.</li> <li>5. Quality manager identifies time and date of the report</li> <li>6. Quality manager updates the current status from time to time based on the progress</li> <li>7. Quality manager enters the closure time and date upon completion of the service degradation report</li> <li>8. Ends.</li> </ol>						
<b>Alternative Path</b>	None						
<b>Exception Path</b>	<p><b>System down</b></p> <ol style="list-style-type: none"> <li>1. Keep paper track until system is up and running</li> <li>2. Update the system and clear all logs.</li> <li>3. End.</li> </ol>						
<b>Extension points</b>	Track and Manage Infection Management performance						
<b>Preconditions</b>	Identification of quality performance failure.						
<b>Post -conditions</b>	Degradation report gets formulated.						

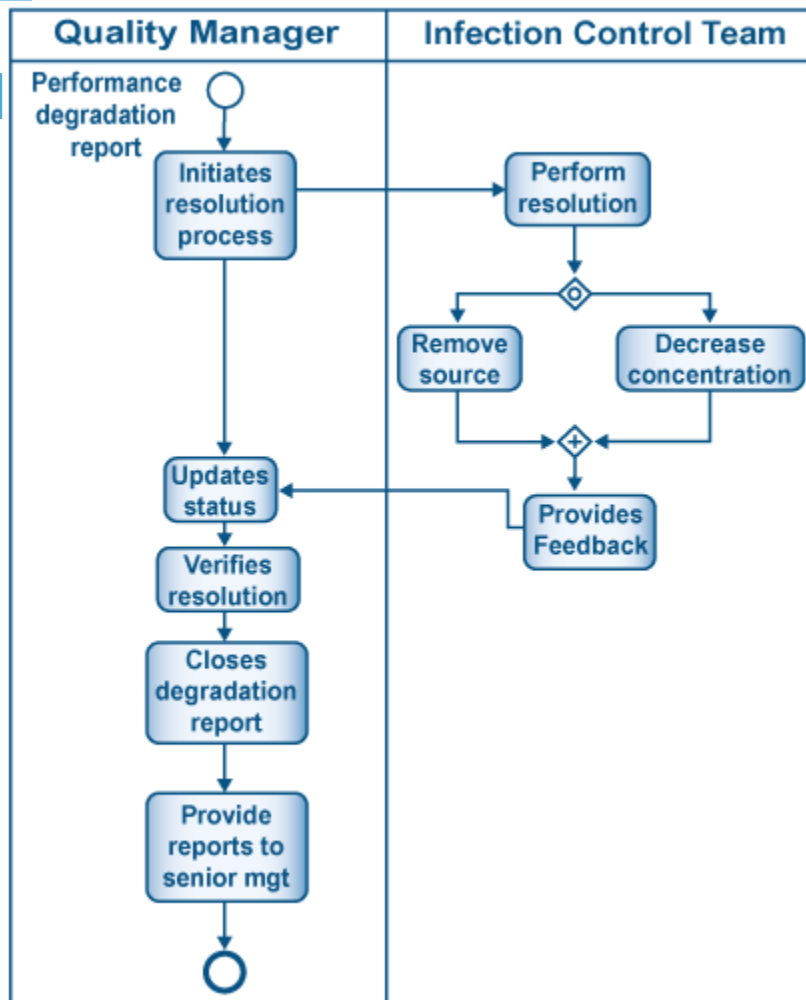


<b>Related Business Rules</b>	Br-002 (ref 7.1)
<b>Related Risks</b>	Rr-001 (ref 7.2)
<b>Related Quality Attributes</b>	Reliability, Usability, Data Integrity, Non-repudiation, Accountability, Performance, Auditability, confidentiality, (Ref 7.3)
<b>Related Data Quality Dimensions</b>	Accuracy, Objectivity, Relevance, Completeness, timeliness, Understandability, interpretability, free of error, concise representation (Ref 7.4)
<b>Related Primary SLA Terms</b>	Tbd (ref 7.9)
<b>Related KPIs</b>	Drr(ref 7.6)
<b>Related CTQs</b>	Drrv(ref 7.7)
<b>Actors/Agents</b>	Quality manager.
<b>Delegation</b>	<p><u>Delegation rule -1: agent not available</u></p> <ol style="list-style-type: none"> <li>1. Delegate the issue to additional agent with same role</li> <li>2. Update the issue</li> <li>3. Log the delegation</li> </ol> <p><u>Delegation rule -2: agent overloaded</u></p> <ol style="list-style-type: none"> <li>1. Delegate the issue to additional agent with same role</li> <li>2. Update the issue</li> <li>3. Log the delegation</li> </ol>
<b>Escalation</b>	<p><u>Rule 1: Performance, operational legal Issues</u></p> <ol style="list-style-type: none"> <li>1. Escalate to environmental services department head.</li> <li>2. Log Escalation</li> </ol>
<b>Process Map</b>	Section 5.1
<b>Process Model</b>	Section 6.7
<b>Other References</b>	Appendix a: business process modeling notation reference

## 6.9 Sub Process – Infection Management Performance Degradation Report- Roles & Responsibilities

Roles	Responsibilities
Quality Manager	Quality Manager establishes Infection Management performance degradation report.

## 6.10 Sub Process – Track & Manage Infection Management Performance Resolution



## 6.11 Sub Process – Track & Manage Infection Management Performance resolution Specification

Specification	Description
<b>Summary/Purpose</b>	The purpose of this process is to track and manage Infection Management performance.
<b>Scope</b>	This is a level 2 Process Specification.
<b>Primary Reference</b>	Lean six sigma- Quality Standard
<b>Related ESM Practices</b>	Infection control coordination, coordination quality management, coordination anomaly management
<b>Related Business Driver</b>	Faster correction of identified performance degradation.
<b>Related Operational Policies</b>	OP-001 (ref 7.5)
<b>Assumptions</b>	Infection Control team is supportive in rectifying the performance degradation caused.
<b>Voice of Customer</b>	Infection, 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)
<b>Customer Satisfaction Measure</b>	Customer satisfaction index
<b>COI Correlation</b>	Link 1, link 2, link 4
<b>Raw Materials</b>	None
<b>Equipment &amp; Accessories</b>	Automated System for Infection Quality management

<b>MSD Management</b>	Lifting/carrying, Disability, Force, Loaded motion, Physical ergonomics, Posture change, Excessive force, Scarceness, Noise, Concentration, Floor hazards, Clothing, Psychosocial factors. (Ref 7.12)						
<b>EBC Procedures</b>	None						
<b>Timing Dimension</b>	<table border="1"> <thead> <tr> <th>Type</th> <th>Normal</th> </tr> </thead> <tbody> <tr> <td>Average</td> <td>30 min</td> </tr> <tr> <td>Std</td> <td>12 min</td> </tr> </tbody> </table>	Type	Normal	Average	30 min	Std	12 min
Type	Normal						
Average	30 min						
Std	12 min						
<b>Trigger</b>	<ul style="list-style-type: none"> <li>Performance degradation report</li> </ul>						
<b>Basic Course of Event</b>	<p><b>Infection quality management</b></p> <ol style="list-style-type: none"> <li>Quality manager initiates resolution process</li> <li>Infection control team performs resolution ( removes source or reduces concentration)</li> <li>Infection control team provides feedback</li> <li>Quality manager updates the status in performance degradation report</li> <li>Quality manager verifies resolution</li> <li>Quality manager closes degradation report</li> <li>Quality manager provides reports to senior management.</li> <li>Ends.</li> </ol>						
<b>Alternative Path</b>	None						
<b>Exception Path</b>	<p><b>System down</b></p> <ol style="list-style-type: none"> <li>Keep paper track until system is up and running</li> <li>Update the system and clear all logs.</li> <li>End.</li> </ol>						
<b>Extension points</b>	Infection control coordination, coordination quality management, coordination anomaly management						
<b>Preconditions</b>	Performance degradation report has been formulated.						
<b>Post –conditions</b>	Performance degradation get corrected.						

<b>Related Business Rules</b>	Br-001(ref 7.1)
<b>Related Risks</b>	Rr-002(ref. 7.2)
<b>Related Quality Attributes</b>	Service Reliability, Usability, Data Integrity, Non-repudiation, Accountability, Performance, Auditability, availability (Ref 7.3)
<b>Related Data Quality Dimensions</b>	Accuracy, Objectivity, Relevance, Completeness, timeliness, Understandability, interpretability, reputation, free of error (Ref 7.4)
<b>Related Primary SLA Terms</b>	(Ref 7.9)
<b>Related KPIs</b>	Imdsr (ref 7.6)
<b>Related CTQs</b>	Imdsrv (ref 7.7)
<b>Actors/Agents</b>	Quality manager
<b>Delegation</b>	<p><u>Delegation rule -1: agent not available</u></p> <ol style="list-style-type: none"> <li>1. Delegate the issue to additional agent with same role</li> <li>2. Update the issue</li> <li>3. Log the delegation</li> </ol> <p><u>Delegation rule -2: agent overloaded</u></p> <ol style="list-style-type: none"> <li>1. Delegate the issue to additional agent with same role</li> <li>2. Update the issue</li> <li>3. Log the delegation</li> </ol>
<b>Escalation</b>	<p><u>Rule 1: Performance, operational legal Issues</u></p> <ol style="list-style-type: none"> <li>1. Escalate to environmental services department head.</li> <li>2. Log Escalation</li> </ol>
<b>Process Map</b>	Section 5.1
<b>Process Model</b>	Section 6.10
<b>Other References</b>	Appendix A: business process modeling notation reference

## 6.12 Sub Process – Track & Manage infection Management Performance Resolution Roles and Responsibilities

Roles	Responsibilities
Quality Manager	<ul style="list-style-type: none"><li>Quality Manager initiate resolution process, updates the status in performance degradation report, verifies changes done, and closes degradation report.</li><li>Quality Manager provides reports to senior management.</li></ul>
Infection Control Team	Infection Management team resolve the issue and provides feedback

## Reference





## 7.1 Business Rules

BR ID	Description	Context	Rule	Source
BR-001	For outsourced Infection Management function, for SLA breaches the outsourced party is entitled to pay all the damages with regards to its SLA violation.	Business	TBD	TBD
BR-002	All violations should be reported	Business	TBD	TBD
BR-003	All highly critical infection impact conditions should be escalated to contingency management process.	Business	TBD	TBD

## 7.2 Risk

Risk ID	Description	Source	Severity Level	Status	Resolution
RR-001	All the Infection Management performances are not recorded	NA	High	TBD	Effort should be undertaken to ensure all the performance are recorded and hence analyzed.
RR-002	Performance degradation identified are not properly followed up	NA	High	TBD	Senior management should ensure that all the identified degradation reports are settled within a stipulated time frame.

### 7.3 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 Dimension

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

## 7.5 Operation Policy

Policy ID	Description	Context	Importance (1-5)
OP-001	All the degradation reports are resolved within 5 working days from the day of identification( maximum)	TBD	TBD
OP-002	All situation which are escalated to contingency planning process should be reported to senior management	TBD	TBD
OP-003	All the Infection hazard would undergo categorization before being raised as a report	TBD	TBD

## 7.6 KPI

Name	Acronym	Description	Context	Importance	Soft Threshold	Hard Threshold
Infection Management degradation rate	IMDR	Number of Infection Management degradation reported per month	NA	TBD	TBD	TBD
Infection Management	IMDSR	Number of reported	NA	TBD	TBD	TBD

degradation solving rate		performance degradation solved per month				
Compliance rate	CR	Compliance achieved per month	NA	TBD	TBD	TBD
Audit rate	AR	Number of audits done per month	NA	TBD	TBD	TBD
Deviation rate	DR	Number of deviations found per month	NA	TBD	TBD	TBD
Degradation reporting rate	DRR	Degradation reports created per month	NA	TBD	TBD	TBD

## 7.7 CTQ

Name	Acronym	Description	Context	Importance	Soft Threshold	Hard Threshold
Infection Management degradation rate variation	IMDRV	Standard deviation of SDR	NA	TBD	TBD	TBD
Infection Management Degradation	IMDSR	Standard Deviation of SDSR	NA	TBD	TBD	TBD

<b>solving rate variation</b>						
<b>Compliance rate variation</b>	<b>CRV</b>	Standard Deviation of CR	NA	TBD	TBD	TBD
<b>Audit rate variation</b>	<b>ARV</b>	Standard Deviation of AR	NA	TBD	TBD	TBD
<b>Deviation rate variation</b>	<b>DRV</b>	Standard Deviation of DR	NA	TBD	TBD	TBD
<b>Degradation reporting rate variation</b>	<b>DRRV</b>	Standard Deviation of DRR	NA	TBD	TBD	TBD
<b>Motion Optimization Measure</b>	<b>MOM</b>	Management of motion optimization measure	NA	TBD	TBD	TBD
<b>Paper work Optimization Measure</b>	<b>PWOM</b>	Management of Paper work Optimization Measure	NA	TBD	TBD	TBD
<b>Correction reduction measure</b>	<b>CRM</b>	Management of Correction	NA	TBD	TBD	TBD

		reduction measure				
<b>Inventory Optimization Measure</b>	<b>IOM</b>	Management of Inventory Optimization Measure	NA	TBD	TBD	TBD
<b>Transportation Optimization Measure</b>	<b>TOM</b>	Management of Transportation Optimization Measure	NA	TBD	TBD	TBD
<b>Waiting Reduction Measure</b>	<b>WRM</b>	Management of Waiting 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

## 7.10 Voice of Customer

VOC	Customer	Description	Perceived Value
<b>Infection</b>	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 Infection level.	<ul style="list-style-type: none"> <li>• High quality healthcare services</li> <li>• Safe environment</li> <li>• Low infection rate</li> <li>• Low risk</li> </ul>
<b>High and Consistent Quality of standards</b>	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.	<ul style="list-style-type: none"> <li>• Reputation of organization or hospital</li> <li>• Professionalism</li> <li>• Trust</li> <li>• Positive psychological bias</li> </ul>
<b>Free of Infections</b>	Doctors, Patients, Nurses, Housekeeping Supervisors,	Infections free and healthy environment.	<ul style="list-style-type: none"> <li>• Safe environment</li> </ul>



	Clerks, Visitors, Environmental Services Management, Laundry worker, Transportation worker, Maintenance worker, Waste management worker, Housekeepers		<ul style="list-style-type: none"> <li>• Reputation of hospital or organization</li> <li>• Trust</li> <li>• Quick healing</li> <li>• Positive psychological bias</li> <li>• Low risk</li> </ul>
<b>Timely Services</b>	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.	<ul style="list-style-type: none"> <li>• Professionalism</li> <li>• Trust</li> <li>• Positive psychological bias</li> <li>• Reputation of hospital or organization</li> <li>• Safe environment</li> </ul>
<b>High Coordinating</b>	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.	<ul style="list-style-type: none"> <li>• Professionalism</li> <li>• Trust</li> <li>• Low risk</li> <li>• Excellent Ergonomic</li> </ul>
<b>Remove Waste</b>	Patients, Nurses, Housekeeping Supervisors, Clerks, Visitors, Environmental Services Management, Laundry worker, Transportation	Wastes should be either removed or minimized.	<ul style="list-style-type: none"> <li>• Safe environment</li> <li>• Low infection rate</li> <li>• Low risk</li> <li>• Reputation of hospital or organization</li> <li>• Low cost</li> </ul>

	worker, Maintenance worker, Waste management worker, Housekeepers		<ul style="list-style-type: none"> <li>• Timely response</li> <li>• High quality</li> </ul>
<b>Excellent Ergonomic</b>	Doctors, Patients, Nurses, Housekeeping Supervisors, Clerks, Visitors, Environmental Services Management, Laundry worker, Transportation worker, Maintenance worker, Waste management worker, Housekeepers	The hospital environment and policy should comply with physical, organization and cognitive ergonomics.	<ul style="list-style-type: none"> <li>• Professionalism</li> <li>• Trust</li> <li>• Job accuracy</li> <li>• Excellent communication</li> <li>• Low risk</li> <li>• Reputation of hospital or organization</li> </ul>
<b>Safety</b>	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.	<ul style="list-style-type: none"> <li>• Safe environment</li> <li>• Professionalism</li> <li>• Low risk</li> </ul>
<b>Appearance</b>	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.	<ul style="list-style-type: none"> <li>• Professionalism</li> <li>• Reputation of hospital or organization</li> <li>• Trust</li> <li>• Positive psychological bias</li> </ul>
<b>Excellent Worker Attitude</b>	Housekeeping Supervisors, Environmental Services Management, Laundry	The environment service employee should be free from negative attitudes.	<ul style="list-style-type: none"> <li>• Professionalism</li> <li>• Reputation of hospital or organization</li> </ul>

	worker, Transportation worker, Maintenance worker, Waste management worker, Housekeepers		<ul style="list-style-type: none"> <li>• Trust</li> <li>• Positive psychological bias</li> <li>• Minimum disputes</li> <li>• Less employee turn over</li> </ul>
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## 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, Nurse 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 effort to the task.

<b>Floor hazards</b>	Remove slip and trip hazards through provision of appropriate floor surfaces and good keeping.
<b>Clothing</b>	Clothing/PPE may prevent sufficient movement for the task or reduce capability. E.g. to grip consider handling needs when selecting work wear/gloves.
<b>Psychosocial factors</b>	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



**GLOSSARY**

Terminology	Description
<b>Abstract Time Scale</b>	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.
<b>BPMN</b>	<b>Business Process Modelling Notation</b> Business Process Modelling Notation is the practice of documenting an organisation's key business processes in a graphical format.
<b>Business Rules</b>	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
<b>CTQ</b>	<b>Critical to Quality</b> Critical To Quality (CTQ) is continuous measuring and monitoring tool agreed between the internal processes to achieve greater customer satisfaction.
<b>COI</b>	Chain of Infection
<b>Data Quality Dimensions</b>	The totality of features and characteristics of data that bears on their ability to satisfy a given purpose
<b>EBC</b>	<b>Evidence Based Cleaning</b>
<b>ESM</b>	Environmental Services Map
<b>KPI</b>	<b>Key Performance Indicator</b> 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.
<b>MSD</b>	Macro Skeleton Disorder
<b>Operational Policy</b>	Rules defined to operate the process.
<b>Quality Attributes</b>	Quality attributes are non-functional requirements used to evaluate the performance of a process.

<b>Risk</b>	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.
<b>SLA</b>	<b>Service Level Agreement</b> 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
<b>VOC</b>	<b>Voice of Customer</b>





## Appendix A: Business Process Modeling Notation Reference



APPENDIX.  
A









## INTRODUCTION

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

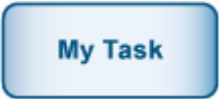


- Is highly graphical
- Focuses on business terminology rather than technical
- Allows all business steps/tasks to be included, not just those which involve a computer system.

Below is a mention of various 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	<b>Message start</b> 
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	<b>TIMER Start</b> 
If the process starts when a rule/condition is met – e.g. when Incident Impact is more than 100,000.	<b>RULE Start</b> 
If a process starts when another process finishes. Following notation can be used	<b>LINK Start</b> 
If there is more than one ‘trigger’ for a process to start. Following notation can be used	<b>MULTIPLE Start</b> 


## TASK AND SUB PROCESS




<b>Task</b>	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	
<b>Sub Process</b>	A Sub-process is a compound activity which can be broken down into finer details.	
<b>Loops</b>	Loops task or sub process continues to iterate until the loop condition is true.	

## INTERMEDIATE EVENTS



Following notation can be used to display the intermediate event, similar to start and end events.						
	<b>BASIC</b>	<b>MESSAGE</b>	<b>TIMER</b>	<b>RULE</b>	<b>LINK</b>	<b>MULTIPLE</b>
						

## 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 simply use the <i>basic</i> 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

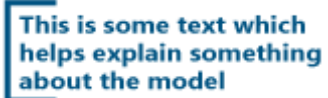


<b>Pool</b>	A <i>Pool</i> represents a participant in a Process. It is also acts as a “swimlane” and a graphical container for partitioning a set of activities from other Pools	
<b>Lane</b>	A <i>Lane</i> is a sub-partition within a Pool and will extend the entire length of the Pool, either vertically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

## CONNECTORS

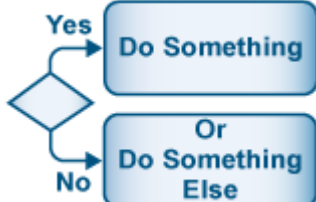
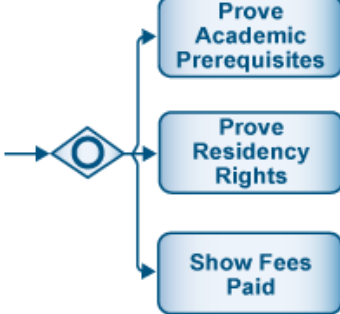
<b>Sequence Flow</b>	A <i>Sequence Flow</i> is represented by a solid line with a solid arrowhead (see the figure to the right) and is used to show the order (the sequence) that activities will be performed in a Process.	
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<b>Message Flow</b>	<p>A <i>Message Flow</i> 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.</p>	
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## ARTIFACTS

<b>Annotation</b>	<p>The ANNOTATION shape is used to add comments to a process model. It consists of text in a square left bracket</p>	
<b>Data Object</b>	<p>A data object represents a piece of data which is required or produced by the process eg. Customer details, output.</p>	
<b>Group</b>	<p>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.</p>	

## GATEWAYS

<b>Exclusive</b>	<p>The values of the process are examined to determine which path to take</p>	
<b>Inclusive</b>	<p>Each branch will be evaluated and will not stop when one branch condition becomes true.</p>	

<b>Parallel</b>	Provides a mechanism to synchronise parallel flow and to create parallel flow.	 A BPMN diagram illustrating a parallel gateway. On the left, a diamond-shaped gateway with a plus sign (+) inside. Two arrows originate from the right side of the gateway, one pointing to a rounded rectangular task labeled "Do Something" and the other pointing to another rounded rectangular task labeled "And Also Do This".
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## Appendix B: Chain of Infection



APPENDIX.  
B

# 10 Appendix B: Chain of Infection

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.



# 10 Appendix B: Chain of Infection

## 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.