Quality Risk Management
An Introduction

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Objective of this presentation

- Understand concept and the process
- Understand how and where to apply QRM

- **Risk Management is used in many areas**
- Project: Every Project has risks and Project Managers attempt to rank risks so that they can manage them. Risks may include delays, budget overruns, specifications not met. The cause of the risks must be identified in order for ranking and mitigation to take place.

- **Risk Management is used in many areas**
- Safety: Risk management is a process by which the management assesses the risks, determines the control measures, and takes appropriate actions to reduce such risks. It is a cornerstone to prevent deaths, injuries and ill health at work. All workplaces need to conduct risk assessments to help identify the source of risks, actions that should be taken, and parties responsible for doing so.

MALAYSIAN STANDARD

MS ISO 31000:2010

RISK MANAGEMENT - PRINCIPLES AND GUIDELINES
(ISO 31000:2009, IDT)

ICS: 03.100.01

Descriptors: risk management, principles, guidelines

DEPARTMENT OF STANDARDS MALAYSIA

OCCUPATIONAL SAFETY AND HEALTH ACT 1994

OCCUPATIONAL SAFETY AND HEALTH (USE AND STANDARDS OF EXPOSURE OF CHEMICALS HAZARDOUS TO HEALTH REGULATIONS 2000

PART IV

ASSESSMENT OF RISK TO HEALTH

Assessment of risk of health

9. (1) An employer shall not carry out any work which may expose or is likely to expose any employee to any chemical hazardous to health unless he has made a written assessment of the risks created by the chemical to the health of the employee.

(2) The assessment mentioned in subregulation (1) shall sontain the following;

(a) the potential risk to an employee as a result of exposure to chemicals hazardous to health;

(b) the method and procedure adopted in the use of the chemicals hazardous to health;

(c) the nature of the hazard to health;

(d) the degree of exposure to such chemicals hazardous to health;

(e) the risk to health created by the use and the release of chemicals from work processes:

TERMINOLOGY

- Risk Assessment is the process of identifying hazards, assessing the level of risks involved, and prioritizing measures to control the hazards and reduce the risks.
- Risk Management is the systematic application of quality management policies, procedures, and practices to the tasks of assessing, controlling, communicating, and reviewing risk

Hazards are situations with a potential for causing harm.

- **Hazardous events** are possible scenarios that may cause harm

Causes are the possible reasons why a hazardous event may occur.

Detectability is the ability to detect situations that may cause harm

FREQUENCY

- **Very likely**
- Probable
- Possible
- Unlikely
- Highly unlikely

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- **Highly unlikely**

SEVERITY (CONSEQUENCES)

- Minor
- Significant
- Major
- Critical
- Disastrous

TERMINOLOGY

- **Safeguards** (mitigation or risk reduction measures) are measures that either prevent or mitigate hazardous events.

TRAQE

TERMINOLOGY

- **Risk** is the combination of frequency and consequence of a hazardous event.

Who will suffer more harm if they fall?

Who is more likely to fall?

Probability	4
Severity	4
Risk	16

Probability	1
Severity	4
Risk	4

Probability 4

Severity 2

Risk 8

Probability 1

Severity 2

Risk 2

4

Medium

16

Critical

2 Low

8 High

QUALITY RISK MANAGEMENT

- ICH Q9 is about Quality Risk Management – not Safety or Project Risk or Insurance Risk
- It adopts many of the same concepts and tools as in other Risk Management
- The evaluation of the risk to quality should be based on scientific knowledge and ultimately link to the protection of the patient

- How might we harm patients?
  - Wrong drug
  - Incorrect formulation
  - Cross contamination
  - Microbial contamination
  - Wrong information
  - Drug deterioration

Drug Deterioration

- Storage
  - Poor design
  - Bad construction
  - Inadequate maintenance
- Controls
  - Inadequate monitoring
  - Insufficient/no control over environment
- Operations
  - Mix up – storage in wrong location

WHY UNDERSTAND RISK

- So that we can:
  - Prioritize and address high risk area first
  - Decide on the type of actions we need to put in place to mitigate risk
  - Decide if a risk is acceptable
  - Justify an activity or lack of activity
  - Measure if the risk reduction activities work

PRIORITIZE

- Prioritize and address high risk area first
  - You are replacing an existing manual temperature and humidity monitoring system with automatic continuous logging by computer. Which are the high priority locations to address first?

Type of Mitigation

- Decide on the type of actions we need to put in place to mitigate risk
  - You are making a highly potent compound in a multi product facility. You need to determine what are the most effective actions for preventing cross contamination

Acceptable Risk

- Decide if a risk is acceptable
  - You have breached in action level in your purified water system. You need to decide if this is an acceptable risk to the quality of the product batches affected.

JUSTIFICATION

- Justify an activity or lack of activity
  - You wish to reduce the level of microbial monitoring in your Grade D area. Can you justify this?

Quality Risk Management Process

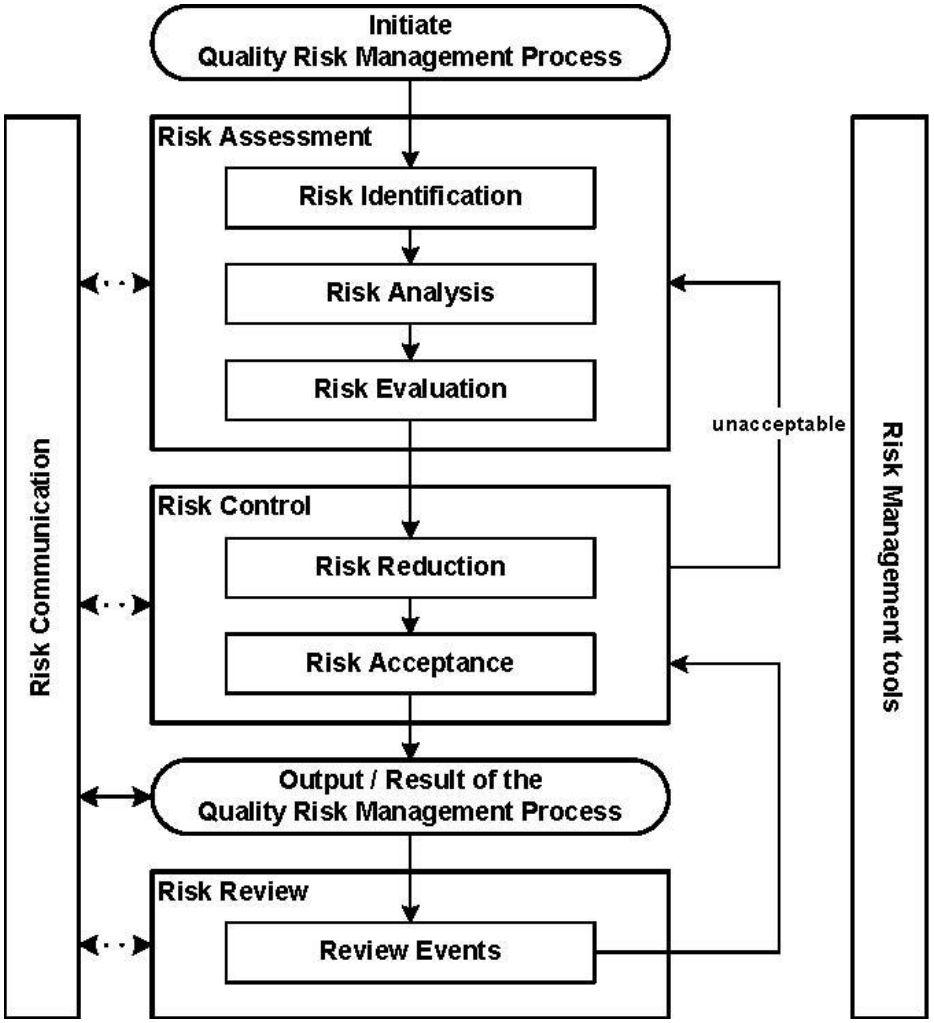
RISK MANAGEMENT PROCESS

Well-defined steps which, when taken in sequence, support **better decision making** by contributing to a greater insight into risks.

Risk Management Process

- Risk Identification (identify potential problems)
- Risks Quantification (How likely are the problems, what is the impact if they occur)
- Risk Response (What shall I do about it)
- Risk Monitoring and Control (How do I monitor the risk to ensure the probability does not change)

RISK MANAGEMENT PROCESS



INITIATE

- Define specifically the **risk management problem** or question.
- Assemble background information and data on the hazard, harm or human health impact relevant to the assessment.
- Define how the assessment information and conclusions will be used by the decision makers.

INITIATE

- Identify the necessary resources, members of the team who have the appropriate expertise, with the leader clearly identified.
- Ask the **right risk assessment questions**
- State clearly the assumptions in the risk assessment
- Assess the quality and sufficiency of relevant data
- Specifying a timeline and deliverables for the risk assessment

Risk Identification

- Identify the hazards
  - **What might go wrong**
  - What is the probability it will go wrong
  - What are the consequences (severity)

RISK ANALYSIS

- Qualitative or quantitative assessment which links likelihood of occurrence with severity of harm

RISK EVALUATION

- Compares the risk that has been identified and analyzed against risk criteria
- Risk can be scored or expressed qualitatively (high, medium, low)

Risk Control

- Do we need to reduce risk or can we accept it?
  - Is the risk above an acceptable level?
  - What can be done to reduce or eliminate risks?
  - What is the appropriate balance among benefits, risks and resources?
  - Are new risks introduced as a result of the identified risks being controlled?

RISK MONITORING

- All risk management processes are dynamic/iterative. Quality Risk Management when applied should benefit from new knowledge with each decision cycle and used to enhance future decisions allowing for continuous improvement.

QRM APPLICATION

- Based on the EU GMP and FDA Quality System Approach we can see that we can/must apply Risk Management approach to:
  - Deciding on monitoring locations for Clean rooms and clean air devices
  - On the amount of monitoring required for Grade C and D areas
  - Setting specifications and process parameters for manufacturing
  - Assessing the impact of change
  - Determining the extent of discrepancy investigation and corrective action
  - Assessing areas of process weakness or higher risk
  - Determining frequency of trending

Tools

- Tools fall into several categories:
  - Facilitating tools
  - Statistical supporting tools
  - Risk ranking tools

Facilitating Tools

- These do not rank risk. They include:
  - Flowcharts
  - Check Sheets
  - Process Mapping
  - Ishikawa diagram
  - Brainstorming

FACILITATING TOOLS

- Use these tools to understand the process, propose Hazard scenarios, determine probable causes and key control points

SUPPORTING STATISTICAL TOOLS

- Use these tools to analyze data to determine the significance of data sets.
  - Control Charts
  - Design of Experiments (DOE)
  - Pareto Charts
  - Process Capability Analysis

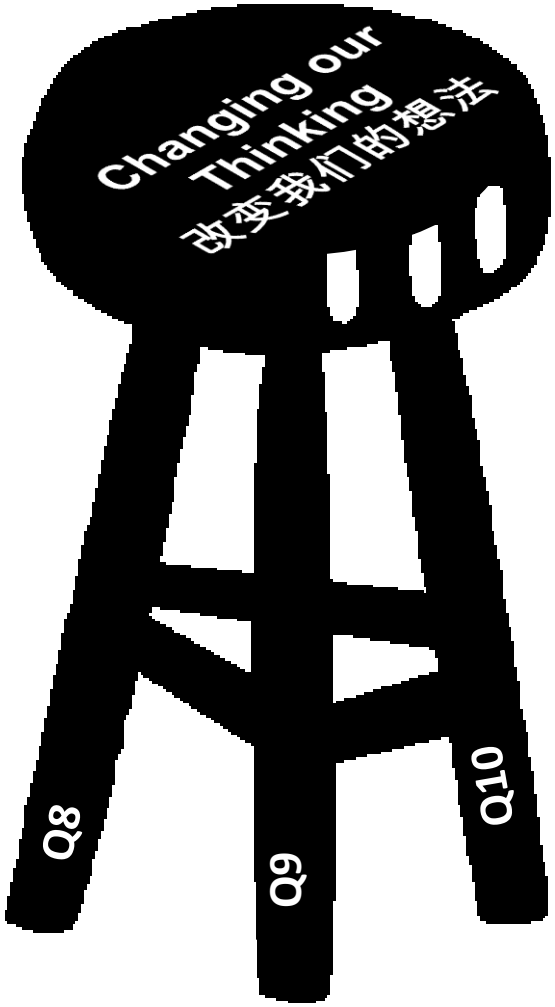
Risk Analysis Tools

- These tools help you rank risk and may help identify appropriate actions to mitigate risk
- These tools have limitations and may not be appropriate for every type of analysis

Failure Modes and Effect Analysis

- FMEA develops the simple Risk Ranking approach by adding another variable – “detectability” to probability and severity.
- Detectability: what mechanisms are in place (if any) to detect a failure if it were to occur?
- The intent of FMEA is to assess causes of potential failure to determine priorities for actions that would reduce severity, reduce occurrence, and increase probability of detection.

WHERE WE ARE GOING?



Pharmaceutical Development (Q8)
Past: Data transfer / Variable output
Present: Knowledge transfer / Science based / Consistent output

Quality Risk Management (Q9)
Past: Used, however poorly defined
Present: Opportunity to use structured process thinking

Pharmaceutical Quality Systems (Q10)
Past: GMP checklist
Future: Quality Systems across product life cycle


Process Understanding流程理解
Submission regulatory oversight资料递交，当局监管
GMP regulatory oversight GMP当局监管
Company Quality System公司质量系统
Post Approval Change批准后变更
Risk风险
Q8 & Q9
Submission regulatory oversight资料递交，当局监管
GMP regulatory oversight GMP当局监管
Company Quality System公司质量系统
PAC to Continuous Improvement批准后变更到持续改进
Risk风险
Add Q10
Submission 资料递交
GMP
Company Quality System 公司质量系统
Continuous Improvement 持续改进
Risk 风险


Thank You
Questions?