



**GHTF SG3 Training (Quality Systems)  
APEC Funded Seminar  
on  
Harmonization of Medical  
Device Regulations  
Toronto, Canada, May 14 - 16, 2009**

**Egan Cobbold, Chair SG3  
Gunter Frey, Vice-Chair SG3**

# **GHTF SG3 Training Overview**

- 1. GHTF SG3 – Role, Members, Documents**
- 2. Quality Management Systems: History and Evolution**
- 3. ISO13485:2003 - An Overview**
- 4. Risk Management Principles and Activities Within a Quality Management System**
- 5. Process Validation**
- 6. Supplier Control**





**GHTEF SG3 –  
Role, Members,  
Documents**

# Role of Study Group 3

- “SG3 is responsible for the task of examining existing quality system requirements in countries having developed device regulatory systems and identifying areas suitable for harmonization.”
- [www.ghtf.org/sg3/sg3.htm](http://www.ghtf.org/sg3/sg3.htm)



# Members (2009)

## Australia

- Mr Ken Nicol MIAA/St. Jude
- Mr Keith Smith TGA/OMQ

## Canada

- Mr Egan Cobbold HC/MDB (Chair SG3)
- Mr Jan Noupbaev MEDEC/Medtronic Can.

## European Union

- Mr Carlos Arglebe COCIR/Siemens (Secretary)
- Mr Victor Dorman-Smith EUCOMED
- Mr Dirk Wetzels EU/BfArM (Germany)

## Japan

- Mr Hideki Asai JFMDA/Hitachi
- Mr Munehiro Nakamura JFMDA/Kaneka
- Mr Nagai Hirotada MHLW
- Ms Noriko Okuyama MHLW
- Mr Tsutomu Makino, PMDA

## United States of America

- Ms Kimberly Trautman FDA
- Mr Gunter Frey NEMA/GE (Vice-Chair)
- Mr Ken Kopesky AdvaMed/Medtronic

## AHWP

- Mr Ali Al Dalaan Saudi FDA
- Mr Ronald Goon Singapore (J&J)



# SG3 Documents – the present

Since 1992, the study group has prepared and published five guidance documents. Three are “final” and two have been “archived” because their contents were transferred to ISO/TR 14969:2004

## Final Documents

SG3/N99-10 (Edition 2) Quality Management System - Process Validation Guidance.

SG3/N15R8/2005 Implementation of Risk Management Principles and Activities Within a Quality Management System

SG3/N17/2008 Quality Management System – Medical Devices – Guidance on the Control of Products and Services Obtained from Suppliers



# SG3 Documents – the present

## Archived Documents

GHTF.SG3.N99-8 Guidance On Quality Systems For The Design And Manufacture Of Medical Devices

GHTF.SG3.N99-9 Design Control Guidance For Medical Device Manufacturers

When required, the study group will work collaboratively with other study groups or *ad hoc* groups on projects like combination products, regulatory auditing, changes etc.



# SG3 Documents – the future

Study Group 3 is currently working on two new guidance documents :

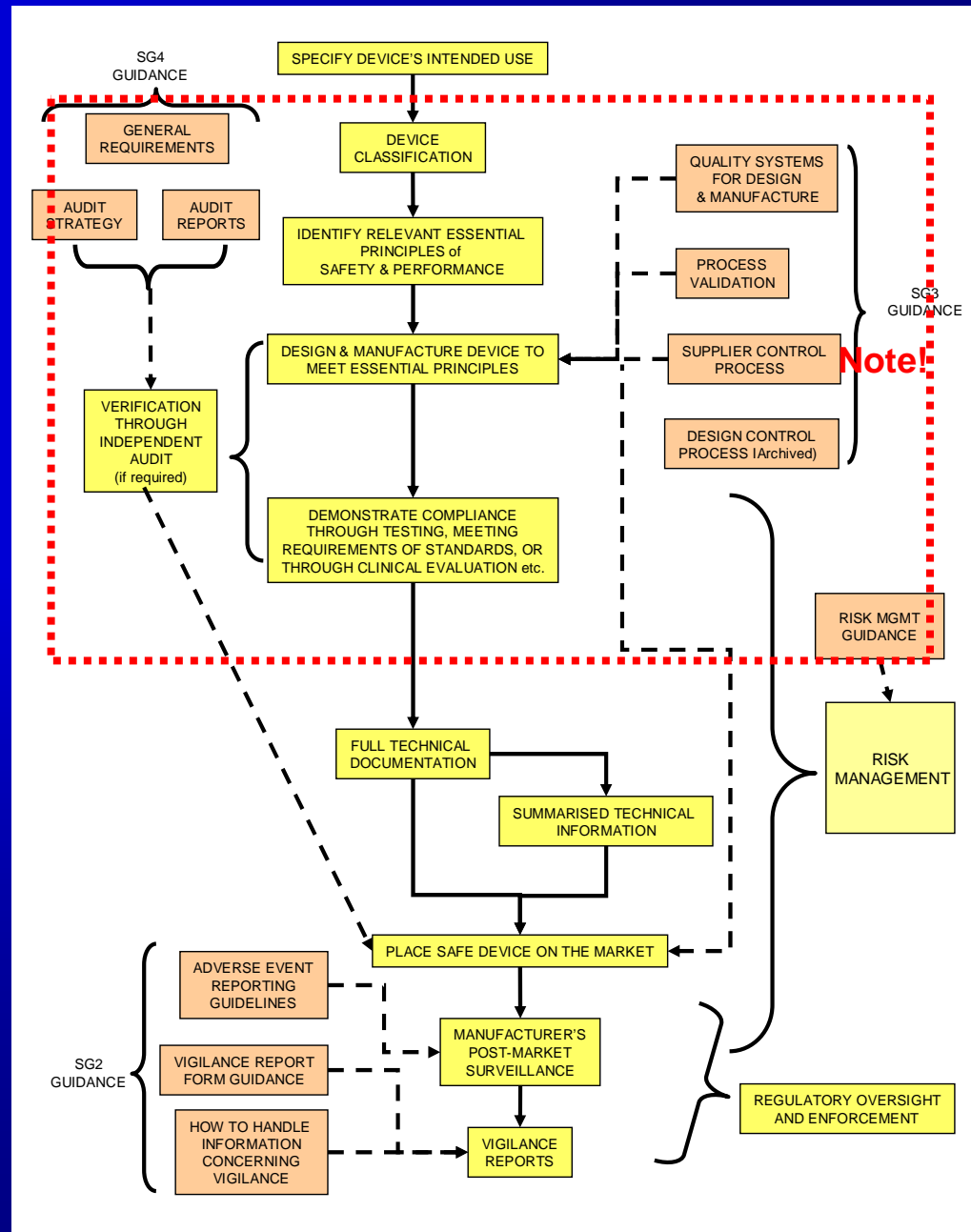
- Document N18 - corrective and preventive action (CAPA) principles and activities” (and
- Document N19 - characterizing the significance of quality management system deficiencies

In the next couple of years the study group will do more work with ISO Technical Committee 210 / Working Group 1 on the expected revisions to ISO 9001:2008, ISO 13485:2003 and ISO/TR 14969:2004



# SG3 Documents - the future

All future work of SG3 will be strongly influenced by the work the Steering Committee is presently doing on topics like the “Global Harmonization Task Force Medical Device Regulation Model”





**Quality Management  
Systems:  
History and Evolution**

# Introduction

- What is a quality management system ?
- Why comply with a quality management system standard ?
- Evolution of quality practices



# What is a quality management system for medical devices?

## Quality Management System

“management system to direct and control an organization with regard to quality.

ISO 9000:2000, Clause 3.2.3.

## Quality

“degree to which a set of inherent characteristics fulfils requirements”

ISO 9000:2000, Clause 3.1.1



# What is a quality management system for medical devices?

- ISO 13485:2003 Medical devices - Quality management systems - Requirements for regulatory purposes
- Regulatory variations ( US FDA CFR 21 Part 820), Japanese MHLW Ordinance No. 169, 2004, etc. )
- “Full” quality management system includes design and development (mandatory for highest risk devices)
- “Production” quality management covers all activities except design and development



# **Why should a manufacturer comply with a quality management system standard?**

- Provides high degree of assurance that manufacturer will consistently produce medical devices that:
  - Are safe
  - Perform as intended
  - Comply with customer requirements
  - Comply with regulatory requirements
  - Have the appropriate degree of quality



# Evolution of Quality – No Quality Efforts

1. **Design → manufacture → distribute →**  
**Result: product may fail → customer**  
**complains**



# **Evolution of Quality – Quality Control**

- 2. Design → manufacture → test → discard rejects → distribute accepted product →**

**Results: Fewer failing products are distributed, but design problems may arise → Customer complains.**

**Manufacturer is unhappy about rejects and waste**



# **Evolution of Quality - Quality Assurance & Good Manufacturing Practice (GMP)**

- 3. Design → build quality into  
manufacturing steps → control  
manufacture → test → discard rejects →  
distribute accepted product → Result:  
Fewer product rejects due to  
manufacturing. Manufacturer is happier,  
but design problems may still arise.  
Customer complains.**



# Evolution of Quality – Quality System

4. **Build quality into design → build quality into manufacturing → control manufacture → Test → Discard rejects → Distribute accepted product → Results: Better-designed products satisfy customers. Manufacturer is happy with fewer rejects and fewer customer complaints**



# Evolution of Quality – Quality Management Systems

Management has greater commitment to  
and responsibility for:

- establishing effective quality system,
- providing adequate resources
- periodically evaluating quality system
- making changes and adjustments



# Summary

- What is a quality management system ?
- Why comply with a quality management system standard ?
- Evolution of quality practices





# **ISO 13485:2003**

## **- An Overview -**

# Key sections of ISO 13485:2003

Section 1.0 - Scope

Section 2.0 - References

Section 3.0 - Definitions

Section 4.0 - Quality Management System Requirements

Section 5.0 - Management Responsibility

Section 6.0 - Resource Management

Section 7.0 - Product Realization

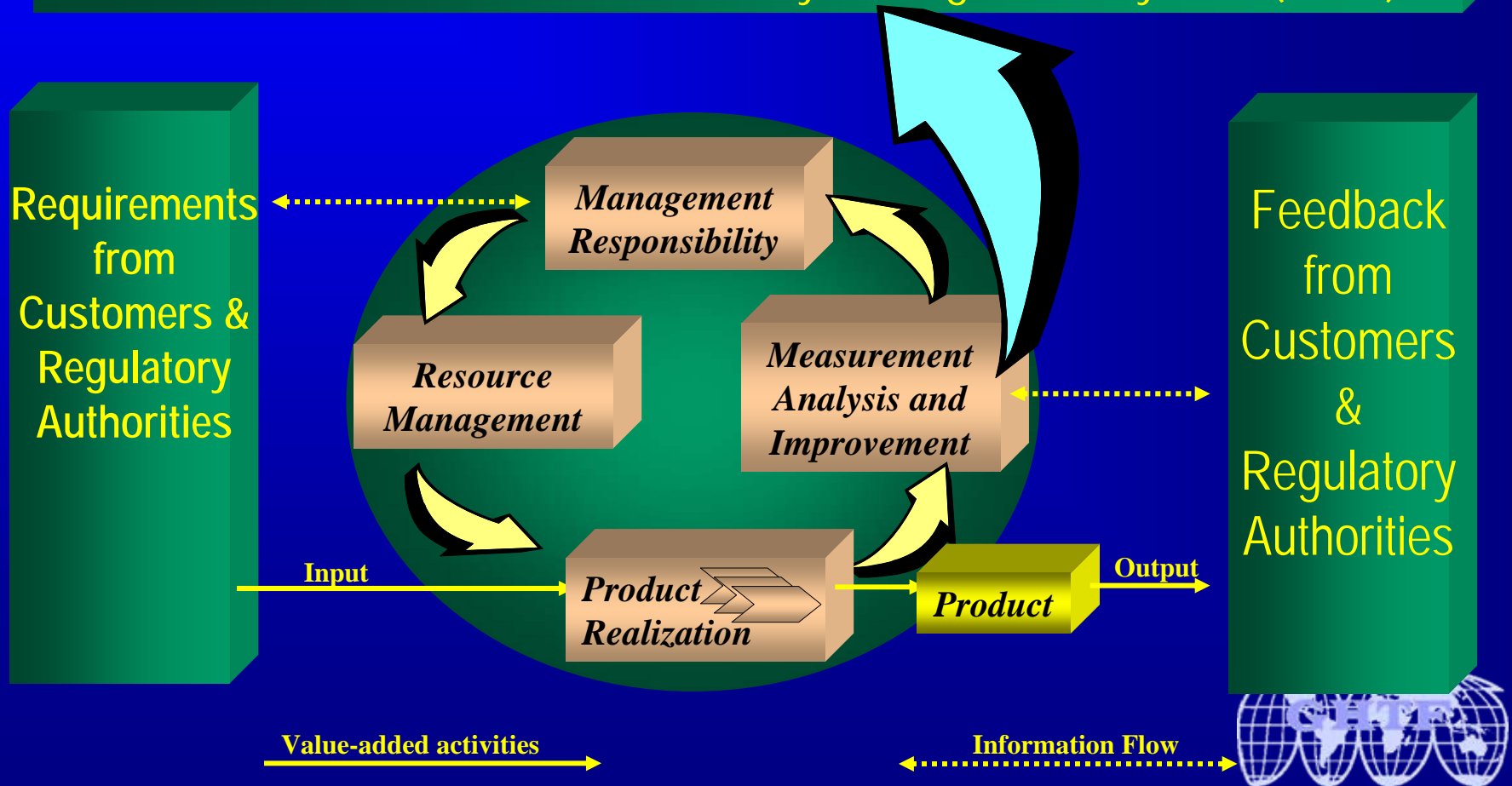
Section 8.0 - Measurement, Analysis, and Improvement



# Process-oriented Structure

ISO 13485:2003 promotes a process approach when developing, implementing, and improving a QMS

Maintain Effectiveness of the Quality Management System (QMS)



## 4. Quality Management System

### 4.1 - General requirements

- Implementation and maintenance of an effective QMS to provide medical devices meeting customer and regulatory requirements.
- **Ensure control of outsourced processes**

Guidance Document SG3N17  
“type and extent of control”.

### 4.2 - Documentation requirements

- what is to be done and by whom, when, where, and how it is to be done, what materials, equipment and documents are to be used,
- how an activity is to be monitored and measured,
- Design History File, Technical File, Complaint File, device records, etc.)

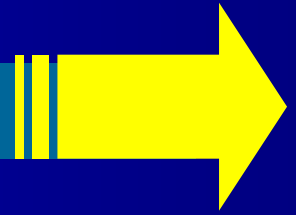


## **GHTF SG3 N17 Guidance on the Control of Products and Services Obtained from Suppliers**

- **ISO 13485 requires the organization to control products and services obtained from suppliers.**
- **The type and extent of controls are to be established and documented within the organization's quality management system.**
- **Control could be defined and documented in the form of contractual arrangements, quality plans or other types of documents.**



## 5. Management Responsibility



### 5.1 Management commitment

- Is demonstrated by actions ensuring processes operate as an effective network of interrelated processes

### 5.2 Customer focus

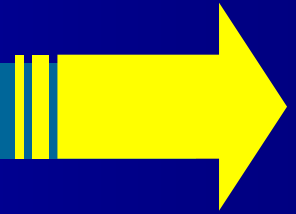
- ensure customer requirements are understood

### 5.3 Quality policy

- Establishes commitment to: quality; continuing effectiveness of the quality management system; meeting customer and regulatory requirements



## 5. Management Responsibility



### 5.4 Planning

- Includes setting quality objectives & associated targets for the quality management system AND for medical devices & related services (see 7.1 a)

### 5.5 Responsibility, authority and communication

- Documented position descriptions, including responsibilities and authorities, organization charts
- One management representative - designated by top management! Ensures promotion and awareness of regulatory and customer requirements throughout organization



## 5. Management Responsibility

### 5.6 Management Review

- Periodic assessment of the QMS for continued suitability, adequacy and effectiveness.
- **Inputs include:**
  - results of audits; changes that could affect the quality management system; recommendations for improvement; and, **new or revised regulatory requirements.**
- **Outputs include:**
  - improvements needed to maintain the effectiveness of the quality management system and its processes; improvement of product related to customer requirements; resource needs



## 6. Resource Management

### 6.1 Provision of resources

- People; infrastructure; work environment; information; suppliers and partners; natural resources; financial resources

### 6.2 Human Resources

- Personnel performing work affecting product quality and device safety and effectiveness must be competent. Organization must be able to demonstrate this!



## 6. Resource Management

### 6.3 Infrastructure

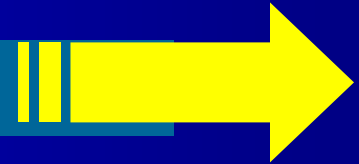
➤ Buildings; work space; utilities (water, electricity, waste management, etc.); process equipment (software and hardware); Equipment maintenance activities & frequency; Supporting services (cleaning, etc.)

### 6.4 Work Environment

➤ Significant factors within the work environment that can affect product quality are process equipment, established work environment (controlled environments, clean rooms, etc.), personnel.



## 7. Product Realization



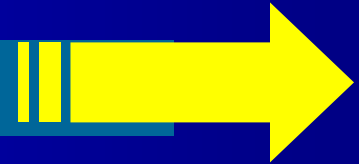
### 7.1 Planning of product realization

“Product realization” describes the processes starting with

- Planning (7.1)
- determination of customer requirements (7.2)
- customer communication
- design and development (7.3),
- purchasing (7.4),
- production and servicing (7.5),
- control of monitoring and measuring devices (7.6)
- delivery of the medical device
- record keeping requirements



## 7. Product Realization



### 7.1 Planning of product realization

The organization shall determine :

- product quality objectives & requirements
- definition of medical device lifetime (record retention!)
- establishing processes & documents
- resource needs
- design and development (7.3),
- verification & validation
- monitoring and inspection
- test activities and product acceptance criteria
- **RISK MANAGEMENT**
- **RECORDS**

SG3/N15R8/2005 “ Implementation of Risk Management Principles and Activities Within a Quality Management System” published in 2005



## **GHTF SG3 N15 Integrate Risk Management throughout product realization**

- **ISO 13485 requires the organization to establish documented requirements for risk management throughout product realization and suggests that ISO 14971 be consulted for guidance.**
- **SG3 developed SG3/N15R8/2005 to inform device manufacturers on how best to integrate ISO 14971 into a QMS like ISO 13485:2003.**



## 7. Product Realization

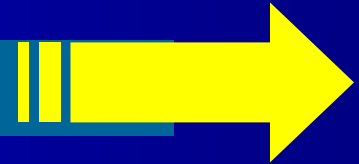
### 7.2 Customer-related processes

Focus is on product and services to be supplied.

- Requirements related to the product like regulatory or legal requirement, design related factors included in customer orders, unspecified customer expectations.
- Review of post-marketing product performance like customer complaints and advisory notices



## 7. Product Realization



### 7.3 Design and development

#### Design and development planning (7.3.1)

- Established procedures describing design processes and ALL design activities

#### Design and development inputs (7.3.2)

- Intended use, physical characteristics, regulatory requirements, customer training, manufacturing processes, lifetime, etc.

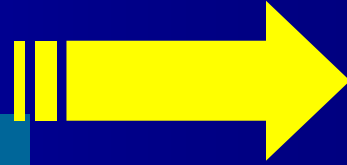
#### Design and development outputs (7.3.3)

- Drawings and parts list, finished device, manufacturing and inspection procedures etc.

#### Design and development review (7.3.4)

- Does design satisfy specified requirements, functional requirements, environmental conditions?





## 7. Product Realization

### 7.3 Design and development

#### Design and development verification (7.3.5)

- Ensure that design outputs conform to specified requirements (i.e. design inputs)

#### Design and development validation (7.3.6)

- Ensure that the medical device meets user requirements and intended use (validation performed on production or production equivalent units)

#### Control of design and development changes (7.3.7)

- Evaluate effect of change on parts and product already delivered. Ensure changes are approved before implementation (regulatory, manufacture etc. )



## 7. Product Realization

### 7.4 Purchasing

Supplier selection and control consists of:

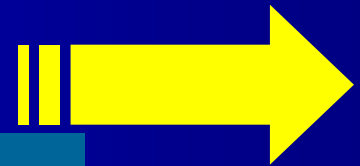
- establishing criteria (product, parts, quality system, process controls, metrology, etc.)
- evaluating against those predetermined criteria
- selecting
- ongoing monitoring

The extent depends on the nature and risk associated with the product or service, and includes outsourced processes.



Purchasing should only occur from list of approved suppliers!





## 7. Product Realization

### 7.4 Purchasing

Purchasing information describes the product to be purchased in sufficient detail.

- technical information and specifications, test and acceptance requirements, quality requirements for products, services, and outsourced processes, regulatory requirements, etc.



## 7. Product Realization

### 7.4 Purchasing

**Verification of purchased product** to ensure specified requirements are met:

- receiving Inspection (shipments are complete, properly identified, undamaged)
- product incoming inspection (100%, sampling, skip lot, etc.)
- certification of suppliers
- certificates of conformance or acceptance test reports from supplier

Must be procedurally defined within the organization's QMS, ***including actions when requirements are not met!***

***Applies to ALL product received from outside the organization's QMS!***



## 7. Product Realization

### 7.5 Production and service provision

#### Control of production and service provision (7.5.1)

- Ensure cleanliness of product and contamination control, control installation, documented procedures for servicing, maintain records and process parameters for sterilization processes, etc.

Validation of processes for production & service is required where the resulting output cannot be verified. (7.5.2)

- Validate software used in production and service delivery and maintain records.
- Validate device sterilization processes prior to initial use.

Guidance document  
SG3/N99-10 (Edition 2) "Quality Management Systems -  
Process Validation Guidance." published.



## 7. Product Realization

### 7.5 Production and service provision

**Identification** is required throughout the product realization process (7.5.3).

- Raw materials; components; finished medical devices, etc.

**Traceability** (when required) allows for identification of the history or location of a product or activity by recorded identification (7.5.3):

- Forward to customers (a.k.a “device tracking”) ; backward to raw materials, components,, etc.

**Customer property** is defined as property or assets owned by the customer and under control of the organization. (7.5.4)

**Preservation** of product applies throughout product realization. (7.5.5)



## 7. Product Realization

### 7.6 Control of monitoring and measuring devices

The standard explicitly refers to monitoring and measuring devices, **including software**. To ensure valid results, instruments shall be

- calibrated or verified at specified intervals (traceable to standard!)
- uniquely identified (traceability to products!)
- protected from damage/deterioration or inadvertent adjustment during storage and use

Software used in the monitoring or measurement process must be validated!

Exempt from calibration may be: instruments used for indication only (not quantitative!), volumetric measurement glassware, etc.



## 8. Measurement, analysis and improvement

### 8.1 General

Monitoring and measurement processes are required to:

- ensure product conformance
- ensure conformance of the QMS
- maintain effectiveness of the QMS

These processes include measurement and analysis of products AND processes.



## 8. Measurement, analysis and improvement

### 8.2 Monitoring and Measurement

**Feedback** as key performance indicators of the QMS include:

- customer related information, post-market surveillance, internal & external audits etc.

### 8.3 Control of nonconforming product

This includes nonconforming product occurring in the organization's own facilities as well as to nonconforming product received or delivered by the organization

- document the existence and root cause of the nonconformity
- define and implement corrective and preventive actions



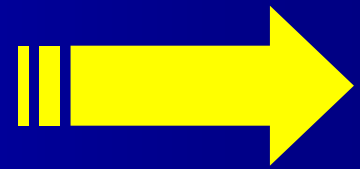
## 8. Measurement, analysis and improvement

### 8.4 Analysis of data

This includes determination, collection, and analysis of appropriate data to demonstrate the

- suitability and effectiveness of the QMS, supplier performance, product conformance, trends of processes & products, feedback, etc.





## 8. Measurement, analysis and improvement

### 8.5 Improvement

Establish procedures to issue and implement advisory notices at any time and to notify regulatory authorities of adverse events.

Corrective action is intended to eliminate nonconformities with the intent to prevent recurrence. Nonconformities may be identified: in the QMS, on the product, in manufacturing processes; in metrology; with training; environmental conditions; control of equipment; with suppliers, etc.

**SG3 has identified the need to develop guidance documents on “significance of nonconformities” and “CAPA principles and practices”**



## 8. Measurement, analysis and improvement

### 8.5 Improvement

**Effective corrective action** includes the following:

- clear and accurate identification of the nonconformity
- affected process(es) or procedure(s)
- identification of affected device(s) and recipient(s)
- identification of the root cause of the nonconformity,
- Immediate correction of problem (if appropriate)
- action required to prevent recurrence
- required approvals prior to taking action
- records that corrective action was taken as identified
- Effectiveness checks (likely to prevent recurrence, no new risks introduced by the corrective action, etc.)



## 8. Measurement, analysis and improvement

### 8.5 Improvement

**Preventive action** is initiated to “eliminate causes of **potential** nonconformities.” Sources to consider include information & data from:

- receiving and incoming inspection
- products requiring rework, reject or yield data
- customer feedback and warranty claims,
- process measurements,
- identification of results that are out-of-trend but not out-of-specification,
- suppliers performance
- service reports, and,
- concessions/deviations.



# Summary

- History of quality management system
- Key Sections of ISO 13485:2003
- Links between SG3 guidance documents and ISO 13485
- Output of an effective QMS

