





### Preparing for ISO 13485:2016

## Further Reducing Risk to Public Health Worldwide

# Providing for Healthcare Everywhere From Medical Devices Made Anywhere

Presented by: Grant Ramaley ISO 13485 Working Group International Accreditation Forum

Ministry of Health & Family Welfare Boyarnment of India









### Preparing for ISO 13485:2016

### **A Brief Overview**

# 29,617 certificates\*

Deemed credible under ISO/IEC IAF accreditation

\*Latest ISO Survey <u>https://www.iso.org/the-iso-survey.html</u>





Certified once, Accepted Everywhere







### Preparing for ISO 13485:2016

# Further Reducing Risk to Public Health Worldwide

# More Regulatory Focus - More Risk Management



Presented by: Grant Ramaley ISO 13485 Working Group International Accreditation Forum QMS Requirements for the European Medical Device Regulation



Certified once, Accepted Everywhere









### Where United States and ISO came together...

...the agency believed that it would be beneficial to the public and the medical device industry for the cGMP regulation to be consistent with the requirements for quality systems contained in International Organization for Standards (ISO) 9001:1994 and at the time the ISO committee draft (CD) revision of ISO/CD 13485 Quality Systems – *FDA preamble* 











### Where US FDA Aligned with ISO 13485:1996

4.1 Management responsibility 4.2 Quality system

4.4 Design control
4.5 Document Control
4.6 Purchasing
4.8 Material Identification, traceability
4.9 Production and process control
4.10 Inspection and testing
4.11 Inspection Measuring and Test Equipment
4.12 Inspection and test status
4.13 Control of Nonconforming Product
4.14 Corrective and Preventive Action
4.15 Handling, storage, and delivery
4.16 Control of Quality Records
4.17 Internal quality audits
4.18 Training

4.19 Servicing 4.20 Statistical Technique 820.20 - Management responsibility 820.5 - Quality system

820.30 - Design controls
820.40 - Document controls
820.50 - Purchasing controls
820.60 - Identification 820.65 - Traceability
820.70 - Production controls
820.80 - Recv, in-proc, finished device acceptance
820.72 - Inspection, measuring, and test equipment
820.86 - Acceptance status
820.90 - Nonconforming product
820.100 - Corrective and preventive action
K--Labeling and Packaging Control
L -- Handling, Storage, Distribution,

17 820.22 - Quality audit 18 820.25 - Personnel

§ 820.200 - Servicing § 820.250 - Statistical techniques









### Where it fell apart

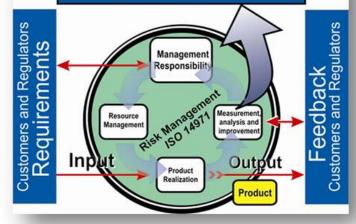
# "The Process Approach"

### 2000-2003

ISO introduced "the Process Approach", which combined 20 processes into 8 larger Processes.

ISO reduced requirements for Documented procedures. US FDA wanted more from the new standard.





so's Process

Approach









### ISO 13485:2003 Adopted More of US FDA Part 820

4.0 Quality System	<ul> <li>820.5 - Quality system</li> <li>820.30 - Design controls</li> </ul>
5.0 Management Responsibility	<ul> <li>820.40 - Document controls</li> <li>820.50 - Purchasing controls</li> <li>820.60 - Identification 820.65 - Traceability</li> <li>820.70 - Production controls</li> </ul>
6.0 Resource Management	820.80 - Recv, in-proc, finished device acceptance 820.72 - Inspection, measuring, and test equipment 820.86 - Acceptance status 820.90 - Nonconforming product
7.0 Product Realization	<ul> <li>820.100 - Corrective and preventive action.</li> <li>KLabeling and Packaging Control</li> <li>L Handling, Storage, Distribution,</li> <li>Subpart MRecords</li> <li>17 820.22 - Quality audit</li> </ul>
8.0 Measurement, analysis and Improvement	<ul> <li>18 820.25 - Personnel</li> <li>§ 820.198 - Complaint files</li> <li>§ 820.200 - Servicing</li> <li>§ 820.250 - Statistical techniques</li> </ul>









# More regulations are aligned with ISO 13485:2003/2016

Korean KGMP & Japanese GMP - MO 169









# More Regulations using ISO 13485

Australia TGA's Quality System Canadian SOR 98-282 "CMDCAS" European "Harmonized Standard"







EN ISO 13485



Quality Management System These European Medical Device Regulations go into effect beginning May 26, 2020

*EU 2017 745 (Medical Devices Regulation) EU 2017 746 (In-Vitro Diagnostic Regulation)* 

Annex IX and Article 10(8)

(Same for both regulations)

Must comply by 27th May 2024

(Same for both regulations)









# More Regulatory Compliance More focus on Managing Risks More of what we should have been doing?









# So what's the difference?

# ISO 13485:2016



Changes









# Quality System Section 4.

4.1.1 – …"The organization shall document <u>the role(s)</u> undertaken by the organization under the applicable regulatory requirements".

Identify roles employees may have in in the quality system

Sales<br/>AssociatesService<br/>TechniciansEmployees who have roles in complaint<br/>reporting procedures

# **Document "Roles" in the QMS**











# Document the Roles of the 'Authorized Representative' Article 11

Specifies a list of obligations of the AR, which the Manufacturer is to actively support.

**Document "AR Roles"** 









4.1.2 The organization shall <u>apply</u> a **risk based** <u>approach</u> to the control of the appropriate processes needed for the quality management system;

It is more essential than ever to understand the sources of hazards with each device and reduce risk appropriately.

	atery.		Noticeable by user	Patient or user inconvenience or temporary discomfort	Causes injury that does not require additional professional medical intervention	Injury requiring additional professional medical attention	Potentially life threatening or causing permanent impairment
	**Likelihood of ha	arm	1	2	3	4	5
5	More than 1/100	Frequent	5	10	15	20	25
4	1/100 to 1/1000	Probable	4	8	12	16	20
3	1/1,000 to 1/10,000	Occasional	3	6	9	12	15
2	1/10,000 to 1/100,000	Remote	2	4	6	8	10
1	1/100,000 to 1/1 million	Improbable	1	2	3	4	5
Broadly Accentable		Reasonably Acceptable			Intolerable		

\* The liklihood of harm should be derived from complaint and adverse event data that relate to each particular hazardous situation.

More Risk Management











# Annex 1 Section 3

3. Manufacturers shall establish, implement, document and maintain a risk management system.

Risk management shall be understood <u>as a continuous iterative</u> process throughout the entire lifecycle of a device, requiring regular systematic updating.

# Risk Management for the Lifecycle!









# **Quality System Section 4**

4.1.5 When the organization chooses to outsource any process, ... The controls shall be proportionate to the risk involved and ... The controls shall include written quality agreements.

Quality Agreements shall be framed in the context of the risk of the supplied part, service and/or medical device.

**Risk Based Quality Agreements** 



**Risk Based Supplier Control** 









# Quality System Section 4.

4.1.6 The organization shall document procedures for the validation of the application of computer software used in the quality management system.

Any software required by the quality system must be validated.



# Must have a procedure for Software Validation









# Quality System Section 4.

**4.2.3 "Medical device file" (MDF)** The Medical Device File (MDF) includes a description of the product, work instructions for manufacturing, testing, servicing etc.

### It may reference more than one "file"



"European Technical Files may include the MDF"











# Quality System Section 4.

4.2.5...The organization shall document procedures to define the controls needed for the identification, storage, <u>security</u> and integrity... and implement methods for protecting <u>confidential health information</u>

Do you store confidential health information of patients?



Secure patient information!









Management Responsibility 5.0 5.6.2 Review input The input to management review shall include: .... complaint handling; ... reporting to regulatory authorities;



# When less is best!

**Complaints and MDRs.** 

**Management Must Review Complaints and "MDRs"** 











# Special Focus - Vigilance Articles

Article 87 - Reporting of serious incidents and **Field Safety Corrective Action (FSCA) Article 88** - Trend reporting Article 89 - Analysis of serious incidents and FSCA Article 90 - Analysis of vigilance data Monitor, Analyze and Report









# Management Responsibility 5.0

# 5.6.3 Review output

The output from management review shall include...changes needed to respond to applicable new or revised regulatory requirements;

Final Dates	1 March 2019	ISO 13485:2016
to adopt these	27 May 2024	Regulation (EU) 2017/745
new requirements	27 May 2024	Regulation (EU) 2017/746

# **Must Plan for Regulatory Changes**









### Concerning Voluntary use of 'Harmonised Standards'

Those procedures and techniques shall specifically cover:

— identification of applicable general safety and performance requirements [of Annex 1] and solutions to fulfill those requirements, taking applicable CS and, where opted for, harmonised standards or other adequate solutions into account

Annex IX 2.2 ('c') paragraph 2

"Common Specifications" (CS) – A specification intended to be developed to address a more general requirement of the medical device regulation.

# Will you use Harmonized Standards?











Concerning Voluntary use of 'Harmonised Standards'

"...Changes in device design or characteristics and changes in the harmonised standards or CS by reference to which the conformity of a device is declared shall be adequately taken into account in a timely manner." Second sentence of Article 10 (9)

> You must evaluate changes to standards In a timely manner if you are using them.











# Resource Management 6.0

- 6.2 Human resources
- The organization shall...
- a) determine the necessary competence...
- b) achieve or maintain the necessary competence;

COMPETENCE "the ability to apply knowledge and skills to achieve intended results" ISO 17021:2015

# Focus on "Competence"









# **Resource Management 6.0**

### 6.2 Human resources

....The methodology used to check effectiveness is proportionate to the risk ....



"What is difficult in training will become easy in a battle" – Alexander Suvorov -

# More Risk? More "Competence" Expected











# Concerning Competency of At Least one RA Representative

permanently and continuously at their disposal

### Article (14) Person responsible for regulatory compliance either of the following qualifications:

(a) a diploma, certificate or other evidence of formal qualification, awarded on completion of a university degree or of a course of study recognised as equivalent by the Member State concerned, in *law, medicine, pharmacy, engineering or another relevant scientific discipline, and at least one year* Companies with 50 or fewer employees and gross 10 million Euro or less annually –

may retain an external RA Rep. Per – Article 14, by way of reference to Article 2 of 2003/361/EC

(b) four years of professional experience in regulatory affairs or in quality management systems relating to medical devices..."



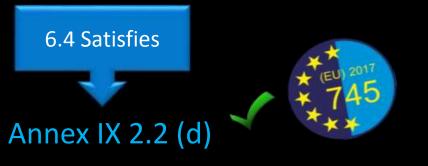








- 6.4 Work environment and contamination control
- 6.4.1 Clean room standards More clearly implied
- 6.4.2 Contamination control for sterile devices More control of biological and particulate contamination.





# **More Environmental Controls**









# 7.1 Planning of product realization –

Plan on what is to be documented, to support the infrastructure and control of work environment.

Plan to include: handling, storage, distribution and traceability activities specific to the product.

# A Little More Planning is Required











- 7.2 Customer-related processes-
- 7.2.1 Determination of requirements related to product
- Adds user training to ensure specified performance and safe use of the medical device.
- 7.2.2 Review of requirements related to product
- Applicable regulatory requirements
- Review user training, if it is necessary

# **Patient or User Training?**











# 7.2 Customer-related processes– 7.2.3 Communication

"The organization shall communicate with regulatory authorities in accordance with applicable regulatory requirements."



# Know what to communicate and when











Procedures for handling communication may be in different procedures, depending on purpose.

The quality management system shall address at least the following aspects: (j) handling communication with competent authorities, notified bodies, other economic operators, customers and/or other stakeholders; Article 10 (9) (j)

# More communication nodes for the EU



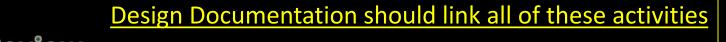






### 7.3.2 Design and Development Planning

<u>The design and development plan must</u> document the methods to <u>ensure traceability</u> <u>of</u> design and development <u>outputs</u> to <u>inputs</u>;



< Design Review

Design input  $\rightarrow$  Design output  $\rightarrow$ 

Verification ->

Validation

Design Transfer 🔿

# Plan to ensure traceability









### 7.3.2 Design and Development Planning

f) the resources needed, including necessary competence of personnel.

# What expertise is needed? ← Design Review Design input→ Design output→ Verification→ Validation Design Transfer →

# **Consider 'competency' requirements**









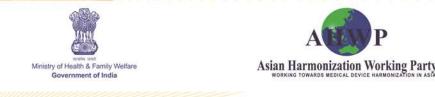
### 7.3.3 Design and Development Inputs

Inputs relating to product requirements shall include usability

# Include 'Usability' in your Risk Management Process Design input

### Scale 'usability' effort consider IEC 62366

# **Reduce risk of 'Use errors'**







#### 7.3.5 Design and Development Review

...include the identification of the design under review, the participants involved and the date of the review...

### **Design Review Records**

 Design input→
 Design output→
 Verification→
 Validation

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## Must Now Record Who, What and When









#### 7.3.6 Design and Development Verification

...shall document methods, acceptance criteria and, as appropriate, statistical techniques with rationale for sample size....

Design input→	Design output $\rightarrow$	Verification	Validation		
"Is there a need for a <b>larger</b> sample size?"					
Justify the validity of your Verification					









#### 7.3.7 Design and Development Validation

...shall document methods, acceptance criteria and, as appropriate, statistical techniques with rationale for sample size....



"Do we have enough people for our user group?" Justify the validity of your Validation









#### 7.3.7 Design and Development Validation

...Design validation shall be performed with... "Representative product" (e.g.) initial production units, lots, or batches, or their equivalents..... ISO 13485:2016 & FDA Part 820.30 (g)

*Is our prototype like the real thing?* 



## Validation needs Realistic Models









#### 7.3.7 Design and Development Validation

If ...the medical device is connected to, or has an interface with other medical device(s), validation shall include confirmation that the requirements for the specified application or intended use have been met when so connected or interfaced.



# Does it work when connected?









#### 7.3.8 Design and Development Transfer

# Each manufacturer shall document procedures for transfer of design and development outputs to manufacturing.

Changes?

Biggest

## Can you Build what you Designed?



Making sure we can make what we intended during design

**Preparing for** 









#### 7.3.9 Design and Development Changes

Procedures for "Design change" shall determine the effect on existing;

1) Function 2) Performance 3) Safety 4) Applicable regulatory requirements



- 5) Intended use

## **Check your "Design Changes"**









### 7.3.9 Design and Development Changes Procedures for "Design change" shall determine the effect on existing

6) product in production
7)\*product in the field
8) risk management input/output
9) product realization process.

\*Same as ISO 13485:2003

## **Check your "Design Changes"**









#### 7.3.10 Design and Development File

...shall include records generated to demonstrate conformity to the requirements for design and development ...and development changes.

Biggest			
Changes	And the Design Change Records		
Design input	Design output	Verification	Validation
Records	Records	Records	Records

#### **Design and Development \*History File**

Reference 21 CFR Part 820 j) Design history file.











7.4.1 Purchasing Process

"The organization shall establish criteria for the evaluation and selection of suppliers".

- "Proportionate to risk"
- "Planned and monitored"
- "Record monitoring of suppliers"
- "Written agreements"

<u>...And more!</u>

## Many little Changes = Big Change

Biggest

Changes

## Manage risk of suppliers' product



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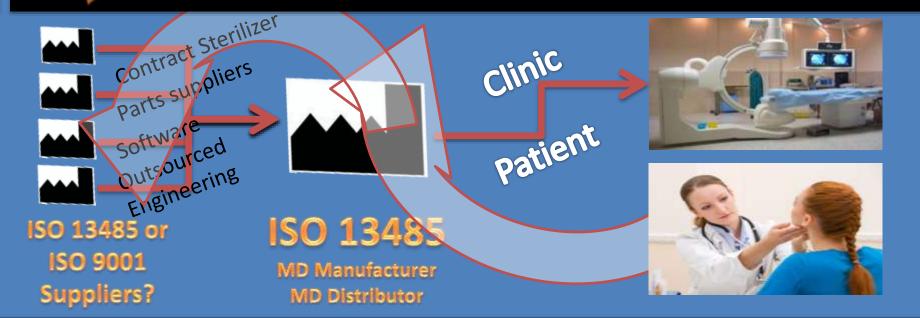
#### **MORE FOCUS ON SUPPLY CHAIN**





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#### **MORE FOCUS ON SUPPLY CHAIN**











#### 7.5.1 Control of product and service provision

"Planned, carried out, monitored and controlled to ensure that product conforms to specification..."

Monitor the process

- Qualify infrastructure

Any software used in the production must be validated (see 4.1.6)



## **Qualify and Monitor Production Processes**









#### 7.5.2 Cleanliness of product

Must now document cleanliness of product or contamination control

...if... product cannot be cleaned prior to sterilization or its use, <u>and its</u> <u>cleanliness is of significance in use;</u>

## IS IT INVASIVE? REUSABLE? Is Cleanliness Significant in Use?









- 7.5.4 Service activities
- The organization shall analyze records of servicing activities carried out by the organization or its supplier:
- 1)...are they to be handled as a "Complaint"?
- 2)...for in put to improve...



### **Complaint Handling & Monitoring During Servicing?**

SERVICI









## "Complaint" means any

#### ISO 13485 Definition Includes "Usability" which concerns "Use-errors"

written, electronic, or oral communication that alleges deficiencies related to the identity, quality, durability, reliability, **[usability]**, safety, [effectiveness], or performance of a medical device after it is released..

**'incident'** means any malfunction or deterioration in the characteristics or performance of a device made available on the market, including **use-error** due to ergonomic features, as well as any inadequacy in the information supplied by the manufacturer and any undesirable side-effect; Article 2 definition (64)

More Focus on "Use Error"









- 7 Product realization
- 7.5 Production...

## **Process Validation**

- 7.5.6 Validation of processes for production and service provision.
- *The organization shall document procedures for validation of processes, Including...*
- g) approval of changes to the processes.

## **More Accountability –** *"Who approved it"?*









## 7 Product realization

#### 7.5 Production...

## **Process Validation**

#### 7.5.6 Validation of processes for production and service provision.

...software validation and revalidation shall be proportionate to the risk.





## More Risk = More Process Validation of Software









7.5.7 Particular requirements for validation of processes for sterilization and sterile barrier systems

...document procedures for the validation of processes for sterilization and sterile barrier systems.



**Keeping sterile products sterile?** 







## **7.5.7** Particular requirements for validation of processes for sterilization and sterile barrier systems

ISO 17607-1 ...Requirements for materials, sterile barrier systems and packaging systems

ISO 17607-2 ... Validation requirements for forming, sealing and assembly processes

## More validation of sterile product packaging







#### 7.5.8 Identification

If required by applicable regulatory requirements, the organization shall document a system to assign unique device identification to the medical device.



## Is "UDI" a Regulatory Requirement?









#### 7.5.9 Traceability

## ...shall define the extent of traceability in accordance with applicable regulatory requirements

How much traceability is required by the Medical Device Regulation?

## Traceability to doctors? Patients??









#### Article 18 Implant card and information to be supplied to the patient with an implanted device

- 1. The manufacturer of an implantable device shall provide together with the device the following:
- (a) information allowing the identification of the device, including the device name, serial number, lot number, the UDI, the device model, as well as the name, address and the website of the manufacturer;

...AND MUCH MORE











#### 7.5.11 Preservation of product

The organization shall protect product from alteration, contamination or damage when exposed to expected conditions and hazards during processing, storage, handling, and distribution by.



#### **Concerns over alteration through distribution**









#### 7.5.11 Preservation of product

#### a) designing and constructing packaging and shipping containers;

Each manufacturer shall ensure that device packaging and shipping containers are designed and constructed to protect the device from alteration or damage during the customary conditions of processing, storage, handling, and distribution. US FDA 21 CFR Part 820.130



#### Design/Construct control of packaging



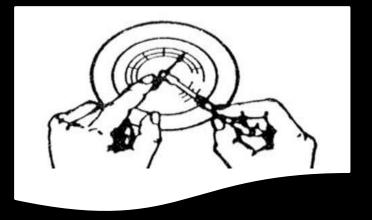






7.6 Control of Monitoring and Measuring Equipment

...adjustments shall be recorded (see 4.2.5);



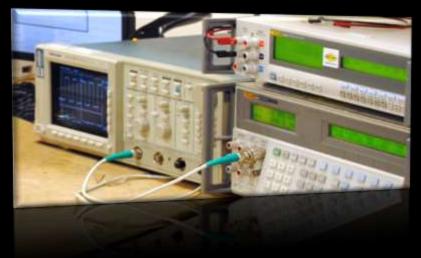
## **Record Adjustments**





**7**.6 Control of Monitoring and Measuring Equipment ...document procedures for the validation of the application of computer software used for the monitoring and measurement of requirements.

Software Validation Procedures Must also cover (MME)





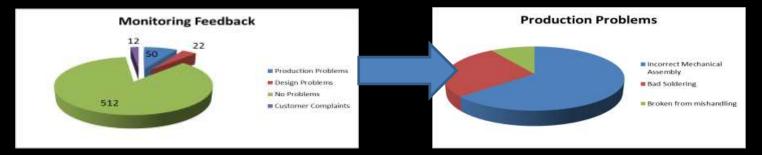






#### 8.2.1 Feedback

shall document procedures for the feedback process... to gather data <u>from production</u> as well as post-production activities



## **Monitoring Data From Production**







Patient

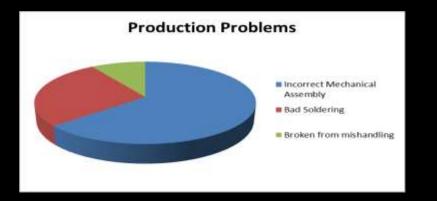
safety

issue??



#### What changed?

### 8.2.1 Feedback shall serve as potential input into risk management



## Does the Quality "Issue" Present a Risk?



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#### 8.2.2 Complaint handling

"The organization shall document procedures for timely complaint handling in accordance with applicable regulatory requirements"

## "Complaint"



## Evaluate for reportability

#### **0 12 24 36 48** 60 72 84 96 108 120



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#### **8.2.3** *Reporting to regulatory authorities*

**Records** of medical device reporting to regulatory authorities shall be maintained.











## Article 87



Reporting of serious incidents and field safety corrective actions (FSCA)

(a) any 'serious incident' involving devices made available on the Union market, except expected side-effects which are clearly documented in the product information and quantified in the technical documentation and are subject to trend reporting pursuant to Article 88;

'serious incident' – immediately to 15 days. 'serious public health threat', no later than 2 days.

See Article 2 definitions to apply Article 87 properly









#### 8.2.4. Internal Audit

#### ...audit of applicable regulatory requirements

Records of the processes and areas audited and the conclusions, shall be maintained ....necessary <u>corrections</u> and <u>corrective actions</u> are taken

Audit regulatory criteria Connect clearly with "CAPA"











8.2.5 Monitoring and measuring processes When planned results are not achieved, correction and corrective action shall be taken, as appropriate. <del>to ensure</del> <del>conformity of the product.</del>

#### Focus no longer on product conformity alone









#### 8.2.6 Monitoring and measuring product

#### As appropriate, records shall identify the test equipment...

(e) the appropriate tests and trials which are to be carried out before, during and after manufacture, the frequency with which they are to take place, and the test equipment to be used; it shall be possible to trace back adequately the calibration of that test equipment.

Annex IX 2.2 (e)











8.3 Control of nonconforming product8.3.1 General requirementsNow requires

....the documented procedure shall define the controls and related responsibilities and authorities "for the identification, documentation, segregation, evaluation and disposition of nonconforming product."

### More requirements in the "NCP" procedure







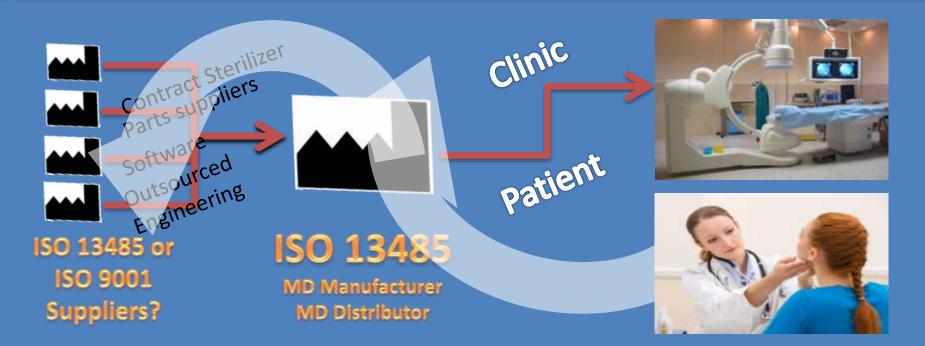


- 8.3 Control of nonconforming product 8.3.1 General
- adds evaluation ...shall include a determination of the need for an investigation and notification of any external party responsible for the nonconformity.

### Investigate further? Notify supplier?



### MORE INVOLVEMENT WITH THE SUPPLY CHAIN











- 8.3 Control of nonconforming product8.3.1 GeneralRecord
- ...nature of the nonconformity
- ...subsequent action taken, including the evaluation
- ... investigations
- ...rationale for decisions

### More details in NCP records



# **8.3.2** Actions in response to nonconforming product detected before delivery

Adds ... nonconforming product is accepted by concession only if the justification is provided,











#### **8.3.3** Actions in response to nonconforming product detected after delivery

#### Must have procedures for implementing and issuing Advisory Notices [Moved to 8.3.3 in ISO 13485:2016 from 8.5.1 in ISO 13485:2003]

### 3.1 'advisory notice'

notice issued by the organization, subsequent to delivery of the medical device, to provide supplementary information or to advise on action to be taken in the:

- use of a medical device,
- modification of a medical device,
- return of the medical device to the organization that supplied it, or
- destruction of a medical device

Must Keep Records of Advisory Notices

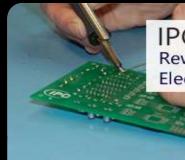


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### 8.3.4 Rework

Adds ...after rework, product shall be verified to ensure that it meets applicable acceptance criteria and regulatory requirements. ...Rework records must be maintained





IPC 7711/7721 Rework, Modification and Repair of Electronic Assemblies

> DISCOVER HOW TO REPAIR AND REWORK DAMAGE ON YOUR ASSEMBLY USING THE IPC 7711/7721.

**New Section "Rework"** 









- 8.4 Analysis of data
- More data to be reviewed, including
- e) Audits
- f) Service reports (s appropriate)

If ...data shows that the quality management system is not suitable, adequate or effective, the organization shall use this analysis as input for improvement...

### More Data to be Reviewed









- 8.5 Improvement
- 8.5.1 General

The organization shall identify and implement any changes necessary to ensure and maintain the continued suitability; adequacy and effectiveness of the quality management system <u>as well as medical device safety and performance.</u>



### Does the product need more help from the QMS?



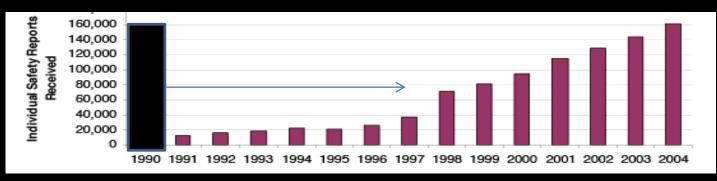






- 8.5 Improvement
- 8.5.1 General

### Adds through the use of ... post market surveillance...



### **Add Feedback from Field Data**









- 8.5.2 Corrective Action
- Adds

"Any necessary corrective actions shall be taken without undue delay".

"Incident"?
Article 87
"Serious incident"?
"Serious public health threat"?



### Don't Delay Reporting Serious Incidents!









#### 8.5.2 Corrective Action (e)

Verify the corrective action does not adversely affect the ability to meet

...applicable regulatory requirements

...safety and performance of the medical device;

"Switching to the plastic screw to manage corrosion will interfere with electrical grounding" – Corrective Action Plan - REJECTED



### Does the CA have unacceptable consequences?







### 8.5.3 Preventive Action (d)

Verify the preventive action does not adversely affect the ability to meet *...applicable regulatory requirements* 

...safety and performance of the medical device;

The more fire retardant plastic is too brittle, and will cause the electrical enclosure to crack too easily– Preventive Action Plan REJECTED



### Does the PA have unacceptable consequences?



- 1) Applicable QMS regulations must be integrated
- 2) Much stronger complaint handling and reporting
- 3) More control over suppliers
- 4) More of the "risk based" approach
- **5) New Documented Procedures** 
  - for Validating software
  - for Rework











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### Further Reducing Risk to Public Health Worldwide



Presented by: Grant Ramaley ISO 13485 Working Group International Accreditation Forum



#### Certified once, Protecting Everywhere