Contract QA, SwQA, RA & Clinical Research Solutions
Medical Device & Combination Products

Challenges in Medical Device Design Validation

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Simon Says… (21 CFR Part 820)

- "establishing by objective evidence that device specifications conform with user needs and intended use(s)"
- "…establish and maintain procedures for validating the device design. ..shall be performed under defined operating conditions on initial production units, lots, or batches, or their equivalents…and shall include testing of production units under actual or simulated use conditions. Design validation shall include software validation and risk analysis, where appropriate". The results… shall be documented in the DHF"
- Also outlined in QSR Preambles and FDA and Global Harmonization Task Force (GHTF) guidance documents

Simon Said But…

CY2013 Design Control Subsystem Warning Letter Cites

WL Citations	# of WL Cites
21 CFR 820.30(g)	30
21 CFR 820.30(i)	28
21 CFR 820.30(a)	22
21 CFR 820.30(f)	20
21 CFR 820.30(j)	13
21 CFR 820.30(e)	12
21 CFR 820.30(c)	6
21 CFR 820.30(d)	6
21 CFR 820.30(b)	5
21 CFR 820.30(a)(1)	3
21 CFR 820.30	2
	Total: 156

What Should We Do?

- Establish and maintain procedures (how will design validation be done)
- Validate the device design
- Perform under defined operating conditions (actual or simulated use) on initial production units or their equivalents
- Ensure devices conform to defined user needs and intended uses
- Perform software validation and risk analysis , where appropriate
- Document

Design Validation Approaches

- Must succeed in answering: Did we design the right device?
- Address intended use and user
- Selection of Validation Approach depends on technology and intended use
- Actual or simulated use?

  FDA 1997 Design Control Guidance: "…Many medical devices do not require clinical trials. However, all devices require clinical evaluation and should be tested in the actual or simulated use environment as a part of validation.
- Must define acceptance criteria a-priori, i.e., pre-approved protocols
- Human Factors - device usability

Design Validation Considerations

- Status of Device: for production-equivalent, i.e., based on DMR document in detail how the device was manufactured, by whom, and how it is similar (equivalent) and possibly different from initial production
- Statistics: no mandate on specific number of lots or devices but needs to be defensible
- Protocols and Results, traceability, consideration of risk mitigations

Planning Design Validation

- Begin planning as soon as user needs and intended uses are understood
- Identify in D&D Plan - Verification and Validation Plan: determine need for animal studies, clinical trials or clinical evaluations, plan for actual or simulated use
- Identify performance characteristics requiring assessment, focus in particular on risk mitigations
- Establish validation methods and acceptance criteria
- Address each type of user

Compliant DV Practices

- Design validation follows a frozen design

"Validation follows successful verification, and ensures that each requirement for a particular use is fulfilled. Validation of user needs is possible only after design is finalized and the device is built." (FDA's Design Control Guidance for Medical Device Manufacturers document, 1997)

- DV should involve devices which are manufactured using the same methods and procedures expected to be used for ongoing production.

"Some manufacturers have historically used their best assembly workers or skilled lab technicians to fabricate test articles…….but pilot production should simulate as closely as possible the actual manufacturing condition"

Compliant DV Practices

- DV should also address product packaging and labeling.
- DV should be reported

  "Validation is a compilation of the results of all validation activities. For a complex design, the detailed results may be contained in a variety of separate documents and summarized in a validation report. Supporting information should be explicitly referenced in the validation report and either included as an appendix or available in the design history file (FDA DC Guidance)."
- DV should be reviewed. A formal review process should be used to resolve any such deficiencies. As with verification, the perception of a deficiency might be judged insignificant or erroneous, or a corrective action may be required.

Warning Letter Example

Failure to establish and maintain adequate procedures for validating the device design and risk analysis, where appropriate, as required by 21 CFR 820.30(g).

For example: The design files for XXX did not include documentation the device had ever been validated before production and marketing. When requested, your firm was unable to provide documentation validation had been performed.

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