INTERNATIONAL STANDARD

ISO 14971

Redline version
compares Third edition to
Second edition

Medical devices — Application of risk management to medical devices

Dispositifs médicaux — Application de la gestion des risques aux dispositifs médicaux

Reference number
ISO 14971:redline:2019(E)

IMPORTANT

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Text example 1	— Text has been added (in green)
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IMPORTANT

Exemple de texte 1	— Texte ayant été ajouté (en vert)
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

~~International Standards are~~The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the ~~rules given in~~editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

~~The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.~~

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

~~International Standard ISO 14971~~This document was prepared by Technical Committee ISO/TC 210, *Quality management and corresponding general aspects for medical devices*, and ~~Subcommittee~~ IEC/SC 62A, *Common aspects of electrical equipment used in medical practice*.~~Annex H, "Guidance on risk management for *in vitro* diagnostic medical devices", was prepared by ISO/TC 212, *Clinical laboratory testing and in vitro diagnostic test systems*.~~

This ~~second~~third edition cancels and replaces the ~~first~~second edition (ISO 14971:~~2000~~2007)~~ as well as the amendment~~, which has been technically revised. The main changes compared to the ~~ISO 14971:2000/Amd.1:2003.~~previous edition are as follows:

~~For purposes of future IEC maintenance, Subcommittee 62A has decided that the contents of this publication will remain unchanged until the maintenance result date[1] indicated on the IEC web site under http://webstore.iec.ch in the data related to the specific publication. At this date, the publication will be~~

— ~~reconfirmed,~~A clause on normative references has been included, in order to respect the requirements for fixed in Clause 15 of ISO/IEC Directives, Part 2:2018.

— ~~withdrawn,~~The defined terms are updated and many are derived from ISO/IEC Guide 63:2019. Defined terms are printed in italic to assist the reader in identifying them in the body of the document.

— Definitions of *benefit*, *reasonably foreseeable misuse* and *state of the art* have been introduced.

1) ~~IEC National Committees are requested to note that for this publication the maintenance result date is 2014.~~

— replaced by a revised edition or More attention is given to the *benefits* that are expected from the use of the *medical device*. The term *benefit*-*risk* analysis has been aligned with terminology used in some regulations.

— amended It is explained that the *process* described in ISO 14971 can be used for managing *risks* associated with *medical devices*, including those related to data and systems security.

— The method for the evaluation of the overall *residual risk* and the criteria for its acceptability are required to be defined in the *risk management* plan. The method can include gathering and reviewing data and literature for the *medical device* and for similar *medical devices* and similar other products on the market. The criteria for the acceptability of the overall *residual risk* can be different from the criteria for acceptability of individual *risks*.

— The requirements to disclose *residual risks* have been moved and merged into one requirement, after the overall *residual risk* has been evaluated and judged acceptable.

— The review before commercial distribution of the *medical device* concerns the execution of the *risk management* plan. The results of the review are documented as the *risk management* report.

— The requirements for production and *post-production* activities have been clarified and restructured. More detail is given on the information to be collected and the actions to be taken when the collected information has been reviewed and determined to be relevant to *safety*.

— Several informative annexes are moved to the guidance in ISO/TR 24971, which has been revised in parallel. More information and a rationale for the requirements in this third edition of ISO 14971 have been provided in Annex A. The correspondence between the clauses of the second edition and those of this third edition is given in Annex B.

This corrected version Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of ISO 14971:2007 incorporates the following correction: these bodies can be found at www.iso.org/members.html.

— a corrected version of Figure 1 on page 6.

Introduction

The requirements contained in this ~~International Standard~~document provide *manufacturers* with a framework within which experience, insight and judgment are applied systematically to manage the *risks* associated with the use of *medical devices*.

This ~~International Standard~~document was developed specifically for *manufacturers* of *medical* ~~*device/system manufacturers using*~~ *devices* on the basis of established principles of *risk management*~~*. For other manufacturers, e.g., in other healthcare industries, this International Standard*~~ that have evolved over many years. This document could be used as ~~informative~~ guidance in developing and maintaining a *risk management process* for other products that are not necessarily *medical devices* ~~system and process~~in some jurisdictions and for suppliers and other parties involved in the *medical device life cycle*.

This ~~International Standard~~document deals with *processes* for managing *risks* associated with *medical devices*. *Risks*~~, primarily~~ can be related to injury, not only to the patient, but also to the ~~operator,~~user and other persons. *Risks*~~, other equipment and~~ can also be related to damage to property (for example objects, data, other equipment) or the environment.

~~As a general concept, activities in which an individual, organization or government is involved can expose those or other stakeholders to hazards which can cause loss of or damage to something they value. Risk management is a complex subject because each stakeholder places a different value on the probability of harm occurring and its severity.~~

~~It is accepted that the concept of risk has two components:~~

~~a) the probability of occurrence of harm;~~

~~b) the consequences of that harm, that is, how severe it might be.~~

Risk management is a complex subject because each stakeholder can place a different value on the acceptability of *risks* in relation to the anticipated *benefits*. The concepts of *risk management* are particularly important in relation to *medical devices* because of the variety of stakeholders including medical practitioners, the organizations providing health care, governments, industry, patients and members of the public.

It is generally accepted that the concept of *risk* has two key components:

— the probability of occurrence of *harm*; and

— the consequences of that *harm*, that is, how severe it might be.

All stakeholders need to understand that the use of a *medical device* ~~entails some~~involves an inherent degree of *risk*, even after the *risks*~~.~~ have been reduced to an acceptable level. It is well known that in the context of a clinical *procedure* some *residual risks* remain. The acceptability of a *risk* to a stakeholder is influenced by the key components listed above and by the stakeholder's perception of the *risk* and the *benefit*. ~~Eachstakeholder's perception of the risk can vary greatly~~Each stakeholder's perception can vary depending upon their cultural background, the socio-economic and educational background of the society concerned~~;~~ and the actual and perceived state of health of the patient~~, and many other factors~~. The way a *risk* is perceived also takes into account other factors, for example, whether exposure to the *hazard* or *hazardous situation* seems to be involuntary, avoidable, from a man-made source, due to negligence, arising from a poorly understood cause, or directed at a vulnerable group within society. ~~The decision to use a medical device in the context of a particular clinical procedure requires the residual risks to be balanced against the anticipated benefits of the procedure. Such judgments should take into account the intended use, performance and risks associated with the medical device, as well as the risks and benefits associated with the clinical procedure or the circumstances of use. Some of these judgments can be made only by a qualified medical practitioner with knowledge of the state of health of an individual patient or the patient's own opinion.~~

As one of the stakeholders, the *manufacturer* reduces *risks* and makes judgments relating to the *safety* of a *medical device*, including the acceptability of *residual risks*. The *manufacturer*~~, taking~~ takes into account

the generally ~~accepted~~acknowledged *state of the art*, in order to determine the suitability of a *medical device* to be placed on the market for its *intended use*. This ~~International Standard~~document specifies a *process* through which the *manufacturer* of a *medical device* can identify *hazards* associated with ~~a~~the *medical device*, estimate and evaluate the *risks* associated with these *hazards*, control these *risks*, and monitor the effectiveness of ~~that control~~the controls throughout the *life cycle* of the *medical device*.

The decision to use a *medical device* in the context of a particular clinical *procedure* requires the *residual risks* to be balanced against the anticipated *benefits* of the *procedure*. Such decisions are beyond the scope of this document and take into account the *intended use*, the circumstances of use, the performance and *risks* associated with the *medical device*, as well as the *risks* and *benefits* associated with the clinical *procedure*. Some of these decisions can be made only by a qualified medical practitioner with knowledge of the state of health of an individual patient or the patient's own opinion.

For any particular *medical device*, other ~~International Standards~~standards or regulations could require the application of specific methods for managing *risk*. In those cases, it is necessary to also follow the requirements outlined in those documents.

The verbal forms used in this document conform to the usage described in Clause 7 of the ISO/IEC Directives, Part 2:2018. For the purposes of this document, the auxiliary verb:

— "shall" means that compliance with a requirement or a test is mandatory for compliance with this document;

— "should" means that compliance with a requirement or a test is recommended but is not mandatory for compliance with this document;

— "may" is used to describe permission (e.g. a permissible way to achieve compliance with a requirement or test);

— "can" is used to express possibility and capability; and

— "must" is used to express an external constraint that is not a requirement of the document.

Medical devices — Application of risk management to medical devices

1 Scope

This ~~International Standard specifies~~document specifies terminology, principles and a *process* for *risk management* of *medical devices*, including software as a ~~*a manufacturer to identify the hazards associated with medical devices, including*~~*medical device* and *in vitro diagnostic medical devices*. The *process* described in this document intends to assist *manufacturers* of ~~*diagnostic (IVD)*~~ *medical devices* to identify the *hazards* associated with the *medical device*, to estimate and evaluate the associated *risks*, to control these *risks*, and to monitor the effectiveness of the controls.

The requirements of this ~~International Standard~~document are applicable to all ~~stages~~phases of the *life*~~-~~ *cycle* of a *medical device*. The *process* described in this document applies to *risks* associated with a *medical device*, such as *risks* related to biocompatibility, data and systems security, electricity, moving parts, radiation, and usability.

The *process* described in this document can also be applied to products that are not necessarily *medical devices* in some jurisdictions and can also be used by others involved in the *medical device life cycle*.

This ~~International Standard~~document does not apply to ~~clinical decision making.~~:

— decisions on the use of a *medical device* in the context of any particular clinical *procedure*; or

— business *risk management*.

This ~~International Standard~~document requires *manufacturers* to establish objective criteria for *risk* acceptability but does not specify acceptable *risk* levels.

Risk management~~This International Standard does not require that the manufacturer have~~ can be an integral part of a quality management system~~ in place~~. However, ~~risk management can be an integral part of~~this document does not require the *manufacturer* to have a quality management system in place.

NOTE Guidance on the application of this document can be found in ISO/TR 24971[9].

2 Normative references

There are no normative references in this document.

~~2~~3 Terms and definitions

For the purposes of this document, the following terms and definitions apply~~:~~.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

~~2.1~~3.1
accompanying ~~document~~documentation
~~document~~materials accompanying a ~~medical device~~ *medical device* (3.10) and containing information for the user or those accountable for the installation, use ~~and maintenance of the medical device, the operator or the user~~, maintenance, decommissioning and disposal of the *medical device* (3.10), particularly regarding ~~safety~~safe use

Note 1 to entry: ~~Adapted from IEC 60601-1:2005, definition 3.4~~The *accompanying documentation* can consist of the instructions for use, technical description, installation manual, quick reference guide, etc.

Note 2 to entry: *Accompanying documentation* is not necessarily a written or printed document but could involve auditory, visual, or tactile materials and multiple media types.

3.2
benefit
positive impact or desirable outcome of the use of a *medical device* (3.10) on the health of an individual, or a positive impact on patient management or public health

Note 1 to entry: *Benefits* can include positive impact on clinical outcome, the patient's quality of life, outcomes related to diagnosis, positive impact from diagnostic devices on clinical outcomes, or positive impact on public health.

~~2.2~~3.3
harm
~~physical~~ injury or damage to the health of people, or damage to property or the environment

[SOURCE: ISO/IEC Guide ~~51:1999, definition 3.3~~63:2019, 3.1]

~~2.3~~3.4
hazard
potential source of ~~harm~~*harm* (3.3)

[SOURCE: ISO/IEC Guide ~~51:1999, definition 3.5~~63:2019, 3.2]

~~2.4~~3.5
hazardous situation
circumstance in which people, property or the environment is/are exposed to one or more ~~hazard(s)~~*hazards* (3.4)

~~[SOURCE: ISO/IEC Guide 51:1999, definition 3.6]~~

Note 1 to entry: See Annex ~~E~~C for an explanation of the relationship between ~~"~~"hazard~~"~~ and ~~"~~"hazardous situation~~"~~.

[SOURCE: ISO/IEC Guide 63:2019, 3.3, modified — Note 1 to entry added.]

~~2.5~~3.6
intended use
intended purpose
use for which a product, ~~process~~*process* (3.14) or service is intended according to the specifications, instructions and information provided by the ~~manufacturer~~*manufacturer* (3.9)

Note 1 to entry: The intended medical indication, patient population, part of the body or type of tissue interacted with, user profile, use environment, and operating principle are typical elements of the *intended use*.

[SOURCE: ISO/IEC Guide 63:2019, 3.4]

~~2.6~~3.7

***in vitro* diagnostic medical device**

IVD medical device

~~medical device~~device, whether used alone or in combination, intended by the ~~manufacturer~~*manufacturer* (3.9) for the in vitro examination of specimens derived from the human body solely or principally to provide information for diagnostic, monitoring or compatibility purposes and including reagents, calibrators, control materials, specimen receptacles, software, and related instruments or apparatus or other articles

~~EXAMPLE Reagents, calibrators, specimen collection and storage devices, control materials and related instruments, apparatus or articles.~~

~~Note 1 to entry: Can be used alone or in combination with accessories or other medical devices.~~

~~Note 2 to entry: Adapted from ISO 18113-1:—, definition 3.29.~~

[SOURCE: ISO 18113-1:2009, 3.27, modified — NOTE deleted.]

~~2.7~~3.8

life~~-~~ cycle

series of all phases in the life of a ~~medical device~~*medical device* (3.10), from the initial conception to final decommissioning and disposal

[SOURCE: ISO/IEC Guide 63:2019, 3.5]

~~2.8~~3.9

manufacturer

natural or legal person with responsibility for the design~~, manufacture, packaging, or labelling of a medical device, assembling a system~~ and/or manufacture of a *medical device* (3.10) with the intention of making the *medical device* (3.10)~~, or adapting a medical device before it is placed on the market or put into service, regardless of whether these operations are carried out~~ available for use, under his name, whether or not such a *medical device* (3.10) is designed and/or manufactured by that person himself or on ~~that person's behalf by a third party~~ his behalf by another person(s)

Note 1 to entry: ~~Attention~~ The natural or legal person has ultimate legal responsibility for ensuring compliance with all applicable regulatory requirements for the *medical device*~~is drawn to the fact that the provisions of national or regional regulations can apply to the definition of manufacturer~~ in the countries or jurisdictions where it is intended to be made available or sold, unless this responsibility is specifically imposed on another person by the Regulatory Authority (RA) within that jurisdiction.

Note 2 to entry: The *manufacturer's* responsibilities are described in other GHTF guidance documents. These responsibilities include meeting both pre-market requirements and post-market requirements, such as adverse event reporting and notification of corrective actions.

Note 3 to entry: “Design and/or manufacture” may include specification development, production, fabrication, assembly, processing, packaging, repackaging, labelling, relabelling, sterilization, installation, or remanufacturing of a *medical device*; or putting a collection of devices, and possibly other products, together for a medical purpose.

Note 4 to entry: Any person who assembles or adapts a *medical device* that has already been supplied by another person for an individual patient, in accordance with the instructions for use, is not the *manufacturer*, provided the assembly or adaptation does not change the *intended use* of the *medical device*.

Note 5 to entry: Any person who changes the *intended use* of, or modifies, a *medical device* without acting on behalf of the original *manufacturer* and who makes it available for use under his own name, should be considered the *manufacturer* of the modified *medical device*.

Note 6 to entry: An authorised representative, distributor or importer who only adds its own address and contact details to the *medical device* or the packaging, without covering or changing the existing labelling, is not considered a *manufacturer*.

Note 7 to entry: ~~For~~To the extent that an accessory is subject to the regulatory requirements of a *medical device*~~definition of labelling, see~~, the person responsible for the design and/or manufacture of ~~ISO 13485:2003, definition 3.6~~that accessory is considered to be a *manufacturer*.

[SOURCE: ISO/IEC Guide 63:2019, 3.6]

~~2.9~~3.10
medical device
~~any~~ instrument, apparatus, implement, machine, appliance, implant, reagent for in vitro ~~reagent or calibrator~~use, software, material or other similar or related article, intended by the ~~manufacturer~~*manufacturer* (3.9) to be used, alone or in combination, for human beings, for one or more of the specific medical purpose(s) of

— diagnosis, prevention, monitoring, treatment or alleviation of disease,

— diagnosis, monitoring, treatment, alleviation of or compensation for an injury,

— investigation, replacement, modification, or support of the anatomy or of a physiological process,

— supporting or sustaining life,

— control of conception,

— disinfection of ~~medical devices~~*medical devices* (3.10),

— providing information ~~for medical purposes~~ by means of in vitro examination of specimens derived from the human body,

and which does not achieve its primary intended action ~~in or on the human body~~ by pharmacological, immunological or metabolic means, in or on the human body, but which may be assisted in its function by such means

~~Note 1 to entry: This definition has been developed by the Global Harmonization Task Force (GHTF). See bibliographic reference [38].~~

~~[SOURCE: ISO 13485:2003, definition 3.7]~~

Note 2 to entry: Products which ~~could~~can be considered to be *medical devices* in some jurisdictions but ~~for which there is not yet a harmonized approach, are~~not in others include:

— disinfection substances;

— aids for ~~disabled/handicapped people~~persons with disabilities;

— devices incorporating animal and/or human tissues;

— devices for ~~the treatment/diagnosis of diseases and injuries in animals~~in vitro fertilization or assisted reproduction technologies.

~~— accessories for medical devices (see Note 3);~~

~~— disinfection substances;~~

~~— devices incorporating animal and human tissues which can meet the requirements of the above definition but are subject to different controls.~~

~~Note 3 to entry: Accessories intended specifically by manufacturers to be used together with a "parent" medical device to enable that medical device to achieve its intended purpose, should be subject to this International Standard.~~

[SOURCE: ISO/IEC Guide 63:2019, 3.7]

~~2.10~~3.11
objective evidence
data supporting the existence or verity of something

Note 1 to entry: *Objective evidence* can be obtained through observation, measurement, ~~testing~~test or by other means.

[SOURCE: ISO 9000:~~2005, definition 3.8.1~~2015, 3.8.3, modified — Note 2 to entry deleted.]

~~2.11~~3.12
post-production
part of the ~~life cycle~~*life cycle* (3.8) of the ~~product~~*medical device* (3.10) after the design has been completed and the ~~medical device~~ *medical device* (3.10) has been manufactured

EXAMPLE Transportation, storage, installation, product use, maintenance, repair, product changes, decommissioning and disposal.

~~2.12~~3.13
procedure
specified way to carry out an activity or a ~~process~~*process* (3.14)

Note 1 to entry: *Procedures* can be documented or not.

[SOURCE: ISO 9000:~~2005~~2015, ~~definition~~ 3.4.5]

~~2.13~~3.14
process
set of interrelated or interacting activities ~~which transforms inputs into outputs~~that use inputs to deliver an intended result

Note 1 to entry: Whether the "intended result" of a *process* is called output, product or service depends on the context of the reference.

Note 2 to entry: Inputs to a *process* are generally the outputs of other *processes* and outputs of a *process* are generally the inputs to other *processes*.

Note 3 to entry: Two or more interrelated and interacting *processes* in series can also be referred to as a *process*.

[SOURCE: ISO 9000:~~2005, definition 3.4.1~~2015, 3.4.1, modified — Notes to entry 4, 5 and 6 are deleted.]

3.15
reasonably foreseeable misuse
use of a product or system in a way not intended by the *manufacturer* (3.9), but which can result from readily predictable human behaviour

Note 1 to entry: Readily predictable human behaviour includes the behaviour of all types of users, e.g. lay and professional users.

Note 2 to entry: *Reasonably foreseeable misuse* can be intentional or unintentional.

[SOURCE: ISO/IEC Guide 63:2019, 3.8]

~~2.14~~3.16
record
document stating results achieved or providing evidence of activities performed

Note 1 to entry: *Records* can be used, for example, to formalize traceability and to provide evidence of *verification*, preventive action and corrective action.

Note 2 to entry: Generally *records* need not be under revision control.

[SOURCE: ISO 9000:~~2005, definition 3.7.6~~2015, 3.8.10]