BSI Standards Publication

Medical devices – Application of risk management to medical devices

National foreword

This British Standard is the UK implementation of EN ISO 14971:2019+A11:2021. It is derived from ISO 14971:2019. It supersedes BS EN ISO 14971:2019, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee CH/210/4, Risk analysis for Medical Devices.

A list of organizations represented on this committee can be obtained on request to its committee manager.

This publication has been prepared under a mandate given to the European Standards Organizations by the European Commission and the European Free Trade Association. It is intended to support requirements of the EU legislation detailed in the European Foreword. A European Annex, usually Annex ZA or ZZ, describes how this publication relates to that EU legislation.

For the Great Britain market (England, Scotland and Wales), if UK Government has designated this publication for conformity with UKCA marking (or similar) legislation, it may contain an additional National Annex. Where such a National Annex exists, it shows the correlation between this publication and the relevant UK legislation. If there is no National Annex of this kind, the relevant Annex ZA or ZZ in the body of the European text will indicate the relationship to UK regulation applicable in Great Britain. References to EU legislation may need to be read in accordance with the UK designation and the applicable UK law. Further information on designated standards can be found at www.bsigroup.com/standardsandregulation.

For the Northern Ireland market, UK law will continue to implement relevant EU law subject to periodic confirmation. Therefore Annex ZA/ZZ in the European text, and references to EU legislation, are still valid for this market.

UK Government is responsible for legislation. For information on legislation and policies relating to that legislation, consult the relevant pages of www.gov.uk.

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Date	Text affected
31 December 2021	Implementation of CEN/CENELEC amendment A11:2021: Annex ZA and Annex ZB added.

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English version

Medical devices - Application of risk management to medical devices (ISO 14971:2019)

Dispositifs médicaux - Application de la gestion des risques aux dispositifs médicaux (ISO 14971:2019)

Medizinprodukte - Anwendung des Risikomanagements auf Medizinprodukte (ISO 14971:2019)

This European Standard was approved by CEN on 5 August 2019.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN and CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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CEN-CENELEC Management Centre:
Rue de la Science 23, B-1040 Brussels

European foreword

This document (EN ISO 14971:2019) has been prepared by Technical Committee ISO/TC 210 "Quality management and corresponding general aspects for medical devices" in collaboration with Technical Committee CEN/CLC/JTC 3 “Quality management and corresponding general aspects for medical devices” the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2020, and conflicting national standards shall be withdrawn at the latest by June 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 14971:2012.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 14971:2019 has been approved by CEN as EN ISO 14971:2019 without any modification.

European foreword to amendment A11

This document (EN ISO 14971:2019/A11:2021) has been prepared by Technical Committee CEN/CLC/TC 3 “Quality management and corresponding general aspects for medical devices” the secretariat of which is held by NEN.

This Amendment to the European Standard EN ISO 14971:2019 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2022, and conflicting national standards shall be withdrawn at the latest by June 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This Amendment to the European Standard EN ISO 14971:2019 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports requirements of EU Regulation(s).

For relationship with EU Regulation(s), see informative Annex ZA, and ZB, which are an integral part of this document.

Any feedback and questions on this document should be directed to the users’ national standards body/national committee. A complete listing of these bodies can be found on the CEN websites.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Annex ZA
(informative)

Relationship between this European standard and the General Safety and Performance Requirements of Regulation (EU) 2017/745 aimed to be covered

This European standard has been prepared under a Commission's standardisation request M/575 to provide one voluntary means of conforming to the General Safety and Performance Requirements of Regulation (EU) 2017/745 of 5 April 2017 concerning medical devices [OJ L 117].

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding General Safety and Performance Requirements of that Regulation, and associated EFTA regulations.

For application of this European standard under Regulation (EU) 2017/745,

1. the scope is limited to medical devices and accessories for a medical device as defined in that Regulation and to products regulated as a device under that Regulation;

2. in case of differences between terms defined in this European standard and terms defined in that Regulation, the terms defined in the Regulation shall prevail;

3. the manufacturer's policy for establishing criteria for risk acceptability (see 4.2 of this European standard) shall ensure that the criteria comply with the General Safety and Performance Requirements of that Regulation.

Explanation on the correspondence of the standard and the General Safety and Performance Requirements is included in Table ZA.1.

NOTE 1 Where a reference from a clause of this standard to the risk management process is made, the risk management process needs to be in compliance with Regulation (EU) 2017/745. This means that risks have to be 'reduced as far as possible', 'reduced to the lowest possible level', 'reduced as far as possible and appropriate', 'removed or reduced as far as possible', 'eliminated or reduced as far as possible', 'removed or minimized as far as possible', or 'minimized', according to the wording of the corresponding General Safety and Performance Requirement.

NOTE 2 The manufacturer's policy for determining acceptable risk must be in compliance with General Safety and Performance Requirements 1, 2, 3, 4, 5, 8, 9, 10, 11, 14, 16, 17, 18, 19, 20, 21 and 22 of the Regulation.

NOTE 3 This Annex ZA is based on normative references according to the table of references in the European Foreword, replacing the references in the core text.

NOTE 4 When a General Safety and Performance Requirement does not appear in Table ZA.1, it means that it is not addressed by this European Standard.

Table ZA.1 – Correspondence between this European standard and Annex I of Regulation (EU) 2017/745 [OJ L 117]

General Safety and Performance Requirements of Regulation (EU) 2017/745	Clause(s) / subclause(s) of this EN	Remarks / Notes
3, first paragraph	4.1 to 4.5	Covered.
3, second paragraph	4.1, 4.2	Covered.
3, item (a)	4.4	Covered in respect of the process requirements.
3, item (b)	5	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
3, item (c)	5.5, 6	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
3, item (d)	7	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
3, item (e)	10	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
3, item (f)	10.4	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
4, first paragraph	4.2, 4.4, 6, 7, 8	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
4, item (a)	7.1 a)	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
4, item (b)	7.1 b)	Covered in respect of the process requirements. Device-specific execution of the process is not covered.

General Safety and Performance Requirements of Regulation (EU) 2017/745	Clause(s) / subclause(s) of this EN	Remarks / Notes
4, item (c)	7.1 c)	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
4, last paragraph	8 (second paragraph)	Covered.
5, item (a)	5.2, 5.3, 5.4, 7	Covered in respect of the process requirements. Device-specific and usability-specific execution of the process is not covered.
5, item (b)	5.2, 5.3, 5.4	Covered in respect of the process requirements. Device-specific and usability-specific execution of the process is not covered.
8	6, 7, 8	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
9	1 to 10	Covered, provided that the criteria for risk acceptability are established in accordance with GSPR 9.

WARNING 1: Presumption of conformity stays valid only as long as a reference to this European standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2: Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

Annex ZB
(informative)

Relationship between this European standard and the General Safety and Performance Requirements of Regulation (EU) 2017/746 aimed to be covered

This European standard has been prepared under a Commission's standardisation request M/575 to provide one voluntary means of conforming to the General Safety and Performance Requirements of Regulation (EU) 2017/746 of 5 April 2017 concerning in vitro diagnostic medical devices [OJ L 117].

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZB.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding General Safety and Performance Requirements of that Regulation, and associated EFTA regulations.

For application of this European standard under Regulation (EU) 2017/746,

1. the scope is limited to *in vitro* diagnostic medical devices and accessories for *in vitro* diagnostic medical devices as defined in that Regulation and to products regulated as a device under that Regulation;

2. in case of differences between terms defined in this European standard and terms defined in that Regulation, the terms defined in the Regulation shall prevail;

3. the manufacturer's policy for establishing criteria for risk acceptability (see 4.2 of this European standard) shall ensure that the criteria comply with the General Safety and Performance Requirements of that Regulation.

Explanation on the correspondence of the standard and the General Safety and Performance Requirements is included in Table ZB.1.

NOTE 1 Where a reference from a clause of this standard to the risk management process is made, the risk management process needs to be in compliance with Regulation (EU) 2017/746. This means that risks have to be 'reduced as far as possible', 'reduced to a level as low as reasonably practicable', 'reduced to the lowest possible level', 'reduced as far as possible and appropriate', 'removed or reduced as far as possible', 'eliminated or reduced as far as possible', 'prevented' or 'minimized', according to the wording of the corresponding General Safety and Performance Requirement.

NOTE 2 The manufacturer's policy for determining acceptable risk must be in compliance with General Safety and Performance Requirements 1, 2, 3, 4, 5, 8, 10, 11, 13, 15, 16, 17, 18 and 19 of the Regulation.

NOTE 3 This Annex ZB is based on normative references according to the table of references in the European Foreword, replacing the references in the core text.

NOTE 4 When a General Safety and Performance Requirement does not appear in Table ZB.1, it means that it is not addressed by this European Standard.

Table ZB.1 – Correspondence between this European standard and Annex I of Regulation (EU) 2017/746 [OJ L 117]

General Safety and Performance Requirements of Regulation (EU) 2017/746	Clause(s) / subclause(s) of this EN	Remarks / Notes
3, first paragraph	4.1 to 4.5	Covered.
3, second paragraph	4.1, 4.2	Covered.
3, item (a)	4.4	Covered in respect of the process requirements.
3, item (b)	5	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
3, item (c)	5.5, 6	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
3, item (d)	7	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
3, item (e)	10	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
3, item (f)	10.4	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
4, first paragraph	4.2, 4.4, 6, 7, 8	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
4, item (a)	7.1 a)	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
4, item (b)	7.1 b)	Covered in respect of the process requirements. Device-specific execution of the process is not covered.

General Safety and Performance Requirements of Regulation (EU) 2017/746	Clause(s) / subclause(s) of this EN	Remarks / Notes
4, item (c)	7.1 c)	Covered in respect of the process requirements. Device-specific execution of the process is not covered.
4, last paragraph	8 (second paragraph)	Covered.
5, item (a)	5.2, 5.3, 5.4, 7	Covered in respect of the process requirements. Device-specific and usability-specific execution of the process is not covered.
5, item (b)	5.2, 5.3, 5.4	Covered in respect of the process requirements. Device-specific and usability-specific execution of the process is not covered.
8	6, 7, 8	Covered in respect of the process requirements. Device-specific execution of the process is not covered.

WARNING 1: Presumption of conformity stays valid only as long as a reference to this European standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2: Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

Contents

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.

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 editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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.

This document was prepared by Technical Committee ISO/TC 210, *Quality management and corresponding general aspects for medical devices*, and IEC/SC 62A, *Common aspects of electrical equipment used in medical practice*.

This third edition cancels and replaces the second edition (ISO 14971:2007), which has been technically revised. The main changes compared to the previous edition are as follows:

— 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.

— 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.

— 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.

— 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.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The requirements contained in this 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 document was developed specifically for *manufacturers* of *medical devices* on the basis of established principles of *risk management* that have evolved over many years. This document could be used as guidance in developing and maintaining a *risk management process* for other products that are not necessarily *medical devices* in some jurisdictions and for suppliers and other parties involved in the *medical device life cycle*.

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

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* 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*. 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. 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.

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* takes into account the generally 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 document specifies a *process* through which the *manufacturer* of a *medical device* can identify *hazards* associated with the *medical device*, estimate and evaluate the *risks* associated with these *hazards*, control these *risks*, and monitor the effectiveness of 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 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 document specifies terminology, principles and a *process* for *risk management* of *medical devices*, including software as a *medical device* and *in vitro diagnostic medical devices*. The *process* described in this document intends to assist *manufacturers* of *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 document are applicable to all 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 document does not apply to:

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

— business *risk management*.

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

Risk management can be an integral part of a quality management system. However, 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.

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/

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

Note 1 to entry: The *accompanying documentation* can consist of the instructions for use, technical description, installation manual, quick reference guide, etc.