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Health informatics — Medical waveform format —

Part 1: Encoding rules

Informatique de santé — Format de la forme d'onde médicale —

Partie 1: Règles d'encodage

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Foreword

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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).

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

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/TC 215, *Health Informatics*.

Introduction

Medical waveform data such as an electrocardiogram (ECG) or an electroencephalogram (EEG) are widely utilized in physiological examinations, physiological research, electronic medical records, healthcare information, and other areas in the clinical field. Medical waveform data can be used for many medical and research purposes if digital signal processing technology is applied to standardize the data in a digital format. For medical waveforms, it is essential to standardize the data format to expedite the mutual application of the standard so that the data can be processed electronically and used in a variety of ways.

Simple and easy implementation: application of medical waveform format encoding rules (MFER) is very simple and is designed to facilitate understanding, easy installation, trouble-shooting, and low implementation cost.

Harmonization with other standards: MFER is specially utilized to describe the medical waveform data. Other information than waveform data, such as patient demographic data and finding information, etc. should be written using other healthcare standards, such as HL7, DICOM, ISO/IEEE 11073.

In addition, experts in each field should independently develop relevant standards for medical specifications; for example MFER for ECG is developed by cardiologists and EEG is developed by neurologists.

Combination with coded information and text information: MFER policy is that both machine and human readable manner are used. Namely coded information is for computer processable and text data are for human readable information. Arterial blood pressure (ART) is coded as 129 and information description fields indicate “Right radial artery pressure”, for example. As the description of MFER is quite flexible, MFER neither hinders the features of each system nor impedes the development of technologies.

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Part 1: Encoding rules

1 Scope

This International Standard specifies how medical waveforms, such as electrocardiogram, electroencephalogram, spirometry waveform, etc., are described for interoperability among healthcare information systems.

This International Standard may be used with other relevant protocols, such as HL7, DICOM, ISO/IEEE 11073, and database management systems for each purpose.

This is a general specification, so specifications for particular waveform types and for harmonization with DICOM, SCP-ECG, X73, etc. are not given.

This International Standard does not include lower layer protocols for message exchange. For example, a critical real-time application like a patient monitoring system is out of scope and this is an implementation issue.

2 Terms and definitions

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

2.1
frame
waveform encoding unit consisting of data blocks, channels, and sequences

2.2
medical waveform
time sequential data that are sampled by A/D converter or transmitted from medical equipment

2.3
sampling
data that are converted at a fixed time interval

2.4
channel
individual waveform data group

3 Abbreviated terms

AAMI	Association for the Advancement of Medical Instrumentation
A/D	Analog to Digital
CSE	Common Standards for Quantitative Electrocardiography
CEN	Comité Européen de Normalization/European Committee for Standardization
ECG	Electrocardiogram