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Health informatics — Digital imaging and communication in medicine (DICOM) including workflow and data management

Informatique de santé — Imagerie numérique et communication en médecine (DICOM) incluant le déroulement des opérations et la gestion des données

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Foreword

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This document was prepared by Technical Committee ISO/TC 215, *Health informatics*.

This second edition cancels and replaces the first edition (ISO 12052:2006), of which it constitutes a minor revision.

The changes made are as follows:

— Clause 1, 6.18, 6.19, 6.20 and Clause 7 have been revised;

— informative material has been added to the Introduction.

0 Introduction

Digital Imaging and Communications in Medicine (DICOM) is the standard for the communication and management of medical imaging information and related data.

0.1 History

With the introduction of computed tomography (CT) followed by other digital diagnostic imaging modalities in the 1970s, and the increasing use of computers in clinical applications, the American College of Radiology (ACR) and the National Electrical Manufacturers Association (NEMA) recognized the emerging need for a standard method for transferring images and associated information between devices manufactured by various vendors. These devices produce a variety of digital image formats.

The American College of Radiology (ACR) and the National Electrical Manufacturers Association (NEMA) formed a joint committee in 1983 to develop a standard to:

— promote communication of digital image information, regardless of device manufacturer;

— facilitate the development and expansion of picture archiving and communication systems (PACS) that can also interface with other systems of hospital information;

— allow the creation of diagnostic information databases that can be interrogated by a wide variety of devices distributed geographically.

ACR-NEMA standards Publication No. 300-1985, published in 1985, was designated version 1.0. The standard was followed by two revisions: No. 1, dated October 1986 and No. 2, dated January 1988. These standards publications specified a hardware interface, a minimum set of software commands, and a consistent set of data formats.

ACR-NEMA standards Publication No. 300-1988, published in 1988, was designated version 2.0. It included version 1.0, the published revisions, and additional revisions. It also included new material to provide command support for display devices, to introduce a new hierarchy scheme to identify an image, and to add data elements for increased specificity when describing an image.

In 1993, ACR-NEMA/Standard 300 was substantially revised and replaced by this document, designated Digital Imaging and Communications in Medicine (DICOM). It embodies a number of major enhancements to previous versions of the ACR-NEMA standard, as listed below.

— It is applicable to a networked environment. The ACR-NEMA standard was applicable in a point-to-point environment only; for operation in a networked environment, a Network Interface Unit (NIU) was required. DICOM supports operation in a networked environment using the industry standard networking protocol TCP/IP.

— It is applicable to offline media exchange. The ACR-NEMA standard did not specify a file format or choice of physical media or logical filesystem. DICOM supports operation in an offline media environment using industry standard media such as CD-R, DVD-R and USB and common file systems.

— It is a service-oriented protocol, specifying the semantics of commands and associated data, and how devices claiming conformance to the DICOM standard react to commands and data being exchanged. Specified services include support for management of the workflow of an imaging department. The ACR-NEMA standard was confined to the transfer of data with only implicit service requirements.

— It specifies levels of conformance. The ACR-NEMA standard specified a minimum level of conformance. DICOM explicitly describes how an implementor must structure a Conformance Statement to select specific options.

In 1995, with the addition of DICOM capabilities for cardiology imaging supported by the American College of Cardiology, the ACR-NEMA Joint Committee was reorganized as the DICOM Standards Committee, a broad collaboration of stakeholders across all medical imaging specialities.

0.2 Principles