

Revised American Dental Association
Technical Report No. 1051

DICOM Requirements for Digital Imaging in Institutional Dentistry

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REVISED AMERICAN DENTAL ASSOCIATION TECHNICAL REPORT NO. 1051 FOR DICOM REQUIREMENTS FOR DIGITAL IMAGING IN INSTITUTIONAL DENTISTRY

The Council on Dental Practice of the American Dental Association has approved American Dental Association Technical Report No.1051 for DICOM Requirements for Digital Imaging in Institutional Dentistry. Working Groups of the ADA Standards Committee on Dental Informatics (SCDI) formulate this and other specifications and technical reports for the application of information technology and other electronic technologies to dentistry's clinical and administrative operations. The ADA SCDI has representation from appropriate interests in the United States in the standardization of information technology and other electronic technologies used in dental practice. The ADA SCDI confirmed approval of ADA Technical Report No. 1051 on July 10, 2015.

The ADA Standards Committee on Dental Informatics thanks the members of Working Group 12.1 on Digital Imaging and the organizations with which they were affiliated at the time the specification was developed:

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FOREWORD

(This Foreword does not form a part of Revised ADA Technical Report No. 1051 for DICOM Requirements for Digital Imaging in Institutional Dentistry).

In 1992, there was interest in the standardization of clinical information systems related to electronic technology in the dental environment. After evaluating current informatics activities, a Task Group of the ANSI Accredited Standards Committee MD156 (ASC MD156) was created by the ADA to initiate the development of technical reports, guidelines, and standards on electronic technologies used in dental practice. In 1999, the ADA established the ADA Standards Committee on Dental Informatics (SCDI). The ADA SCDI is currently the group that reviews and approves proposed American National Standards (ANSI approved) and technical reports developed by the standards committee's working groups. The ADA became an ANSI accredited standards organization in 2000.

The scope of the ADA SCDI is:

"The ADA SCDI shall develop informatics standards, specifications, technical reports and guidelines and interact with other entities involved in the development of health informatics standards aimed at implementation across the dental profession."

The ADA endorses the use of DICOM as the standard means for exchange of all digital dental images. DICOM allows providers a lossless exchange of patient images in their original diagnostic quality and enables a direct comparison between current and former examinations of the patient. In the institutional setting, dental imaging interoperability includes the ability to order, acquire, store, retrieve, archive and share DICOM radiographic and photographic images. In addition to the interoperability within and between institutions, it may be required that these images be attached to an electronic patient record. Therefore, in an institutional setting, interoperability is required functionality among various digital acquisition devices and DICOM conformant storage devices both stand alone and integrated with an electronic patient record.

These guidelines are written as guidance for the present and near-future "standards of care" relevant to imaging interoperability. It provides typical use cases and offers DICOM services to solve these interoperability scenarios. A DICOM glossary is provided to assist with terms and concepts used. ADA Technical Report No. 1051 builds upon ADA Technical Report No. 1023: Implementation Requirements for DICOM in Dentistry.¹ The final section goes into further detail into specific technical requirements that support interoperability. The complete DICOM standard provides additional details and specific explanations that are beyond the scope of this ADA technical report. The complete DICOM Standard is available on the website of the National Electrical Manufacturers Association (NEMA).²

¹American Dental Association Technical Report No. 1023: Implementation Requirements for DICOM in Dentistry. Chicago: American Dental Association, 2005

² DICOM (Digital Imaging and Communications in Medicine). Rosslyn: National Electrical Manufacturers Association (<http://medical.nema.org>)

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1 SCOPE

This report provides a technical specification based on the DICOM Standard as it applies to dentistry with the goal of increasing interoperability within and between institutional digital radiographic systems. This report will illustrate through high-level interaction use cases how to achieve interoperability for typical dental imaging tasks. They are: (1) view and print images on removable media; (2) create interoperable removable media images; (3) share images among various networked multi-vendor storage and acquisition systems; (4) ability to exchange visible light photographic and endoscopic images within a dental image acquisition context; (5) create and exchange DICOM structured display objects; (6) perform scheduled workflow to integrate digital images with an electronic dental records system; (7) import and reconcile Images from outside the institution into the electronic dental records system; (8) securely transfer DICOM images via email, and; (9) access DICOM images locally via the Internet. These use cases show the DICOM requirements in context, describing them in clear relationship to the clinical tasks of the dental provider.

2 FUNCTIONAL USE CASES

The purpose of the use cases presented in this section is to identify and illustrate the DICOM functional requirements on systems used in various institutional dental settings. The figures illustrate models of dental systems and the interactions between them. They represent a desired sequence of interactions between DICOM systems. Each scenario has at least two systems sharing information, each acting together to provide DICOM services for a dental department. These sequence diagrams shows the order of events, the interactions and clearly shows who's doing what.

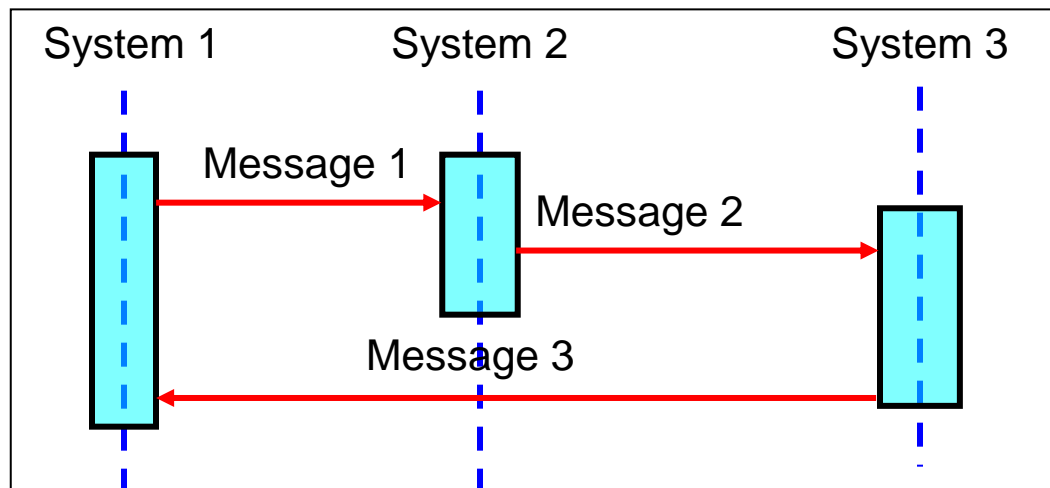


Figure 1. Modeling a use case using a sequence diagram

The convention used in these system diagrams is that the arrow indicating the direction for the transaction points from the initiator of the transaction to the destination. In this particular example, shown in Figure 1, Message 1 is sent from System 1 to System 2, then Message 2 from System 2 to System 3 and then Message 3 from System 3 to System 1. Note that an institution could implement a combination and/or mix/match any of these scenarios, systems, and messages. Before systems can act together a number of negotiated issues have to be addressed. Systems have to agree on the role each will play, have an equivalent view on the message information and select the operations that each side implements. The dental scenarios in this report trend from simplest requirements to more complex.