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An American National Standard

Standard Specification for Transferring Digital Voice Data Between Independent Digital Dictation Systems and Workstations¹

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1. Scope

1.1 This specification covers the format and content of digitally recorded voice data files and their identifying data. The object is to enable transfer between independent digital dictation systems and workstations, regardless of manufacturer and protocols for ensuring reliability. This specification does not cover the transmission of voice data files and their identifying data within digital dictation systems and workstations or their transcription into text files.

1.2 This specification may be applied to either the transmission of data over medium- to high-speed data communication networks or to the transmission of data by recording on, and later playing back from, magnetic or optical digital storage media. It defines the blocked stream of data, called a message, which is transmitted over a network connection or recorded on a storage medium. It does not define the hardware or software network protocols or storage media formats needed for message transmission (for example, see [ISO 8072-1986](#)) or the formats used to store data internally by the sender or receiver.

1.3 Since some standardization in storage media format and network protocols would help to promote the exchange of data between computer systems with diverse hardware and software, it is suggested that readily available universal media and formats be used for data exchange when possible.

1.4 Any considerations regarding the security of the digital dictation file or its components as defined herein are outside the scope of this specification. Such measures as encryption of files (either at rest or in transit), authentication of users or originators, assignment and control of file access permissions, and backup or recovery of files which may be necessary to meet institutional policies or governmental regulations are not addressed in this specification. Guidance for security of dictated health records can be found in Guide [E1902](#).

¹ This specification is under the jurisdiction of ASTM Committee [E31](#) on Healthcare Informatics and is the direct responsibility of Subcommittee [E31.15](#) on Health Information Capture and Documentation.

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2. Referenced Documents

2.1 ASTM Standards:²

E1762 [Guide for Electronic Authentication of Health Care Information](#)²

E1902 [Specification for Management of the Confidentiality and Security of Dictation, Transcription, and Transcribed Health Records](#)²

E1985 [Guide for User Authentication and Authorization](#)²

E2084 [Specification for Authentication of Healthcare Information Using Digital Signatures](#)³

2.2 ANSI Standards:

X3.172-1990 Dictionary of Information Processing⁴

X3.4-1986 Coded Character Sets—American National Standard Code for Information Exchange (7 bit ASCII)⁵

2.3 ISO Standard:

[ISO 8072-1986](#) Network Standards⁴

2.4 Other Standards:

Health Level Seven Standard (HL7), Version 2.3.¹⁶

Resource Interchange File Format (RIFF) Standard⁷

ITU G7.11⁸

3. Terminology

3.1 Definitions:

3.1.1 *degradation of sound quality*—in speech storage and reproduction, loss of intelligibility, reduced signal quality, and reduced ability to identify the speaker. The sound quality is a major factor in transcription, where the user must listen to

² *Annual Book of ASTM Standards*, Vol 14.01.

³ Withdrawn. The last approved version of this historical standard is referenced on [www.astm.org](#).

⁴ Available from International Organization for Standards (ISO), 1 rue de Varembe, Case Postale 56, CH-1211, Geneve 20, Switzerland.

⁵ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th floor, New York NY 10036.

⁶ Available from Health Level Seven (HL7), 3300 Washtenaw Ave., Suite 227, Ann Arbor, MI 48104-4261.

⁷ A multimedia standard published as a joint design document by IBM and Microsoft, available from Microsoft Corporation, One Microsoft Way, Redmond, WA 98052.

⁸ Available from International Telecommunications Union (ITU) (formerly CCITT), Palais des Nations, CH-1211, Geneva 10, Switzerland.

speech for extended periods. The listener may have a reduced ability to identify the speaker due to the degradation of sound quality.

3.1.2 *destination system*—digital dictation system that receives dictation messages from another system.

3.1.3 *dictate workstation (or dictate station)*—device for input of voice dictation and data that is captured and subsequently stored.

3.1.4 *digital dictation recorder*—device designed specifically to accept and store digital dictation from multiple discrete sources. The recorder can usually be accessed by a variety of means including, but not limited to, touch-tone telephones, direct-wire input stations, and PC-based dictation applications.

3.1.5 *digital dictation server*—device designed as a repository for digital dictation. This server may function as the management point for workflow and routing of the dictation files.

3.1.6 *digital dictation system*—system that receives, stores, manages, and transmits digital sound files and their associated data. It may be shared between a number of remote dictate and transcribe stations. The system may contain various combinations of dictate workstations, dictation recorders, dictation servers, transcribe workstations, and other related components.

3.1.7 *digital voice file audio element*—digitized audio portion of a dictation message, excluding the data elements.

3.1.8 *digital voice file data elements*—information associated with a digital voice file, excluding the audio component. The data elements contain information that describes the voice file or its contents, or both.

3.1.9 *digital voice format*—technical description of the digital representation of the voice.

3.1.10 *interoperability*—capability of a functional unit to operate normally in different data processing environments in a way that requires users to have little or no knowledge of the unique characteristics of those units. (See ANSI X3.172-1990, page 60.)

3.1.11 *source system*—digital dictation system that sends dictation messages to another system.

3.1.12 *transcribe workstation (or transcribe station)*—device utilized to access stored data or voice dictation, or both, in order to convert it into text or integrate it, or both, with existing text.

3.1.13 *voice file compression*—sound is an analog wave that can be converted into a digital form for computer storage or nondegradable transmission. The digital voice file is generated by sampling the sound wave at predetermined intervals, and then representing each sample with bits or bytes of data. When the voice needs to be heard, a digital-to-analog conversion is performed in order to reconstitute the actual sound of the voice. The resulting sound quality will be related to: (1) the accuracy of the sampling algorithm, (2) the amount of data originally collected (the number of samples per unit of time times the number of bits per sample), and (3) the impact of any data compression. It will also be affected by the hardware. Compression can be “lossless” or “lossy.” A lossless compression reduces the amount of data required to represent the original digital voice file but has absolutely no impact on sound quality. The original file can be replicated, precisely, at any time. Lossy

compression actually loses some information, resulting in degradation of the sound quality inherent in the original voice file and an inability to precisely regenerate that original file. However, “compression ratios” are typically greater with this type of compression. Suitable lossy compression algorithms are able to reduce data storage and transmission requirements while maintaining a sufficient voice quality for the sound file’s intended use.

3.1.14 *voice file transfer/transmission*—movement of a discrete amount of digitally recorded voice information over a transfer media.

3.1.14.1 *Discussion*—The voice information is in digital form and includes a header of descriptive textual data about the voice information. The amount of voice information depends on the length in time of the voice episode and the method of encoding the voice. Transfer media types include telecommunication media (like phone lines), local area networks, discrete storage media, and wireless means. The data interchange transmission may be between computer systems in a given medical institution, between medical institutions, or between a healthcare institution and a business partner, such as a transcription service.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *dictation message (or digital voice file)*—unit of information that consists of both audio and data elements. The audio (voice) component generally represents one entire dictated job, and the associated data elements are applicable to that particular job. In the context of this specification, a dictation message to be transferred from one system to another is generally contained within a single file.

3.2.2 *document*—voice file with its associated data elements (see *dictation message*).

3.2.3 *intelligibility*—how well the speech is understood by human subjects. It is measured by having human subjects listen to reproduced speech and answer questions to determine how well the speech is understood. Speech may be intelligible, but may be unpleasant to hear and have background noises.

3.3 Acronyms:

ADPCM	Adaptive Delta Pulse Code Modulation
ASCII	American Standard Code for Information Interchange
CPR	Computer-based Patient Record
MIME	Multipurpose Internet Mail Extensions
MS-DOS	Microsoft Disk Operating System
PCM	Pulse Code Modulation
RIFF	Resource Interchange File Format

4. Significance and Use

4.1 *General Approach*—This specification defines a general and flexible mechanism to enable the interoperability of digital dictation systems and workstations, including the transfer of digital voice files and their identifying data between disparate systems, regardless of manufacturer. The specification identifies required and suggested data elements associated with voice files utilized in a healthcare environment. The required elements shall be provided by any industry standard digital dictation system. The elements in the suggested category may accompany a voice file using a digital dictation system coupled with another system (like the CPR system). This specification addresses not only those data elements that are required when the job is created but also information that is used during the