hiso Health Information Standards Organisation
PAEREWA PĀRONGO HAUORA

Health Level 7(HL7) Endorsement

HISO 10013

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This document has been approved as a standard for the New Zealand health and disability sector by the Health Information Standards Organisation (HISO).

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1 INTRODUCTION

In November 2004, the New Zealand Health Information Standards Organisation (HISO) endorsed Health Level 7 (HL7) Standards for Health Information Communications as a national standard for New Zealand.

For some time now, health care professionals and organisations have been using electronic systems to collect, store and exchange patient information, to help improve delivery of care. The implementation of HL7 messaging standards helps reduce or eliminates incompatibilities between systems, thus achieving a speedy and consistent flow of patient information between hospitals, general practitioners and other health professionals.

At this stage, HISO is not endorsing a particular version of HL7 as there are a number of versions in use in New Zealand. HISO recommends that HL7 standards be used where appropriate; at times it should be acknowledged that HL7 standards are inappropriate for a particular use and other standards should be considered.

1.1 HL7 International Context

Health Level 7 (HL7) is an international health information standards organisation, based in the USA United States with over 27 affiliated member countries, including New Zealand and Australia. The standards developed by the organisation's working groups focus on the exchange, management and integration of data that supports clinical patient care and the management, delivery and evaluation of health care services.

The benefits of using HL7 standards include:

(a) faster, more consistent information to support integrated care;

(b) greater efficiency in health care processes;

(c) reduced costs of information interchange between health care providers;

(d) improved marketing advantages for health IT vendors developing HL7 compliant health IT systems.

1.1.1 *What does HL7 mean?*

'Level 7' refers to the highest level of the International Standards Organization's (ISO) communications model for Open Systems Interconnection (OSI) – the application level. The application level addresses the definition of the data to be exchanged, the timing of the interchange and the communication of certain errors to the application. HL7 supports such functions as security checks, participant identification, availability checks, exchange mechanism negotiations and, most importantly, data exchange structuring.

1.1.2 *Why HL7?*

Hospitals, general practitioners and other health care centres around the world need to be able to exchange vast amounts of health care data, including patient information and various lab reports, on a daily basis. However, medical data can be extremely complicated due to the abundance of clinical terminology, as well as the structural complexity in the way the information is presented. Thus, such information must be presented in a standardised format in order to ensure that the data is universally understood and organised. In order to achieve this, all health care information must be sent in a specialised health care language.

The language that has been developed to ensure universal compatibility is HL7. The HL7 protocol consists of grammar and vocabulary that is standardised so that clinical data can be shared amongst all health care systems and easily understood by all. By using the HL7 messaging protocol as a standard, all systems following the HL7 specifications are able to communicate easily with one another, without the need for information conversion.

1.1.3 *The seven layers of the OSI model*

The OSI model defines a networking framework for implementing protocols in seven layers. Control is passed from one layer to the next, starting at the application layer in one station, proceeding to the bottom layer, over the channel to the next station and back up the hierarchy.

Application (Layer 7)	This layer supports application and end-user processes. Communication partners and quality of service are identified, user authentication and privacy are considered and any constraints on data syntax are identified. Everything at this layer is application-specific. This layer provides application services for file transfers and e-mail and other network software services. Telnet and FTP are applications that exist entirely in the application level. Tiered application architectures are part of this layer.
Presentation (Layer 6)	This layer provides independence from differences in data representation (eg, encryption) by translating from application to network format and vice versa. The presentation layer works to transform data into a form that the application layer (layer 7) can accept. This layer formats and encrypts data to be sent across a network, providing freedom from compatibility problems. It is sometimes called the *syntax layer*.
Session (Layer 5)	This layer establishes, manages and terminates connections between applications. It sets up, co-ordinates and terminates conversations, exchanges and dialogues between the applications at each end. It deals with session and connection co-ordination.
Transport (Layer 4)	This layer provides transparent transfer of data between end systems, or hosts, and is responsible for end-to-end error recovery and flow control. It ensures complete data transfer.
Network (Layer 3)	This layer provides switching and routing technologies, creating logical paths, known as virtual circuits, for transmitting data from node to node. Routing and forwarding are functions of this layer, as well as addressing, internet working, error handling, congestion control and packet sequencing.
Data Link (Layer 2)	At this layer, data packets are encoded and decoded into bits. The layer furnishes transmission protocol knowledge and management and handles errors in the physical layer, flow control and frame synchronisation. The data link layer is divided into two sublayers: the Media Access Control (MAC) layer and the Logical Link Control (LLC) layer. The MAC sublayer controls how a computer on the network gains access to the data and permission to transmit data. The LLC sublayer controls frame synchronisation, flow and error checking.
Physical (Layer 1)	This layer conveys the bit stream – electrical impulse, light or radio signal -- through the network at the electrical and mechanical level. It provides the hardware means of sending and receiving data on a carrier, including defining cables, cards and physical aspects. Fast ethernet, RS232 and ATM are protocols with physical layer components.

Health Level 7 standards are available from www.HL7.org