

**Update the learning module (to support a HI course) on HL7 Version
3 and the HL7 Development Framework**

by

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Dalhousie University

Report of Internship for the period September 2 – December 12, 2007

Date Submitted: December 14, 2007

Acknowledgement and Endorsement

This report has been written by me and has not received any previous academic credit at this or any other institution.

I would like to thank Dr. Grace Paterson for providing the performance data used in this study, and for her useful suggestions on the manuscript.

(signature)

Asha Sundareshan

Executive Summary

The Internship work included development of new learning modules and files and updating of the existing learning modules and files of the “Introduction to HL7” part of the home page of <http://healthinfo.med.dal.ca>. The work was very interesting and informative to work on.

Focus: The focus of the above was to develop a learning module about HL7 V3, which is simple and easy for HL7 learners at an introductory level.

Plan and Objective: The plan was made as to how the author, as a MHI (Master of Health Informatics) student, would learn and understand basic HL7 concepts at an introductory level. And later apply similar methods to develop the ‘sequence of learning’ to fellow MHI students.

Highlights: The work was mainly focused on developing a learning module which consists of the following sections: Introduction, Learning Objectives, Getting Started with HL7 V3, HL7 Development Framework (HDF), Navigating the Artifacts and Clinical Scenario to use HDF.

Mission accomplishment and Key to success: As the internship work was on a very important topic, as HL7 V3, which is a vital part of the health information standards, in the present world, it was very well related to the topic of Health Informatics. This itself created an immense amount of interest to work on it, moving towards success in get it accomplished. HL7 V3, which is Health Level 7 Version 3 is an important concept of the EHR (Electronic Health records) standardizations. It is important for the interoperability of the electronic transfer of health information across various health information systems, across roads to across countries. With the Canada Health Infoway, working towards the Pan Canadian EHR implementation plan, this forms an even more important and interesting topic to learn and work, as a Health Informatic’s person. It was also an adjuvant opportunity to get the right guidance on the work, as it was performed at Medical Informatics of Dalhousie University, under the supervision of Dr. Grace Paterson, a Clinical Informatician and Asst. Prof. at the department.

Risks: The main risk is the limited knowledge of the above voluminous topic put in the website learning module. The topic of HL7 V3 is very vast, with immense knowledge and information available on it, in electronic and textual forms. Hence depending on only this learning module to learn HL7 V3 completely is definitely not suggested. The learners are encouraged to read and learn more on the same from the various other electronic and textual sources freely available to get a strong hold on the topic of HL7 V3.

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1 Introduction:

The following report will walk through the accomplished work. As the internship work was on a very important topic, as HL7 V3 (Health Level Version 3), which is a vital part of the health information standards, in the present world, it was very well related to the topic of Health Informatics, in the first place.

Secondly, it created an immense amount of interest to work on and move towards success in getting it accomplished. HL7 V3, which is an important concept of the EHR (Electronic Health records) standardizations. It is important for the interoperability of the electronic transfer of health information across various health information systems, across roads to across countries. Hence forms an important and interesting topic to learn and work on for Health Informatics professionals.

It was helpful and useful to perform such a work at the Department which relates to such work, as in this case, at Medical Informatics, Dalhousie University, whose details are given ahead.

The work was to develop the new learning modules and sections and update the existing learning modules and sections of the “Introduction to HL7” part of the home page of <http://healthinfo.med.dal.ca>. The work was very interesting and informative to work on as an MHI (Masters of Health Informatics) student of Dalhousie University.

Reading through the description of the work performed, the organization, and the relationship of the work with health informatics will create further interest in HL7 V3, in a person interested in health informatics. Performing this task, gave the author, knowledge and interest in working towards it, and to learn more and more on the related topics. The author’s contribution from introducing the topic to performing some exercise tools on the topic, created an awesome learning experience for her, as a MHI student. Learning the topic step by step and reaching towards performing the practical tasks in the topic, included an additional learning concept.

The author hopes that this piece of work on the learning module of HL7 V3 will help fellow MHI students to become interested in the topic and if possible, even pursue on it, as a career for future research and work on the same as a health informatics professional.

2 Description of the organization:

Medical Informatics is a department within the Division of Medical Education and is located at the 'Sir Charles Tupper Medical Building', Halifax, Nova Scotia, Canada B3H4H7. It is a part of the Faculty of Medicine, Dalhousie University. Medical Informatics is the discipline that studies and encourages the use of appropriate information to support clinical care, research, teaching and health services administration.

The history of Medical Informatics is that it was established in the faculty of Medicine at Dalhousie University in July 1996,. This restructuring was in keeping with the Medical Informatics Review Committee Report, "Medical Informatics: A key to maintaining an effective medical school." And in September 2002, Medical Informatics and the Faculty of Computer Science enrolled the first class of a unique collaborative program, the Master of Health Informatics. This was the first graduate Health Informatics program in Canada and was the result of a collaboration between the Faculties of Medicine, Computer Science and Business Administration.^[3]

The Faculty of the department include: Dr. David Zitner, Professor and Director, Email: david.zitner@dal.ca

Dr.Grace Paterson,Assistant Professor and Clinical Informatician, Email: grace.paterson@dal.ca

Naomi Mensink, Lecturer, Email: nmensink@eastlink.ca

The staff includes Deirdre Harvey, Administrative Assistant, Email: deirdre.harvey@dal.ca.

Grace Paterson's research interests include health information standards, health terminologies, health infostructures, topic maps, data quality, health indicators, and informatics competencies and curricula in medical education, applied health informatics and research methods in health informatics. Specifically, the research areas relate to Health Level 7 (HL7), SNOMED CT, Unified Medical Language System (UMLS), and Electronic Health Records.

To learn flow of health information, the Health informatics research themes in the department include: Clinical practice guidelines, patient education, clinical decision support systems, knowledge translation and knowledge management, semantic interoperability, Electronic health record, lifelong healthcare planning, virtual clinics, health policy research, patient safety and empowerment and Health level 7 Clinical document Architecture.^[1]

Dalhousie University announced the creation of a Consumer Health Information Community Access Program (CHICAP) site dedicated to helping members of the public to reach verified, on-line health information (2001). This initiative was a part of a Federal/Provincial government partnership. In addition to the government support of the project, the CHICAP site is the result of the efforts of Dalhousie's Academic Computing Services and Medical Informatics, along with support from the Brain Injury Association, the Victorian Order of Nurses and the Lung Association.^[4]

The department currently is promoting primary care co-operatives as an alternative concept to health care delivery. The organization, Connecting People for Health, are implementing HL7 into an EHR. They consult with Grace Paterson on how to implement HL7 standards. The department organises biweekly health informatics seminars.

Newsletter of the Canadian Cochrane Network and Centre - April 2006 gives the change in Dalhousie University's CCN/C Site Representatives. The Canadian Cochrane Network and Centre is pleased to announce that Dr. Michael Graven is now a Dalhousie University Co-Representative, along with Dr. Grace Paterson. They also take the opportunity to thank Dr Alixe Howlett for her years of commitment and contribution to the CCN/C as a Dalhousie Site Co-Representative. ^[5]

The site "Diabetes Care Program of Nova Scotia" with Direct Links to the Canadian Diabetes Association (CDA) 2003 Clinical Practice Guidelines, was a work contribution by the medical informatics team. The information found in this reference 'Diabetes: An Instant Reference', is a collaborative effort between the department of Medical Informatics, Faculty of Medicine at Dalhousie University, and the Diabetes Care Program of Nova Scotia. Dr. Sonia Salisbury MD, Medical Director, DCPNS was responsible for data abstraction for this reference and insertion of practical clinical advice in applying CDA Guidelines and Nova Scotia algorithms for care, derived from the opinions of specialists in Nova Scotia. Hannah Wang provided technical assistance while completing her Master's Program in Medical Informatics, Dalhousie University, under the guidance of Ron Soper. ^[6]

Thus, the list of accomplishments by the department is endless and ongoing. Always working on old and new research topics on health information and related topics creating interest for the health informatics students and professionals.

3 Description of the work performed at the organization

The internship work was of immense interest to the author. It is planned to be a learning module for the fellow MHI students.

The work is on HL7 V3 topic. The work included developing new and updation of old learning module on HL7 V3 to the MHI students.

My internship workplace was department of Medical Informatics, Faculty of Medicine, Dalhousie University. The author would like to describe the work in the sequential way as performed.

First the **need for the work** was analysed. The existing old website was based on HL7 V3. It needed updating and new modules on HL7 V3 as HL7 keeps evolving with new concepts frequently. HL7 V3 on expansion is Health Level 7 Version 3, on which the work is based on. One of the present topics in the health research industry is about electronic health records, EHR. There is a need to standardize this technique for easy and acceptable flow of health information between different health information systems electronically. In this process, it is also important to maintain the quality and meaning of the transferred information across. Hence for this come the standards for information transfer. Syntax and semantics of information is to facilitate the Interoperability of systems to send and receive information as necessary.

Now, the updation module has 6 following sections:

- 1) Introduction
- 2) Learning Objectives
- 3) Getting started with HL7V3
- 4) HL7 development framework-HDF
- 5) Navigating the Artifacts
- 6) Clinical Scenario to use HDF

All these sections are part of the module titled, 'Introduction to HL7', as seen in the appendix A.

The 'Introduction' part consists of:

- describing the need for standards to exists in the information exchange world
- brief introduction about what is HL7
- the information standards, the background on which HL7 is developed
- description of the OSI (Open system interconnection) model in connection to HL7
- and references

The 'Learning Objectives' part consists of:

- description of the objectives for the students to be able to do after going through this learning module

- the benefits of HL7 knowledge to MHI students

The 'Getting started with HL7V3' part consists of:

- an overview of the HL7 version 3
- knowing HL7 v3 in terms of health information flow
- HL7 V3 requirements model to build the HMD (Hierarchical message description) through constraining RIM (Reference Information model)
- Use case model
- Information model
- Interaction model
- Message model
- Implementation model
- Phases of development
- Description of messages versus documents and when to use what.

The 'HL7 development framework: HDF' part consists of:

- the above various model descriptions again
- HDF, background, objectives, overview
- UML (Unified Modeling language) in brief
- HDF life cycle along with relating diagram
- Scope and process overview of HDF along with relating diagram
- Methodology key concepts
- HDF requirement framework
- RIM classes
- An example HDF diagram for 'lab observation order' POLB

The 'Navigating the Artifacts' part consists of:

- HL7 specification component introductions
- Description of **HL7 V3 artifacts** with corresponding diagram for the same
- HL7 specification components with an XML, implementation code example
- HL7 V3 data models for care composition, clinical condition
- Summary diagram
- HL7 model detail diagram
- References

The 'Clinical Scenario to demonstrate the use of HDF' part consists of:

- EHR architecture overview
- An example clinical case description
- The care composition data model for it
- RIM model for it
- And how to derive the HL7 V3 artifacts for it

The work involved the planning phase of what is necessary to develop the learning module. Then collection of relevant related information material to develop this. Sorting

and arranging the necessary information only and then develop the module. Many draft phases of the same, modifications and improvements on it. And then ultimately to launch the module onto the server to go on the website, <http://healthinfo.med.dal.ca/hl7intro>.

4 Discussion on how the work relates to health informatics:

From the above internship work the author learned about HL7V3 and its working scenario theoretically. It was more relevant to work on such a topic at a workplace dealing with such scenarios as the Medical Informatics department of Dalhousie University.

HL7 is about information standards. It is one of those that allows communication and integration of health related computer information systems and applications, permitting the sharing of data around the globe. Hence it forms a relevant topic to learn about for the health informatics students. Hence as a health informatics student, the author became interested in it, and felt the knowledge of it is necessary and relevant to fellow MHI students also. And they may be able to learn at an introductory level by going through this learning module developed by the author.

To clinicians, the important clinical issue is to capture relevant information and to make it widely available for other clinical needs. For this an infrastructure is needed that promotes better, more cost effective and more efficient health care delivery to people. HL7 as it evolves provides with a technical business model to fulfill this vision of a diverse, integrated health information system. Hence it makes absolute relevance to health informatics professionals to have a knowledge of HL7 V3. Hence this module development is to meet the same above needs and inspire MHI (Master of Health Informatics) students to know, learn and research about this topic.

Lessons Learned:

Working with Medical Informatics Department at Dalhousie University especially on this project gave the author an experience in:

- learning standards of HL7 V3 and using the structures in clinical information
- implementing HL7 V3 concepts and artifacts in terms of sharing data, information and knowledge through a clinical scenario example.

Upon successful completion of this HL7 module, participants will be able to:

1. Explain the need for health information flow standards.
2. Understand Health Level Seven (HL7) and how it is used in health information standards.
3. Able to do the information retrieval and retrieve an HL7 artifact from the HL7 registry services.
4. Able to analyse a clinical scenario, design and document the processes and artifacts associated with HL7 development framework methodology.

Hence this work forms a relevant topic for health informatics professionals.

5 Discussion of a problem that the author analyzed and the corresponding proposed solution.

It was really an excellent experience in learning about HL7 V3 and HDF (HL7 V3 development framework), because, it is not a required course in the regular MHI program at Dalhousie university. It is also not easily available as an elective course. Hence the author being unable to learn about HL7 during the regular course works for the program, as a MHI student, was able to learn and fulfill the desire to know HL7 in detail through this Internship work. Hence the author thinks it may be the same useful experience for fellow MHI students when they read this module.

But a major **problem** observed during this module development is that there is no HL7 lab in the Medical Informatics department, where the author could put the knowledge of HL7 and HDF gained, as 'hands on' experience with the tool. The lack of practical knowledge about HL7 is a hindrance to further progressing work on the same.

Hence to prevent the above, the **proposed solution** by the author is that a HL7 lab for the MHI students be created. It could be physically located in either the Faculty of Computer Science or the department of Medical Informatics. So that it will give the MHI students a practical experience with HL7 V3 developer tools like open source V3 generator tools for HL7 V3 model and artifacts developed using HDF methodology.

This would make them theoretically and practically knowledgeable about HL7 V3 and its use in the real world scenario.

6 Conclusion

On the whole the internship work was a knowledge gaining experience, very relevant to health informatics. The HL7 V3 and HL7 development framework topic is both fundamental and advanced concept in the health informatics field. Depending on the depth the learner can put into knowing it, the view on its use at an individual level is variable.

The work was and is a good experience in knowing the HL7 V3 and HDF concepts. It gave the author an opportunity to learn about the HL7 V3 concepts and develop a learning module to show what was understood by the author. In turn the learning module will help fellow MHI students to learn the topic. HL7 V3 forms an interesting, important necessary topic in health information standards. It is a dynamic topic where change and challenging positions are open presently and in the future to health informaticians. Hence, it forms an useful topic to learn as an MHI student and a career path to continue on, as a health informatics professional.

7 Recommendations and future work

The author recommends this topic for study or research to MHI students. But it depends on the individual's interest to continue on it for further knowledge or career.

The author recommends the MHI program of Dalhousie University have a HL7 V3 lab with the open source tools for HL7 in the near future. This will help the MHI students interested in this topic to have a practical experience in developing the HDF artifacts and models. In turn this experience would provide a useful health informatics career path to pursue for the students involved with it.

For this, the author thinks that a physical space, with necessary digital equipment and other university regulations have to be met to set up the HL7 lab. This is in the hands of the MHI program and Executive Committee to decide with the Dalhousie University for the accomplishment of the real lab in the future.

8 Limitations

Like most research and academic work, this internship work too has its limitations. These include, the limited knowledge of the author about HL7 V3. The voluminous information available on HL7 V3 electronically and textually, puts an immense amount of pressure in designing a specific module with time and space limitations. There was a limited amount of print material, such as books and journal articles. The major print resource used was an 88-page booklet.^[7]

Due to which any amount of time spent on the topic would be considered as limited, as the topic is voluminous, industrious, dynamic, ever changing with new research outcomes every now and then. Hence users of this module are advised to look into the new developments on HLV3 and HL7V3 development framework, electronically and textually from time to time.

Due to time constraints, there was not sufficient time to seek written permission for re-use of diagrams originally produced by Canada Health Infoway and other sources, as required by Copyright Law. Hence next step involves in getting it done as per instructions available from Dalhousie's Copyright Office.^[8]

9 References

- 1) 'Medical Informatics' Dalhousie University
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accessed on Dec 14th 2007

10 Appendices A B C D E F G

10.1 Appendix A

The 'home page' of Med.dal.ca

Health Informatics, Faculty of Medicine, Dalhousie University - Mozilla Firefox

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http://healthinfo.med.dal.ca/index.htm

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Introduction to HL7
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Information Flow and Use
Diabetes: An Instant Reference
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Health Informatics in Medicine

Health Informatics at Dalhousie University is a unique collaboration between the Faculties of Medicine and Computer Science. We offer an interdisciplinary degree program, [Master of Health Informatics](#).

The Medical Informatics webserver was purchased through HEALNet funds. HEALNet was committed to basic and applied research directed at the development and sustainability of evidence-based tools for health care. The webserver is made available for research projects of our students and our collaborators. This server is hosted by [Med IT](#).

Dr. David Zitner, Executive Director
Health Informatics Program
Dr. Grace Paterson, Clinical Informatician
Medical Informatics, Dalhousie University

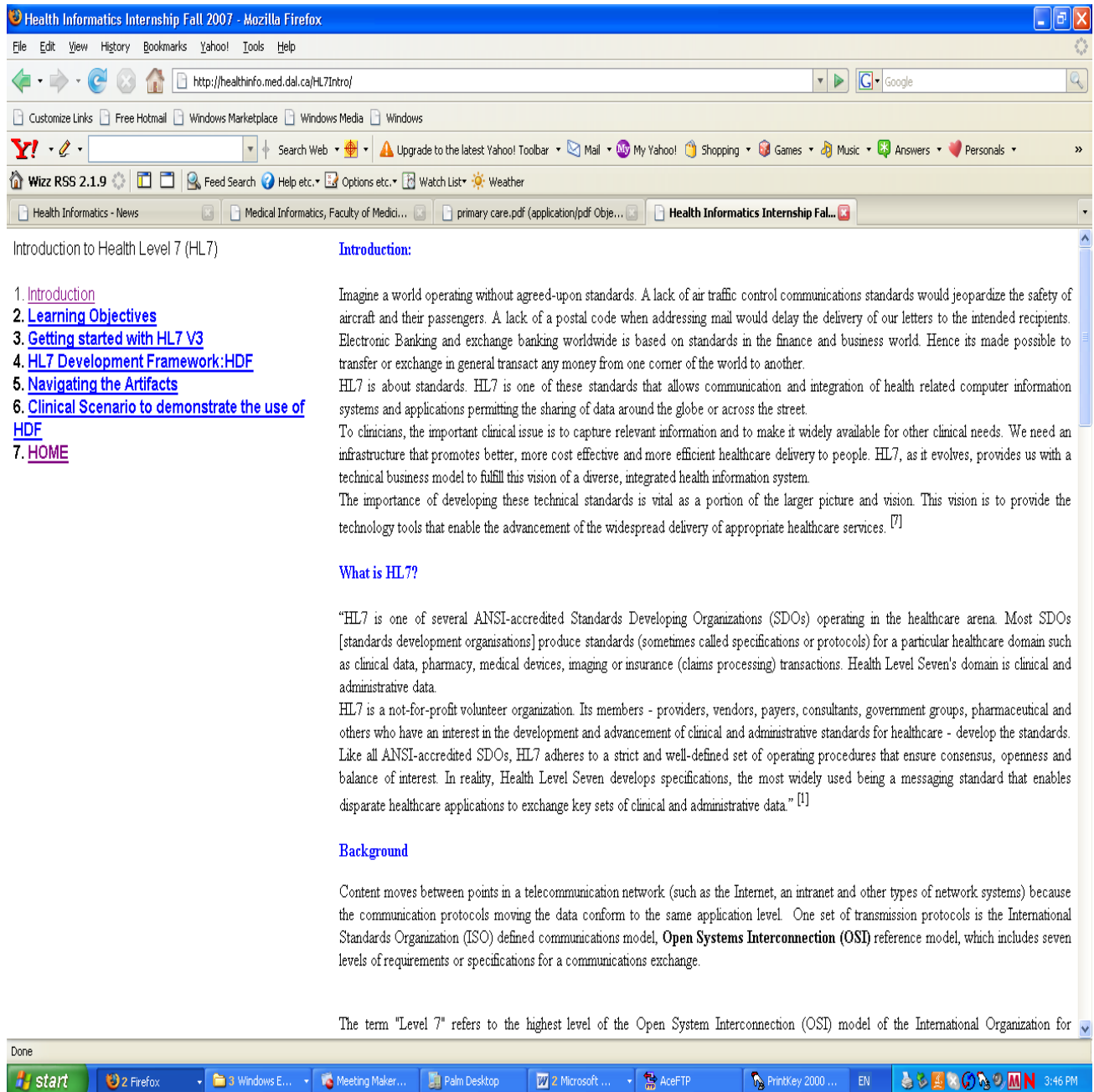
Health Informatics Seminars

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10.2 Appendix B

The 'Introduction' page of the HL7 V3 and HDF learning module



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http://healthinfo.med.dal.ca/HL7Intro/

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Introduction to Health Level 7 (HL7)

- 1. [Introduction](#)
- 2. [Learning Objectives](#)
- 3. [Getting started with HL7 V3](#)
- 4. [HL7 Development Framework:HDF](#)
- 5. [Navigating the Artifacts](#)
- 6. [Clinical Scenario to demonstrate the use of HDF](#)
- 7. [HOME](#)

Introduction:

Imagine a world operating without agreed-upon standards. A lack of air traffic control communications standards would jeopardize the safety of aircraft and their passengers. A lack of a postal code when addressing mail would delay the delivery of our letters to the intended recipients. Electronic Banking and exchange banking worldwide is based on standards in the finance and business world. Hence its made possible to transfer or exchange in general transact any money from one corner of the world to another.

HL7 is about standards. HL7 is one of these standards that allows communication and integration of health related computer information systems and applications permitting the sharing of data around the globe or across the street.

To clinicians, the important clinical issue is to capture relevant information and to make it widely available for other clinical needs. We need an infrastructure that promotes better, more cost effective and more efficient healthcare delivery to people. HL7, as it evolves, provides us with a technical business model to fulfill this vision of a diverse, integrated health information system.

The importance of developing these technical standards is vital as a portion of the larger picture and vision. This vision is to provide the technology tools that enable the advancement of the widespread delivery of appropriate healthcare services. [7]

What is HL7?

"HL7 is one of several ANSI-accredited Standards Developing Organizations (SDOs) operating in the healthcare arena. Most SDOs [standards development organisations] produce standards (sometimes called specifications or protocols) for a particular healthcare domain such as clinical data, pharmacy, medical devices, imaging or insurance (claims processing) transactions. Health Level Seven's domain is clinical and administrative data.

HL7 is a not-for-profit volunteer organization. Its members - providers, vendors, payers, consultants, government groups, pharmaceutical and others who have an interest in the development and advancement of clinical and administrative standards for healthcare - develop the standards. Like all ANSI-accredited SDOs, HL7 adheres to a strict and well-defined set of operating procedures that ensure consensus, openness and balance of interest. In reality, Health Level Seven develops specifications, the most widely used being a messaging standard that enables disparate healthcare applications to exchange key sets of clinical and administrative data." [1]

Background

Content moves between points in a telecommunication network (such as the Internet, an intranet and other types of network systems) because the communication protocols moving the data conform to the same application level. One set of transmission protocols is the International Standards Organization (ISO) defined communications model, **Open Systems Interconnection (OSI)** reference model, which includes seven levels of requirements or specifications for a communications exchange.

The term "Level 7" refers to the highest level of the Open System Interconnection (OSI) model of the International Organization for

10.3 Appendix C

The 'Learning Objectives' page of the HL7 V3 and HDF learning module

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Introduction to Health Level 7 (HL7)

1. [Introduction](#)
2. [Learning Objectives](#)
3. [Getting started with HL7 V3](#)
4. [HL7 Development Framework:HDF](#)
5. [Navigating the Artifacts](#)
6. [Clinical Scenario to demonstrate the use of HDF](#)
7. [HOME](#)

Learning Objectives

Upon successful completion of this module, participants should be able to:

- ◆ Explain the need for health information flow standards.
- ◆ Understand Health Level Seven (HL7), V3 and HL7 development framework (HDF) at an introductory level.
- ◆ Able to do the information retrieval and able to retrieve an HL7 artefact from the HL7 registry services.
- ◆ Able to analyse a clinical scenario, design and document the processes and artifacts associated with HL7 Development Framework methodology.

Why HL7 knowledge for HI (Health Informatics) students: Context

"HL7 is a standards development organization (SDO). HL7 products are specifications that are balloted to become standards that implementers use to enable interoperability among information systems in healthcare.

Standards development is inherently iterative that requires a complete development cycle. The cycle includes steps of planning, requirements, analysis, design, balloting and publication of the specification. Some projects may also have a construction, testing and deployment phase.

HL7, or HL7 in collaboration with external parties, typically do the planning, requirements, analysis, design, balloting and publication of the specification

External parties, using HL7 specifications, typically do the construction, testing and deployment steps; HL7 does not build applications

HL7 may complete the full cycle of development for work that has an internal focus such as building tools, developing educational material or documenting a best-practice process

"Multiple System"/"Multiple Context" is the "problem space" that HL7 specifications are working with. It also characterizes the environment in which HL7, including International Affiliates, is seeking to develop specifications. HL7 is a group of individuals dispersed around the world working concurrently, largely through electronic communication, to produce specifications that are congruent across the full set of products.

A full set of project charters, representing the collective work of HL7, is part of the necessary minimal infrastructure needed to manage within an inherently complex environment. Experience in complex environments has demonstrated repeatedly that a minimum level of consistent communication is necessary to avoid wasting scarce human attention on efforts that do not contribute to the congruent outcome." [1]

Hence it's a good career path to choose from a HI point of view.

[The benefit of using HI 7 standard specifications includes:](#)

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10.4 Appendix D

The 'Getting started with HL7 V3' page of the HL7 V3 and HDF learning module

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Introduction to Health Level 7 (HL7)

[Getting started with HL7 V3](#)

- [1. Introduction](#)
- [2. Learning Objectives](#)
- [3. Getting started with HL7 V3](#)
- [4. HL7 Development Framework:HDF](#)
- [5. Navigating the Artifacts](#)
- [6. Clinical Scenario to demonstrate the use of HDF](#)
- [7. HOME](#)

HL7 Overview: HL7 Version 3

"In 1992 HL7 made a fundamental shift in the methodology it uses to develop its standards specifications. The new methodology, referred to as HL7 Version 3.0 or V3, is a model-driven methodology based upon modern object-oriented software development practices. HL7 spent four years creating the methodology that adapts modern analysis techniques from system building to message design.

In 1992, HL7 Executive Committee chartered an independent task force to establish an approach. In January 1996, the Technical Steering Committee agreed to adopt the main features of the approach and take over its management. In the spring of 1997, all the HL7 Technical Committees began to use the V3 process.

HL7 version 3.0 is the most definitive HL7 standard thus far, incorporating more trigger events and message formats than any previous version. It uses a Reference Information Model (RIM) as a common source for the information content of specifications. The RIM is an essential part of the HL7 Version 3.0 development methodology. It provides an explicit representation of the semantic and lexical connections that exist between the information carried in the fields of HL7 messages. As part of version 3.0, the HL7 Vocabulary Technical Committee developed methods that allow HL7 specifications to draw upon codes and vocabularies from a variety of sources.

The use of standardized vocabulary ensures unambiguous interpretation of the code sources and code value domains across systems. HL7's primary goal for version 3.0 is to offer a standard that is definite and testable, and to provide certification of vendor's and implementation conformance.

The HL7 Version 3.0 development methodology is a continuously evolving process that seeks to develop specifications that facilitate interoperability between healthcare systems. The HL7 RIM (reference information model), vocabulary specifications, and model-driven process of analysis and design combine to make HL7

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10.5 Appendix E

The 'HL7 Development framework' page of the HL7 V3 and HDF learning module

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Introduction to Health Level 7 (HL7)

- [1. Introduction](#)
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HL7 Development Framework: HDF

Health Informatics being exchange of information between healthcare information systems, here we define the general methodology for developing messaging standards. Communications between entities usually takes the form of a message composed of message elements, triggered by some event. There is a sender and a receiver. Interoperability requires consistency in the message. The basis for the specification of a messaging standard is a Reference Information Model (RIM) that completely covers the domain being addressed. The RIM and the vocabulary domains are the bases for the semantic specification of message elements. The Domain Information Model (DIM) defines the information content for a specific area of expertise or interest. The DIM represents one group's view of the world.

A proper subset of the RIM, called Refined Message Information Model (R-MIM) is used to express the information content for one or more related messages. The R-MIM provides one method of controlling optionality.

The Hierarchical Message Description (HMD) specifies a set of messages based of one R-MIM. A message type is specified in one HMD.

Use cases: The scenarios describe real world examples, identifying stakeholders or participants, their roles and relationships, the interactions of the participants and the events of the interactions. Use case analysis is the methodology for capturing user requirements.

Information models: The components are defined in a metamodel, the textual representation maintained in a database, and graphical representations maintained using UML (Unified Modeling language).

Three types of Information models are defined in the modeling process: DIM defined for administrative process, RIM a coherent shared information model for all derived messages and R-MIM takes the generic RIM and

http://healthinfo.med.dal.ca/HL7Intro/clinicalscenario.html

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10.6 Appendix F

The 'Navigating the artifacts' page of the HL7 V3 and HDF learning module

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Introduction to Health Level 7 (HL7)

Navigating the Artifacts:

HL7 Specification Component Introductions:

The two spellings of artifact and artefact are used interchangeably in HL7 documentation. The basic components of each artifact entered within the HL7 specification are:

1. **Title Name:** Human readable name for the artifact. The Title Name will appear as the artifact title and in all references and hyperlink lists when the database is rendered.
2. **Code:** Unique code that is used to identify the artifact over time. Format is: UUDD_AAxxxxxxRRVV where:
UU = Sub-Section code
DD = Domain code
AA = Artifact or Document code
xxxxxx = Six digit zero-filled number
RR = Realm code. (If not specified, universal assumed)
VV = Version code. (If not specified, version 1 assumed)
For example: PRPM_AR000001CA01 is version 1 of the Practice, Personnel Management Domain, Application Role Artifact number 00001 for the Canadian realm = CA01. Because version numbers only apply to artifacts which have completed the HL7 balloting process, they will be omitted from RP502 artifact codes during the standards development and approval process. The code will appear after the title name when the specification is rendered.
3. **Description:** Most (not all artifacts) include a description that may be used to describe the artifact as well as to insert links to other artifacts or images.^[12]

The following diagram shows the component artifacts of the HL7 V3 messaging methodology and their

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10.7 Appendix G

The 'Clinical Scenario to demonstrate the use of HDF' page of the HL7 V3 and HDF learning module

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Clinical Scenario to demonstrate the use of HL7 Development framework(HDF):

Now, why are we learning about HL7 and standards. This is in all for the ultimate goal of implementation of Electronic health records, in physician offices across the country, known as the Pan Canadian implementation of EHR.

EHR (electronic health record) Architecture Overview

In July 2003, *Infoway Canada* published version 1 of the *EHRs Blueprint* (Electronic Health Record Solution Blueprint). It is a comprehensive and interactive document that describes the business and technical architecture of EHR solutions to be implemented across Canada. EHRs Blueprint, an EHR interoperable framework is available on the *e-Health KnowledgeWay*.

Below is a high-level conceptual view of the three main components of the EHR architecture: EHR Data & Services, Health Information Access Layer and Point of Service Applications. The specific architectural solutions vary across the country depending upon the size of the jurisdictions.

The diagram illustrates the EHR architecture. At the top, 'JURISDICTIONAL INFRASTRUCTURE' includes registries for Client, Provider, Location, and Terminology. Below this is the 'PHS Data & Services' section with Outbreak and PHS Reporting Services. The 'EHR Data & Services' section includes EHR Service, Drug Information, Diagnostic, and Laboratory services. A 'Common Services Communication Bus' (HI A) layer handles Security, Consent, and Configuration. At the bottom, the 'POINT OF SERVICE' layer connects to Public Health, Pharmacy, Radiology, Lab, Hospital, Physician, and Clinical Portal.

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