原文題目(出處)：	Digital DICOM in Dentistry
原文作者姓名：	Jeff Burgess
通訊作者學校：	University of Washington School of Dental Medicine
報告者姓名(組別)：	Intern E 組　陳鈺文
報告日期：	2015/12/08

內文：

ABSTRACT

Nowadays, the incorporation of digital systems into medical and dental practice has ***necessitated development of a standard*** that allows ***reliable transmission of information***. This standard is termed as ***DICOM(Digital Imaging and Communication in Medicine)***.

INTRODUCTION

- **Conventional(Legacy) VS Digital Image**

Legacy image	*Digital image*
little information	considerable information combine with HIS
machines that only take and develop the images	many different components take, display and store the images
2D	2D,3D, even CAD/CAM

Standardization of Digital images becomes important.

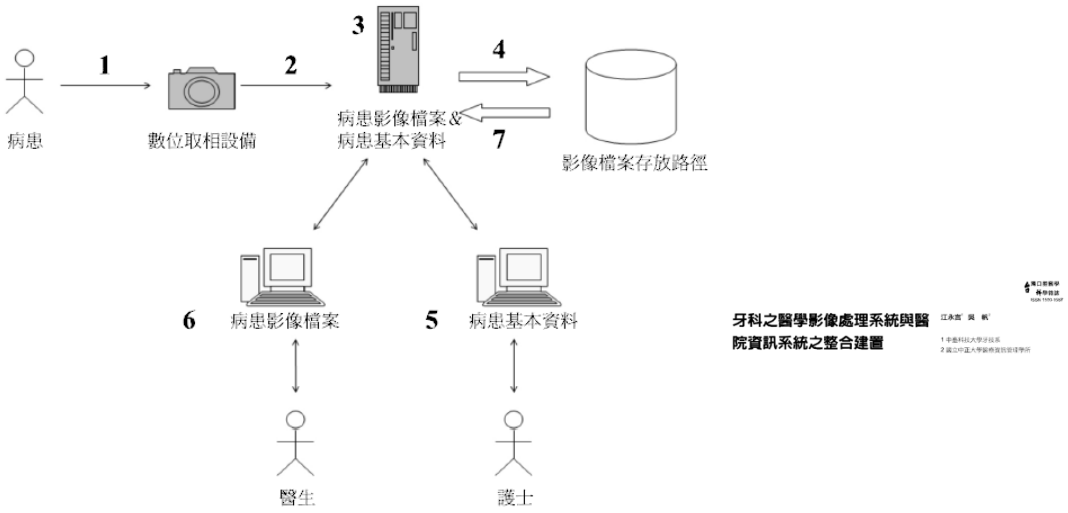
WHAT IS DICOM

- **History of DICOM**

Since 1985, when the first iteration of DICOM was presented for use (American College of Radiology(ACR) and National Electrical Manufacturers Association(NEMA) standards).

Since 1996, dentistry has been actively involved in the formulation of DICOM standards with special categorization for intraoral projections (IO) as well as color photography.

Now most companies producing imaging devices (termed ***acquisition modalities***). There are also numerous other software products (termed Picture Archiving and Communication Systems – ***PACS***) that have been further developed to allow for the comprehensive storage and retrieval of digital DICOM images.



- **Conformance Statement**

A dental digital x-ray machine(acquisition modality) includes a 'conformance statement'. Information contained details how the x-ray system should be set up to allow communication between different products.

One modality provider's conformance statement is not sufficient; therefore, DICOM performance statements for various acquisition are typically available for download on the WEB. The conformance statements for acquisition devices are standardized to allow comparison of DICOM devices and the ability of one product to communicate with another.

- **In-Office Servers and the Cloud**

MRIs or CT scans which have much bigger files, transmission and quick viewing can be problematic; this is because the more information that is stored on a hard drive (server) the slower the speed of retrieval. The issue of speed can be mitigated by use of cloudbased.

The other issue related to PACS and DICOM image storage/retrieval systems is cost. Maintenance of a purchased PACS system is also costly.

TERMINOLOGY

- Association: communication connection that is established between two DICOM
- Attributes: are used to describe information objects
- Composite objects: the objects that are defined in DICOM
- Data elements: the contents of data sets
- Data set: such as patients, equipment, images, *etc.*
- Unique identifier: is a unique 'name' that allows the finding and retrieval
- Value representation: is the description of how the attribute value is represented
- Library: this refers to the generally accepted terms

DICOM IN DENTISTRY(DICOM CBCT)

Converting CBCT images into DICOM requires Sophisticated software programs that are available include 3dMDvultus software (3dMD, Atlanta, Ga), Dolphin Imaging (Dolphin Imaging, Chatsworth, California), and InVivoDental (Anatomage, San Jose, California).

- **Orthodonitcs**
  - **Improve** diagnosis, treatment options, final treatment results, outcome measure assessment.
  - The visual landmarks identified in 2-D may be **difficult to visualize or locate** on a curved 3-D surface. In addition, measurements on CBCT 3-D images can vary depending on which slice is utilized.

DICOM file should be interpreted with caution in providing orthodontic diagnosis because the available tools in the 3-D software systems have **not** been fully validated in terms of 'accuracy and precision'.

- **Oral Surgery**

Surgical implant planning is another area where DICOM based files in CBCT can be helpful.

  - **Implant placement** in three dimensions.
  - **Sinus lift**, may be critical to therapeutic success.
- **Oral Medicine**
  - Measured in three dimensions and assessed in terms of relative volume and evaluated
  - Bone density
  - Assessment and management of sleep apnea, snoring, and airway obstruction as the shape and contours of upper airway passages can be analyzed in three dimensions.
- **Concerns**
  - The diagnosis of caries
  - File compression associated with DICOM storage could alter a viewed image
- **Innovation**

Includes internet image transfer and the use of mobile devices as viewers

CONCLUSION

Sharing of images between multiple sites, continuing pressure for dental compliance with national and international **imaging standards** as well as the convenience that the technology affords in terms of **web transmission** by using DICOM and 'Cloud' based storage and retrieval.

題號	題目
1	.對於下列醫療資訊之敘述何者正確？ **(A)** DICOM 3.0 為解決不同機型之造影設備的通訊協定，使影像可彼此認同，發表於 ~~1985 年~~ **2003** **(B)** IHE 目的在協定 DICOM 與 HL7 彼此適應性（adaptation）之問題 **(C)** RIS 為電腦化之~~醫院管理系統，可用來預測醫院之財務花費~~ **(Radiological Information System；RIS)** **(D)** HIS 主要用於~~放射科醫療檢查排程及管理作業~~ **(Health Information System；HIS)**
答案(B)	**出處：**PACS and Imaging Informatics: Basic Principles and Applications
題號	**題目**
2	下列何者不是醫療數位影像傳輸標準（DICOM）目前已制定完成之service？
	(A) query/retrieve **(B)** modality performed procedure step **(C)** interchange media storage **(D)** voice recognition
答案(D)	**出處：**PACS and Imaging Informatics: Basic Principles and Applications