



The use of DICOM By the United States Federal Government

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Agencies Involved in Providing Health Care

■ Department of Veterans Affairs

- Provides healthcare to the retired members of the US armed forces. Operates a network of hospitals and a large number of outpatient clinics in the 50 states and Puerto Rico.

■ Department of Defense (Army, Navy, Air Force, Marines, Coast Guard, National Guard and Reserve)

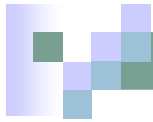
- Provides health care to the current US armed forces. Operates permanent and mobile hospitals world wide.

■ Department of Health and Human Services

- A number of agencies under the umbrella of the HHS, including the Office of the National Coordinator for Healthcare Information Technology (ONCHIT), are involved in health care delivery or research.

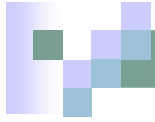
■ Department of Justice

- Provides health care to the prison population, operates clinics at a number of locations



Department of Veterans Affairs

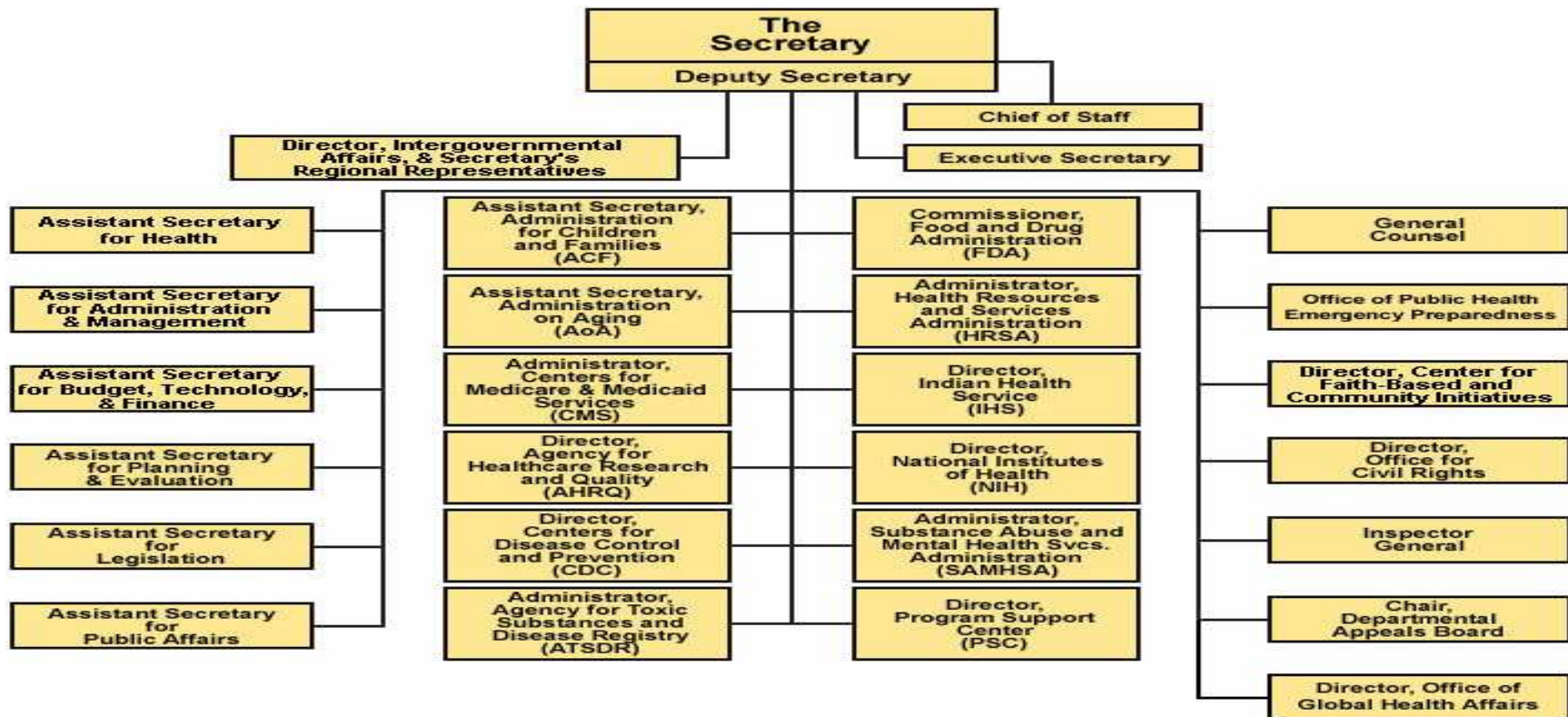
- In-house development
 - VistA Project
 - Current System
 - Reengineering effort
- Commercial systems
 - Integration with Vista
- Collaboration with other agencies
 - VistA Office distribution through HHS & WorldVista




Department of Defense

- Healthcare is provided by Tricare
- Permanent Army, Navy and Air Force hospitals in the US, Pacific, Central and Latin America, Canada and Europe.
- Mobile units are part of major deployments

Department of Health and Human Services





Department of Health and Human Services (HHS)

- The following HHS entities are involved in health care research, or regulation
 - Food and Drug Administration (FDA)
 - National Institutes of Health
 - Centers for Disease Control & Prevention
- The Indian Health Service provides care for native Americans and native Alaskans.
- The Center for Medicare & Medicaid Services administers health care claims for its recipients.



Federal Initiatives

■ HHS

- Office of the National Coordinator for Health Information Technology (ONCHIT)
 - The Office of the National Coordinator for Health Information Technology provides leadership for the development and nationwide implementation of an interoperable health information technology infrastructure to improve the quality and efficiency of health care and the ability of consumers to manage their care and safety. As of August 2005 ONCHIT is structured as follows
 - The Office of Health Information Technology Adoption
 - The Office of Interoperability and Standards
 - The Office of Programs and Coordination
 - The Office of Policy and Research

- **Consolidated Health Informatics (CHI)**
 - Adopts a portfolio of existing health information interoperability standards (health vocabulary and messaging) enabling all agencies in the federal health enterprise to “speak the same language” based on common enterprise-wide business and information technology architectures.



Federal Initiatives

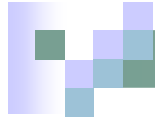
■ VA/DOD

□ BHIE

- DoD/VA Bidirectional Health Information Exchange (BHIE), formerly known as CHCS-VistA Data Sharing Interface (DSI)

□ CHDR

- The Clinical Data Repository/Health Data Repository (CHDR). The CHDR initiative seeks to ensure the interoperability of the DoD Clinical Data Repository (CDR) with the VA Health Data Repository (HDR)
- Imaging Work Group



Routine Use of DICOM

- General PACS
- Integration of EMR
- Image information exchange between agencies and facilities.
- Workflow integration



PACS

- VA
 - Uses Commercial and Government developed solutions.
 - Has a long standing program to improve modality and commercial PACS integration across the enterprise.
 - Developed or in the process of developing conformance requirements for Modalities, PACS and portable media.
- DOD
 - MDIS
 - DINPACS
 - CHCS II
- HIS and Federal Prisons
 - Use VA developed solutions
- NIH
 - Internal development (ImageJ and similar)
 - Commercial PACS systems



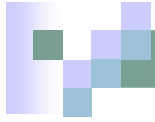
EMR integration

■ VA

- The VA had an integrated EMR for 10+ years.
- Current integration is facility centric. Large scale reengineering targeted to change the integration to patient centric.
- Integration of Radiology, Cardiology, Dentistry, Ophthalmology, Pathology modalities is accomplished using DICOM interfaces.

■ DOD

- CHCS II



Experimental uses of DICOM

- Reconstructive surgery applications
- Functional MRI
- Drug trials



DICOM in Prosthesis Development

- While body armor has protected soldiers' vital organs and lives, many survive with extreme injuries
- Human perception of faces is very sensitive to differences in symmetry: standard manufacture prosthesis for head injuries will still leave patient noticeably disfigured
- The US DoD is using DICOM imaging to build custom prosthetic devices matching the patient's remaining bone structure

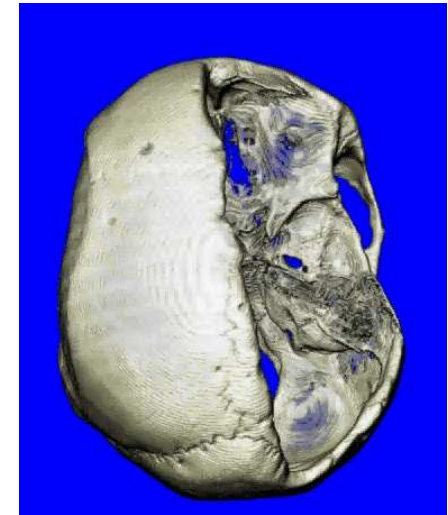
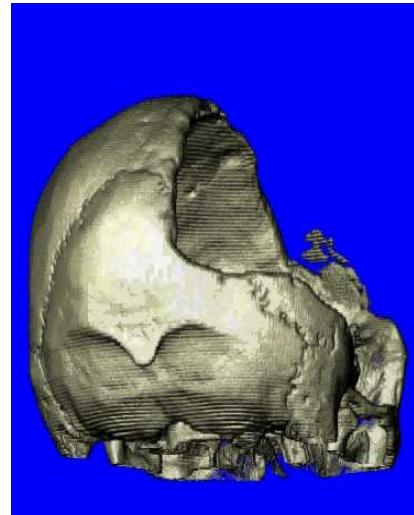
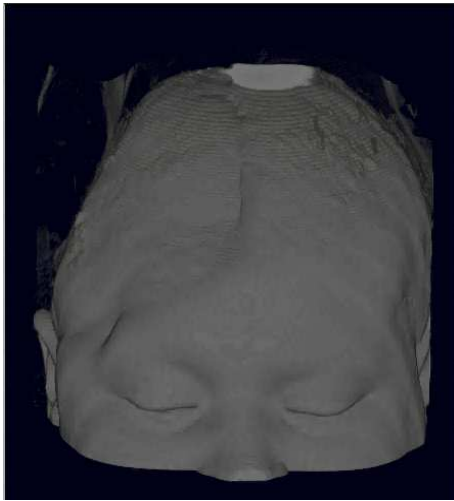


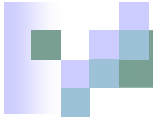
Cranial plate prosthesis SOP

- Thin slice CT performed of skull
- CT data volume rendered graphically
- Bone structures segmented from volume
- 3D Model visualizes injury
- Mirror image used to create missing anatomy model
- Maxillofacial prosthetics lab makes implant
- Surgery to place prosthesis

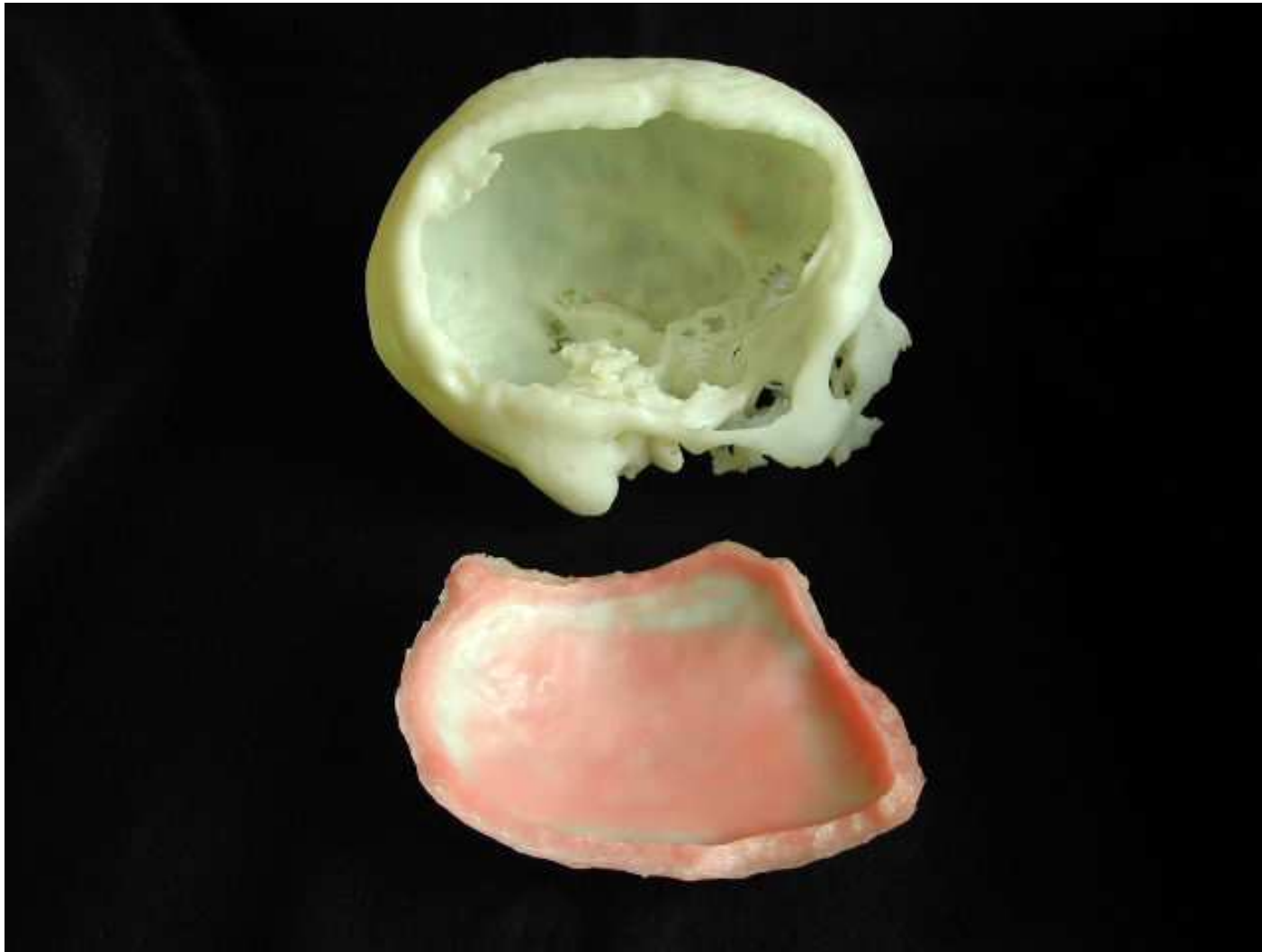
Visualization of Injury

- Patient survived encounter with explosive device
- Resulting injury destroyed right side of the cranium

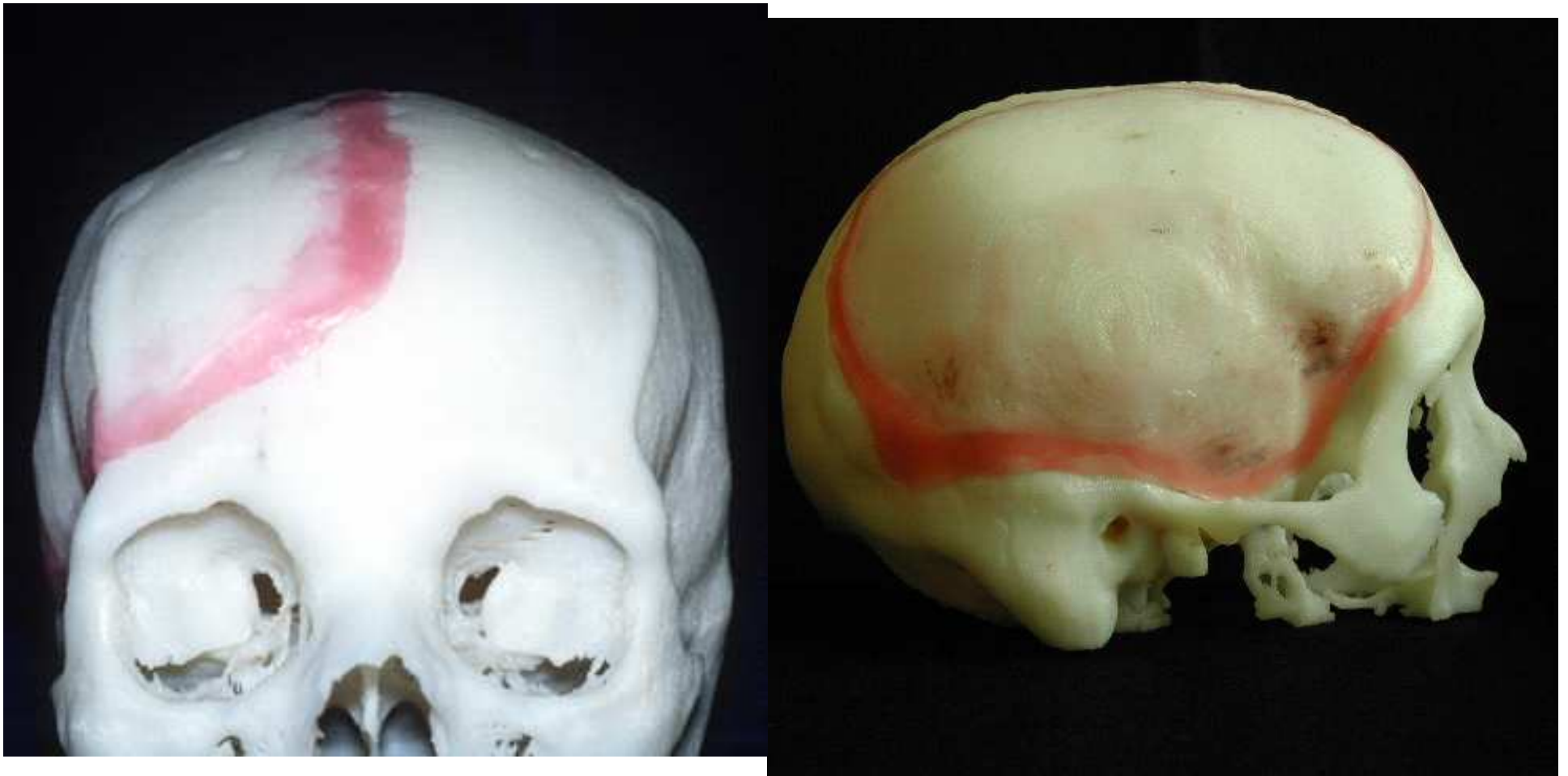




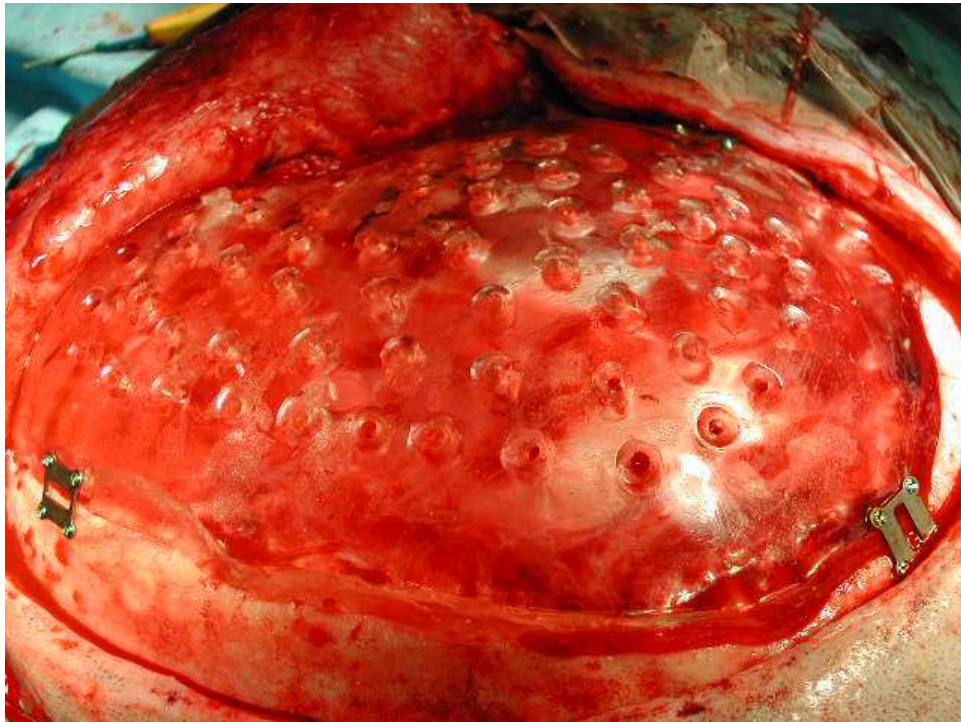
Mirrored contra lateral side of skull

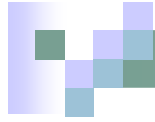


Prosthesis Fitted to Model



Surgical Installation of Prosthesis





Credits

Presentation Summarizes Paper by

CAPT A.C Richardson, USN (ret)

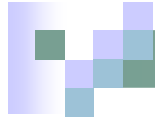
National Naval Medical Center, Bethesda
MD

Journal of Prosthetics Vol (tbd) 2004



Status Quo

- Things that have worked
 - Modality conformance requirements
 - Involvement in IHE and DICOM
 - Others.....
- Things that did not work
 - Achieve full acceptance of DICOM as the standard form of image exchange by all agencies.
 - The lack of official government agency representation in IHE and DICOM
- Things in process
 - Integrated PACS conformance requirements



Recommendations

- Get more involved with the federal government.
 - Primary non-DOD organizations to target are CHI and ONCHIT.
 - Understand the relation between CHI and ONCHIT.
 - Target CHCS II and DPSC (DINPACS).
- In the long term, improve the acceptability of DICOM by harmonizing the format and protocol with the mainstream standards.