Australasian College for Emergency Medicine

EMUGs

Image Archive and Review

Article 1: Overview and Definitions – an ideal system for image storage and review

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This document has been provided by the ACEM and EMUGs Collaboration Working Group to assist Clinical Leads in Ultrasound in developing ED ultrasound training programs. The suggestions outlined are not required for accreditation for the FACEM Training Program. Due to the variation in size and resources available at sites throughout Australia and Aotearoa New Zealand, the guidance provided in this document may or may not be appropriate for your site.

Image Archive and Review
Article 1: Overview and Definitions – an ideal system for image storage and review

The ability to store and review images is essential to any ultrasound program for:

- Archiving images within patient context
- Image sharing and interpretation with other health-care professionals
- Quality assurance
- Teaching
- Credentialling and ongoing CME/maintenance of practice

The method of image transmission and storage should be through wireless transfer in the **DICOM** format (Digital Imaging and Communication in Medicine) to an image archive or **PACS** (Picture Archiving and Communication System) or a **VNA** (Vendor Neutral Archive).

The ideal solution would include a software "**middleware**" interface that allows review and curation of the images before they are archived to the PACS or VNA. (Various middleware solutions are available, including Sonosite Synchronicity, MIDAS, Telexy, QPath, Kailo, SonoReview, etc.)

Definitions

USB: Universal Serial Bus is a type of computer port or interface

USB drive: a storage device that plugs into a USB port

HL7: set of international standards for the transfer of medical data

EMR: Electronic Medical Record

PAS: Patient Administration System

SQL: Structured Query Language used for managing data in a database

SMTP: Simple Mail Transfer Protocol

HTTPS: HyperText Transfer Protocol Secure used for secure data on internet browsers

PHI: Protected Health Information

DICOM: Digital Imaging and Communication in Medicine

PACS: Picture Archiving and Communication System

VNA: Vendor Neutral Archive

Video File types: AVI, wmv, MP4

Image file types: JPEG, Bitmap, MPEG

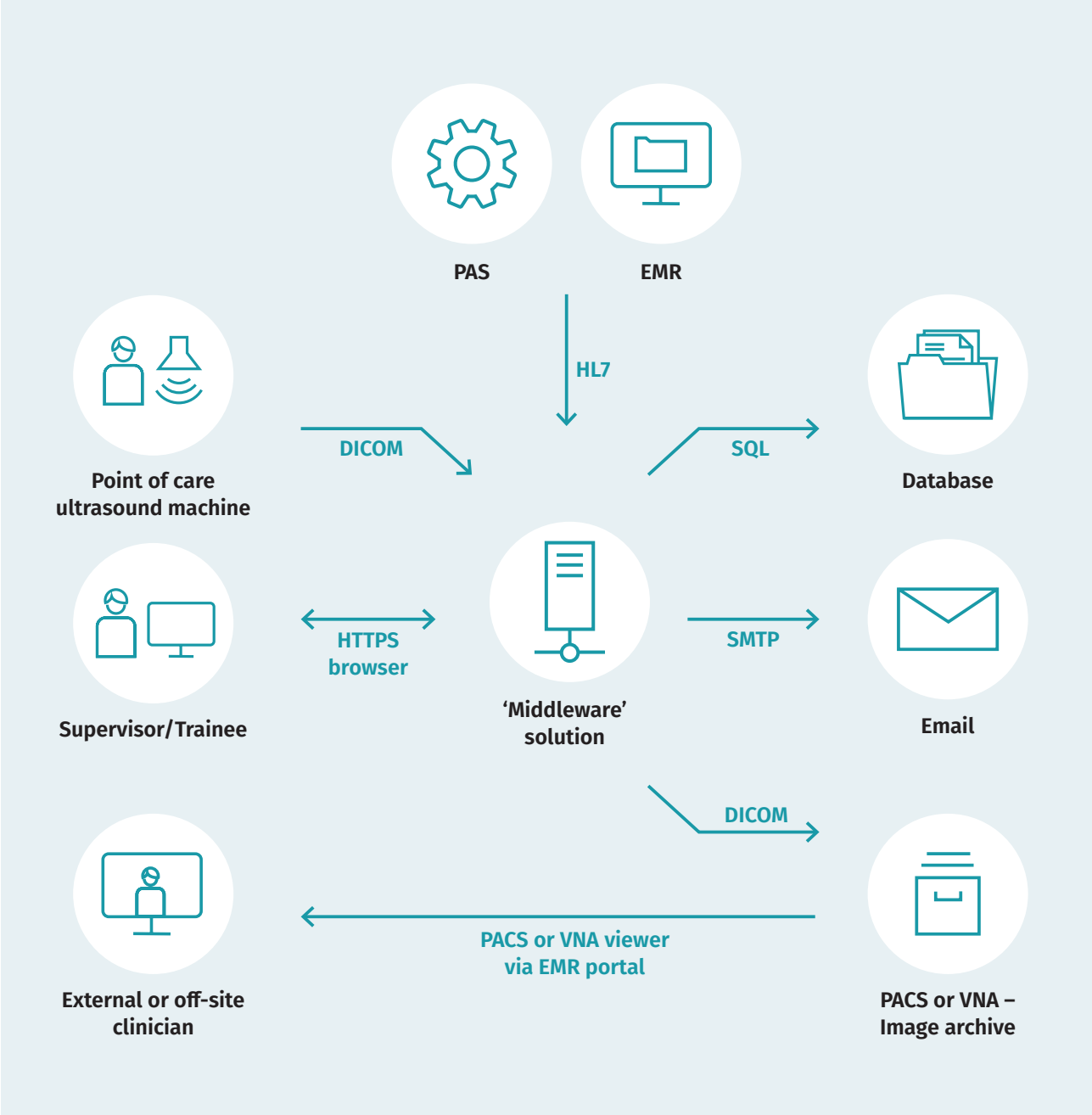

Figure 1: System for image transfer with "middleware"

Interim Solutions

Option 1: Review and curate images on the ultrasound machine

Problems:

- Labour intensive, need to physically review images on the machine
- Unable to perform quality assurance or improvement processes
- Unable to perform credentialing for individual practitioners
- Images are not saved within patient context
- Images are not available to view to external or off-site clinicians
- Logbook images cannot be reviewed, paper logbooks are not secure
- Images are lost with every software upgrade of ultrasound system
- Limited hard drive space of ultrasound system
- Slowing of ultrasound system as hard drive fills up

Machine memory needs to be cleared at regular intervals.

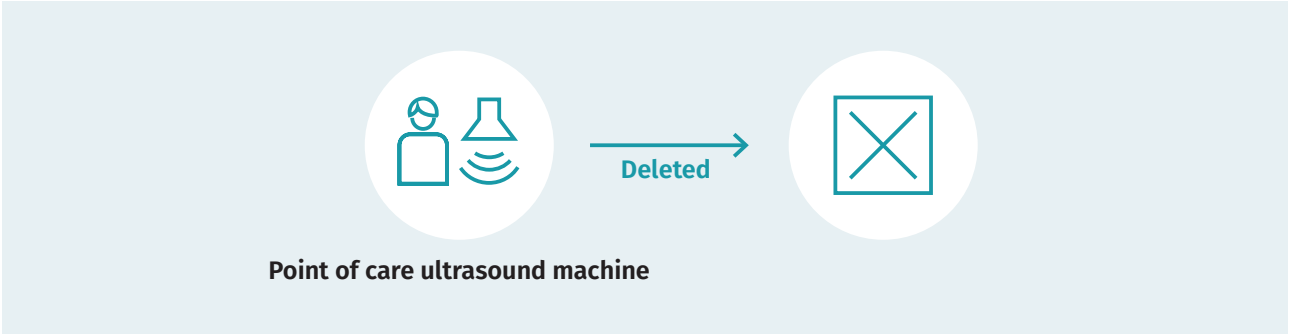

Figure 2: Review on machine only

Option 2: Download images from machine onto USB drive to review

Problems:

- Labour intensive
- Images are not saved within patient context
- Images are not available to view to external or offsite clinicians
- Images may be lower quality and saved in a compressed format rather than DICOM format
- Significant data security risk
- Unable to safeguard Protected Health Information (PHI)

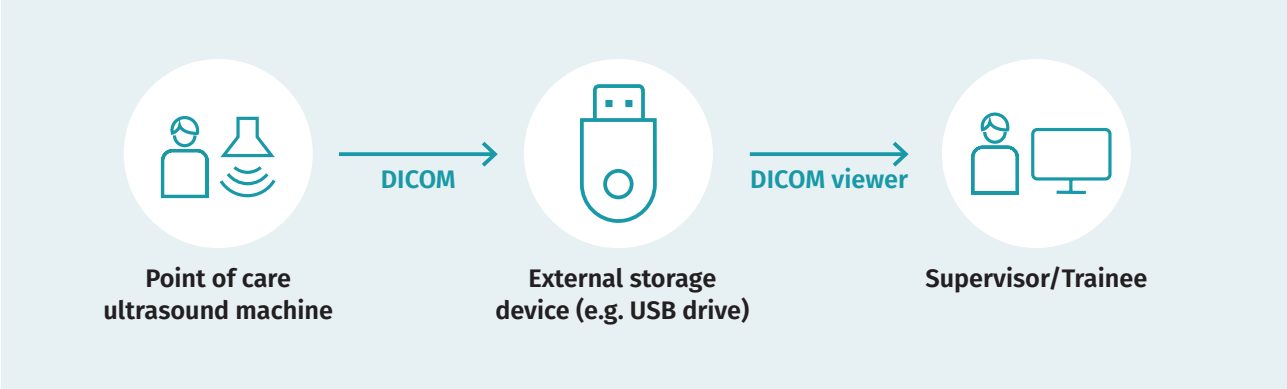

Figure 3: Download images to USB

Option 3: Handheld devices uploading images to vendor's cloud storage

Problems:

- Unable to safeguard Protected Health Information (PHI)
- Only available for specific devices and vendors

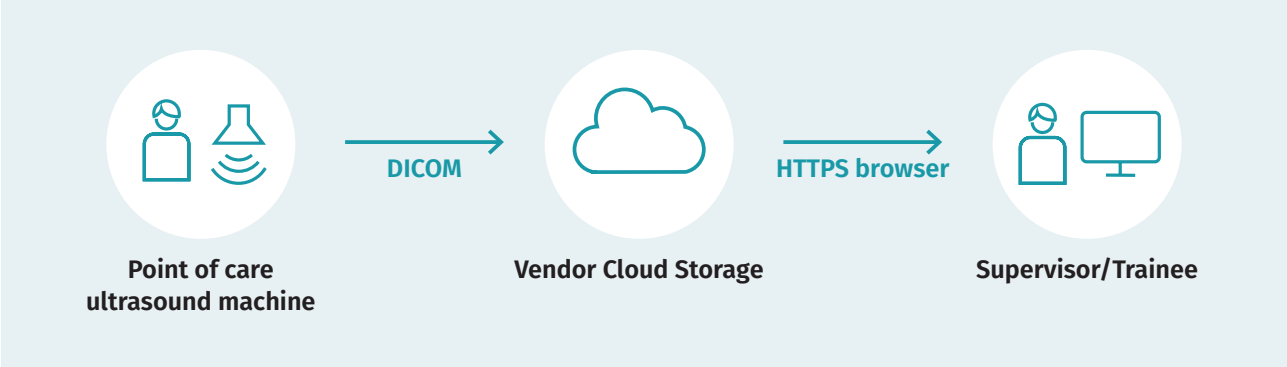

Figure 4: Upload to Vendor Cloud Storage

Option 4: Wireless transfer to PACS or VNA without "middleware" solution

Problems:

- Unable to curate images, non-diagnostic or training scans uploaded
- Labour intensive for administration staff to match images to medical record
- Difficulty credentialing individual clinicians, separate logbooks required
- Difficulty complying with quality assurance processes, separate processes required

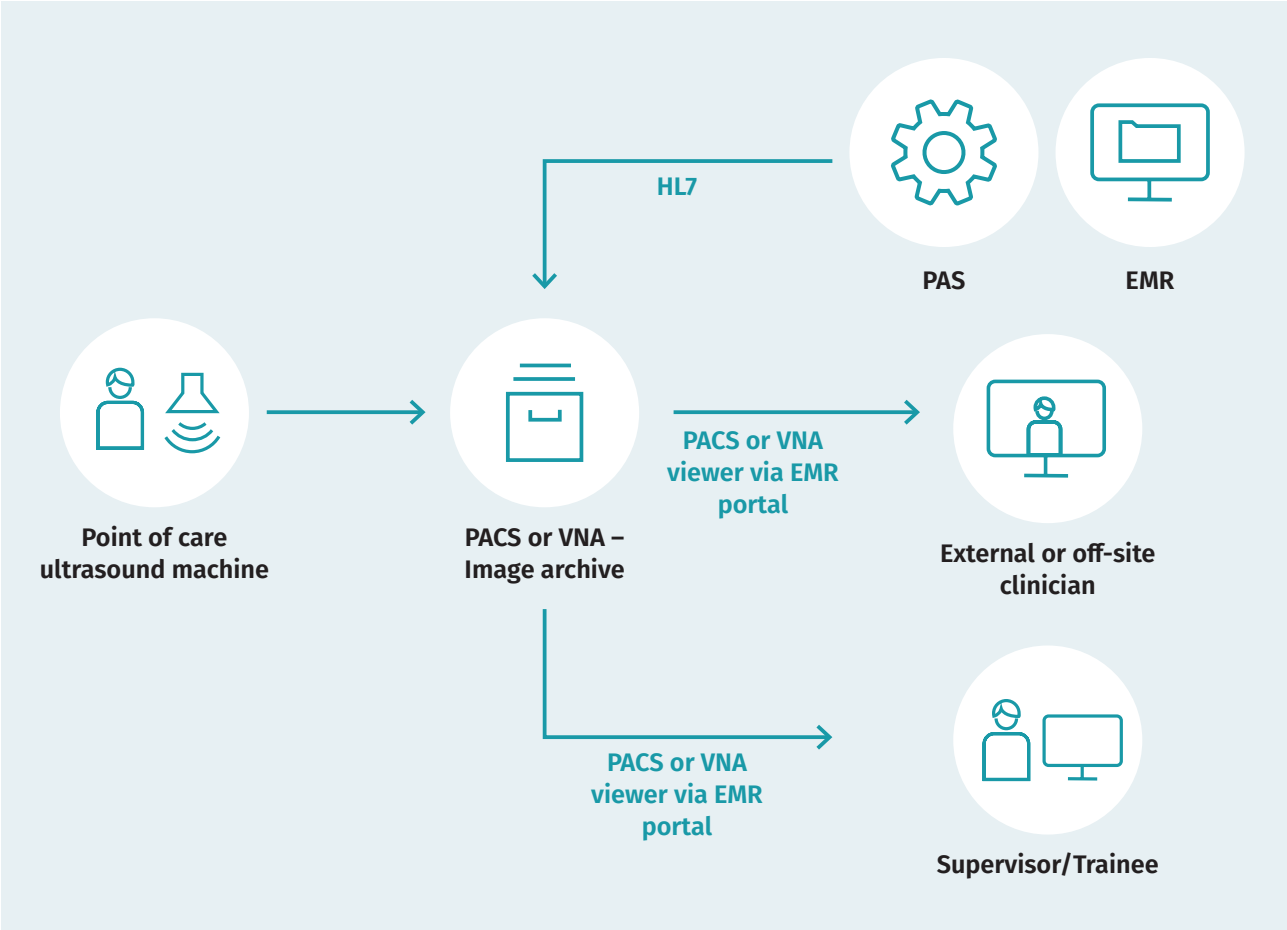

Figure 5: Image archive to PACS without "middleware"

Australasian College for Emergency Medicine
34 Jeffcott St
West Melbourne VIC 3003
Australia

t +61 3 9320 0444
e policy@acem.org.au

acem.org.au

Emergency Medicine Ultrasound Group Australia
Level 2, 431 St Kilda Road
Melbourne VIC 3004
Australia

e central@emugs.org

emugs.org