



Access to medical imaging for
research in Scotland

The role, possibilities and limitation of
the National PACS

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National PACS Background

Origins of the National PACS (1)

Drivers



- Early 2000,s
- Glasgow had a data storage problem
- They were spending a fortune on film
- The CT and MRI scanners were producing digital data
- Plain film equipment needed replaced (CR was coming)
- GGHB explored the possibility of a PACS solution

Origins of the National PACS (2)

Drivers



- GGHB looking after 2-3 million people
- 60% of the Scottish health budget
- The thought of GGHB spending a fortune on PACS concentrated minds at SEHD
- A national procurement was considered

Origins of the National PACS (3)

Executive input



- 2003-2004
- Scottish Executive (Malcolm Chisholm)
- SEHD (Charlie Knox, Alan Hyslop)
- GGHB PACS expanded into a national procurement
- Operational Requirement / Business Case generated largely within GGHB
- Input from the RIS/PACS reference group, NSS, Scottish Healthcare Supplies to give comfort that the solution was nationally applicable



Origins of the National PACS (4)

The Kerr Report

- 24 Electronic imaging, such as PACS can transform patients' experience of the care they receive as well as enable clinicians using any sort of image to provide a much faster, more effective and straightforward service. The particular benefits will include:
- More effective care as clinicians and care teams work together in one or more locations (much easier to separate the capturing of the image from the reading of it – meaning the image can travel rather than the patient)
 - Faster access to high quality medical imaging services and results
 - Reduced re-testing
 - Quicker discharge from hospital and better care planning resulting from easier access to images and test results
 - Fewer appointments and operations postponed because of non-availability of images
 - Images available 24 hours a day, seven days a week
 - Simultaneous image viewing across multiple sites and locations
 - More efficient use of facilities and staff.





National PACS Procurement

Procurement (1)



- GGHB team
- Representatives from Scottish Radiology
- Radiographic management
- NSS
- Scottish Healthcare Supplies

- To make a recommendation to SEHD

Procurement (2)



- Formal procurement started
- Financial criteria excluded many companies
- Presentations from suppliers
- Round of site visits
- Presentations from suppliers
- Decision
- Negotiations (preferred supplier, Kodak)
- Contract

Interestingly _____



- A Scottish Executive spokesperson told EHI:
- "PACS offers the opportunity for radiology reporting to be done remotely, utilising telemedicine and potentially facilitating much more flexible working of radiologists who will be able to access images on a 24-hour, seven day a week basis. It challenges traditional radiology reporting structures and encourages organisational review and reconfiguration of imaging services across health communities for maximum efficiency."

Thus showing some confusion about the difference between PACS, RIS and Telemedicine



National PACS drivers and specification summary

Drivers for the National PACS Summary



- Service delivery drivers
- Service improvement drivers
- Economic drivers
- Political strategic drivers

- No academic drivers
- No research drivers

Output based specification for the National PACS summary



- Service delivery based
- Developed in Glasgow to meet GGHB requirements
- Checked against wider service needs

- No University input
- No consideration research requirements



Preparation for the National PACS

Prerequisites of a national system (1)



- All acquisition devices producing digital images
 - Unique patient identification number (CHI)
 - Every image acquired using a competent RIS
 - All modalities running off RIS derived worklist
 - No coincident accession numbers from different hospitals
- CR call off contract
 - CHI as the primary identifier
 - Replacement RIS systems at 6 Health Boards (Carestream RIS)
 - Hospital prefix on accession numbers

Prerequisites of a national system (2)



- Ability to transmit large data volumes locally
- Ability to transmit large data volumes over a distance
- System resilience
- System support
- Disaster recovery
- Upgraded local networks
- Upgraded N3 network
- Data duplication
- 24/7 system support
- Mirrored data stores





National PACS organisational arrangements

Current National PACS organisational structures



Scottish Government Health
Department - Policy

Scottish Government eHealth – Strategy
and Corporate Governance

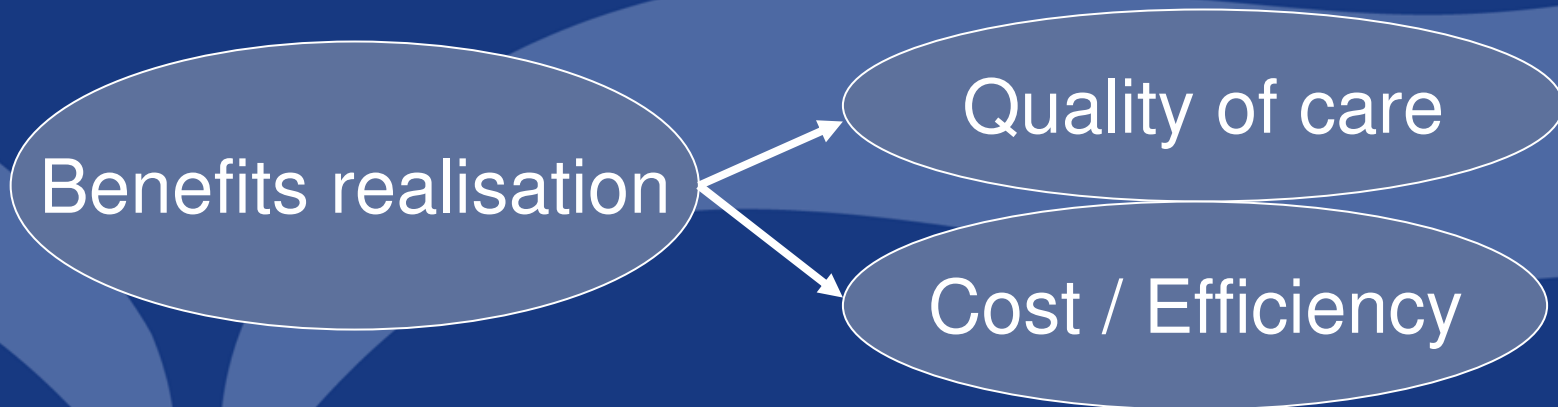
NSS - Project Implementation

Health Boards - Project Implementation

Benefits realisation

Quality of care

Cost / Efficiency



Remits: General arrangements



- **Overall PACS Programme Arrangements**

- The PACS Programme and its projects forms part of the eHealth Programme in NHS Scotland.
- NSS is responsible for the programme delivery of PACS in conjunction with Health Boards.

- **PACS Programme Structure**

- This structure separates governance into; executive board, clinical governance, user management and quality assurance.

How is it all being run?



National PACS Programme Board
Chair / Executive; Dr Frances Elliot
Programme Manager: Alan Fleming
Business Change Manager: TBA

Robin Wright, GM IM&T Lanarkshire - eHealth Leads Chair, IT Leadership
Martin Egan, Director eHealth, Lothian - QA Lead & Chair QMG
Ron Anderson, Director IM&T, NSS - NSS Lead
Jim Crombie, Director of Diagnostics, NHSGG&C - NHS Director
Dr Brian Robson, Clinical Director, IM&T, NSS - Clinical Director NSS
Dr Hamish McRitchie, Chair of Clinical Advisory Group - Clinical Lead
SGHD Lead, Director of eHealth

Clinical Advisory
Group
Chair: Dr Hamish
McRitchie

User Group
Chair : Allan
Somerville

Technical QMG :
Martin Egan

Deployment Project
Team
Alan Fleming
Jim Kydd
John McDonald

Local HB PACS
Project Board

Local HB Strategy & Business
Change Processes

Remits: PACS Board



Terms of Reference

- 1 Establish strategic direction for PACS
- 2 Approve the programme plan and monitor overall progress on plan.
- 3 Monitor the commitment of central finance for the programme.
- 4 Receive regular reports on the progress of the programme from the programme manager (s).
- 5 Receive regular reports from the clinical advisory group.

Structures and remits

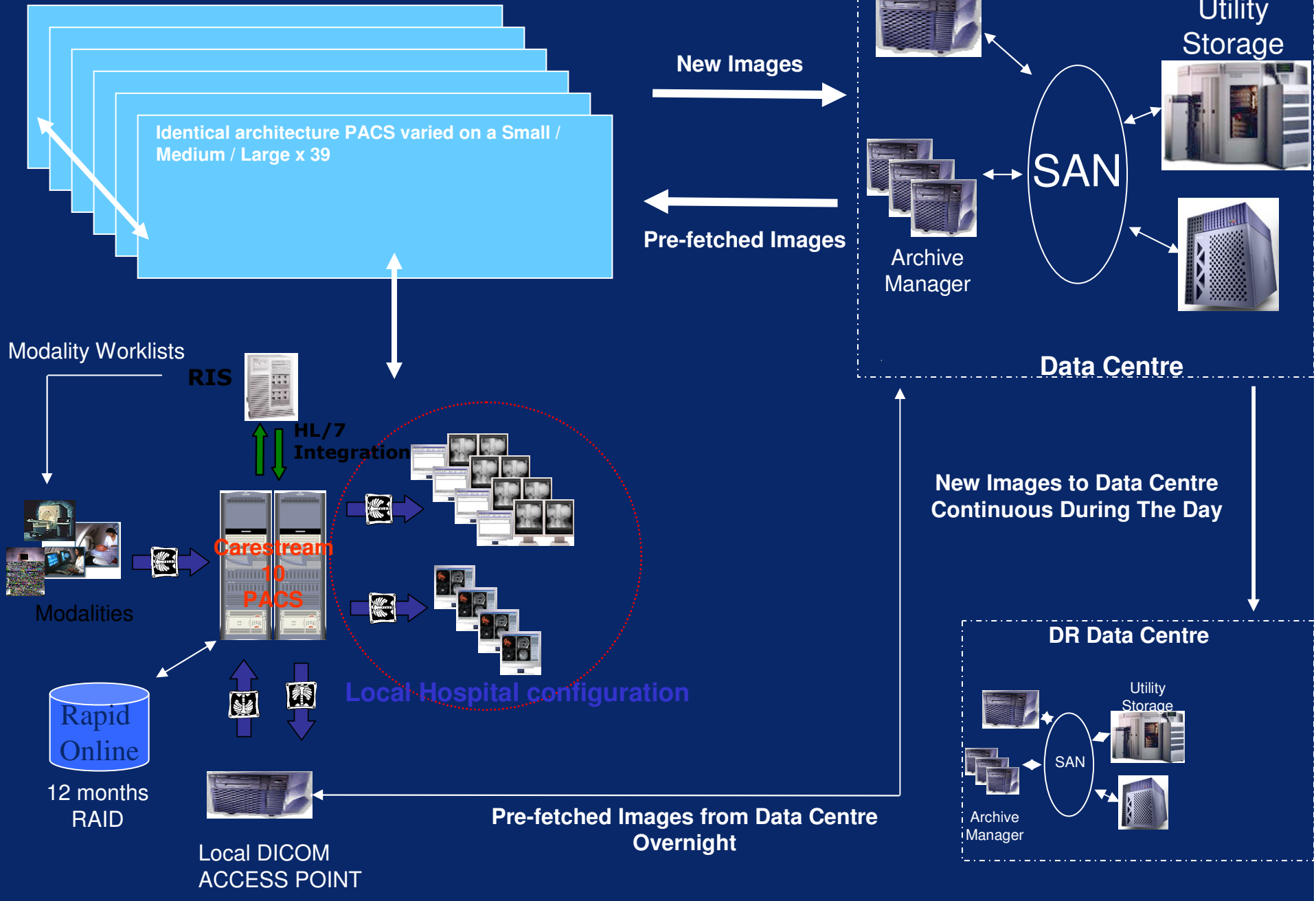


- Organisational structures
 - Research not represented
- Remit of the PACS Board
 - The needs of research not currently considered



National PACS architecture and data storage

National PACS Architecture



National PACS. What goes in?



- All image data that is acquired using an accession number generated by a RIS system
- Must be in DICOM format
 - Either directly
 - Or in a DICOM envelope
- Must be indexed by a CHI number
- No current limitation on data that meets these criteria by volume

- If it is not patient data generated using an accession number and linked to a CHI number it does not go in

National PACS. Image retention and compression.

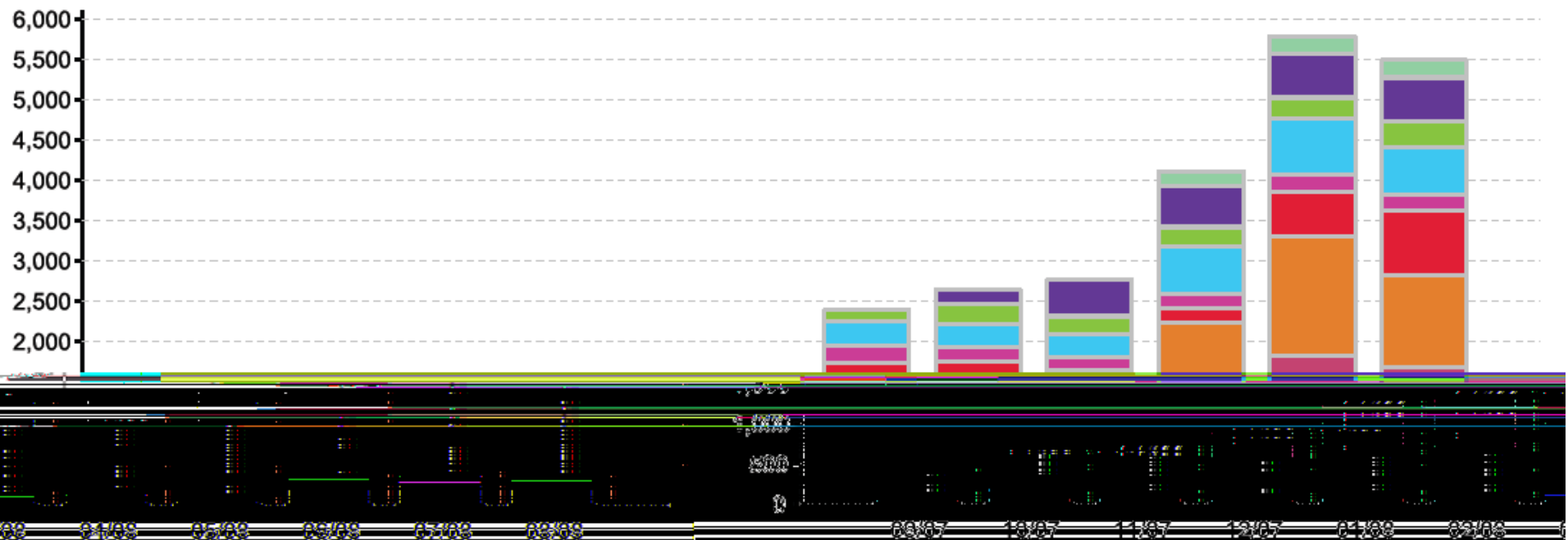


- Images being retained for the life of the patient plus three years
- 2:1 lossless compression for all modalities

Data volumes generated over the 12 months



Global Vol(GB) last 12 months



Analysis & Action | Fast Vs Day | Haystack | Aggr & Cycle | Database & Gateway | Golden Rules | Clinical Glasgow | Details | Western Isles | Highland | Lanarkshire | Grampian



National PACS. Issues related to data volumes (1) Costs



- Cost of storage
 - Most of this relates to management and security rather than hardware
 - Cost of data storage – £1.4m to date, projected to be £3.6m by end March 2010.
- Cost of networks

National PACS. Issues related to data volumes (2) Functionality



- Data queues sending
 - Local at hospitals
 - Centrally at the archive
- Data queues retrieving
 - Centrally at the archive
 - Locally at the hospital
- Reduced local storage
- Network pressure
 - N3
 - Local networks

Measures to address data volume issues currently being considered



- Limit the total amount of data that will be allowed per health board without additional cost
- Limit the amount of data that will be allowed per examination without additional cost
- Lossy compression of data in the central archive
 - At ingest
 - At 18 months
- Data deletion ? Seven years

The role of RIS in data storage.



- Generates the accession number
- Populates the modality worklist with DICOM header information
- Allows a report to be generated
- Holds the report – sends it to the PACS (DICOM structured reports)
- Responsible for all the information used to index the images



Limitations of the National PACS

Limitations of the National PACS

(1) What goes in



- Designed around routine service delivery requirements
 - System architecture/System rules/RIS related/Contractual/Cost structure
- If research image data fits it will go into the PACS

Limitations of the National PACS

(2) What does not go in



- If research image data does not fit it will not currently go in
 - Non RIS indexed data
 - Non CHI related data
 - Non image data (raw data)
 - Non patient data

Limitations of the National PACS

(3) What is not costed



- High data volume per examination
- Non image data (raw data)
- Non patient data
- Non clinical diagnostic data
- Network upgrades for high data volume transmission

- Not within current costing structure – would require additional finance

Limitations of the National PACS

(4) Proposed changes



- Limitation of ingested data volumes (moves towards archiving reduced data sets)
- Compression on ingest
- Delayed compression (18 months)
- Data deletion



Possibilities for the future

Possibilities for the future



- The network is there and university departments are connected
- The archive is there and available as utility bulk data storage
- The interfacing is done
- Additional data could be stored within the system
 - Once indexing is sorted
 - Once the cost is funded

To use the PACS



- Define your requirements
- Persuade
 - Scottish Government
 - Political
 - Managerial (civil service)
 - Health service providers
 - NSS
 - Territorial Boards
- Negotiate the cost
- Negotiate the service
- Influence the product design



Other points to consider

Data governance



- Caldicott guardian
 - these are local roles (territorial board)
 - usually DPHs
- CLO advice is that NSS is not the data controller in PACS but the Health Board is – NSS can only ever be the data processor on Boards behalf

Long term future



- What to do at
 - End of contract
 - Exit strategy



Thank you