

Scottish National Archive Brings Local Benefits to Stirling Royal Infirmary

As part of Scotland's eHealth Programme, Carestream Health worked with NHS National Services Scotland to install CARESTREAM PACS across 39 hospitals in Scotland's fifteen Health Boards, with integrated CARESTREAM RIS in many locations. The resulting National Picture Archive and Communication System (PACS) and Archive in Scotland is now one of the first examples of a truly national PACS system. With Scotland having a population of some five million, in a mixture of dense urban areas such as Glasgow and Edinburgh and remote rural communities, this is a nationwide solution encompassing all types and size of hospital.



NHS Forth Valley

Part of NHS Forth Valley, Stirling Royal Infirmary is a typical location in central Scotland, serving a population of some 300,000. Linked with Falkirk and District Royal Infirmary, the Radiology Department carries out around 175,000 examinations annually across a full range of modalities, with acute and A&E services based at Stirling and planned care and minor injuries at Falkirk.

Dr Raj Burgul, Consultant Radiologist at Stirling Royal Infirmary, remembers life before the advent of the new PACS. "We had a department with film bags everywhere. It was a daily task to get them from the wards, get images reported and then get them back to the wards so that people could see them. Because we are a hospital on two sites," he continued, "we had to continually transport huge volumes of film bags between both sites. It was logistically challenging."

The CARESTREAM PACS solution enables the seamless acquisition, storage, retrieval and display of digital patient images within and between clinical sites, from Scotland's National Archive. Area Imaging Service Manager, **Norma Wilson**, based at Stirling, was in overall charge of the PACS installation project.

"With a project this size it was important to ensure that everybody embraced the new system and that all the consultants, the junior doctors, the radiologists, were properly trained." So we put a very robust training plan in place," she explained. "It was hard work but it was worth it. We had a group of eHealth trainers trained as well, so that we had people who could go to other departments to do training. Obviously data protection was very important," she added. "To use PACS you need to have completed data protection training within the last year so I arranged for the information governance team to go in at the beginning of PACS training."

Having now experienced the new PACS on both a local and national level Dr Burgul can see an immediate difference. "The main advantage is speed," he said. "As soon as an image is taken it is visible across the establishment. You can see the previous history and current films without physically ordering them. It's had the biggest impact on emergencies and cross-site referrals. Now, as soon as the patient is scanned, you can get on the phone and get an opinion straightaway as it's visible on the national store. It has definitely improved our turnaround times. You can make a decision for tertiary centre transfer in well under an hour."



Falkirk and District Royal Infirmary



Scotland—The Facts

Population—5 Million people living in a mixture of dense urban areas such as Glasgow and Edinburgh and remote rural communities in the highlands and Islands

15 Health Boards—39 Hospital sites with local PACS systems and connected to smaller satellite imaging departments
—3.8 million new X-rays per year

The Solution

- Built as standard bundles based on each hospital’s annual exam volume, ranging from 50,000 to more than 100,000
- Common user interface across all hospitals with access to the same features and functionality
- Projected managed storage totalling 2 Petabytes

- 20,000 registered users
- Installation of 320, 3 monitor 3MP diagnostic workstations for use in radiology
- Web-based image viewing in over 2,000 wards
- Mirrored National Image/Report Archive
- Implementation of the Community Health Index (CHI), Scotland’s national patient identification system, across new and legacy systems. Only images with a valid CHI are shared throughout Scotland
- Scalable workflow grid computing drives functionality and provides a common and synchronised virtual workflow throughout Scotland’s multi site enterprise
- Virtually all types of multi-media clinical information is managed in patient centric files including radiology images, laboratory results, video files and other non-DICOM data

National Archive

All studies from all hospitals are stored in the National Archive so, with a common user interface giving controlled access to the same features and functionality, authorised users in every hospital across the country can access current and prior images regardless of where they were generated. Dr Burgul explained the requirements at a local level—the need to link Stirling Royal Infirmary with Falkirk and District Royal Infirmary eleven miles away. “We wanted to run the two departments as one, with a seamless communication across both. I can now see what examinations are unreported and, regardless if it is Stirling or Falkirk, it will load up from the appropriate PACS server. It’s excellent. It works really well and has changed our way of working considerably.”

The radiology departments at Stirling and Falkirk quickly became filmless. Norma Wilson explained: “On 1st April we put up signs saying ‘PACS No Print!’ Emails went out, posters went up, and we didn’t experience any problems. It all went very smoothly. We also installed a

workstation in each theatre,” she added. “They were all furnished with one monitor and one keyboard. The orthopaedic surgeons, especially, were great. I organised special training for them and we had all the required orthoview templates loaded and the list is updated on a fairly regular basis. The consensus is that it’s a brilliant product.”

The National Archive also acts as a back-up for the local PACS servers in each local hospital. Managed storage is expected to reach 2 Petabytes with 20,000 users currently registered across the country.

“We really can act as a nationwide community using PACS,” said Dr Burgul. “For instance, bone ages for paediatric hands are now being reported by radiologists in Glasgow and we often get neuro-surgical MRIs and CTs double reported by colleagues in Edinburgh.”

Norma Wilson agreed: “We operate very much within a national context. If one of our patients is sick in Inverness there’s no detriment, because we’ve got the images. It doesn’t matter where anybody is, in fact we’ve had patients from abroad and we’ve sent CDs back with them. We even

emailed a doctor in Spain recently with images of a patient who had had a chest condition while they were on holiday here. So that’s not just local or even national, it’s global!”

Remote Access

The Carestream Health system also allows consultants to access stored images from home. “All our radiologists have VPN links via their home broadband connection into NHS Net,” explained Dr Burgul, “so we can see the whole country from the comfort of our own home. For on call work it makes a massive difference.”

“We can now load full body CT scans, sometimes up to 800 images, and they will load almost instantaneously, streaming data through in the background,” he continued. “You start with compressed images, looking for any major abnormalities and detail improves as the rest of the data downloads. Whatever part of the anatomy you’re looking at, it will decompress that area first, so if you scroll to an area it will

bring that up to maximum resolution first. I like its intelligence.”

Improved Workflow

Having the CARESTREAM RIS integrated with the new PACS has also improved workflow. “The radiographers have already got their worklists set up,” explained Norma Wilson. “They’re not going into the RIS and putting data in manually, it’s much slicker overall. When a patient comes to the front desk they are put straight onto the system. Administratively it’s a much quicker workflow; it’s less noisy, less busy and frenetic, with less chance of error. We’re also able to get statistics out in a much better, more seamless fashion. The whole integration has really been terrific.

“We’re also scanning requests into the RIS now, which we couldn’t do before,” she added. The whole process, from getting an appointment to getting a report out in a more timely fashion, has been helped enormously. It’s helping us to meet our 18 week diagnostic waiting time quite comfortably in Forth Valley.”



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Historical Data

A major part of integrating the CARESTREAM RIS was a merge/migrate project for data in the existing RIS. Norma Wilson detailed the process: "We had a huge amount of data in the existing RIS that we needed to enter robustly into the CARESTREAM RIS. This was a huge exercise and required a lot of input from Carestream Health. It was a good

demonstration of the partnership that we had. There were in excess of half a million records (which equates to circa 1.2 million examinations), including up to 80,000 records that had already been migrated onto the old system. It was quite a difficult part of the project but one that was critical to the whole integration, and means that everything is now in place."

'There are time savings at all steps of the workflow journey.'

Norma Wilson, Area Imaging Services Manager, Forth Valley Health Board.

Verifying Images

A major part of the national programme was the implementation of the Community Health Index (CHI), Scotland's national patient identification system. This unique number is the primary identifier in the PACS and Carestream Health's solution verifies that only images with a valid CHI are available nationally.

Dr Burgul summed up the benefits of the new system

"The CARESTREAM PACS is very easy to use, so training clinicians was easy, and having the CARESTREAM RIS driving the PACS means you can now do a reporting list faster. It has some really powerful features which are transforming medical care both locally and nationally," he said. Norma Wilson added: "This has been a very positive process. Carestream Health has been very supportive. I feel they do genuinely believe we are partners. It's been hard work but it has been absolutely worth it."



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Dr Raj Burgul, Consultant Radiologist at Stirling Royal Infirmary.