NORTHUMBRIA FDR XAIR SYSTEM TRIAL

Phase 1 Report

Project Lead – Deborah Henderson
Written by: Jessica Brealey – Trial Team Lead & Radiographer
NORTHUMBRIA HEALTHCARE NHS FOUNDATION TRUST

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BACKGROUND

The Fujifilm **FDR Xair** device is a portable x-ray system designed for use in challenging and unconventional healthcare environments. Used in conjunction with a D-EVO II detector, Console Advance laptop and a stand, the **FDR Xair** system enables high quality, low dose images to be acquired in any location. Wi-Fi connectivity and Fujifilm's cloud collaboration platform enable images to be uploaded immediately to the hospital RIS and PACS systems.

A partnership between Northumbria Healthcare Trust (NHCT), NHS Improvement (NHSI) and Fujifilm resulted in a trial which aimed to assess the provision of plain film routine imaging in the community as a means to alleviate pressure on patient transport services and reduce the volume of hospital attendances for vulnerable patients.

The trial formed a preliminary phase and three core phases:

- **Preliminary Phase** – Medical Physics & Radiographer Assessment (safety, usability and image quality) and Applications Training within the Radiology Department.
- **Phase 1** – Appointment Based System at a GP surgery and two care homes for routine imaging.
- **Phase 2** – Non-Appointed GP Call-Out System for care home residents in the acute setting, including the use of cloud for connection to hospital systems for non-appointed patients.
- **Phase 3** – Emergency Ambulance Response for pre-hospital imaging assessment in partnership with North East Ambulance Service (NEAS) and Trust Emergency Department (ED).

Jessica Brealey (RTF) NHCT
Trial Team Leader & Radiographer

Fig. 1 - **FDR Xair** portable x-ray unit

INTRODUCTION

This report details the first phase of the pilot. The inspiration for this service improvement originated from barriers to care that stemmed from the Covid-19 pandemic. These barriers included reduced access to patient transport services and the suspension of open access imaging in the Radiology Department. Both of these constraints were implemented to keep the public safe and maintain social distancing within each service. Whilst improving patient safety, these are however potential barriers to patient care for those who have limited access to alternative transport services.

Patient surveys have shown that patients who are more vulnerable to Covid-19 or shielding are also reluctant to use public transport services to attend radiology appointments. Additionally, care homes often have residents that need imaging and will need patient transport and an escort in order to attend. This can mean even a simple chest x-ray results in the patient and escort being away from the care home for several hours which regularly leads to confusion and agitation for the patient. Therefore, if imaging can be performed within the resident's own room it can be carried out quickly and with little disruption. The patient may be calmer and more comfortable in more familiar and less intimidating surroundings, potentially resulting in higher quality images.

Jessica Brealey (RTF) NHCT
Trial Team Leader & Radiographer

KEY AIMS

- To evaluate the equipment for suitability of use outside of the hospital setting.
- To reduce the number of patient transport requests and department attendances.
- To assess the cost-effectiveness and safety of the service provision.
- To improve patient experience.

METHODOLOGY

The table below details the tasks completed within the preliminary and first two stages.

Preliminary Stage	Stage 1A	Stage 1B
• Medical Physics acceptance testing completed. • Radiographer assessment to evaluate potential safety issues, usability and image quality. • Applications training of senior radiology staff within the Trust Radiology Department.	• Implemented appointment system to provide a list at selected pilot sites. • Kept a log of all patient examinations and evaluation forms completed for image quality. • Completed patient experience surveys and gained feedback from staff at pilot sites. • Evaluated service and resolved issues as they arose.	• Trust IT, NHS Digital and Fujifilm team collaborated to connect Fujifilm Cloud solution to NFNT PACS to allow immediate off-site image transfer. • Established access to CRIS and PACS off-site to allow worklists and immediate image archive.

Jessica Brealey (RTF) NHCT
Trial Team Leader & Radiographer

PRELIMINARY PHASE

The preliminary phase began with Medical Physics Department testing to establish the safety and suitability of the equipment and to deliver feedback on the results to Fujifilm. Following completion of the acceptance tests, the focus moved to familiarising the Radiology Department staff with the **FDR Xair** system and its components, with the support of the Fujifilm applications team. Image evaluation was completed which determined the suitability and scope of use for the unit in phase 1. Local rules and employers' procedures, quality assurance programme and users guide were all created and agreed by the trust Radiation Protection Supervisor (RPS) and Medical Physics Expert (MPE).

The MPE completed an evaluation of the **FDR Xair** device, following which some adaptations were made to regulate the safe and effective use of the unit. This included removal of the exposure hand switch when not in use or in storage to avoid unplanned radiation exposures. A quality assurance (QA) regime was implemented, with daily and weekly checks to be completed after transportation of the unit.

Shockwatch® indicators, which can detect if an item has had a drop, were added to the storage case and x-ray tube. The case indicator registers 50G of force and the x-ray tube indicator registers 15G of force, alerting users to any potential drop damage to the **FDR Xair** device or D-EVO II detector. These values were determined by the force levels which could prompt a QA test to rule out any damage to the unit and its shielding.

Daily QA tests included a light beam diaphragm test and an EI copper filter test. Weekly QA included a shielding test; this involved making a series of exposures with each side of the tube facing the detector to observe if any radiation was leaking from the shielding. A QA record was completed on each day that the unit was in use to guarantee safe practice.

The primary care team was contacted to help select appropriate pilot sites and these were determined for phases 1 and 2. These included a GP practice which was chosen for its remote location in a small rural town, and two local care homes with dedicated GPs. Communication between the Radiology Department and the selected pilot sites was established in preparation for Phase 1.

PHASE ONE – STAGE 1A

Stage 1A involved attending the pilot sites with pre-registered patients on a suspended appointments list, negating the need for end-to-end off-site IT connectivity. Surveys were completed by the GP patients and the care home staff to gather feedback on the experience of patient pathways before and during the pilot to help establish the value of the community service. Stakeholder meetings were arranged to discuss the project and assess weekly progress. This also established good lines of communication between NHCT and NHSI for the duration of the trial. Risk assessments were carried out in each location by the Medical Physics Expert (MPE) to determine the safest procedure for radiation exposures in each community setting.

The GP remote access service was offered to those without access to a car, i.e. those who would use patient transport, public transport or rely on a lift from a friend or relative, in order to attend x-ray appointments. This pilot ran from the 25th August to 15th September 2020, attending the surgery once a week to test the efficacy of the service and gain feedback from both service users and staff at the site.

An evaluation of the service to identify any developing problems and allow changes to be made before moving onto phase 2 was completed by the trial team.

STAGE 1B

This involved preparing for phase 2 to begin. In order to do this, developing issues regarding IT connectivity were to be resolved. As the unit was being used off-site, the availability of CRIS and PACS was not accessible. This meant that phase 1 was limited to working from a hospital base and returning to the base in order to archive images to PACS. This prompted the proposal of connecting Trust PACS to the Fujifilm cloud-based solution; in theory this would give us access to Trust PACS and worklist from the RIS, from the **FDR Xair** system at any location using a mobile internet router. A collaboration of Trust IT, NHS Digital and Fujifilm was established in order to explore some of the practical challenges associated with this connectivity for phase 2. These items were completed and implemented and will be detailed in the Phase 2 report.

During phase 1, the **FDR Xair** system was used at a GP surgery for appointed routine patient imaging. It was also used for appointed patients at two care homes in the North East. The service was managed by the care home GP communicating a new x-ray request to the Radiology Department. We were then able to appoint the examination at the soonest availability by contacting the care home staff. This phase highlighted the need for off-site access to CRIS and PACS as well as immediate image transfer, which was developed later in the trial by Trust IT, NHS Digital, and the Fujifilm team.

Fig 2. **FDR Xair** unit on tripod stand detector

Fig. 3 – single carry case, displaying D-EVO II and Console Advance laptop

RESULTS

Image quality data was collected by a reporting radiographer assessment of images from the **FDR Xair** system and department images. These images were matched for body part and image projection to reflect clear comparisons. This evaluation was converted into a points system to quantify the image quality of each examination overall. The points system ranged from 0-17 with a score of 17 demonstrating maximum image quality.

Skeletal image evaluations were completed by three reporting radiographers from within the Radiology Department. This approach recognised the subjectivity of the evaluation and enabled us to create a mean average which increased data validity. The sets of data were then

compared to assess the difference in image quality when using a standard x-ray room compared to the **FDR Xair** system in a community setting.

A radiologist also evaluated a set of chest images from the **FDR Xair** unit and the Radiology Department.

Qualitative data which was collected during the study to analyse patient feedback during phase 1 allowed us to evaluate the impact on patient experience and whether the availability of off-site imaging was a valuable service to patients.

Table 1: Image Quality – Appendicular Skeleton

Case No.	Examination Type	*FDR Xair* unit Average	Department Average
1	Foot	16.5	17
2	Ankle	16	17
3	Ankle	16	17
4	Hand	15.5	15.5
5	Wrist	16.5	16.5
6	Shoulder	11.5	13.5
7	Shoulder	11	16.5
8	Shoulder	12	12.5
9	Elbow	13.5	17
10	Elbow	13.5	17
11	Pelvis	10	17
12	Knee	16.5	17
13	Knee	14	17
14	Thumb	16.5	16.5

Table 2: Image Quality – Chest Imaging

FDR Xair unit Case Number & Projection	Image Quality Score (out of 20)	Department Case Number	Image Quality Score (out of 20)
1 – PA	16	1 – PA	20
2 - PA	15	2 – PA	20
3 - PA	19	3 – PA	20
4 - PA	15	4 – PA	20
5 - PA	19	5 – PA	20
6 - PA	17	6 – AP	20
7 - AP	16	7 – AP	17
8 - AP	16	8 – AP	16

FDR Xair unit Average		Department Average	
PA	**AP**	**PA**	**AP**
16.8	16	20	17.6

DISCUSSION

Image Quality

The **FDR Xair** system produced diagnostic images for multiple areas of interest including chest imaging and the appendicular skeletal imaging. Image quality was variable dependent upon patient size and compliance. Caution is advised for larger patient or those unable to stay still as there is a risk of motion unsharpness due to increased exposure times as a result of the fixed mA of the **FDR Xair** device (5mA).

As the results show, images of far extremities such as hands and feet achieved a similar standard as department images. Image quality decreased when imaging the axial skeleton i.e. shoulder girdle and pelvis; caution is advised when imaging larger areas such as these. However, with more specific training on the **FDR Xair** system the image quality has improved.

The evaluation of chest images was a blind study to increase validity of the results. The radiologist commented on each chest from the **FDR Xair** device that the image was 'higher contrast' than previous imaging. In response to this we have altered the processing algorithm for chest imaging to reduce the contrast. Discounting differences in contrast, chest imaging

was of a similar standard to that produced within the department. Further evaluations will be carried out to analyse the effect of the adjustments made.

It should be noted that image processing is highly subjective according to radiologist and radiographer preference, and also that the Trust Radiology Department has previously never used Fujifilm x-ray systems.

Radiologist and reporting radiographer feedback from these evaluations indicated that more recent images showed a marked improvement in image quality compared to images taken earlier in the preliminary phase. We believe this to be the result of improved training and radiographer confidence in handling the **FDR Xair** unit. Further optimisation of images occurred throughout Phases 2 and 3 and will be further detailed in those reports.

Storage

We felt that the initial storage case provided for the **FDR Xair** system was too big and bulky for our requirements. Fujifilm therefore supplied two separate storage boxes and a fabric carry case, which is a much lighter weight solution to transport off-site and can be easily carried by one member of staff, but is not weatherproof.

A combination of two support stands catered for all required examinations – one on castor wheels and the other a tripod design. Some care is needed when using the tripod with the tube in a low position to ensure stability.

Radiographer feedback shows that the whilst the **FDR Xair** device is not as robust as a typical hospital use portable unit, it is user friendly and fit for purpose.

Connectivity

Phase 1 did not require remote IT connection as the unit and team returned to the hospital at the end of each day and the images uploaded directly to the Trust PACS.

IT connectivity with the Fujifilm cloud portal solution for subsequent phases presented some initial issues, predominantly associated with the creation of a VPN connection. These were resolved during phase 2, facilitating a connection to Trust PACS for reporting, to HSS CRIS for receipt of patient worklists and also connection to cloud based AI algorithms. The trial has given us valuable experience in this area and we will share our learnings to help streamline future setups which will be detailed in the Phase 2 report.

Patient Experience

The team received excellent patient feedback during the five weeks of this first phase and the service proved valuable to those with limited hospital access.

Feedback from care homes was very positive from staff and residents. Feedback suggested that the **FDR Xair** unit was far more tolerable for patients with dementia, as the equipment has a far less intimidating appearance with many reporting it to have the appearance of a 'large digital camera'.

Radiographers have also found the experience in care homes very rewarding as patients are more comfortable with this style of care compared to radiology within the hospital.

Value/ Cost Effectiveness

During this short pilot it was not possible to properly assess whether demand would justify fully staffing the service regularly and whether there was potential for a cost effective service with long term savings. We recommend the service to be more fully evaluated for demand levels and long-term value over an extended trial at other remote access sites. Further data will be made available in later phase reports where the solution was utilised in a number of different scenarios and patient pathways.

Staff Satisfaction

The radiographers selected for this trial were determined according to appropriate radiation protection training, clinical experience and competency sign offs.

Referring to Appendix 1, which shows an example of the questionnaire completed by the whole team of five senior radiographers on the use of the **FDR Xair** system, the feedback overall was very positive. The survey did highlight some minor concerns, for example the cleaning of the unit. The **FDR Xair** device has many parts and requires a lot more cleaning than a standard x-ray unit. However, the unit is not designed to be used as regularly as a standard x-ray room and can easily and safely be covered over when in use during high infection risk examinations.

The battery life was also a concerning factor from some radiographers; in response to this the unit was tested in the radiology department, attempting to replicate off-site use and was able

to produce 68 x-rays. We don't expect this to be an issue in normal usage if care is taken to ensure the equipment is only turned on when necessary.

Feedback also showed the the stands were not simple to assemble or use, although with more training and experience this has proved to be more of a learning opportunity than an ongoing issue. Further experience has allowed simpler and more informed decision making about which stand is best in a variety of scenarios and the easiest way to assemble them. It should be highighted that this is not normally something a plain film radiographer would think about or have to carry out. Therefore some additional problem-solving and skills training is required for this scope of practice.

Staff at the pilot sites also provided feedback, which mainly concerned the limitation of the service; it was highlighted that the team only attended the GP remote access site once a week which was not deemed a viable service as it was not always available when needed. The service could be extended depending on availability of staff, however within our Trust this was not a practical use of staff resources with the limited number of patients we received per day.

The concept of remote access imaging was proved and could be more suitable in other communities. The staff at the GP site also pointed out that the service did not cover all areas of the body, e.g. spinal and pelvic imaging, which further limited the availability of the service. Pelvic imaging will be developed as the trial continues, however the MPE has deemed that pelvic imaging using the **FDR Xair** system should only be done in emergencies. Again, development of this service was explored further in later phases of the trial and will be discussed and detailed in those reports.

RECOMMENDATIONS FOR THE FUTURE

- Pelvic imaging (AP only) should be feasible for patients of normal BMI or lower. This would require more training with the **FDR Xair** device in order to achieve consistency in terms of image quality and would have to be assessed dependant on the patient population in the community in which the unit is being used.

- The Cloud connectivity portal solution will enable the **FDR Xair** system to be more suited to its purpose as this will allow far more flexibility in the environment it can be used in and avoid delays in image processing.
- Potential use in acute settings such as availability for pre-hospital imaging as part of an ambulance service or call-out service for vulnerable patients. This is the provisional plan for Phase 3 of the trial.

CONCLUSION

Phase 1 was successful in that all of our aims were achieved.

The suitability of the unit for off-site use has been proved and evaluated with positive feedback from the radiography team – see Appendix 1.

The safety of the service has been evidenced through medical physics risk assessments and staff training within care homes concerning radiation safety. The unit has also been proven to be safe and effective for use by the radiography team following the appropriate training from the Fujifilm applications team and project team leader.

According to service user feedback from the remote access pilot site, we reduced the need for patients to use patient transport and public transport services. This is especially useful during the current Covid-19 pandemic.

In the care home setting, we have reduced the need for patient transport and alleviated staff pressures within the care home due to residents and staff having to self-isolate following a hospital visit.

Feedback shows this service has improved patient experience and service users are far happier to be seen at more convenient locations using this equipment.

The **FDR Xair** system could be valuable in adding resilience to community hospitals that no longer have an on-site portable machine but may need the occasional bedside examination. It would be useful in case of equipment failure at a community site radiology department with a single room to prevent complete loss of service until equipment is fixed.

APPENDIX

1. *Radiographer Evaluation of* FDR Xair *system*

	Excellent	Good	Average	Satisfactory	Poor	Comments
1. How good was the operator's manual?	x					
2. How good was the clinical applications training provided by supplier?	x					
3. Ease of use						
3.1 How do you rate the user-friendliness of use overall?	x					
3.2 How do you rate the ease of use of the acquisition software?	x					
4. Manual handling						
4.1 How comfortable is the system to use?	x					
4.2 How do you rate the weight of the X-ray tube system?		x				
4.3 How do you rate the weight of the detector	x					
4.4 How do you rate the weight of the stand?		x				
4.5 How do you rate the ease of assembling the stand?			x			
4.6 How do you rate the ease of attaching the X-ray tube to stand?			x			
5. Was the X-ray exposure time and kV acceptable?	Yes/No	Yes				If not, explain
6. Setting the radiographic views						
6.1 How do you rate the stability of the stand?	x					
6.2 How do you rate the visibility of the display?		x				
7. How adequate was the range of movements offered by the stand?		x				Tripod has limited movements and castor stand has limited height
8. Range of controls and indicators						Explain if no
8.1 Were all the expected controls present?	Yes/No	YES				
8.2 Were they easy to find and use?	Yes/No	YES				
9. How do you rate the time for an image to appear at the acquisition workstation?	x					
10. How do you rate the image handling and processing facilities at the acquisition workstation?		x				Working examination, ease of swap between protocols, for example
11. How would you rate the overall image quality of the acquisition workstation?		x				
12. How easy was it to transfer images to the reporting workstation or to a encrypted hard drive, for example?		x				
13. How easy was it to transfer work list/patient details from RIS to the system?	x					
14. What was your level of confidence in good results on the machine?	x					
15. Were there any potentially hazardous areas accessible to:						Explain if yes
a. you?	Yes/No	NO				
b. the patient?	Yes/No	NO				
16. Equipment cleaning						
16.1 Ease of cleaning the machine?				x		
16.2 Were clean instructions in the manual?	Yes/No	YES				
16.3 Does this meet the local infection control requirements?	Yes/No	YES				
17. Was all necessary patient and exposure data available on the image?	Yes/No	YES				
19. Did the digital X-ray system performance limit patient throughput?	Yes/No	NO				If yes, explain (for example, wait between exposures too long)
20. How do you rate the X-ray unit's battery life?			x			
21. How do you rate the detector battery life?	x					
22. Any additional comments on general imaging performance	N/A					

2. Radiologist Chest Image Evaluation

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Use the following letters as abbreviations when filling in the forms:

Positioning: Excellent (E), good (G), satisfactory (S), poor (P), or inadequate (I)
Contrast: Very high (VH), high (H), satisfactory (S), low (L), very low (VL)
Sharpness: OK or blurred
Image noise : OK or noisy
Suitability of image processing: Excellent (E), good (G), satisfactory (S), poor (P), or inadequate (I)
Diagnostic value: Excellent (E), good (G), satisfactory (S), poor (P), or inadequate (I)

Case Number & Exam Date	Exam	View used	Positioning	Overall contrast	Sharpness	Image Noise	Suitablity of image processing	Diagnostic value	Comments
488179 25/08/20	cxr	PA	G	H	OK	OK	G	**G**	MORE CONTRASTY THAN PREVIOUS
1013886 27/11/20	CXR	PA	E	S	OK	OK	E	**E**	GOOD
869955 27/11/20	CXR	PA	E	S	OK	OK	E	**E**	
998200 25/08/20	CXR	PA	G	H	OK	OK	G	**G**	DIGNOSTIC - OBVIOUS ABNORMALITY - BUT DETAIL IN LUNGS POOR
474031 25/08/20	CXR	PA	G	S	OK	OK	E	**E**	
828307 27/11/20	CXR	PA	E	S	OK	OK	E	**E**	
809405 27/11/20	CXR	PA	E	S	OK	OK	E	**E**	
1032135 01/09/20	CXR	PA	S	H	OK	OK	G	**G**	COSTOPHRENIC ANGLES MISSED OFF, QUITE CONTRASTY
583039 15/09/20	CXR	PA	G	S	OK	OK	E	**E**	
238431 27/11/20	CXR	AP	E	S	OK	OK	E	**E**	
38893 27/11/20	CXR	AP	G	S	OK	OK	G	**G**	
779071 15/09/20	CXR	PA	E	H	OK	OK	G	**G**	FEEL TOO CONTRASTY - DETAIL IN LUNGS LESS THAN ON PREVIOUS
1014115 03/09/20	cxr	AP	G	H	OK	OK	G	**G**	BIT TOO CONTRASTY
400564 27/11/20	CXR	PA	E	S	OK	OK	E	**E**	
53111 27/11/20	cxr	AP	s	S	OK	OK	G	**G**	
782556 15/10/20	CXR	AP	G	H	OK	OK	G	**G**	LUNGS QUITE CONTRASTY BUT OK

3. *Reporting Radiographer Image Evaluation*

Case Number	Exam	View used	Overall contrast	Sharpness	Image Noise	Suitability of image processing	Diagnostic value	Comments
72861 (1)	Foot Lt	DP + Obl	E	OK	OK	E	E	High quality images
78468 (2)	Ankle Lt	AP + Lat	E	OK	OK	S (E without artefact)	G	Several linear lines are seen on the AP image suspicious of processing/detector artefact. I do not feel this would have a significant negative impact on the ability to
215047 (3)	Ankle Lt	AP + Lat	E	OK	OK	S (E without artefact)	G	Artefact identical that that in the above patient is noted. It is demonstrated in both the AP and lateral views.
79742 (4A)	Hands + Wrists	Laterals	E	Blurred	OK	S (E without artefact)	G	The 1st metacarpal (right lateral) shows blurred coritcal margins suggestive of motion artefact.
79742 (4B)	Hands + Wrists	DP's	E	OK	OK	E	E	High quality images
896966 (5)	Wrist Lt	DP + Lat	E	OK	OK	E	E	High quality images
735423 (6A)	Shoulder Rt	AP	E	OK	OK	E	E	High quality imange
735423 (6B)	Shoulder Rt	Lordotic	G	Blurred	OK	G (E without artefact)	I	The acromial end of the clavicle is degraed by motion artefact. Detector artefact is demonstrated at the bottom of the image. It does impact the image in a significant
735423 (6C)	Shoulder Rt	Axial	G	OK	OK	S (E without artefact)	G	Detector artefact is noted. It does not significantly impact the diagnostic quality of the image
998291 (7)	Elbow Rt	AP + Lat	E	OK	OK	S (E without artefact)	G	Detector artefact is seen on both images. It is more evidenct on the lateral. It does not significant impact the diagnostic quality of the image.
886267 (8A)	Shoulder Rt	AP	E	Ok	OK	S (E without artefact)	G	Detector artefact is noted. It prominently affects the demonstrated left hemithorax. It is limited over the area of interest.
886267 (8B)	Shoulder Rt	Lat	E	Ok	OK	S (E without artefact)	S	Detector artefact is noted. It does not significantly impact the diagnositc quality. The image is perhaps a little underexposed; however, I feel positioning contributed to this (the image was repeated).
886267 (8C)	Shoulder Rt	Lat	E	Blurred	OK	E	S	The cortices are a little blurred possibly due to movement. No artefact is seen.
1005550 (9A)	Shoulder Lt	AP	E	OK	OK	S (E without artefact)	G	Detector artefact is noted. It does not have a significant impact on the image
1005550 (9B)	Shoulder Lt	Lat	E	Blurred	Ok	S (E without artefact)	I	The cortices are blurred likely due to movement. I note in this case there is a possitive finding which is demonstrated on this image; however, I feel if the finding was more subtle it may not be demonstrated. Detector artefact is again noted; it
837895 (10A)	Elbow Rt	Lat	E	Blurred	Ok	E	I	Cortical margins are blurred. This is likely due to movement artefact. A positive finding is noted; however, a more subtle finding could be missed.
837895 (10B)	Elbow Rt	AP	E	Ok	OK	E	E	High quality image
125609 (11)	Pelvis	AP	E	Ok	Noisy	E	S	The images are a little noisy
285585 (12A)	Knee Lt	AP	E	OK	OK	E	E	High quality image
285585 12B)	Knee Lt	Lat	E	OK	OK	E	E	High quality image
285585 (12C)	Knee Lt	Skyline	E	Blurred	OK	E	S	Slightly blurred cortices
285585 (12D)	Knee Rt	AP	E	OK	OK	E	E	High quality imnage
285585 (12E)	Knee Rt	Lat	E	OK	OK	E	E	High Quality image
285585 (12F)	Knee RT	Skyline	E	Blurred	Ok	E	I	Blurred image. Appears to be motion artefact
489016 (13)	Thumb Rt	AP + Lat	E	OK	OK	E	E	High quality images
239687 (14A)	Knee Lt	AP	E	Blurred	OK	E	I	Blurred AP view.
239687 (14B)	Knee Lt	Lat	E	Ok	Ok	S (E without artefact)	G	Detecor. It does not significantly degrade the diagnostic quality of the image

Use the following letters as abbreviations when filling in the forms:

Contrast: Very high (VH), high (H), satisfactory (S), low (L), very low (VL)

Sharpness: OK or blurred

Image noise : OK or noisy

Suitability of image processing: Excellent (E), good (G), satisfactory (S), poor (P), or inadequate (I)

Diagnostic value: Excellent (E), good (G), satisfactory (S), poor (P), or inadequate (I)

Summary: Number of images in each category for each examination

Examination	Excellent	Good	Satisfactory	Poor	Inadequate	Comments
Foot	2					High quality images
Ankle		5				Good images. Some of which are degraded by artefact
Hand	2					Good high quality images
Wrist	2	2				Good images. Some blurring is evident on one the lateral views (not the area of interest)
Shoulder	1	3	2		2	Most images are of good quality. Most seem to be affected by processing artefact. A couple of images
Elbow	1				1	One high quality image. The second image is unfortunately blurred
Pelvis			1			Image is of a satisfactory quality
Knee	4	1	1		2	One image demonstrated processing artefact as well as motion artefact. A skyline view also shows m
Thumb	2					High quality images

4. Pilot Site Feedback

(Some Feedback has been edited for confidentiality reasons)

GP SURGERY PILOT SITE

1) I understand you were keen for feedback regarding the radiology pilot at (Location). As far as I am aware this was only available for 2-3 weeks before being stopped due to low demand.

   I referred 2 patients from memory, one of which turned out to have a significant diagnosis as a result of his CXR done at (Location).

   The older patients I referred liked the idea of having their Xray nearby, but both would have been able to travel to alternative sites without too many problems.

2) The main benefit for us was convenience for patients, not having to travel as far. Essentially, I think that for the vast majority if they can get to (location) they can get anywhere, but closer is better. It worked well for a couple of CXRs that we benefitted from r/o consolidation at the time- in fact great for this.

   The downside is that for a service to work well for this reason it needs to be more constant for people to get used to using it i.e. every morning but we don't have the demand for this. Also, the ability to only do certain x-rays makes it a bit faffy- the more caveats there are to a service/less frequent/harder to use then the less likely it is to be used to full potential.

   Hope above does not sounds too negative, we were happy to be part of the pilot and if any further work comes from this then happy to be of help again,

   Thanks,
   (LEAD GP OF SURGERY)

5. Pilot Timeline

Date	**Action**
27/07/20	Unit arrived at North Tyneside General Hospital for Medical Physics Acceptance Testing. On-site Connectivity to RIS and PACS confirmed.
28/07/20 – 21/08/20	Department Imaging applications training commenced with senior radiography team for a variety of chest and extremities imaging.
31/07/20	Weekly NHS Improvement/NHS Digital/Fujifilm/Radiology Dept Meeting set up to discuss progress of trial and assist dept where necessary.
03/08/20	Primary Care Team contacted to identify suitable pilot sites
11/08/20	Stakeholders meeting with primary care and pilot sites to discuss trial. GP Remote Access site and two local care homes confirmed as pilot sites
14/08/20	Applications team left.
17/08/20 & 18/08/20	MPE and radiography team carried out Radiation Protection risk assessments of sites.
21/08/20	Quality Assurance schedule confirmed.
25/08/20	First Day at GP remote access site, applications and radiography team to attend
26/08/20	QA baseline figures confirmed by Applications and Trust Lead Radiographer.
01/09/20	Second GP site visit – Application team left team with unit. Only radiographers to attend.
03/09/20	First care home visit – CXR routine imaging
14/09/20	Meeting with ED and pre-hospital Consultant team to discuss potential for off-site imaging in the emergency setting - ?phase 3 project.
15/09/20	GP remote access site service stopped after 4 weeks due to low demand. Care home service to continue.
16/09/20	Care home patient visit – Knee OA imaging
27/09/20	Official Phase 1 End Date