

# **Countess of Chester Radiology Department Visit to Kisiizi Hospital**

**October 2011**

## **Report**

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# **Contents**

## **1. Introduction**

## **2. Aims**

## **3. X-ray Imaging**

### 3.1. Project Work Undertaken

3.1.1. Education program

3.1.2. Equipment

3.1.3. QA

3.1.4. Monitoring and Evaluation

### 3.2. Recommendations

## **4. Ultrasound Imaging**

## **5. Summary**

## **6. Appendices**

6.1. Reject Film Analysis Audit

6.2. Image Quality Audit

6.3. Feedback from Trainees

# 1. Introduction

On Friday 28<sup>th</sup> October the radiology department at the Countess of Chester Hospital began their 5<sup>th</sup> visit to Kisiizi Hospital in Uganda. The visit was part of a three year project which began in October 2009 and is funded by an IHLFS grant. The visit was for two weeks and the team members were

Tracy Hughes	Senior Radiographer/ Project Team Leader
Naomi Leadbetter	Senior Radiographer

## 2. Aims

The aims were to continue with the project plan set out in 2010.

- i. Extra equipment was to be taken out and installed
- ii. Various tutorials and practical teaching sessions were planned
- iii. The QA program was to be expanded.
- iv. Annual audit data would also be collected for monitoring and evaluation purposes.

## 3. X-ray Imaging

There have been no staff changes in the x-ray department since our last visit in April 2011. Ezra Turamureeba and Bennon Mshimire are progressing well with the education program. Benon was unfortunately only able to spend 5 days working with the team from Chester as he was required to work in an Ophthalmology Camp for the first week. It would have been more advantageous to arrange the visit when both radiographers were available. This should be taken into consideration when planning dates for future visits.

### 3.1. Project work undertaken

#### 3.1.1 Education Program

This education program has been written by the team members specifically for the needs of the two radiographers in Kisiizi to enable them to perform the whole range of examinations required. It is been delivered gradually over three years

PowerPoint presentations were given on radiographic technique and anatomy of the skull, facial bones mandible and OPGs. These were followed by practical teaching sessions. Pre prepared handouts of the tutorials were given to the staff and the work was also put on the department laptop

Tutorials were given on Radiographic Contrast Agents and Adverse Reactions to Contrast Agents. The importance of ordering the correct low osmolar, non ionic contrast was discussed to reduce risk of adverse reactions to patient having these types of examinations

An IVU protocol was written and discussed and the availability of appropriate emergency drugs whilst carrying out such a procedure emphasized.

The emergency drug box was checked and after discussions with pharmacy it was decided that the drug box contents and expiry date checks needed to be the responsibility of the radiographer. A system for recording this weekly was put in place.

The LMP protocol was discussed again and there is evidence in the record book that this is been adhered to. This protocol ensures that females of child bearing age are not irradiated unnecessarily when pregnant.

We had the opportunity to teach adapted technique on various types of examinations. Ideally more positioning pads are needed to help with this.

Radiation protection of the gonads during pelvic and abdominal examinations was discussed and gonad shields in various sizes were provided. Demonstration of the correct position for males and females was given. The adult size is broken and ideally should be replaced

During this visit it became apparent that the routine request for all acute abdomens is an erect abdomen no matter what the clinical indications are. It is known that this is not always the best examination and so a talk was given to the medical officers on when it is more appropriate to request supine abdomens, erect abdomens and erect chests. Dr Gabriel and Dr Denise were present and it was agreed that supine abdomen would be the standard request with erect abdo and erect chest ordered as extra views if necessary. A more detailed tutorial on Acute Abdomens would be beneficial for the next visit.

We went over IT skills with all the staff. Brenda and Proscovia have e-mail addresses and are proficient with the laptop. Benon and Ezra need more assistance. We suggested that they teach each other when time allows in the department. All the educational material, departmental protocols and photographs are on the department laptop. This will be added to on the next two visits to ensure that everything done on the project is available for future teaching and reference

### 3.1.2. Equipment

Most of the large equipment required has now been taken out or purchased by COCH or Kisiizi Hospital. A selection of accessory equipment was taken out this time,

Gonad Shields for radiation protection

Densitometry and sensitometry equipment to assist in monitoring the processor

Daylight marker cassettes to replace old damaged ones

Washable children's toys and stickers

More reference books to complement the teaching. It would be very useful to add a Radiology text book on normal variants and radiological appearances in tropical disease on the next visit

Sheets and pillow cases

The silver recovery unit is in good working order. On inspection there is silver collecting on the blades although not enough to recover yet. Mosses the hospital administrator is still researching selling the recovered silver in Uganda

The chest stand is becoming increasingly difficult to use. We discussed with Mosses the possibility of purchasing a new one with charitable funds from Carestream UK Ltd. It would have to be sourced in Uganda or imported as it is such a large heavy item. Moses will speak to Engineers or provide us with contact details to enable us to investigate. In the meantime the Kisiizi maintenance department fitted wing nut screws to make it more user friendly.

A digital camera is available to photograph x-ray images but the quality when sent via e-mail isn't good enough to report from. Sending them via a safe on line site may be a possibility which we will look into further.

The darkroom is still letting in small amount of white light through the door. A blackout curtain, track and door sealer would resolve this. The bulbs in darkroom need changing to 15watt next time as they are causing fogging so films have to be processed in complete darkness.

The 24 x 30 gridded cassette

is letting in light so a loose grid is needed to replace this. Ideally a box grid would be best. There is also a need for thicker lead for dividing images on films.

An inventory was done on all radiology stock both in the department and in the stores. All blue sensitive film is now in x-ray department leaving only green on the stock ordering system. Both types of barium sulphate and the correct Contrast Agent are now on stock ordering. An average usage of all supplies was calculated and given to stores to allow them to set a re-order of certain items to prevent things not been available when needed. We were able to link with the stock control project, led by Carolyn Faulkner from COCH as she travelled with us on this visit.

With the completion of a new theatre block it may be possible to support the installation of a c-arm image intensifier to aid orthopaedics and allow more complex operations to be performed. This would also allow fluoroscopy examinations to be done

Finally we checked all existing equipment and found it all to be in good working order.

### 3.1.3. QA

The QA program was set up in 2010 and has been built on each visit. It is a vital part of the working of the x-ray department ensuring that film quality remains consistently high and that radiation doses to patients and staff are kept as low as possible.

The screens in the cassettes were cleaned and department cleanliness, particularly keeping dust to a minimum, was discussed with Annette. Weekly and monthly records are kept to ensure this is kept up with.

Light beam diaphragm alignment tests were done on the X-ray machine and were found to be out of the recommended range. This needs to be altered by the service engineer on his next visit but action can be taken by the radiographers in the mean time to ensure examinations are coned adequately and avoid repeat examinations

The staff were taught how to do daily sensitometry and densitometry tests on the processor. Measurements are to be recorded over the next 6 months to establish accurately when to change the chemicals. This will reduce unnecessary doses to patients and reduce film and chemical wastage.

The film reject data was collected by the radiographers and recorded.

Adult exposure charts were added to and paediatric charts started

### 3.1.4. Monitoring and evaluation

There are 3 audits in progress at the moment. Annual data is collected during the October visits for the Image Quality Audit and the Ultrasound and X-ray Service Improvement Audits. Data is collected every 6 months for the Reject Analysis Audit.

#### Reject Analysis

This is one of the methods of self audit that the staff in Kisiizi are able to use and will continue to be done every 6 months as part of an on going QA program. It allows the staff to identify the main reason for their rejects and put measures in place to reduce them. The results from this period can be seen in appendix 1

#### Audit of image quality

The assessment of the quality of radiographs produced in Kisiizi is been measured in two ways. The assessment of image quality, radiographic technique audit will allow us to measure the improvements made through the education program whilst the assessment of image quality, exposure and processing audit will measure improvements made by introducing new equipment. Baseline data for this audit was collected on the first visit in October 2009, October 2010 and then again on this visit. The results can be seen in appendix 2

#### Audit of service improvement

Data on the numbers and types of x-ray examinations and ultrasound scans is being collected for this audit. Baseline data was collected on the first visit in October 2009, October 2010 and again this October 2011. The results will be available at the end of the project.

#### Feedback from trainees

All four members of staff from Kisiizi involved in the project wrote a short personal statement about the impact of the project on them, the department and the hospital in Kisiizi. These are attached in appendix 3

## 3.2. Recommendations

#### Objectives and Recommendations for Kisiizi staff

1. Radiographers to damp dust all electrical x-ray and ultrasound equipment weekly/Record in Qa file
2. Continue collection of rejects for analysis next time
3. Continue with the QA that has been started.
4. Research information for selling recovered silver in Uganda
5. Wide legged stool for skull and facial bone technique
6. Repair OPG machine
7. Check emergency drugs every Thursday and alert pharmacy to expiry dates.
8. Complete Paediatric and Adult exposure charts
9. Locate the missing books
10. Record densitometry results each day
11. Clean the screens in the cassettes every 3 months/Record in QA file

#### Objectives and Recommendations for COCH Staff

1. Acute abdomen tutorials for medics and clinical officers
2. Research C-arm for new theatre
3. Images of depressed skull #s
4. Research Urografen re-oral contrast
5. Tutorial on barium enemas
6. Calcaneum positioning lecture notes
7. Review densitometry data from previous 6 months
8. Research Lopomiro

## **4. Ultrasound Imaging**

Unfortunately we were unable to take a sonographer from COCH to Kisiizi due to staff shortages and so a full ultrasound report is unavailable.

Ultrasound staff in Kisiizi are Brenda kamwesigye and Proscovia Tumubwine. Proscovia has recently completed an ultrasound course in Kampala. She and Brenda now work full time. There is scope to run two ultrasound rooms and on this visit we took enough additional equipment to make this possible. A thermal printer is now available to use on the second scanner but unfortunately the freeze frame has broken. This needs to be looked at when the engineer comes to service the machines. Brenda has had a year's experience post qualification now and is competent at most examinations. She has requested tuition in muscular skeletal scanning and breast, testes and other small part scanning

Blinds were installed in both ultrasound rooms.

The portable ultrasound machine is back in the UK at the moment being repaired by GE. Hopefully this will go back out in the next couple of months

Money has been donated for a water filter to be purchased. This will make it easier to hydrate ultrasound patients. Proscovia is going to organise this.

It is vital that both ultrasound machines are serviced regularly if they are to remain working efficiently

## **5. Summary**

Again the visit was very successful and enjoyable. The staff and friends around Kisiizi made us feel very welcome.

The X-ray part of the project is doing very well and making good progress. The staff are working hard to learn all the new things that are been taught. They are enthusiastic and prepared to make changes to working practice to benefit the department and therefore the patients in Kisiizi. The interim audit work is evidence that improvements are consistently been made with each visit.

The staff in ultrasound are equally as enthusiastic but unfortunately COCH hasn't been able to support direct teaching on this visit. This will however be compensated for by bringing the sonographers to the UK for hands on experience. Proscovia is due to travel back with the team at the end of the visit along with Reverend Ezra. We hope they enjoy the visit to the UK and gain as much experience as possible.

Thank you to everyone who helped make this visit a success especially the five members of the radiology department, the management team, and all the family and friends that welcomed us into their homes.

We look forward to working together again soon

## 6. Appendices

### 6.1 Reject Film Analysis Audit

#### **Kisiizi Hospital, Uganda Reject Analysis Audit (6 Monthly) Period 3 April 2011 to October 2011**

##### Aim

To Audit and compare the film rejects from Period 3 with Period 2 and Period 1 to see if there have been any significant changes, since actions were put in place following the last Audit

##### Method

As before the reject films were collected from April 2011 to October 2011. The films were counted, analysed and put into the same 7 categories chosen for the last Audit. The information was recorded on the data sheets. We also counted the number of films used in the same period. This information was taken from the daily records book in the department.

##### Results 1

Period : 1	From: April 2010	To: October 2010
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<b>Cause</b>	<b>Total</b>
Technique	21
Patient Movement	4
Under Exposure	21
Over Exposure	9
Darkroom Faults (Fogging, Artefacts etc)	13
Processor Problems	3
Other	0
<b>Total</b>	<b>71</b>

Total films rejected    71

Total films used        1023

Rejected films as a percentage of films used    6.94%

Cost of films rejected this period    106,500 Ugandan Shillings  
(Using 1,500 average cost per film)



## Results 2

Period : 2	From: October 2010	To: April 2011
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Cause	Total
Technique	8
Patient Movement	0
Under Exposure	11
Over Exposure	8
Darkroom Faults (Fogging, Artefacts etc)	5
Processor Problems	3
Other	5
Total	40

Total films rejected 40

Total films used 1507

Rejected films as a percentage of films used 2.65%

Cost of films rejected this period 60,000 Ugandan Shillings

## Results 3

Period : 3	From: April 2011	To: October 2011
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Cause	Total
Technique	8
Patient Movement	2
Under Exposure	16
Over Exposure	5
Darkroom Faults (Fogging, Artefacts etc)	4
Processor Problems	3
Other	0
Total	38

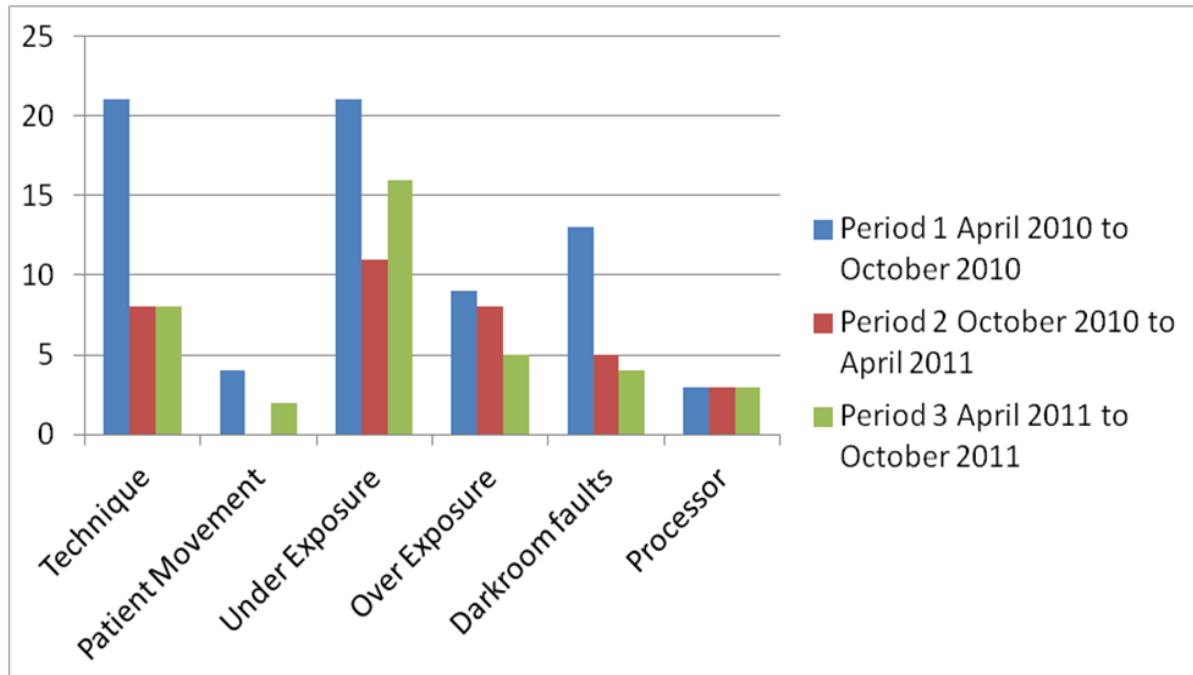
Total films rejected 38

Total films used 1392

Rejected films as a percentage of films used 2.73%

Cost of films rejected this period 57,000 Ugandan Shillings

# Film Reject Analysis Audit



- A total of 38 films were rejected in period 3 compared to 40 in period 2 and 71 in period 1
- Overall cost of rejected films is reducing in each period
- The number of rejects is reducing or staying constant in all the categories' except under exposed which has risen slightly
- Rejects due to technique errors remains the same
- Rejects due to overexposure have reduced
- Darkroom faults have reduced again
- Processor rejects have remained constantly low throughout the three periods

## Conclusions

The number of reject films is gradually reducing and therefore the cost. All categories have reduced with the exception of processor problems which remains the same and under exposure which has risen slightly. This indicates that there is still a problem with underexposed images. If the problem was radiographer error in selecting exposures then there would likely be a similar increase in over exposed films. This leads us to believe that the processor developer chemicals are still not being replaced as frequently as they should. Densitometry testing has been set up on this trip and if done correctly can accurately measure a reduction in speed of the processor. Measurements are to be taken daily for the next six months to see if this is possible to achieve.

## Actions

Rejects will continue to be collected and re audited in 6 months

## 6.2 Image Quality Audit

### **Kisiizi Hospital Uganda Film Quality Audit 2011**

#### Aim

The aim was to look at the image quality of radiographs produced in kisiizi in order to measure and record improvements.

We have identified two main areas to make improvements. The first by delivering an education program over 3 years to improve radiographic technique and the second by introducing new and more modern processing and photographic equipment.

#### Objectives

The objective was to design a program to collect comparable data every 12 months though out the duration of the project. This data would then be analysed and used to measure where and if any improvements had been made. Appropriate action could then be taken.

#### Potential Problems

Radiographs are not stored in Kisiiz but are given to patients to take away with them. This means that films can only be assessed for quality when we visit and have to be done as each patient is x-rayed. We therefore only use a small sample of assessed films. Also the assessment is done by a radiographer from COCH and is subjective

#### Method

We assessed all films taken over 7 working days in October 2009 and again 7 working days in October 2010. Each examination was assessed twice once for its technical quality and again for its processing quality. A score of 1 to 4 was given for each film

Poor	1
Okay	2
Good	3
Very Good	4

The data was then collected and analysed

2009	- 45 examinations were assessed
2010	- 40 examinations were assessed
2011	- 42 examinations were assessed

## Results

### October 2009

#### **Image Quality – Technique**

Poor - 1	Okay - 2	Good - 3	V Good - 4	Total
16	15	14	0	45

Total score **88**

Average Quality score for each film assessed **1.955**

#### **Image Quality – Processing**

Poor - 1	Okay - 2	Good - 3	V Good - 4	Total
23	10	12	0	45

Total score **79**

Average Quality score for each film assessed **1.755**

### October 2010

#### **Image Quality – Technique**

Poor - 1	Okay - 2	Good - 3	V Good - 4	Total
3	7	17	13	40

Total score **120**

Average Quality Score for each film assessed **3**

#### **Image Quality – Processing**

Poor - 1	Okay - 2	Good - 3	V Good - 4	Total
4	4	21	11	40

Total score **119**

Average Quality score for each film assessed **2.975**

### October 2011

#### **Image Quality – Technique**

Poor - 1	Okay - 2	Good - 3	V Good - 4	Total
0	4	14	24	42

Total score **146**

Average Quality score for each film assessed **3.48**

#### **Image Quality – Processing**

Poor - 1	Okay - 2	Good - 3	V Good - 4	Total
0	1	12	29	42

Total score **154**  
Average Quality score for each film assessed **3.66**

## Improvement of Quality of films from 2009 to 2010

Technique **53%** Improvement  
Processing **69%** Improvement

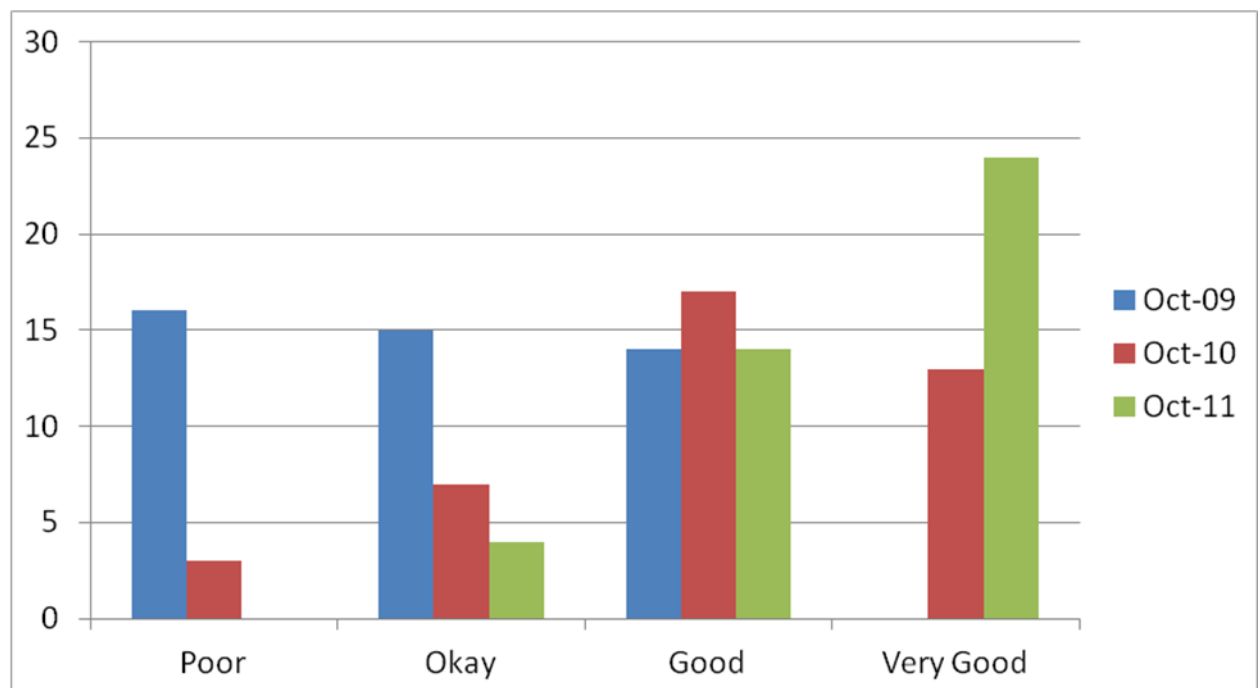
## Improvement of Quality of films from 2009 to 2011

Technique **78%** Improvement  
Processing **108%** Improvement

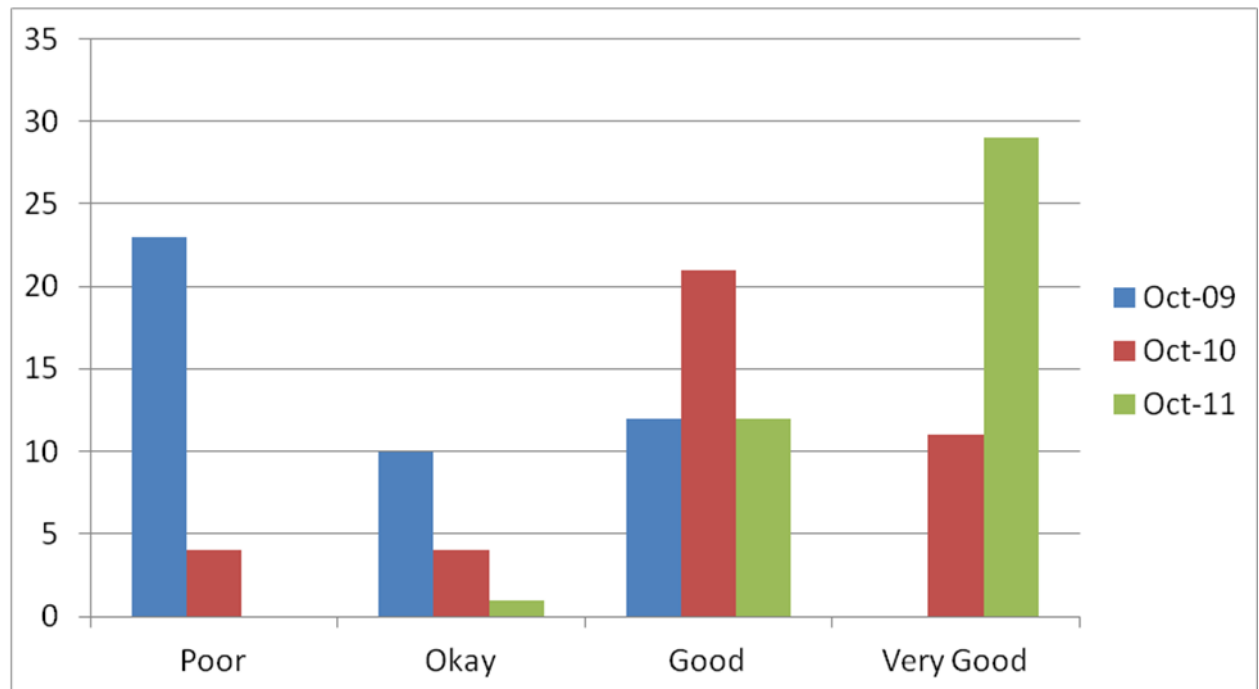
## Overall Image Quality

	Poor	Okay	Good	V Good	Total
2009	19.5 (43%)	12.5 (28%)	13 (29%)	0 (0%)	45
2010	3.5 (9%)	5.5 (14%)	19 (47%)	12 (30%)	40
2011	0(0%)	2.5(5.95%)	13(30.95)	26.5(63%)	42

# Film Quality Audit (Technique)



# Film Quality Audit (Processing)



## Conclusion

In 2009 most of the images were technically poor quality and none were very good. This was also the case for the quality assessment of the processing of the films. When audited in 2010 most of the images were good and only 9% were classed as poor. The technical quality of the assessed films had improved by 53% and the processing of the films had improved by 69%. When audited again in 2011 the quality of images had improved significantly again, technique by 78% and processing by 108%. These audits are demonstrating a trend year on year of steady improvements. This is a clear indicator that the Radiology Project is having a positive impact on the quality of images produced in Kisiizi. This is almost certainly down to the current education program and the introduction of new processing equipment.

## Actions

Final audit to be done in October 2012

## 6.3 Feedback from Trainees

### 1. Reverend Ezra Turyamureeba



#### Reverend Ezra Turyamureeba

I work as radiographer in Kisiizi hospital. I have worked in this department for over 10 years. I thank God so much for the link and partnership between Countess of Chester and Kisiizi hospitals. As an individual, I have benefited from this link since the team of radiographers from Chester started visiting Kisiizi. I have learnt many more new techniques and skills in the department and now I am confident on my work. They have even brought some new equipments, automatic processor for example and many others. Thank you very much for allowing me to pay a visit to Chester which I am yet to start in 4 days time.

At the level of the hospital, a lot of changes have come and for that matter many patients are referred to Kisiizi from the health centres and even hospitals of this region. Therefore I pray to God almighty to strengthen this link with cords that cannot get broken.

Thank you very much.

10/11/2011

## 2. Benon Musiimire



Benon Musiimire

My names are Musiimire Benon Kikafunda. I joined the institution 1987 and now working as radiographer / ophthalmic assistant. I have served Kisiizi hospital for a long time serving in radiology and eye departments. Work in radiology formally was going on well but the quality of images after evaluation would not be good as such. Simply because the system used was manual and blue sensitive films were being used which would also need higher exposure factors which would in order to make fair quality of images.

Special thanks go to the Countess of Chest and Kisiizi hospital administration for the link / partnership created.

This has helped the department to develop more, most especially on provision of new cassettes, automatic processor, name marker machine, densitometer, to name but a few.

More to that for the sending of radiographers led by Tracy, Mark etc. The above mentioned people have done a great worker in the department, more especially o the side of training me and my co-worker. We have gained much experience and developed our skills in different fields.

I conclude by request you to keep this partnership with Kisiizi hospital.

11/11/2011



### 3. Brenda Kamwesigye



Brenda Kamwesigye

My name is Brenda Kamwesigye and I am a radiographer and sonographer at Kisiizi hospital. The project has helped improve a lot of things at Kisiizi.

The COCH – Kisiizi radiology project has improved and widened my knowledge in scanning which has in turn helped me build my confidence in the service I provide, improve the accuracy in diagnosing and also widened the range of service the hospital provides. For example; musculoskeletal scanning, small parts scanning and the use of Doppler in diagnosing.

It has provided updated knowledge about the best techniques to apply in order to obtain the best diagnostic images in some body regions, like abdomen and chest. More information on how to obtain the best images and minimise wastage of resources has also been provided.

It has improved the health and safety of both radiology staff and the general hospital by providing information on how to ensure that personal and public safety through lectures on waste management, patient handling and radiation protection.

It has helped provide equipment and services, an ultrasound machine, a new processor, new cassettes, face masks and storage units.

Improved the working conditions in the Kisiizi hospital radiology department like new floors, comfortable furniture and new lights.

Improved image quality like the new cassettes, anatomical markers and automatic processor.

Improved health and safety like new sinks, face masks, gloves and aprons.

Improved radiation protection like more lead aprons, gonad shields and warning signs.

They have educated and provided facilities for clinicians to interpret x-rays by providing tutorials on x-ray interpretation and viewing boxes at accessible points in the hospital.

In conclusion, this project has improved radiology services at Kisiizi hospital, improved health knowledge of both radiology staff and clinical staff at Kisiizi and provided equipment that has increased the range of radiology services that the hospital can provide. I would therefore like to say thank you to all the COCH staff who have done everything to enable this project to continue for all this time and to everyone who has had a contribution in this project that has helped save some lives and improve health services at Kisiizi hospital. Thank you very much.

11/11/2011

#### 4. Proscovia Tumubwine



Tumubwine Proscovia

I am a female Ugandan aged 30 years. I have been working in Kisiizi hospital since 2008.  
Achievements since Kisiizi / COCH NHS link project started;

1. I have been trained as a sonographer
2. The radiology department was expanded.
3. New Ultrasound machines.
4. Support from Chester radiology department and continued education.
5. Hopefully this weekend I have a trip to the UK for the first time.
6. I have made friends and hope to make many more.
7. Financial support as our trip has been funded.

And many more.  
God bless you.

10/11/2011



Ezra and Tracy assessing films



Enjoying banana break



Ezra positioning a patient



IT Skills



Annett washing the laundry



Portering patients to the department





Naomi giving a facial bones tutorial



Difficulties in getting patients to x-ray



Mandible technique practical



Proscovia, Brenda and Tracy researching



Proscovia with the Logic 9 Scanner



Catching up on paper work



Annett proud of her clean department



Sonographers Brenda and Proscovia



Checking Emergency Drugs



Practicing using lead gonad shields



Ezra and Proscovia begin the visit to COCH



The Team - a sad farewell