



Impacts to diagnostic procedures and treatment as a result of Catheter Laboratory staff being multi-skilled after completing the Graduate Certification in Adult Cardiac Catheter Practice

Year 2 Evaluation Report

CL2264



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EXECUTIVE SUMMARY

Rationale for the Catheter Laboratory Practitioner

The aim of the Catheter Laboratory Practitioner is to resolve the problems arising from a shortfall in Cardiac Physiologists, Nurses and Radiographers by increasing the size and flexibility of the non-medical workforce by achieving a new multi-skilling role - the Catheter Laboratory Practitioner.

The Catheter Laboratory Practitioner is trained to undertake specific aspects of a Nurse, Radiographer and Cardiac Physiologist role within elective and emergency cardiac angiography and angioplasty procedures.

The formalised name of the role, Catheter Laboratory Practitioner, was introduced through the development of the job specification. The job specification detailed the competencies required for the role and the activities the Catheter Laboratory Practitioner was expected to carry out. This was accepted by the Department of Health (DOH) Agenda for Change

Aims of the evaluation

The aim of evaluation was to:

- Understand the impact of students' new knowledge and skills on diagnostic procedures and treatment as a result of completing the Graduate Certification in Adult Cardiac Catheter Practice;
- Understand the extent to which the Catheter Laboratory Practitioner was being utilised within hospitals and the barriers to utilisation of these new skills;
- Identify good practice in the implementation and management of the Catheter Laboratory Practitioner.

The evaluation has run from October 2009 to March 2011, covering four cohorts of students. At the time of reporting one cohort of students had completed the Graduate Certification in Adult Cardiac Catheter Practice.

Impact of the Catheter Laboratory Practitioner

The evidence indicated that the Catheter Laboratory Practitioner could help resolve the problems arising from a shortfall in Cardiac Physiologists, Nurses and Radiographers, through increasing staff flexibility. This was because the Catheter Laboratory Practitioner could be utilised as a Nurse, Radiographer or Cardiac Physiologist, which could help hospitals cover staff shortfalls. Moreover, the evidence indicated that the number of staff required to conduct an angiogram and angioplasty could be reduced from five to four. This was because opportunities for multitasking and cross-disciplinary working during a procedure could be increased when a team of Catheter Laboratory Practitioners was utilised.

Flexibility could therefore help hospitals who wish to:

- maintain current levels of service despite being unable to fill vacant Catheter Laboratory staff posts
- increase levels of service without increasing the size of the non-medical workforce

- maintain current levels of service but are required to reduce the size of their non-medical workforce.

Flexibility also had two additional benefits.

It could help increase laboratory utilisation, when laboratory downtime was due to shortfalls in resource. The Catheter Laboratory Practitioner could replace either a Nurse, Radiographer or Cardiac Physiologist and in turn provided the hospital with an opportunity to process more cases.

Staff flexibility was also thought to have the potential to help hospitals introduce certain services, mainly Primary Percutaneous Coronary Intervention (PPCIs), opening a new Catheter Laboratory and introducing a 24 hour service. This was because the Catheter Laboratory Practitioner(s) provided a solution to help manage the unpredictability in resource demand, introduced by these new services.

However, the evidence indicated that the best way to achieve these benefits was for a hospital to train at least two Catheter Laboratory Practitioners, with a focus on developing a team of Catheter Laboratory Practitioner(s).

Implementation and utilisation of the Catheter Laboratory Practitioner

Based on the evidence from Oct 2009 to March 2011 implementation and utilisation of the Catheter Laboratory Practitioner, was unplanned and ad-hoc, with the Catheter Laboratory Practitioner only being utilised when needed to cover staffing shortfalls. This meant that hospitals were unlikely to realise the full benefits of the Catheter Laboratory Practitioner.

This level of utilisation was caused by inadequate change management, which can lead to three key barriers, staff restrictions, trust restrictions and lack of understanding of the Catheter Laboratory Practitioner role. Moreover poor implementation and utilisation could lead to competence degradation which could have a significant impact on patient safety.

Recommended practice to enhance implementation and utilisation

A few hospitals fully utilised the Catheter Laboratory Practitioner. This was achieved through the implementation of certain change management processes. Examples of this included:

- development of a business case
- job specification and job plan
- education packages
- competence development and management of the Catheter Laboratory Practitioner.

However the evidence indicated that these processes were not introduced all together as part of a wider holistic management of change program. For example, one hospital introduced a job specification, business plan and job plan while another introduced the education package and competence management system.

A change management model has therefore been proposed for hospitals. The model consists of the following stages:

- understanding requirements
- assessment of risk
- management commitment

- involvement and communication
- measurement
- sustain and embed.

Using this model can help hospitals to structure the implementation of the Catheter Laboratory Practitioner and incorporate good practices currently being implemented by several hospitals.

Finally this evaluation recommended that:

- The British Heart Foundation develop additional training and advice in change management
- the concept of the Catheter Laboratory Practitioner is re-launched as part of a wide management of change initiative.



Impacts to diagnostic procedures and treatment as a result of Catheter Laboratory staff being multi-skilled after completing the Graduate Certification in Adult Cardiac Catheter Practice

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1 INTRODUCTION

1.1 Rationale for introducing the Catheter Laboratory Practitioner

The aim of the Catheter Laboratory Practitioner is to resolve the problems arising from a shortfall in Cardiac Physiologists, Nurses and Radiographers by increasing the size and flexibility of the non-medical workforce by achieving a new multi-skilling role - the Catheter Laboratory Practitioner. In addition the multi-skilling role aims to facilitate an improvement in Catheter Laboratory performance, especially in respect of laboratory availability, patient experience and treatment times as well as to enhance staff retention.

The Catheter Laboratory Practitioner is trained to undertake specific aspects of a Nurse', radiographer's and cardiac physiologist's role within elective and emergency cardiac angiography and angioplasty procedures.

To achieve this, the Graduate Certificate in Adult Cardiac Catheter Laboratory Practice is undertaken to become a Catheter Laboratory Practitioner. The Graduate Certificate in Adult Cardiac Catheter Laboratory covers three main competences: diagnostic imaging, patient management and cardiac physiology and is intended for Nurses, Radiographers and Cardiac Physiologists who work in Cardiac Catheter Laboratories.

1.2 Aims of the evaluation

The aim of evaluation was to analyse, measure and understand the impact of students' new knowledge and skills on diagnostic procedures and treatment as a result of completing the Graduate Certification in Adult Cardiac Catheter Practice. Specifically the evaluation focused on:

- assessing the change in Cardiac Catheter Laboratory services as a result of introducing multiskilled workers into a Cardiac Catheter Laboratory setting
- assessing the impact on NHS Trusts that have multi-skilled staff as a result of course completion
- assessing the impact on cardiac patients
- identifying potential improvements and impacts on students' work and careers after they have completed the course
- identifying the extent to which the Catheter Laboratory Practitioner was being utilised within hospitals and the barriers to utilisation of these new skills
- identifying good practice in the implementation and management of the Catheter Laboratory Practitioner.

The evaluation has run from October 2009 to March 2011, covering four cohorts of students. At the time of reporting one cohort of students had completed the Graduate Certification in Adult Cardiac Catheter Practice.

1.3 Purpose of this document

The purpose of this document is to present the findings from the evaluation into the impacts to diagnostic procedures and treatment as a result of Cardiac Catheter laboratory staff being multi-skilled after completing the Graduate Certification in Adult Cardiac Catheter Practice, commissioned by the British Heart Foundation and conducted by Greenstreet Berman Ltd.

2 METHOD

2.1 Rationale

The original method proposed by Greenstreet Berman and agreed by the BHF focussed on:

- gathering quantitative performance data and qualitative patient experience information from Cardiac Catheter Laboratories who sent students on the course (experimental group)
- acquiring a baseline measure against which to compare performance and patient experience after students had completed the course
- gathering the same performance and patient experience data from Cardiac Catheter Laboratories who had not sent students on the course in the UK (control group).

The use of the experimental and control group meant a before and after analysis would be undertaken to identify observed changes in Cardiac Catheter Laboratory performance and patient experience and determine the extent to which any observed changes could be attributed to introducing Cardiac Catheter Laboratory staff who are multi-skilled after completing the course.

This quantitative data was to be supplemented with qualitative information from Catheter Laboratory Managers and students who had completed the course to understand why these impacts had occurred.

As the project progressed the evidence indicated that implementation and utilisation of the Catheter Laboratory Practitioner was low. For example from the 14 hospitals where students had completed the course (cohort 1) only two hospitals were utilising the Catheter Laboratory Practitioners fully, with nine hospitals partially utilising the Catheter Laboratory Practitioner.

The pre-requisite for the before and after comparison of performance and patient experience, was for all hospitals to be fully utilising the Catheter Laboratory Practitioner, after course completion.

The observed level of utilisation at the time of reporting (March 2011) meant that a before and after performance comparison could not be carried out.

The observed level of utilisation indicated that hospitals that were looking to implement the Catheter Laboratory Practitioner required support in respect of:

- understanding the key benefits the Practitioner can bring
- the barriers that need to be overcome to utilise the Catheter Laboratory Practitioner
- best practice approaches to change management that can help hospitals ensure effective implementation and utilisation of the Catheter Laboratory Practitioner.

The method therefore re-focused on the identification and description of:

- perceived and where possible actual benefits of introducing the Catheter Laboratory Practitioner, using predominantly qualitative information, due to low levels of utilisation and where possible available quantitative performance data
- barriers that affect the implementation and utilisation of the Catheter Laboratory Practitioner, categories of implementation levels and the affect this could have on hospitals;

- Good practice approaches undertaken by hospitals who have successfully implemented the Catheter Laboratory Practitioner along with the perceived benefits these practices have brought.

This evidence allowed judgements to be made on how the Catheter Laboratory Practitioner could affect service provision and patient care, how hospitals could enhance the utilisation of the Catheter Laboratory Practitioner and how the British Heart Foundation and other relevant partners could support hospitals to effectively implement and utilise the Catheter Laboratory Practitioner.

2.2 Methods of data collection

To achieve the redefined aims and focus of the method the following data collection methods were used (appendix A):

- **Quick fire questions.** Cardiac Catheter Laboratory managers were asked a set of “quick fire” questions over the phone (appendix B) focused on understanding the level of utilisation of the Catheter Laboratory Practitioner and relevant impacts.
- **Myocardial Ischaemia National Audit Project.** Data from this project was collected that provided the recorded “door-to-balloon” timeframe of Primary PCIs (PPCI) for all hospitals, across the UK for 2007 to 2010. This allowed a comparison of PPCI door-to-balloon times between control and experimental group to help understand if the control and experimental group differed in terms of “door-to-balloon” time and whether there was potential for the Catheter Laboratory Practitioner to affect improvements in “door-to-balloon time”.
- **Data request.** Performance data was sought using a data request form (appendix C). This was used to help understand if the control and experimental group differed in terms of angiogram waiting times and “door-to-balloon” times and whether there was potential for the Catheter Laboratory Practitioner to affect improvements in these areas.
- **Patient experience.** This data was gathered using a patient experience questionnaire (appendix D) to see if patient experience differed between the experimental and control group and to understand whether it was possible for the Catheter Laboratory Practitioner to affect patient experience.
- **Cardiac Catheter Laboratory Manager interview** (appendix E). This was used to understand what the managers felt were the main benefits of the Catheter Laboratory Practitioner and the barriers to implementation.
- **Catheter Laboratory Practitioner on-line questionnaire and interview** (appendix F & G). This was used to understand levels of implementation, what Catheter Laboratory Practitioners felt the impact on service and patient care was and the barriers they had encountered.

- **Site visits** (appendix H). These were carried out to understand how hospitals were planning to implement the Catheter Laboratory Practitioner, the practices being implemented to enhance utilisation and the challenges that hospitals faced. Observations of angiograms and angioplasties were undertaken with (experimental group) and without (control group) a Catheter Laboratory Practitioner to develop high-level process maps of the procedures and help qualitatively assess how the Catheter Laboratory Practitioner could change Cardiac Catheter Laboratory practice and the potential benefits this could bring.

2.3 Methodological considerations

It should be noted that due to the low levels of implementation and utilisation of the Catheter Laboratory Practitioner the original data request form was not fully utilised across the project. The main purpose of the tool was to gather quantitative baseline data for the originally proposed “before and after” comparison of performance, which as stated was no longer viable. Moreover, the Myocardial Ischaemia National Audit Project provides more accurate performance data.

Also the patient experience questionnaire was not fully utilised across the project. Firstly its original purpose was to gather baseline data for a “before and after” comparison. Secondly it was highlighted by hospitals and other partners that, from the patient perspective, they would be unable to determine if they were treated by a team with a Catheter Laboratory Practitioner. Hence they could not provide feedback on the impact that Catheter Laboratory Practitioner had on their experience.

Instead Catheter Laboratory Practitioners and their managers were asked to provide information on what they judged were the benefits of the Catheter Laboratory Practitioner on patient experience.

Finally the overall sample for the project size was small. This was because few hospitals were fully implementing the Catheter Laboratory Practitioner and only one cohort of students finished the course at time of reporting. This meant that the maximum sample size for hospitals that had employed a Catheter Laboratory Practitioner was 14 hospitals and 17 students.

This means that caution needs to be taken in drawing conclusions from the evidence base, particular with reference to generalisation across the NHS.

The evidence base indicates the potential, rather than actual benefits the Catheter Laboratory Practitioner brings to performance and care. The evidence has allowed qualitative judgements to be made based on consideration of changes in Catheter Laboratory practice, to indicate where the Catheter Laboratory Practitioner will have the most impact on performance and patient care and why.

Moreover, the evidence base provides detailed information to help the BHF and their partners make strategic decisions on how to support hospitals implement the Catheter Laboratory Practitioner and enhance the utilisation. Indeed the evidence base will also help hospitals implement best practice to enhance their implementation and utilisation of the Catheter Laboratory Practitioner.

3 CHANGES IN LABORATORY PRACTICE AND IDENTIFIED BENEFITS

3.1 Overview of findings

Evidence was gathered from a spectrum of impact indicators (Table 1).

Table 1 impact indicators

Impact indicator grouping	Example impact indicator
Patient experience	Care and communication
Performance	Waiting time and door-to-balloon time Cancellations and postponements Out of hours response
Productivity	Turnover of cases Laboratory utilisation Offering of new services
Staffing	Staff flexibility Turnover of staff and vacancies Promotional prospects

This evidence base was analysed to identify which impact indicators the Catheter Laboratory Practitioner had the greatest potential to influence and how this occurs through qualitative changes in Catheter Laboratory practice.

Based on the evidence it can be concluded that the introduction of the Catheter Laboratory Practitioner can have an impact on the following, through qualitative changes to working practice:

- **Patient experience**, through enhancing communication of procedures and activities. That is, through a developed holistic knowledge of the roles, the Catheter Laboratory Practitioner was better able to explain more clearly to the patient the procedure and answer any questions, which could have a positive impact on patient stress and anxiety. This impact was dependent on the operational role the Catheter Laboratory Practitioner was working in and the condition of the patient.
- **Cancellations/postponements caused by resource management**. The introduction of Catheter Laboratory Practitioner could help reduce the risk of cancellations or postponements caused by gaps in resource, as the Catheter Laboratory Practitioner could replace either a Nurse, Radiographer or Cardiac Physiologist. However it was reported that the occurrence of cancellations or postponements caused by resource gaps was uncommon, reducing the impact of this benefit.
- **Collaboration and communication amongst Laboratory staff**, through the improved holistic understanding of the role. This impact was dependent on the number of Catheter Laboratory Practitioners employed.

- **Turnover of cases**, in that the Catheter Laboratory Practitioner could help increase laboratory utilisation, when laboratory downtime was caused by resource management, by replacing either a Nurse, Radiographer or Cardiac Physiologist.
- **Introduction of new services**, mainly in the form of primary PCIs, opening a new Catheter Laboratory and introducing a 24 hour service. The Catheter Laboratory Practitioner helped provide the staffing flexibility needed to introduce these services,
- **Promotion prospects and career development**, as becoming a Catheter Laboratory Practitioner increased knowledge and skill. This impact was dependent on the development of a job specification.
- **Staff vacancies**, in that the Catheter Laboratory Practitioner could be utilised as either a Nurse, Radiographer or Cardiac Physiologist, providing an extra level of resource.
- **Staffing requirements**, in that the introduction of the Catheter Laboratory Practitioner could help reduce the number of people required to complete angiograms and angioplasty, from five to four. This was achieved through increased multitasking and cross disciplinary working.
- **Staff flexibility** as the Catheter Laboratory Practitioner could be utilised as either a Nurse, Radiographer or Cardiac Physiologist within the laboratory. This would therefore reduce the resource management constraints for hospitals associated with ensuring that the roles relating to patient management (Nursing), diagnostic imaging (Radiographer) and Cardiac Physiologist were undertaken only by individuals from those disciplines.

This following provides a detailed consideration of the evidence, broken down by impact indicator.

3.2 Patient experience

3.2.1 Overview

The evidence suggested that the Catheter Laboratory Practitioner could have limited impact on patient experience, mainly in the area of communication. That is, through a developed holistic knowledge of the roles, the Catheter Laboratory Practitioner was better able to explain more clearly to the patient the procedure and answer any questions. However this impact could only be realised during specific aspects of the procedure. Moreover, realisation of this impact was also dependent on the operational role the Catheter Laboratory Practitioner was working in and the condition of the patient. That is, the patient may not be in a condition to receive the information being communicated, while a Catheter Laboratory Practitioner carrying out a Nurses role was likely to have more opportunity to communicate with the patient during a procedure than a Catheter Laboratory Practitioner operating in the Cardiac Physiologist or Radiographer role.

3.2.2 Consideration of evidence

Care and communication

From the perspective of the Catheter Laboratory Manager the introduction of the Catheter Laboratory Practitioner appeared to have a limited impact on patient experience. For example seven out of 27 hospitals in the experimental group (26%), who responded to the quick fire questions, referred to patient experience as an impact (or anticipated impact) of utilising the Catheter Laboratory Practitioner. Four out of six (67%) Catheter Laboratory Managers, who took part in an interview and were utilising the Catheter Laboratory Practitioner in some form, reported that the Catheter Laboratory Practitioner had made 'no improvement' to patient experience.

A commonly held belief amongst this group was that the patient would be unaware of the Catheter Laboratory Practitioner and therefore from the patient perspective the change in practice would go unnoticed and hence patient experience would not get worse or better. Example responses included:

“Staff always introduce themselves to the patients in the role they will be undertaking during the procedure”;

“There should be no impact on the patients as they should know no different”;

“Patient experience should get no worse as a bare minimum”.

However, from the perspective of the student, their introduction as a Catheter Laboratory Practitioner did have a positive effect on patient experience. For example, five out of the seven (71%) students who completed the on-line questionnaire and were being utilised in some form as a Catheter Laboratory Practitioner, believed becoming a Catheter Laboratory Practitioner had enabled them to deliver better patient care, with four out of eight (50%) students who took part in an interview and were being utilised as a Catheter Laboratory Practitioner, believed they were able to deliver better patient care.

The underpinning reason for this appeared to be the enhanced understanding of the other roles and tasks carried out within the Cardiac Catheter Laboratory setting (Cardiac Physiology, Diagnostic Imaging and Patient Management) developed through the training to become a Catheter Laboratory Practitioner. This level of knowledge, allowed the Catheter Laboratory Practitioner to better explain to the patient the procedure and treatment they were to receive, which in turn had the potential to reduce levels of anxiety and enhance care. Example quotes included:

“...Explain the whole procedure to the patient and answer any queries they may have”;

“It relaxes the patient if all the information comes from one person in the lab, particularly those patients who are very sick or primary cases as they can focus on one voice”.

Indeed 33%, two out of six Catheter Laboratory Managers who took part in an interview and were utilising the Catheter Laboratory Practitioner in some form felt that patient experience could be improved through enhanced communication. Expanding on their responses, it was stated that the Catheter Laboratory Practitioner provided:

“Improved patient experience as able to explain elements to the patient which fall outside of their usual role”.

“The patient with a better overview of all aspects of procedure”.

However observations and evidence from the cases studies highlighted that the ability to improve patient care through better communication was dependent on two factors.

Firstly, the condition of the patient. In some cases the patient may be in a condition that impairs their ability to comprehend the information being provided and hence enhanced communication may have little impact on their experience.

Secondly, the sequence of tasks carried out for the procedure and the operational role of the Catheter Laboratory Practitioner can determine the opportunities the Practitioner has for communicating with the patient.

During preparation before the procedure, the Catheter Laboratory Practitioner, whichever role they are working in, will have an opportunity to communicate with the patient. For example, the Nurse will scrub and prep the patient, providing the opportunity to communicate; the Radiographer will have an opportunity to communicate with the patient through preparation for the ventricle pump and administration for the dye, while the Cardiac Physiologist will have an opportunity to communicate through preparing the ECG wires and patches.

During the procedure the opportunity for communication reduces, depending on the role the Catheter Laboratory Practitioner undertakes. The greatest opportunity for communication during the procedure will occur if the Catheter Laboratory Practitioner is undertaking the role of the Nurse, in terms of pain and equipment management, as they will be in communication with the patient and the Cardiologist, to help manage pain and comfort. The Radiographer and the Cardiac Physiologist have much less opportunity to communicate with the patient as their responsibilities do not require communication with the patient.

Indeed based on observations of angiograms and angioplasties during the site visits it was the consultant or doctor who mainly communicates with the patient and therefore during the procedure had the most opportunity to reduce anxiety through communication.

There was therefore potential for the Catheter Laboratory Practitioner to improve patient experience and care through enhanced communication but realisation of this impact was dependent on the role the Catheter Laboratory Practitioner undertakes before and during the procedure and the condition of the patient. This may explain why there was no universal agreement amongst Cardiac Catheter Laboratory Managers and students, regarding the impact on patient experience.

3.3 Performance

3.3.1 Overview

The evidence suggested that the introduction of Catheter Laboratory Practitioner had little impact on angiogram waiting time and door-to-balloon time. This was because they are affected by multiple variables and hence a resource based solution on its own such as the introduction of the Catheter Laboratory Practitioner, was not enough to have a significant impact. Moreover, the evidence suggested that the introduction of the Catheter Laboratory Practitioner did not seem to speed up the completion of a procedure due to the sequential nature of the procedural tasks, hence the Catheter Laboratory Practitioner had little impact on door-to-balloon time.

The evidence suggested that the Catheter Laboratory Practitioner did not affect out of hours.

The evidence also indicated that the introduction of Catheter Laboratory Practitioner had little impact on diagnostic error rate, in that the Catheter Laboratory Practitioner did not increase or decrease error rates.

The evidence did suggest that the introduction of Catheter Laboratory Practitioner could help reduce the risk of cancellations or postponements caused by resource management as the Catheter Laboratory Practitioner could replace either a Nurse, Radiographer or Cardiac Physiologist. However occurrences of cancellations or postponements caused by resource management may be rare.

Finally, based on the evidence the Catheter Laboratory Practitioner did have an impact on collaboration and communication, through the improved holistic understanding of the role. However this impact was dependent on the number of Catheter Laboratory Practitioners employed, in that having more than one Catheter Laboratory Practitioner seemed to increase the positive impact the Practitioner can have on collaboration and communication.

3.3.2 Consideration of evidence

Angiogram waiting times

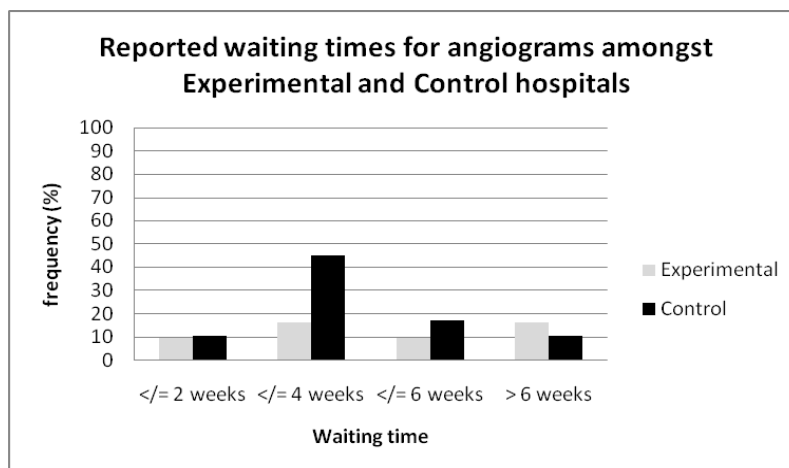
The evidence indicated that the majority of students and Catheter Laboratory Managers who took part in the research believed that the Catheter Laboratory Practitioner would have no impact on the waiting times of angiograms. For example six out of the seven (86%) students who completed the on-line questionnaire and were being utilised in some form as a Catheter Laboratory Practitioner, believed becoming a Catheter Laboratory Practitioner had no impact on angiogram waiting times. Three out of the five (60%) Catheter Laboratory Managers who took part in an interview provided a response to the angiogram waiting time question and were utilising the Catheter Laboratory Practitioner in some form, reported that the Catheter Laboratory Practitioner had made 'no improvement' on angiogram waiting times.

The key reason for this highlighted during the case studies and the Catheter Laboratory Manager interviews was that angiogram waiting times were affected by number of other variables other than staffing and resource. For example, the waiting time measured the time between referral to treatment and there were a range of administration and scheduling variables that could affect the length of time. Moreover, there were also a number of operational characteristics that could affect the waiting time such as: number of laboratories, type of service provided (diagnostic or intervention, 24 hours) and the type of patients serviced (elective or emergency).

Indeed the Catheter Laboratory Managers who took part in the research and who had reduced waiting times highlighted that this was not due to the Catheter Laboratory Practitioner, but instead due to streamlining processes relating to scheduling, admissions and the technology that underpins these processes.

Finally evidence gathered from the quick fire questions did indicate that the control group, at time of reporting, appeared to have better waiting times than the experimental group (Figure 1). The evidence however did not provide an explanation as to why this may be the case. It could be that the control group had fewer resourcing problems than the experimental group, or that the experimental group had less capacity than the control group. What this highlights, is that a number of different issues may affect waiting times and hospitals are likely to need more than a resource based solution to help improve angiogram waiting times.

Figure 1 Reported waiting times for angiograms for experimental and control group



Door-to-balloon time

The evidence, from the case studies, quick fire questions and Myocardial Ischaemia National Audit Project suggested that the introduction of the Catheter Laboratory Practitioner had little effect on the door-to-balloon time.

Evidence from the case studies indicated that the introduction of the Catheter Laboratory Practitioner could help stream line the preparation process but did not provide a significant time saving to affect the door-to-balloon time.

Figure 3 provides a process map, based on observations of Catheter Laboratory Practitioner working within the Catheter Laboratory, taken during the site visits. The solid line boxes indicate procedural tasks, while the dotted line boxes indicate the range of opportunities for the Catheter Laboratory Practitioner to provide support during preparation.

This figure highlights that there was a range of opportunities for the Catheter Laboratory Practitioner to help prepare equipment across multiple roles. For example, they could help prepare Radiographer equipment or help the Nurse gather equipment. However, as the figure shows tasks needed to be carried out in a sequential order rather than in parallel. For example, patient details needed to be collected and recorded by the different disciplines before the patient could be scrubbed. Moreover two tasks could not be carried out by the same person at the same time. For example a Catheter Laboratory Practitioner could not prepare the drugs to manage patient care and connect the ECG wires. This suggested that during preparation the Catheter Laboratory Practitioner was unlikely to have any real impact on the speed of preparation.

This is the same for during the procedure. As figure 5 shows, there was opportunity for multitasking when a team of Catheter Laboratory Practitioners were working together. However the tasks required completing the procedure remained the same and needed to be carried out in a sequential order, with or without a Catheter Laboratory Practitioner as part of the team. For example it would have been difficult for the Catheter Laboratory Practitioner responsible for diagnostic imaging to also focus on Cardiac Physiology. Moreover the Cardiologist had direct control over the speed of the procedure as they were the person carrying out the procedure. This again suggested the ability for the Catheter Laboratory Practitioner to speed up the process was extremely limited.

Rather, the Catheter Laboratory Practitioner provided flexibility in who can carry out tasks, which could reduce the negative impact resource constraint could have on service provision.

Students and Catheter Laboratory Managers who took part in the case studies, also indicated that, like angiogram waiting times, door-to-balloon time was affected by a range of other variables beyond resource and staffing, particularly systems relating to admission.

Indeed evidence from Myocardial Ischaemia National Audit Project suggested that hospitals were improving their primary angioplasty response without the use of a Catheter Laboratory Practitioner.

For example as Table 2 indicates the UK average primary angioplasty procedures conducted within 90 minutes of arrival increased by 10%, since 2007, indicating improvements occurring separate to the introduction of Catheter Laboratory Practitioner.

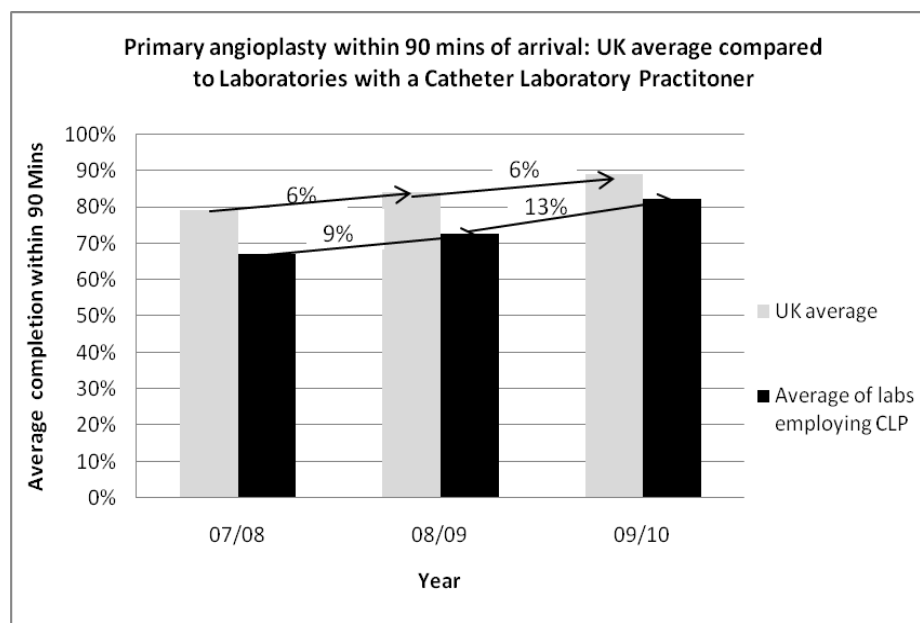
Table 2 UK primary angioplasty procedures conducted within 90 minutes of arrival taken from the Myocardial Ischaemia National Audit Project

	07/08	08/09	09/10
UK average	79%	84%	89%
Experimental group	67%	73%	82%
UK Average excl. experimental group	76%	82%	87%

Moreover, hospitals that had a Catheter Laboratory Practitioner were performing differently compared to the UK average. Figure 2 shows hospitals that had a Catheter Laboratory Practitioner appeared to be improving the primary angioplasty procedure response at a greater rate than the UK average. This seemed to be occurring unrelated to the introduction of the Catheter Laboratory Practitioner as out of the 14 hospitals whose students completed the Graduate Certificate in Adult Cardiac Catheter Laboratory Practice, two (14%) indicated that they had fully implemented the Catheter Laboratory Practitioner.

This suggests that changes to working practices and systems, other than the introduction of the Catheter Laboratory Practitioner had an influence on door-to-balloon time.

Figure 2 Primary angioplasty procedures conducted within 90 minutes of arrival taken from the Myocardial Ischaemia National Audit Project, for hospitals who have a Catheter Laboratory Practitioner, compared to the UK average



Cancellations and postponements in Catheter Laboratory procedures

The majority of students and Catheter Laboratory Managers, who took part in the research, felt that the introduction of the Catheter Laboratory Practitioner could have an effect on reducing cancellations and postponements. For example five out of the seven (71%) students who completed the on-line questionnaire and were being utilised in some form as a Catheter Laboratory Practitioner and five out of eight (63%) students who took part in an interview and were being utilised as a Catheter Laboratory Practitioner believed becoming a Catheter Laboratory Practitioner had helped reduce cancellations and postponements in procedures.

Indeed two out of the three (67%) Catheter Laboratory Managers who took part in an interview, provided a response to the cancellations and postponement question and were utilising the Catheter Laboratory Practitioner in some form, reported that the Catheter Laboratory Practitioner had helped reduce cancellations and postponements in procedures.

The key reasons for this was that the Catheter Laboratory Practitioner acted as an extra resource and so could provide effective cover when staffing restrictions or challenges had the potential to cause cancellations or procedural postponements. Examples of this were reported by both students and Catheter Laboratory Managers during the interviews and site visits. Examples included:

“[Catheter Laboratory Practitioner] cover staff shortage and sickness, thus we manage to run all labs without cancelling lists. This has an impact in reducing procedure postponements.”

“I was able to fill in for the other disciplines when they were short and a lab was unable to open, or cover a lunch break so the lab didn’t have to close for 30 minutes”;

“Postponements are influenced as she [Catheter Laboratory Practitioner] can step in to fill staff shortages immediately, so don’t need to wait for their [staff cover] arrival. We can also keep lab open if necessary through lunch as she [the Cath Lab Practitioner] can cover”.

However, the Catheter Laboratory Practitioner could only help to reduce cancellations and postponements in procedures if they were caused by staffing issues. There is evidence to suggest that the occurrence of cancellations and postponements due to staffing may not be very common. For example evidence from the quick fire questions indicated that of the 35 hospitals, combined from the control and experimental group, who provided data on the cancellations and postponements, 19 (54%) indicated that procedural cancellations occurring due to staffing was very rare.

Rather cancellations and postponements appeared to occur for other reasons which could not be tackled by the introduction of Catheter Laboratory Practitioner, such as:

“Medical problems [with the patient], such as blood abnormalities”,

“Having to wait for a bed [for elective procedures]”;

“If the consultant is sick rather than other members of staff”.

This indicated that when cancellations and postponements were due to staffing issues, then the Catheter Laboratory Practitioner could be an effective approach to tackle this.

Diagnostic error rate

Both students and Catheter Laboratory Managers who took part in the research indicated that the introduction of the Catheter Laboratory Practitioner had no impact on diagnostic error rate, in that the Practitioner did not increase or decrease error rate. For example, four out of the seven (57%) students who completed the on-line questionnaire and were being utilised in some form as a Catheter Laboratory Practitioner believed becoming a Catheter Laboratory Practitioner had no impact on diagnostic error rates. Three out of the five (67%) Catheter Laboratory Managers who took part in an interview, provided a response to the diagnostic error rate question and had a practicing Catheter Laboratory Practitioner in some form, believed that the introduction of the Catheter Laboratory Practitioner had no impact on diagnostic error rates.

Evidence from the case studies suggested that the limited impact of the Catheter Laboratory Practitioner on diagnostic error rates was due to the operational role undertaken and the opportunity this provided to influence diagnostic error rates. The Catheter Laboratory Practitioner only had an opportunity to influence diagnostic error rates when they were undertaking the tasks relating to diagnostic imaging, as they were providing images for the consultant or doctor to provide an accurate diagnosis. When they were carrying out roles related to patient management and Cardiac Physiology they had no opportunity to influence diagnosis.

However even when the Catheter Laboratory Practitioner was undertaking diagnostic imaging it was the responsibility of the doctor or consultant to make a diagnostic assessment.

Indeed as one Catheter Laboratory Managers highlighted:

“It is the doctor’s job to diagnose and not that of the Nurses and radiographers”.

Out of hours response

Students and Catheter Laboratory Managers who took part in the research indicated that the introduction of the Catheter Laboratory Practitioner had no impact on their out of hours response. For example six out of the seven (86%) students who completed the on-line questionnaire and were being utilised in some form as a Catheter Laboratory Practitioner believed becoming a Catheter Laboratory Practitioner had no impact on out of hours response. Three out of the five (60%) Catheter Laboratory Managers who took part in an interview, provided a response to the out of hours response question and had a practicing Catheter Laboratory Practitioner, in some form, believed that the introduction of the Catheter Laboratory Practitioner had no impact on out of hours response.

This limited impact seemed to stem from the fact that in most cases the Catheter Laboratory Practitioner was not allowed to work out of hours. For example:

“[a Catheter Laboratory Practitioner] can prep for other disciplines..... [but, a Catheter Laboratory Practitioner] is a Nurse and does not practice Radiography work on call”;

“...[the Catheter Laboratory Practitioner] can prep, but [Catheter Laboratory Practitioner] doesn't practice out hours”.

However these quotes do indicate that if the Catheter Laboratory Practitioner was allowed to work out of hours there could be potential benefit through their ability to help prepare tasks for the staff. For example the Catheter Laboratory Practitioner could help mobilise the laboratory for the arrival of the patient, through starting to prepare relevant equipment and drugs.

Moreover, during one of the site visits a Catheter Laboratory Practitioner who was working out of hours highlighted that they were able to cover for a Nurse, Radiographer or Cardiac Physiologist during out of hours response, which in turn helped to reduce the risk of delays to out of hours response due to staffing.

During this and subsequent case studies it was felt that the Catheter Laboratory Practitioner would not speed up the out of hours response, but instead reduced the potential risk of delays that could be caused when mobilising staff and the laboratory. Indeed during the case studies respondents felt that other solutions were also needed beyond an intervention focused around staffing to help increase response time.

Another point raised during the case studies and the interviews with students and Catheter Laboratory Managers was whether a Catheter Laboratory Practitioner should be working out of hours. As already suggested most Catheter Laboratory Practitioners who took part in the research were not allowed to work out of hours. This appeared to be a control measure to reduce the potential risk of a Catheter Laboratory Practitioner being involved in an unusual event, out of hours and therefore working in situations that move outside their level of competence.

An example was provided where the Catheter Laboratory Practitioner was involved in two abnormal events, during out of hours working, involving equipment failure, both of which were outside the training and competence of the Catheter Laboratory Practitioner.

Both incidents were solved through other technical services, but the potential risk relating to abnormal events during out of hours working and levels of competence of the Catheter Laboratory Practitioner was highlighted and consideration will need to be given as to whether the benefits of the Catheter Laboratory Practitioner working out of hours, outweighs the potential risks.

Collaboration and communication

Improved collaboration and communication appears to be one of the key benefits brought about by the introduction of the Catheter Laboratory Practitioner. For example seven out of the seven (100%) students who completed the on-line questionnaire and were being utilised in some form as a Catheter Laboratory Practitioner believed becoming a Catheter Laboratory Practitioner had improved communication and collaboration between staff. Four out of the five (80%) Catheter Laboratory Managers, who took part in an interview, provided a response to the communication and collaboration question and had a practicing Catheter Laboratory Practitioner, in some form, believed that the introduction of the Catheter Laboratory Practitioner improved collaboration and communication between staff within the Cardiac Catheter Laboratory setting.

The development of a holistic understanding of the roles, through the training provided to the Catheter Laboratory Practitioner appeared to help break down disciplinary barriers and facilitate communication across the disciplines as individuals start to understand more about each discipline. Examples reported included:

“The [Catheter Laboratory Practitioner] has encouraged collaborative working and a multi-skilling approach. The environment is a supportive one.”

“[Communication and collaborative working] was good before but may have improved - students have greater understanding of the different roles [within the lab]”;

“Other professionals have a greater appreciation of the nursing role within the cath lab; they are more inclined to help out nursing staff and also to educate nursing staff about their own roles.”

Introduction of the Catheter Laboratory Practitioner also appeared to aid collaboration through demonstrating the benefit it could bring other disciplines. This helped to reduce resistance and demonstrated that the Catheter Laboratory Practitioner could help other disciplines cover staff shortages and reduce pressure and stress. Examples reported included:

“Working relationships within the team improved through helping each other and covering them for breaks and so on”;

“Better understanding of the other disciplines’ pressures, stresses and roles. I am able to assist them if required”;

“The other two disciplines are supportive.... they could appreciate the assistance that [the Cath Lab Practitioner] was able to now provide, such as being able to get the patient on the table and prep the lab ready to start when all disciplines are available.”

The final quote also highlighted that although improvements in collaboration and communication had been reported, this was not always observed across the disciplines, especially within Radiographer:

“Closer with the ECG people [Cardiac Physiologists], but not so much the x-ray guys [Radiographers]”;

“Improved amongst Physiologists and Nurses but radiographers remain more isolated with their discipline”;

“Improved the relationship and communication between physiologists and Nurses, but Radiographers remain isolated and do their own role only.”

As discussed in section four, one reason for this continued barrier could be knowledge regarding the role of the Catheter Laboratory Practitioner. This was indicated in one response:

“Initially got worse [communication and collaboration] due to radiographer’s reluctance to train “Radiographers don’t want their years of training to be replaced by a quick-fire course”.

Moreover, breaking down certain inter-disciplinary barriers could be much more difficult when there is only one Catheter Laboratory Practitioner working in the Laboratory. Individuals interviewed during one case study visit highlighted that they trained a staff member, from each different discipline to become a Catheter Laboratory Practitioner. They felt this helped to more effectively break down discipline barriers and start to build new professional boundaries focused around multi-skilling. It also provided a “Change Champion” (see section 5) in each discipline to promote the Catheter Laboratory Practitioner role.

The evidence would suggest increased understanding of the roles and demonstration of benefits helped to improve communication and collaboration, but to ensure this occurs across all disciplines and is long lasting, there is a need to clarify the scope and role of the Catheter Laboratory Practitioner (section 5) and try to ensure more than one Catheter Laboratory Practitioner is employed in the Laboratory.

3.4 Productivity

3.4.1 Overview

The evidence suggested that the introduction of the Catheter Laboratory Practitioner had the potential to increase the turnover of cases. This was achieved through the Catheter Laboratory Practitioner increasing laboratory utilisation, when laboratory downtime was caused by resource management because the Catheter Laboratory Practitioner could replace either a Nurse, Radiographer or Cardiac Physiologist. Moreover this benefit was most applicable when the hospital had a number of laboratories.

The evidence also suggested that the introduction of the Catheter Laboratory Practitioner had the potential to help hospitals introduce new services, mainly in the form of primary PCIs, opening a new Catheter Laboratory and introducing a 24 hour service. This was because staffing inflexibility and constraints that could reduce the ability of a hospital to introduce certain services is removed. However, this benefit could only be realised to the full, if a team of Catheter Laboratory Practitioners was employed instead of just one.

3.4.2 Consideration of the evidence

Turnover of cases and utilization of Catheter Laboratory

Both students and Catheter Laboratory Managers who took part in the research, felt that the introduction of the Catheter Laboratory Practitioner would help them to maintain their current demands for procedures and in the future allow them to potentially increase their turnover of cases and meet future service demands. For example seven out of the seven (100%) students who completed the on-line questionnaire and were being utilised in some form as a Catheter Laboratory Practitioner believed becoming a Catheter Laboratory Practitioner had improved turnover of cases. Three out of the five (60%) Catheter Laboratory Managers who took part in an interview provided a response to the turnover question and had a practicing Catheter Laboratory Practitioner, in some form, believed that the introduction of the Catheter Laboratory Practitioner had improved turnover.

The responses obtained from the students and Catheter Laboratory Managers indicated that the key reasons why the Catheter Laboratory Practitioner had the potential to help maintain and improve current turnover was through their ability to help improve Laboratory utilisation. Example responses included:

“[The Cath Lab Practitioner] helps to increase the turnover of cases through the utilisation of the lab. This is because the [Cath Lab Practitioner] can cover lunch etc and reduce downtime, helping to keep all 3 labs open. [The Cath Lab Practitioner] can also prepare equipment etc to speed up the process”;

“Before, when we were short staffed I was able to fill in for the other disciplines when they were short and a lab was unable to open, or cover a lunch break so the lab didn’t have to close for 30mins” ;

“The Catheter Laboratory does not need to be closed during the day as the team of Cath Lab Practitioners can keep the laboratory running”.

Essentially the Catheter Laboratory Practitioner was an extra resource within the team and therefore could provide cover for other disciplines, reducing downtime caused by staffing issues.

A common theme across the case studies was that each hospital believed staff flexibility brought about by the Catheter Laboratory Practitioner would allow them to enhance capacity and reduce downtime caused by resource. However in all cases the main way to achieve this was through training more than one Catheter Laboratory Practitioner.

For example one hospital that had two Catheter Laboratory Practitioners reported that they were able to process a further 2 cases per day through covering lunch to keep the lab open.

Another laboratory had three Catheter Laboratory Practitioners (2 in training). This team of Catheter Laboratory Practitioner were rotated into the case list to ensure that the Laboratory remained open all day. This helped them achieve current turnover and provided a foundation for meeting future increases in demand.

Employing or training at least two Catheter Laboratory Practitioners also had the advantage of helping the Catheter Laboratory Practitioners manage their workload. If only one Catheter Laboratory Practitioner was employed, the short term impact would potentially be an improvement in laboratory downtime as the Catheter Laboratory Practitioners could provide resource cover. However this would significantly increase the workload of the Practitioner and in the long term, lead to increases in stress and fatigue which could affect well-being and performance. Developing a team of Catheter Laboratory Practitioners can reduce the risk of work overload as the workload can be shared across the team.

Students and Catheter Laboratory Managers also reported that the Catheter Laboratory Practitioners helped maintain current turnover, through their ability to help remove potential “bottlenecks” in the procedural process, particularly during preparation, which could otherwise have caused delay. Example responses included:

“[The Cath Lab Practitioner] can also prepare equipment etc to speed up the process”;

“Turnover may be slightly improved as [The Cath Lab Practitioner] can prep for other disciplines”;

“There is potential for it [the Cath Lab Practitioner] to speed up the process through preparation and teamwork”.... Greatest benefit being the overall smoother running procedure”.

Figure 3 provides a process map based on observations of Catheter Laboratory Practitioner working within the Catheter Laboratory, taken during the site visits. The solid line boxes indicate procedural tasks, while the dotted line boxes indicate the range of opportunities for the Catheter Laboratory Practitioner to provide support during preparation. This included:

- taking patient to recovery
- preparing equipment and recording relevant details from the Nurse, Radiographer and Cardiac physiologist perspective
- wiring up the ECG
- preparing patient, pump and fluid.

As one Laboratory Manager highlighted:

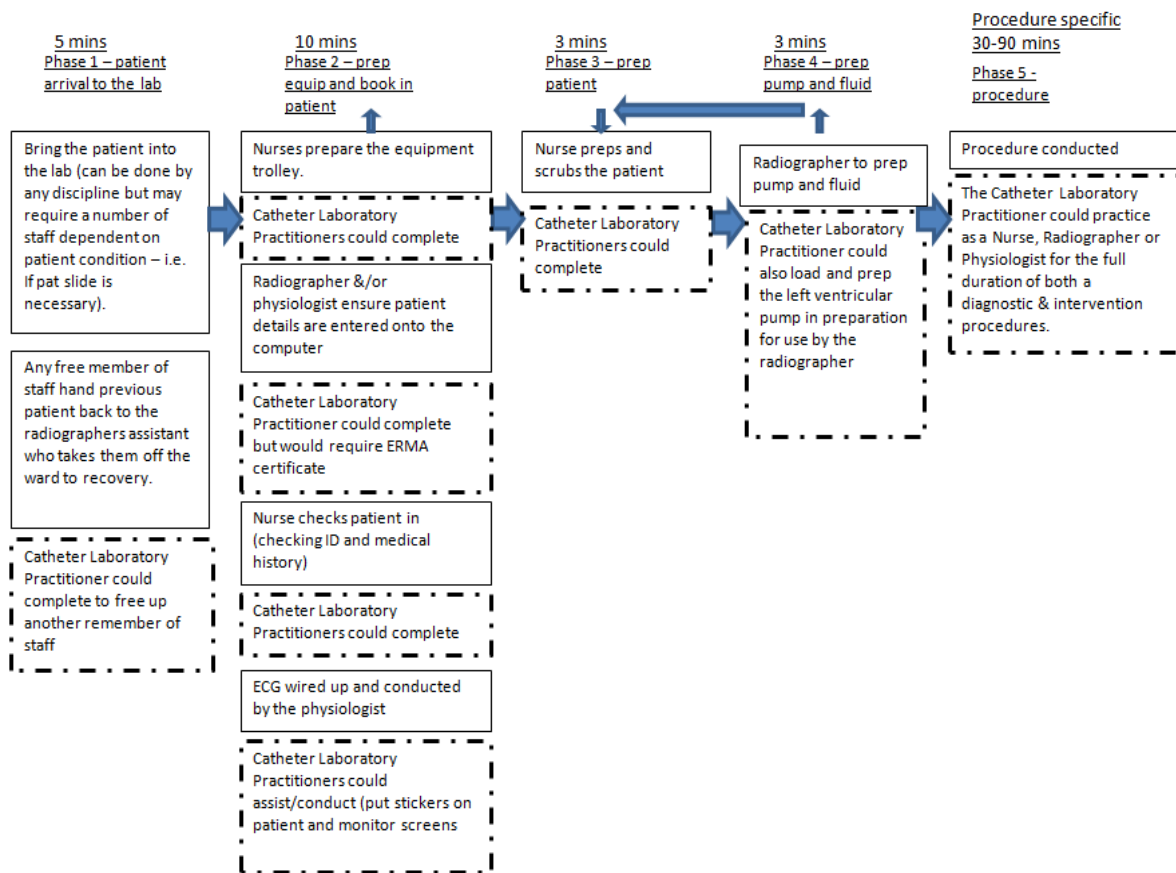
“[The Cath Lab Practitioner] is able to bring in the next patient and take the previous patient back to the ward (something otherwise done by a Nurse) which has an impact on lab utilisation;”

Indeed a student within one case study highlighted that during preparation, time can be saved as the Catheter Laboratory Practitioner could help prepare equipment across multiple roles. For example they could help prepare radiographer equipment or help the Nurse gather equipment or help the Physiologist put the ECG monitor leads on the patient.

As can be seen from Figure 3 and in line with the case study evidence, the time saved during preparation was not enough to mean new cases could be added to the list, but could help to streamline the process, making it easier for the team to meet current service demands.

The case study evidence also highlighted that the effectiveness of the Catheter Laboratory Practitioner to increase utilisation and turnover was dependent on the type of service provided by the Catheter Laboratory. The case studies were taken from Catheter Laboratories that provided diagnostic and interventional service to emergency and elective patients. This meant that their service was underpinned by a level of unpredictability in the nature of their case list, in that emergency cases could arrive at any time. This meant that their service required a much greater level of staff flexibility to manage this unpredictability and hence the use of Catheter Laboratory Practitioner provided the required flexibility in resource.

Figure 3 Process map for opportunities of the Catheter Laboratory Practitioners to influence during preparation



New Catheter Laboratory Services

The evidence from the case studies and Catheter Laboratory Managers highlighted that some hospitals who were training Catheter Laboratory Practitioners were doing so as part of a move to introduce new services. Most notably a move to primary PCIs (PPCIs) and a 24 hour service.

For example, one hospital reported sending two staff members on the course to become qualified Catheter Laboratory Practitioners as the trust was starting a PPCI service and therefore the demand for a Catheter Laboratory Practitioners became apparent:

“At times you are waiting for a member of the team to arrive; therefore the procedure can be delayed. With Catheter Laboratory Practitioners this eliminates this delay”.

Another sent one staff member on the course for the same reason and stated that the hospital:

“Started a primary PCI so have staff on call now and were therefore looking to increase flexibility and prevent short staffing on nursing side.”

Finally one hospital stated that:

“Following a recent Laboratory expansion, they are now undertaking PCIs as well as diagnostic procedures and consequently the Catheter Laboratory Practitioners (2 staff members were sent) will be used in order to provide cover for staff who have been on call the night before”.

These new services introduced further unpredictability into the management and resourcing of patients. The Catheter Laboratory Practitioner(s) therefore provided a solution to help manage unpredictability in resource demand, by providing extra resource and an increasing flexibility across that resource. As one individual within a case study highlighted:

“The flexibility provided [by the Catheter Laboratory Practitioners] allows us to cope with PPCIs and a 24/7 service”.

3.5 Staffing

3.5.1 Overview

The evidence suggested that becoming a Catheter Laboratory Practitioner could have a potential impact on promotion prospects and career development, if a job specification was developed for the role.

Staff turnover did not seem to be affected by the introduction of the Catheter Laboratory Practitioner, but the introduction of the Catheter Laboratory Practitioner did seem to help hospitals manage staff vacancies, as the Catheter Laboratory Practitioner could be utilised as either a Nurse, Radiographer or Cardiac Physiologist, providing an extra level of resource.

There is some evidence to suggest that the introduction of the Catheter Laboratory Practitioner was leading to changes in staff requirements, particularly the reduction in the number of staff required to undertake procedures.

The key benefit of the Catheter Laboratory Practitioner, based on the evidence, was staff flexibility. The introduction of the Catheter Laboratory Practitioner allowed hospitals to bring in much more flexibility in how they run and staffed the Catheter Laboratory. This was because the Catheter Laboratory Practitioner could be utilised as either a Nurse, Radiographer or Cardiac Physiologist, within the laboratory and hence reduced the resource management constraints for hospitals associated with ensuring that the roles relating to patient management (Nursing), diagnostic imaging (Radiographer) and Cardiac Physiologist were undertaken only by individuals from those disciplines.

3.5.2 Consideration of the evidence

Student promotional prospects

The evidence indicated that there was potential that becoming a Catheter Laboratory Practitioner could have a positive impact on promotional prospects and career development. For example four out of the seven (57%) students who completed the on-line questionnaire and were being utilised in some form as a Catheter Laboratory Practitioner believed becoming a Catheter Laboratory Practitioner had improved their promotional and career development prospects.

Moreover three of the seven (43%) students who completed the on-line questionnaire and were being utilised in some form as a Catheter Laboratory Practitioner had received some form of promotion.

The development of new knowledge and experience was seen as beneficial to career development:

“[Being a qualified Catheter Laboratory Practitioner] shows wider knowledge in a specialist area; “Training allowed me to develop greater understanding of roles and enhance my competence”.

However both promotion and career development are underpinned by support mechanisms introduced by the hospital, such as a formalised job specification and job title, competence management system and job plan to ensure application of knowledge and skill. As discussed in Section 4 and 5 the majority of hospitals who were implementing the Catheter Laboratory Practitioner had not effectively introduced such systems and hence, at present, the promotional and career development opportunities of the Catheter Laboratory Practitioner may be limited. This would explain why:

- Three out of the seven (43%) students who completed the on-line questionnaire and were being utilised in some form as a Catheter Laboratory Practitioner believed becoming a Catheter Laboratory Practitioner had no impact on their promotional and career development prospects; and
- Four out of the seven (57%) students who completed the on-line questionnaire and were being utilised in some form as a Catheter Laboratory Practitioner had no promotion since becoming a Catheter Laboratory Practitioner.

Staff turnover

The evidence from Catheter Laboratory Managers interviewed and those who were approached during the site visits indicated that the introduction of the Catheter Laboratory Practitioner had no impact on staff turnover. Indeed only one Catheter Laboratory Manager indicated that the Catheter Laboratory Practitioner had made some improvement to staff turnover stated that:

“Just means that staff don’t look elsewhere in terms of retention”....“it [the training] presented an opportunity to retain a knowledgeable and experienced member of staff, by providing a sideways move for her when she may otherwise have moved elsewhere.”

This provides a reason as to why a reduction in turnover of the individuals undertaking training to become a Catheter Laboratory Practitioner could be observed, through development of new knowledge and experience which could have positive effect on job satisfaction and retention. The evidence, however, indicated this was not happening, at the time of reporting.

Staff vacancies

The evidence suggested that the introduction of the Catheter Laboratory Practitioner could help hospitals manage staff vacancies across the disciplines. Example reports included:

“Radiographers were selected [to attend the course], due to trouble recruiting and retaining Nurses, to provide flexibility of staff and fill shortages.”

“...Good thing to be able to use staff interchangeably as [the hospital] couldn’t afford to recruit a full member of staff in each discipline”;

“Physiologists were short staffed and prevented from recruiting so it was to provide flexibility with the staff.”

As highlighted above and in the case studies the Catheter Laboratory Practitioner could provide cover for staff shortfalls across the disciplines and thereby helped hospitals to manage short staffing and vacancies. Essentially the Catheter Laboratory Practitioner equated to an extra resource across the disciplines without the additional recruitment.

For example at one hospital the Catheter Laboratory Practitioner worked until 18:00 and was therefore able to practice as a Physiologist for hour, helping to provide extra resource.

Staffing requirements for Catheter Laboratory procedures

The evidence indicated that the use of the Catheter Laboratory Practitioner could reduce the numbers of staff required to carry out a procedure.

Based on the observations of angiograms and angioplasties within the control group site visits and discussion with the specialist disciplines Figure 4, represents the traditional model for staffing the Catheter Laboratory. The solid lined boxes represent procedural tasks for the role and the dotted lines represent optional staff members who may join the team during a procedure. There were five staff each carrying out a specialist role, with no cross disciplinary working. The staffing number could move up to a maximum of seven, if there was a trainee Cardiologist and additional Cardiac Physiologist. However the typical staffing number was five.

Figure 4 Traditional staffing model for the Catheter Laboratory

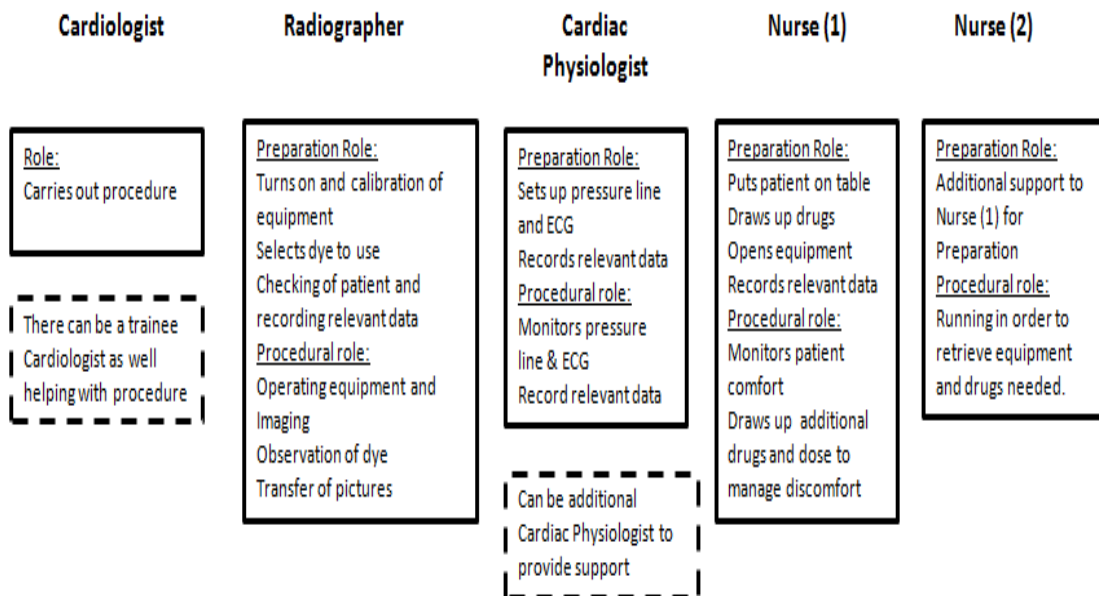


Figure 5 illustrates the staffing model for an angiogram and angioplasty completed by a team of Catheter Laboratory Practitioners and a Cardiologist, based on observations carried out during a site visit to a hospital within the experimental group. The solid line boxes indicate procedural tasks for each role and the dotted line boxes indicate the opportunities for multi-tasking.

As the figure shows, the use of a team of Catheter Laboratory Practitioners reduced the number of staff required to complete the procedure to four. This was because the training provided to the Catheter Laboratory Practitioner allowed for increased multitasking and cross disciplinary working to take place, to the extent that the additional Nurse in the traditional model of staffing, was no longer required.

During preparation the three Catheter Laboratory Practitioners worked together to ensure that all preparation work relating to Diagnostic Imaging, Patient Management and Cardiac Physiology was completed.

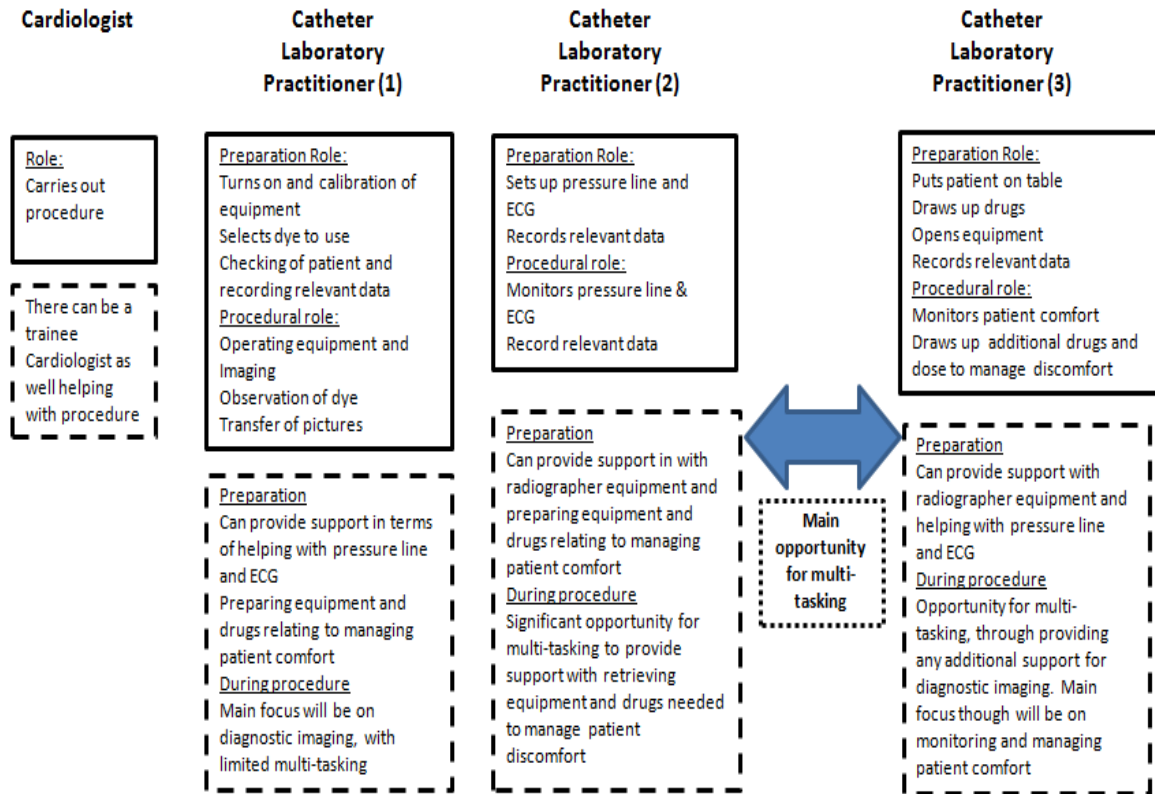
During the procedure, the Catheter Laboratory Practitioner responsible for Cardiac Physiology had significant opportunity to help with patient management, through the retrieval of relevant equipment and drugs. This was supplemented by additional support for patient management when required, provided by the Catheter Laboratory Practitioner responsible for diagnostic imaging. In turn the Catheter Laboratory Practitioner responsible for Patient Management provided any additional support required for Diagnostic Imaging. This level of multi-skilling meant that the additional Nurse was no longer needed.

It should also be noted that the ability of the Catheter Laboratory Practitioner to multi-task could depend on the procedure. During an angiogram the Catheter Laboratory Practitioner responsible for Diagnostic Imaging had a key role in monitoring the contrast and the catheter; hence there was limited room for multi-tasking. The opportunity for multi-tasking appeared to be greater for the Catheter Laboratory Practitioners responsible for Cardiac Physiology and Patient Management.

During an angioplasty there was potentially more opportunity for multi-tasking for the Catheter Laboratory Practitioner responsible for Diagnostic Imaging. For example, with the input of a stent, the Diagnostic Imaging role was slightly reduced, due to level of monitoring required.

Hence, the Catheter Laboratory Practitioner responsible for Diagnostic Imaging was able to provide additional support, to the Catheter Laboratory Practitioners responsible for Cardiac Physiology and Patient Management, through helping to prepare equipment and additional drugs for the procedure and patient management.

Figure 5 Staffing model for the Catheter Laboratory, using 3 Catheter Laboratory Practitioner



Finally during one site visit it was suggested that for an elective angiogram with a stable patient, where there was no perceived complications the staffing number for the procedure would be reduced down to three. A Cardiologist and two Catheter Laboratory Practitioners.

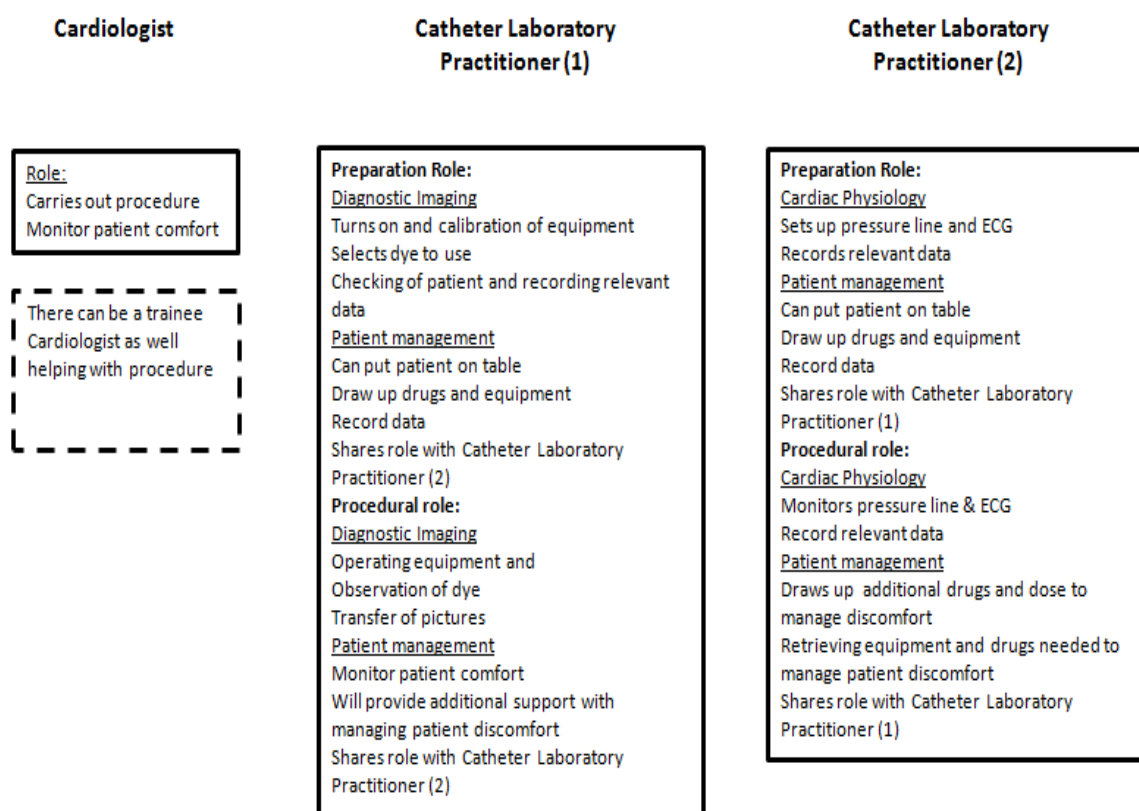
This working model is presented in Figure 6. The solid line boxes indicate procedural tasks for each role and the dotted line boxes indicate the opportunities for multi-tasking.

In this staffing scenario the preparation work relating to Diagnostic Imaging, Patient Management and Cardiac Physiology was shared across the two Catheter Laboratory Practitioners.

During the procedure one Catheter Laboratory Practitioner took responsibility for Diagnostic Imaging and the other for Cardiac Physiology. Patient management was the responsibility of the Cardiologist and the two Catheter Laboratory Practitioners in that the Cardiologist and Catheter Laboratory Practitioner responsible for Diagnostic Imaging monitored patient comfort and the Catheter Laboratory Practitioner responsible for Cardiac Physiology drew up additional drugs and equipment to manage any discomfort. The Catheter Laboratory Practitioner responsible for Diagnostic Imaging provided, when required, additional support for managing patient discomfort, such as retrieving equipment or drugs.

It should be noted that this model of working was only used during low risk cases. Indeed it was identified during other site visits that this model of working had the potential to significantly reduce the resilience of the team to deal with any unusual or abnormal events that may occur. This type of working model would therefore need to be substantially risk assessed, as part of the change management process (section 5.3) to ensure risks to patient and staff are as low as reasonable practicable.

Figure 6 Staffing model for the Catheter Laboratory, using two Catheter Laboratory Practitioners



Staff flexibility

The evidence base indicated that staff flexibility was a key impact, brought about by the introduction of the Catheter Laboratory Practitioner. For example five out of the eight (63%) Catheter Laboratory Managers who took part in an interview and had a practicing Catheter Laboratory Practitioner, in some form wanted to introduce the Catheter Laboratory Practitioner to improve staff flexibility. This was mainly to help manage resource shortages and maintain services that required staff flexibility. Example responses from the Catheter Laboratory Managers and case studies included:

“To increase flexibility of staff as we have six labs and a large throughput.”;

“Flexibility to provide cover over lunch, sickness and emergencies”;

“...Sent on the course to assist staffing in any role ... and assist with the running of a smooth and efficient Cath Lab”;

“provides the ability to work flexibly with what arises. It means that staff can work interchangeably when [the hospital] did not have the resource to recruit another position in full”.

The last quote highlighted the key reason why the Catheter Laboratory Practitioner introduced staff flexibility into the process and resource management of the Catheter Laboratory. The multi-skilling model provided the opportunity for inter-disciplinary working.

Instead of a working practice, where each of the following roles within the Laboratory (patient management, diagnostics imaging, Cardiac Physiology) were carried out by a specialist discipline only, the multi-skilling model meant the roles of patient management, diagnostics imaging, Cardiac Physiology could be carried out inter-changeably across the disciplines. For example, Cardiac Physiology could be carried out by a Nurse trained to be a Catheter Laboratory Practitioner, or diagnostics imaging could be carried out by a Cardiac Physiologist trained to be a Catheter Laboratory Practitioner.

Moreover the multi-skilling model not only provided flexibility in resourcing the Catheter Laboratory, it provided flexibility in the preparation and completion of procedures, in that a level of multitasking could be carried out. So for example during preparation a Catheter Laboratory Practitioner responsible for diagnostics imaging could also help the Nurse gather equipment, scrub the patient and prepare drugs that are needed for the procedure.

Indeed it was this level of flexibility that meant the Catheter Laboratory Practitioner could have a positive influence on the performance, productivity and staffing of the Catheter Laboratory. This was demonstrated by a range of responses provided by Catheter Laboratory Managers, through the interviews and case studies on the benefits staff flexibility brought to their Catheter Laboratory(s):

“Free up specialists to do technical or more problematic procedures”;

“Cover for staff who have been on call, get procedures started and patients ready while waiting for another discipline to arrive”;

“Only to be used in a primary... can set up for others [disciplines] cover shortages and relieve staff”;

“Cover in the [standard practice] labs as well as operate the multi-skilling labs with only two staff and a consultant”;

“Provides general flexibility if the lab is short staffed or needs cover”.

“Can help minimise the impact of emergency procedures by helping ensure that elective procedures are still completed. With elective procedures per say it ensures that lists are completed in spite of low staff or staffing lunches and breaks”;

“[The lab] was short staffed of radiographers and physiologists, however in amongst long bouts of sick leave (approx six months), circumstances have changed and now have full complement of staff and commence PCIs next week”.

These benefits were however dependent on the characteristic of the Catheter Laboratory. Evidence from the control group indicated, that those Catheter Laboratories who carried out only elective procedures, required less flexible staff to maintain their service, due to the stable nature of their case list. On the other hand, hospitals within the experimental group, who carried out emergency procedures and provided a 24 hour service, required much more flexibility as their service provision introduced a significant amount of uncertainty in the case list.

4 IMPLEMENTATION OF THE CATHETER LABORATORY PRACTITIONER AND BARRIERS TO IMPLEMENTATION

4.1 Introduction

The evidence base indicated, at the time of reporting (March 2011), that full implementation of the Catheter Laboratory Practitioner was low amongst hospitals whose students completed the Graduate Certificate in Adult Cardiac Catheter Laboratory Practice.

This section details, based on the evidence, the levels of implementation reported amongst hospitals whose students completed the Graduate Certificate in Adult Cardiac Catheter Laboratory Practice and the barriers to implementation identified by these hospitals.

4.2 Implementation of the Catheter Laboratory Practitioner

Three levels of implementation were reported amongst hospitals whose students completed the Graduate Certificate in Adult Cardiac Catheter Laboratory Practice – full (14%), partial (64%) and no implementation (22%).

4.2.1 Full implementation

Out of the 14 hospitals whose students completed the Graduate Certificate in Adult Cardiac Catheter Laboratory Practice, two (14%) indicated that they had fully implemented the Catheter Laboratory Practitioner.

Full implementation was categorised by ensuring the Catheter Laboratory Practitioner practiced across the three disciplines on a regular bases.

As one Catheter Laboratory Practitioner highlighted:

“Rostered to practice at least one day per week”.

Indeed these two hospitals reported that their Catheter Laboratory Practitioner spent a significant amount of their time undertaking a multi-skilled role. In one case, the Catheter Laboratory Practitioner spent approximately 50% of the time working outside their discipline:

“Out of four days, we ensure that two days are spent in [the Cath Lab Practitioners] original discipline and the other two days are split between the other two disciplines”.

4.2.2 Partial implementation

Nine (64%) of the 14 hospitals whose students completed the Graduate Certificate in Adult Cardiac Catheter Laboratory Practice, indicated that they had partially implemented the Catheter Laboratory Practitioner.

Partial implementation was categorised by a significant reduction in the utilisation of the Catheter Laboratory Practitioner, outside original profession, most commonly reported between 5-10% of time spent working outside original discipline.

This utilisation was unplanned and not on a regular basis. Instead the Catheter Laboratory Practitioners was used only when required to provide cover for staff, reducing downtime, caused by staffing issues.

Examples of partial implementation reported by the nine hospitals included:

- *“Cover staff sickness, absence and lunch as necessary”;*

- *“Undertaking a Nursing role in staff sickness, lunch breaks”;*
- *“I can make up the numbers to prevent the lab closing and cover staff who have worked out of hours on the day shift”;*
- *“Nurse covers as a physiologist as-and-when needed”* (reportedly less than 5% of the time).

4.2.3 No implementation

Three of the 14 hospitals (22%) whose students completed the Graduate Certificate in Adult Cardiac Catheter Laboratory Practice indicated that they had not implemented the Catheter Laboratory Practitioner.

This meant that these individuals were only practicing in their current discipline, with no future plan for utilising them as a Catheter Laboratory Practitioner.

4.2.4 Impact of limited implementation of the Catheter Laboratory Practitioner

Partial or no implementation of the Catheter Laboratory Practitioner had two significant impacts for hospitals.

Firstly, there is no significant change in current working practices which meant it was very difficult for hospitals to realise the full benefits of the Catheter Laboratory Practitioner as described in Section 3.

Partial implementation could help the hospital reduce the risk of downtime due to staff shortages, but this ad-hoc approach to implementation meant that there was limited chance of long term change in practice as the Catheter Laboratory Practitioner was not fully integrated into the overall management and structure to staffing and operating the Cardiac Catheter Laboratory.

The second significant impact of partial or no implementation of the Catheter Laboratory Practitioner was competence degradation. Without regular opportunity for the Catheter Laboratory Practitioner to practice their skills in the disciplines outside their original profession, their level of competence could degrade over time as could their confidence to perform duties outside their profession. The following examples of this were reported:

- *“Insufficient staff across all disciplines means that it has now been five months since previous practice as a Catheter Laboratory Practitioner. [This has resulted in] loss of confidence to practice”.*
- *“Not able to practice as a technician as they are rarely short staffed and so when I can be released from radiography I practice as a Nurse. I have been given no opportunity to maintain my technician competence”.*

This could introduce a significant risk within the Cardiac Catheter Laboratory, in that an individual trained to be a Catheter Laboratory Practitioner maybe asked to undertake duties in a discipline where their competence has started to degrade due to a lack of opportunity to practice. This in turn could have a significant impact on patient safety. As described in Section 5, an effective competence management system needs to be in place to monitor and assess competence of the Catheter Laboratory Practitioner especially if the opportunity to practice skills is limited or reduced.

4.3 Reported barriers to implementation

Hospitals, who reported either partial implementation of the Catheter Laboratory Practitioner or no implementation, identified three key barriers that stopped them fully implementing the Catheter Laboratory Practitioner. These were:

- staffing restrictions
- trust requirements
- understanding of the Catheter Laboratory Practitioner role.

Hospitals, whose students were yet to complete the course (at time of reporting), also reported the above as key barriers to overcome to help ensure full utilisation the Catheter Laboratory Practitioner.

4.3.1 Staffing restrictions

Staffing restrictions across the disciplines seemed to have a significant effect on levels of utilisation.

Utilisation could be reduced or stopped because there was insufficient staff within the individuals' own discipline to provide the required cover to allow them to work in another discipline. Reported examples of this included:

- *“Insufficient staff across all disciplines means that it has now been five months since previous practice as a Catheter Laboratory Practitioner”;*
- *“A shortage of radiographers means I am not given any time in the other disciplines as I am needed to be a radiographer and we have no other discipline trained as a multi-skilled worker to replace me”;*
- *“I was practicing however, the current lack of practice over the last five months is purely due to staff leaving and a freeze on recruitment to replace them”.*

On the other hand, there could be sufficient staff within the individuals own discipline and across the other disciplines, which in turn reduced the opportunities available for the individual to practice as a Catheter Laboratory Practitioner and meant that at best the Catheter Laboratory Practitioner only practiced in one other discipline. Reported examples of this included:

- *“Not able to practice as a technician as they are rarely short staffed and so when I can be released from radiography I practice as a Nurse”.*

Staffing restrictions also affected the ability of the individual to train as a Catheter Laboratory Practitioner. Staffing restrictions within or across disciplines, could make it difficult for the individual to find the time and the required cover to be seconded to another discipline to develop and obtain the required discipline specific competence.

Staffing restrictions seemed to be a significant problem for hospitals that had changing staffing requirements and who may not have effectively monitored these changes to identify how these could affect utilisation of the Catheter Laboratory Practitioner and then developed relevant strategies to reduce impact.

Staffing requirements can change dramatically over the time it takes to complete the Graduate Certificate in Adult Cardiac Catheter Laboratory Practice. For example, one hospital that took part in the site visits indicated that at the time of sending a student on the Graduate Certificate in Adult

Cardiac Catheter Laboratory Practice they had problems recruiting Radiographers and Cardiac Physiologists. By the time the student had completed the course the resource challenge had changed, in that the hospital could recruit Radiographers and Cardiac Physiologists but could not recruit Nurses (the students own discipline).

Without effective monitoring of staffing requirements and challenges across the disciplines, hospitals may not identify the potential impact this can have on the training, implementation and utilisation of the Catheter Laboratory Practitioner and develop relevant solutions to overcome this challenge.

It could be suggested that implementation may be more successful for hospitals that do not currently have staff shortages, but may anticipate resource constraints in the future, thus taking a proactive approach to resource management. Those hospitals currently understaffed and hence taking a reactive approach to tackling resource constraints, may find it difficult to implement the Catheter Laboratory Practitioner.

4.3.2 Trust requirements

Certain trusts had specific policies around drug administration and use of machinery, which meant that the Catheter Laboratory Practitioner was not considered competent to undertake specific cross discipline duties reducing the level of utilisation. Reported examples included:

- *“Legislation from the hospital and trust restricts practice no drug administration when practicing as a Nurse and no radiography ...only fully trained Rads may operate machinery”.*

On the other hand, in one case, trust specific competency requirements for the Cardiac Physiologist role, led to a significant burden on the individual and reduced their ability to carry out the required training:

- *“I need to complete 30 hospital specific competencies before I can practice as a physiologist”.*

In the above cases it was reported that the relevant individuals were unaware of these practice restrictions at the time of commencing the Graduate Certificate in Adult Cardiac Catheter Laboratory Practice. This indicated a failure in the process to train, implement and manage the Catheter Laboratory Practitioner. Without an effective management process for the Catheter Laboratory Practitioner, which includes consideration of staffing requirements, hospitals are unlikely to identify in advance potential trust requirements that can affect the implementation of the Catheter Laboratory Practitioner and develop a relevant strategy with the trust.

4.3.3 Understanding of the Catheter Laboratory Practitioner role

Hospitals highlighted that resistance across the professions could affect the extent to which the Catheter Laboratory Practitioner was integrated into the Cardiac Catheter Laboratory setting and therefore utilised. For example members of professions could believe the Catheter Laboratory Practitioner could dilute the expertise of their profession. Moreover, some may be fearful that the introduction of the Catheter Laboratory Practitioner could increase the risk of redundancies within certain professions; therefore individuals can be keen to protect their profession from the integration of Catheter Laboratory Practitioner.

This level of resistance seemed to be related to a lack of understanding regarding the role of the Catheter Laboratory Practitioner. In that the Practitioner was seen as a replacement for a discipline instead of being seen as change of practice aimed at helping to support all disciplines within the Cardiac Catheter Laboratory setting.

This lack of understanding seemed to stem from the fact that, at the time of reporting, there appeared to be no formal policy and job specification for the Catheter Laboratory Practitioner, detailing the purpose of the Practitioner, their role within the Laboratory and the scope of their duties. Moreover, there seemed to be limited evidence of hospitals building a business case for the introduction of the Catheter Laboratory Practitioner to sell the role not only to trusts but to all relevant disciplines, highlighting the positive impact the Practitioner could have within the Laboratory setting and for the relevant disciplines.

As described in Section 5, clarification of the Catheter Laboratory Practitioner role and subsequent buy-in from all disciplines could have a significant influence on the implementation of the Catheter Laboratory Practitioner.

5 LESSONS LEARNT TO OVERCOME THE BARRIERS TO IMPLEMENTATION

5.1 Introduction

The following section details the key enablers to the implementation of the of the Catheter Laboratory Practitioner reported by hospitals who took part in the research and provides a proposed change management process, based on guidance produced by Greenstreet Berman and the HSE that can be used by hospitals to help manage the implementation and utilisation of the Catheter Laboratory Practitioner.

The evidence for the enablers mainly comes from the hospitals who took part in the site visits and 3 case studies are used to illustrate enablers.

5.2 Reported enablers to implementation of the Catheter Laboratory Practitioner

The evidence gathered highlighted five enablers that hospitals, who took part in the research, felt enhanced the implementation and utilisation of the Catheter Laboratory Practitioner. These were:

- business case for the Catheter Laboratory Practitioner
- development of a job specification for the Catheter Laboratory Practitioner
- formalised job plan for utilisation
- eEducation package around the role and scope of the Catheter Laboratory Practitioner
- competence development and management of the Catheter Laboratory Practitioner.

The evidence suggested that these enablers improve implementation and utilisation because they predominately helped increase understanding of the Catheter Laboratory Practitioner role and build commitment and collaboration across the disciplines. This understanding and collaboration was a pre-requisite for the successful management of change in working practices. Indeed once understanding and commitment was developed, the disciplines within the Cardiac Catheter Laboratory(s) could then start to identify and tackle the other key barriers to implementation, namely staffing restrictions and trust restrictions.

5.2.1 Business case for the Catheter Laboratory Practitioner

The development of a business case not only helped to clarify the scope and purpose of the Catheter Laboratory Practitioner but was a key tool to help disciplines and the trust understand the benefits the Catheter Laboratory Practitioner could bring them. A successful business case can help to secure funding, shared across the disciplines that enhance commitment to the implementation and utilisation of the Catheter Laboratory Practitioner. The following example was reported:

“Money to fund the post came from all three disciplines and so they have stuck rigidly to sharing [the Cath Lab Practitioner] between the professions. This also allows her to maintain her competency in the different areas.”

Within another organisation the development of a business case led to the award of funding for two posts. It also set the foundations for the development of a job specification and job plan for utilisation, as the disciplines and the trust were clear on how the Catheter Laboratory Practitioner could be used within the Cardiac Catheter Laboratory and the benefits this would bring.

5.2.2 Catheter Laboratory Practitioner specification

The development of a job specification for the Catheter Laboratory Practitioner was seen as the key method to formalise the scope and role of the Catheter Laboratory Practitioner. This in turn helped lead to the introduction of a new role into the Cardiac Catheter Laboratory setting, i.e. the Catheter Laboratory Practitioner. Once this formalised role was agreed and introduced, the job specification could help formalise the key competencies required for the Catheter Laboratory Practitioner and the requirements for practice and utilisation. This therefore formed the basis for the development, assessment and management of Catheter Laboratory Practitioner competence and the on-going utilisation of the Catheter Laboratory Practitioner within the Cardiac Catheter Laboratory setting.

The following example was reported:

“Developed job specification to formalise the Catheter Laboratory Practitioner role. This helped to reduce current discipline boundaries and build new professional boundaries. Focus was on the introduction of a new role to support and enhance service provision”.

In this case the job specification helped to increase collaboration and understanding across the disciplines. It also meant that the trainee Catheter Laboratory Practitioner had a clear and systematic process for the development, assessment and management of competence. Also agreement from the DOH Agenda for Change helped to facilitate the introduction of the new role within the Cardiac Catheter Laboratory setting.

5.2.3 Job plan for utilisation

A formalised job plan helped to ensure that the Catheter Laboratory Practitioner was utilised and fully implemented in to the management and staffing of the Cardiac Catheter Laboratory setting. Without a formalised job plan a hospital is likely to only achieve partial implementation of the Catheter Laboratory Practitioner. Moreover, a formalised job plan will help ensure that degradation of the Catheter Laboratory Practitioner competence does not occur. The following example was reported:

“Job plan was developed to ensure dedicated time for the Catheter Laboratory Practitioner to practice. The job plan also ensures that practice takes place across the disciplines to manage competence across all disciplines.”

It was reported that the formalised job plan ensured the full utilisation of the Catheter Laboratory Practitioner, across the three disciplines. This helped ensure the Catheter Laboratory Practitioner was integrated into the management and staffing of the Cardiac Catheter Laboratory setting, helping to change the working practices of the Laboratory. This helped the hospital start to realise the benefits of the Catheter Laboratory Practitioner such as increased staff flexibility and improved turnover of cases. Moreover, utilisation across the disciplines helped to reduce the risk of competence degradation.

5.2.4 Education package

The education package was another method to help all disciplines understand the purpose, role and scope of the Catheter Laboratory Practitioner. The education package also helped to break down discipline barriers and scepticism of the Catheter Laboratory Practitioner and start to build collaboration and commitment across the team. The education package helped the trust make effective decisions, through highlighting the scope, role and benefit of the Practitioner. Moreover, the education package helped the trust understand the support requirements of the Catheter Laboratory Practitioner and what the trust, hospital and Cardiac Catheter Laboratory disciplines would need to do to ensure the Catheter Laboratory Practitioner was supported, trained to the required level of competence and utilised. The following example was reported:

“The meetings took place to help everyone (managers, mentors and candidates for the post) understand the role and scope of the Catheter Laboratory Practitioner and the competencies. This helps build collaboration and understanding, but also helped us understand the support requirements for the role.”

This organisation highlighted that the educational package provided the opportunity to set expectations from the perspective of the BHF and the strategic health authority and help the hospital and student understand the demands and expectations which would be placed on their time and changes to their working practices.

The educational package also helped to break down barriers between disciplines and start to build collaboration and commitment to ensure the effective development and utilisation of the Catheter Laboratory Practitioner.

It should also be noted that the ideal time to use the education package appears to be when trusts are considering introducing the Catheter Laboratory Practitioner and could be run by the relevant strategic health authority.

5.2.5 Competence development and management of the Catheter Laboratory Practitioner

Effective competence development and management was used to ensure that when the Catheter Laboratory Practitioner was utilised they could carry out their duties to the standard required. Moreover a competent and utilised Catheter Laboratory Practitioner has a much greater impact on service provision. Also ensuring that competence was developed through mentors across the disciplines within the Cardiac Catheter Laboratory setting, enhanced collaboration and commitment to ensure the Catheter Laboratory Practitioner was developed, management and utilised effectively.

The following example was reported:

“Competence development and management occurs through the mentors. This ensures collaboration and commitment to my development and opportunity to practice.”

This organisation reported that the benefit of competence management was that it helped to provide a systematic plan for competence development, ensuring that time, support and opportunity for practice was identified for each discipline. This also enhanced commitment from all parties to the development, management and utilisation of the Catheter Laboratory Practitioner.

5.3 Case study examples of implementation and benefits

The following section details three case studies taken from the evidence base, that highlights how the Catheter Laboratory Practitioner can be implemented and utilised within the Cardiac Catheter Laboratory setting and the benefit this has brought the hospital in question.

5.3.1 Case study 1

Driver for the Catheter Laboratory Practitioner

Resource management was the key driver for the use of the Catheter Laboratory Practitioner. The Catheter Laboratory Manager identified that the hospital was short of Radiographers and Physiologists. Also there was the prospect of opening another Cardiac Catheter Laboratory. The Catheter Laboratory Manager believed the Catheter Laboratory Practitioner could help cover the resource gap in the most cost effective manner to help keep the new lab open.

Approach

A key enabler for the success of the Catheter Laboratory Practitioner was to get buy-in from the professions. This was achieved through highlighting the positive impact the Catheter Laboratory Practitioner could have on resource management and how this could help the professions effectively manage and increase their resource in a cost effective manner. Indeed both Cardiac and Radiographer professions provided funding for the in-house development and employment of the Catheter Laboratory Practitioner which meant they had a vested interest in their success.

During the course, the Catheter Laboratory Practitioner worker was rotated to do 2 days a week within the Cardiac Physiologist role. This was then swapped half way through the course for 2 days within the Radiographer role. Thus the Catheter Laboratory Practitioner was given the opportunity to practice and develop within the role, while also building relationships within the professions. This approach of course relied on having available resource in the first place.

Moreover, both professions identified competence degradation as a key risk with the Catheter Laboratory Practitioner and hence ensured that the Catheter Laboratory Practitioner practiced in all professions - 2 days as a Nurse (pre-assessment), 1 day as a Cardiac Physiologist and 1 day as a Radiographer

Benefit

The main benefit of the Catheter Laboratory Practitioner was to cover resource, in terms of covering for shortages and helping to staff the new Laboratory. The level of staff flexibility provided by the Catheter Laboratory Practitioner helped maintain utilisation of the Laboratories. The Catheter Laboratory Practitioner also operated until 18:00 and was therefore able to practice as a Physiologist for an hour providing a cost and resource benefit.

5.3.2 Case study 2

Driver for the Catheter Laboratory Practitioner

The driver for the Catheter Laboratory Practitioner(s) was to create a change in professional practice that provided more staff flexibility, allowing the Catheter Laboratory to cope with future demands, such as PPCI and 24 hour service.

Approach

A business case was developed to highlight firstly the scope of the Catheter Laboratory Practitioner, that is, to undertake aspects of the Nursing, Radiographer and Cardiac Physiologist role, not a replacement of the discipline. Secondly the business case highlighted how the Catheter Laboratory Practitioner was used within other countries and the benefits that it had brought Cardiac Catheter Laboratories in these countries. Finally the business case focused on the benefits the Catheter Laboratory Practitioner could bring to the trust and the disciplines within the Cardiac Catheter Laboratory. These benefits focused on improvement in patient experience, through reductions in bed stay; potential increase in turnover of cases, through increased laboratory utilisation; ability to tackle potential short falls in staff and offer new services such as primary PCIs, by removing staffing restrictions on service delivery, through increased staff flexibility.

A job specification was developed in collaboration with the disciplines and sent to the Department of Health (DOH) Agenda for Change, for acceptance. The job specification detailed the competencies required for the role and the activities the Catheter Laboratory Practitioner expected to carry out. The job specification also provided the formalised name of the role to be introduced. In this case – Catheter Laboratory Practitioner.

A job specification was also developed for the Trainee Catheter Laboratory Multi-Skilled Practitioner. This detailed the role and scope for the Trainee Catheter Laboratory Multi-Skilled Practitioner and the competencies they needed to achieve to become a Catheter Laboratory Multi-Skilled Practitioner.

A job plan was developed, in collaboration with the disciplines, each week to determine the days when the Catheter Laboratory Practitioner would be used and the disciplines the Catheter Laboratory Practitioner would be covering. The job plan aimed to ensure that the Catheter Laboratory Practitioner was utilised across the week, ideally across the disciplines. As this was a formalised document, all disciplines ensured that it was achieved.

The job plan also set aside one afternoon per week for dedicated Catheter Laboratory Practitioner sessions. That is, one afternoon per week, one of the Cardiac Catheter Laboratories was used only by Catheter Laboratory Practitioners and a consultant, to work through cases.

Benefit

The introduction of the Catheter Laboratory Practitioner brought about a range of benefits. Staff flexibility was increased allowing the Cardiac Catheter Laboratory to cope better with PPCIs and the 24/7 service.

The laboratory also felt that patient experience was improved because carrying out PPCIs reduced the bed stay of the patient, enhancing experience. It was also felt that the introduction of the Catheter Laboratory Practitioner had a cost benefit attached, in that the Laboratory was able to offer more services and a better experience by using the same level of resource. Finally during elective angiograms the hospital had reduced the number of staff to 3 (1 Cardiologist and 2 Catheter Laboratory Practitioners). This has had a resource and cost benefit.

5.3.3 Case study 3

Driver for the Catheter Laboratory Practitioner

The driver for the Catheter Laboratory Practitioner(s) was to provide a solution that would help the hospital maintain a 24 hour service, with staff shortages in the Cardiac Physiologist discipline.

Approach

The education package was held as a meeting with relevant managers (Cardiac Catheter Laboratory, discipline managers), identified mentors of the candidate and the candidates themselves who wished to undertake the training. The meeting covered the role and scope of the Catheter Laboratory Practitioner, each competency that the candidate was required to achieve and highlight the support requirements of the Catheter Laboratory Practitioner.

A further meeting was then hosted which took place within the first few weeks of students enrolment on the course. This was to establish the extent to which individuals had been provided an opportunity to train within their hospital outside of their original discipline and also attend training as necessary.

This arrangement of action meetings was used to help disseminate good practice on the implementation and utilisation of the Catheter Laboratory Practitioner.

A mentor from each discipline was identified who would identify opportunities for development of skill and knowledge within that discipline and assess achievement of the discipline specific competencies.

The candidate(s), Catheter Laboratory Manager and mentors had a strategy meeting to identify how each competency would be achieved, the experience and practice required to achieve the competency, the time and support required from the candidate and the mentor for achievement and how assessment would take place.

A meeting to determine on-going competence management and assessment needs was to be developed once the candidate had become a Catheter Laboratory Practitioner.

Benefit

The Catheter Laboratory Practitioners are still in training however, through practice as part of the training several benefits have emerged. The use of the Catheter Laboratory Practitioner during procedures had helped increase efficiency of the process, by removing potential bottlenecks. Also the Catheter Laboratory Practitioner helped improve the management of current lists and reduce the risk of procedural postponements, (elective cases) due to staff shortages. It was also felt that the Catheter Laboratory Practitioner provided the patient with better care, through improved communication.

Finally it was felt, that once the Catheter Laboratory Practitioner had finished their training, this would help the hospital manage its 24 hour service and also allow them to manage the current shortfalls in Cardiac Physiologists.

5.4 Proposed model of change management

5.4.1 Introduction

The evidence highlighted that several hospitals at time of reporting, were implementing key processes to ensure that the Catheter Laboratory Practitioner was managed and utilised effectively. However the evidence also indicated that these processes were not being implemented as part of a wider holistic management of change in working practices.

This means that although the enablers described in section 5 helped enhance the implementation and utilisation of the Catheter Laboratory Practitioner, they would be more effective if they were part of an overall change management program.

The following section summarises a change management program, which can be adopted by hospitals to implement the Catheter Laboratory Practitioner. This model is based on work carried out by Greenstreet Berman¹ and guidance from the HSE (Health and Safety Executive).

5.4.2 Understanding requirements

Understanding the requirement for change is the foundation of effective change management. In the case of the Catheter Laboratory Practitioner, the hospital and trust need to determine the issue they are trying to solve by the change. For example dealing with staff shortages or introduction of a new service and the extent to which the introduction of the Catheter Laboratory Practitioner will effectively solve that issue. For example based on the evidence from the research if a hospital wanted to improve their door-to-balloon time for PCIs, the Catheter Laboratory Practitioner is unlikely to be the solution to solve this problem. Whereas if the hospital wishes to reduce downtime of the Laboratory caused by staff shortfalls, the Catheter Laboratory Practitioner is likely to be a helpful solution.

Once the requirements for change are understood, these requirements need to be communicated and “sold” to relevant decision makers and influential personnel. The development of a business case (case study 2) is an excellent method to build the case for change. In the case of the Catheter Laboratory Practitioner the business case will need to detail the role the Catheter Laboratory Practitioner will play and the benefits that they will bring, specifically matched to the Cardiac Catheter Laboratory issues facing the hospital.

A common method used to help “sell” the business case and need for change is the use of change champions. These are individuals who are influential within the work setting and can help promote the need to change both formally and informally.

Moreover these “change champions”, along with other relevant decision makers can make up a “change committee” who take the responsibility to manage the change and ensure that it is effectively implemented within the work setting.

¹ Greenstreet Berman (2001) Development of a multi-skilling life cycle model. HSE books

5.4.3 Assessing risk

Once the change has been agreed, in this case the introduction of the Catheter Laboratory Practitioner, the hospital and trust need to assess and understand the potential risks such a change may introduce into the working setting. This needs to consider the risk to patients, service delivery and other employees.

For example, the evidence from this research project has highlighted several key risks associated with the Catheter Laboratory Practitioner and current implementation practice. This includes:

- Catheter Laboratory Practitioner working outside their level of competence, potentially working unsupervised while still training;
- Catheter Laboratory Practitioner working out of hours with no “back up” support from the relevant dedicated profession;
- Insufficient utilisation of the Catheter Laboratory Practitioner, leading to competence degradation;
- Reductions in staffing numbers to carry out procedures, reducing the resilience of the team to tackle abnormal situations.

Without effective risk assessment relating to change management an organisation will not be able to identify the potential consequences of the change and proactively tackle them. Indeed risks associated with change often do not surface until several years after a change has occurred and are normally uncovered when an incident or accident occurs.

Once risks have been identified, risk control measures need to be put in place to ensure these risks do not surface.

Considering the risks already identified by this research (described above) three potential risk controls would be a detailed job specification (case study 2), job plan (case study 1 and 2) and competence management system (case study 3).

For example, the job specification will clearly detail the role and scope of the trainee Catheter Laboratory Practitioner, including supervision arrangements and working inside levels of competence. A separate job specification for the Catheter Laboratory Practitioner will also detail role and scope, impact on staffing numbers (if and when it is ok to reduce staffing numbers) and indicate the supervision or support arrangements for the Catheter Laboratory Practitioner working within normal hours and out of hours.

Finally the job plan and competence management system can help tackle and detect competence degradation. The job plan will aim to help ensure the Catheter Laboratory Practitioner can practice in all professions, while the competence management system will assess levels of competence and detect any degradation.

5.4.4 Management commitment

The evidence from this research has highlighted that without commitment across the disciplines and management, the Catheter Laboratory Practitioner will not be implemented effectively, especially as commitment from all disciplines and managers is needed to ensure that the Catheter Laboratory Practitioner has the time and opportunity to train and develop competence and practice their skills once they have completed their training. The introduction of the Catheter Laboratory Practitioner does require substantial commitment and effort from all involved to ensure the change takes place.

Commitment needs to be demonstrated both at an operational level and strategic level. At the operational level effective leadership behaviours to exhibit during change are:

- show interest and support for change
- encourage and reward positive behaviours to the change;
- ensure allocation of resources and time are appropriate to ensure change is implemented
- support change champions and individuals undertaking the change.

As described in case study 3, recruiting mentors from each discipline to help support and develop the Catheter Laboratory Practitioner is an excellent approach to demonstrate commitment, especially as it demonstrates interest in the change, helps the allocation of resources, supports the individual undertaking the change and provides opportunities to reward positive behaviours.

At the strategic level support can come from the strategic health authority or other relevant organisations (case study 3). The education package was run by the relevant strategic health authority and helped demonstrate the support and commitment the authority was willing to provide.

5.4.5 Involvement and communication

Involvement and communication is essential for the success of a change initiative. As the evidence from this research has indicated that poor communication and involvement can have a significant impact on the implementation of the Catheter Laboratory Practitioner.

For example, poor communication can lead to people not fully understanding the role of the Catheter Laboratory Practitioner and potentially being resistant to the idea. Inadequate involvement of relevant individuals can mean that specific trust and staffing restrictions are not identified and tackled before the Catheter Laboratory Practitioner is introduced.

Indeed, when carrying out the field work for this project, there were a number of cases where either the Laboratory Manager or discipline manager did not know that an individual was undertaking the Graduate Certificate in Adult Cardiac Catheter Laboratory (CCL) Practice.

For the implementation Catheter Laboratory Practitioner to be effective, consideration needs to be given to involvement and communication between disciplines, Laboratory Manager and student.

Based on the evidence from this project this involvement and communication needs to focus on:

- understanding trust and staffing restrictions and developing collaborative working to identify solutions
- developing across the disciplines an understanding of Catheter Laboratory Practitioner and the benefits it will bring

- identifying how each relevant individual can help support the change process and the responsibilities they need to undertake
- communicating progress and barriers that arise to implementation.

Case studies 1, 2 and 3 highlight involvement and communication in that all relevant individuals were required to discuss the Catheter Laboratory Practitioner role, the support requirements and the responsibilities each person held to ensure the change took place.

5.4.6 Measurement

Measurement of the change is essential to help the hospital and trust understand how effective the change has been and areas for development. As the evidence from this project has highlighted, at the time of reporting the measurement of the success of the Catheter Laboratory Practitioner was limited and focused mainly on qualitative impacts.

However the evidence highlighted indicators where the Catheter Laboratory Practitioner could influence and hence measurement would be advantageous. This included:

- communication of procedures to the patient
- cancellations or postponements caused by resource management
- turnover of cases
- utilisation of the Laboratory
- introduction of new services
- management of staff vacancies
- staffing numbers for procedures.

Although not covered by this research project, measurement of organisational indicators, such as bed stay and cost savings would also be beneficial.

To ensure measurement is effective, the indicators need to be matched to the original issue the hospital or trust were looking to solve by the change. Moreover measurement should involve:

- development of clear objectives
- identification of indicators to measure the objectives
- collection of data (quantitative and qualitative) for each indicator
- data collected, ideally before and after the change.

5.4.7 Sustain and embed

Ensuring the Catheter Laboratory Practitioner is embedded and sustained as a permanent change in working practices, is essential for long lasting change and realisation of benefits. Indeed the risk for the Catheter Laboratory Practitioner is that without a permanent change in working practices, changes in resource demands or demands in other areas, could mean the individual working as the Catheter Laboratory Practitioner may be required to revert back to working only in their own profession.

This has already been reported:

“Insufficient staff across all disciplines means that it has now been five months since previous practice as a Catheter Laboratory Practitioner”.

The following steps can help ensure change is sustained and embedded:

- identifying the strengths of the change process and ensure their continued support
- identifying the development areas that resulted from the measurement of the change
- developing new objectives and goals to maintain momentum
- providing feedback to the all relevant individuals involved and continually encourage involvement and communication to maintain and embed the change

Goal setting will help lead to the development of new objectives to ensure momentum is maintained.

Goals can be developed using the SMARTER method:

S = Specific

M = Measureable

A = Achievable

R = Realistic and relevant

T = Time bound

E = Evaluated

R = Reviewed

Also the on-going management and assessment of competence can help to identify strengths and development needs, in terms of competence and ongoing maintenance of skills (case study 3).

Moreover, formalised processes such as a job specification and job plan (case study 1 and 2) are likely to help ensure that changes are embedded, ideas from the measurement stage can be used to identify how these systems and process can be enhanced to ensure continued change and realisation of benefits.

6 CONCLUSIONS

6.1 Changes in laboratory practice and benefits

The evidence gathered during this project is currently qualitative. This was due to the low levels of implementation and utilisation of the Catheter Laboratory Practitioner.

The evidence indicated that the Catheter Laboratory Practitioner could help resolve the problems arising from a shortfall in Cardiac Physiologists, Nurses and Radiographers, through increasing staff flexibility. This was because the Catheter Laboratory Practitioner could be utilised as either a Nurse, Radiographer or Cardiac Physiologist, within the laboratory and hence reduce the resource management constraints for hospitals associated with ensuring that the roles relating to patient management (Nursing), diagnostic imaging (Radiographer) and Cardiac Physiologist were undertaken only by individuals from those disciplines.

Moreover, the evidence indicated that the number of staff required to conduct an angiogram and angioplasty could be reduced from five to four. This was because opportunities for multitasking and cross-disciplinary working, during a procedure were increased when a team of Catheter Laboratory Practitioners was utilised.

Flexibility could therefore help hospitals who wish to:

- maintain current levels of service despite being unable to fill vacant Catheter Laboratory staff posts
- increase levels of service without increasing the size of the non-medical workforce
- maintain current levels of service but are required to reduce the size of their non-medical workforce.

Flexibility also had two additional benefits.

It could help increase laboratory utilisation when laboratory downtime was due to shortfalls in resource because the Catheter Laboratory Practitioner could replace either a Nurse, Radiographer or Cardiac Physiologist. This in turn provided the hospital with an opportunity to process more cases.

Staff flexibility was also thought to have the potential to help hospitals introduce certain services, mainly primary PCIs, opening a new Catheter Laboratory and introducing a 24 hour service. This was because the Catheter Laboratory Practitioner(s) provided a solution to help manage the unpredictability in resource demand, introduced by these new services.

However, the evidence indicated that the best way to achieve these benefits was for a hospital to train at least two Catheter Laboratory Practitioners, with a focus on developing a team of Catheter Laboratory Practitioner(s).

The two main areas where the Catheter Laboratory Practitioner did not have an impact was angiogram waiting times and door-to-balloon time. This was because these performance measures were affected by a range of variables beyond resource management. Moreover, the introduction of the Catheter Laboratory Practitioner did not seem to speed up the completion of a procedure in any significant way due to the sequential nature of the procedural tasks.

6.2 Implementation and utilisation of the Catheter Laboratory Practitioner

It can be concluded from the evidence that between 2009 and March 2011 implementation and utilisation of the Catheter Laboratory Practitioner was unplanned and ad-hoc, with the Catheter Laboratory Practitioner only being utilised when needed to cover staffing shortfalls. This level of utilisation meant that hospitals were unlikely to realise the full benefits of the Catheter Laboratory Practitioner as long term changes to working practice were unlikely to occur. Moreover, this level of utilisation could lead to competence degradation which could have a significant impact on patient safety.

This level of utilisation was caused by inadequate introduction of change management processes, by hospitals who had tried to implement the Catheter Laboratory Practitioner. Inadequate change management could lead to the introduction of three key barriers, staff restrictions, trust restrictions and lack of understanding of the Catheter Laboratory Practitioner role. These barriers could make it very difficult for hospitals to fully implement and utilise the Catheter Laboratory Practitioner.

6.3 Recommended practice to enhance implementation and utilisation

It can be concluded from the evidence that a few hospitals at time of reporting fully utilised the Catheter Laboratory Practitioner and were making long term changes to their working practices and realising the benefits this brings. This was achieved through the implementation of certain change management processes. Examples of this include:

- development of a business case
- job specification and job plan
- education packages
- competence development and management of the Catheter Laboratory Practitioner.

However the evidence indicated that these processes were not introduced all together as part of a wider holistic management of change program. For example one hospital introduced a job specification, business plan and job plan while another introduced the education package and competence management system.

Implementing such a program would ensure the effective and long-lasting utilisation of the Catheter Laboratory Practitioner.

A change management model has therefore been proposed for hospitals looking to implement the Catheter Laboratory Practitioner and consists of the following stages:

- understanding requirements
- assessment of risk
- management commitment
- Involvement and communication

- Measurement
- Sustain and embed.

Using this model can help hospitals to structure the implementation of the Catheter Laboratory Practitioner and incorporate good practices currently being implemented by several hospitals.

Finally this evaluation recommended that:

- The British Heart Foundation develop additional training and advice in change management;
- The concept of the Catheter Laboratory Practitioner is re-launched as part of a wide management of change initiative.

APPENDIX A: DATA COLLECTION METHODS

The following section provides details of the data collection methods and response rates.

Data request

The performance data was sought using a data request form and covered measures such as:

- waiting times for angiograms
- door-to-balloon time
- total number of angiograms and PCI's
- total number of postponements and cancellations of elective angiogram procedures.

The response rate from the data request was low (five completed data requests out of 34 hospitals in the experimental group, a response rate of 15%; and 21 completed data requested from 94 hospitals in the control group, a response rate of 22%).

It should be noted that due to the low levels of implementation and utilisation of the Catheter Laboratory Practitioner the data requests form was not fully utilised across the project as the main purpose of the tool, was to gather quantitative baseline data for the originally proposed before and after comparisons.

Quick fire questions

Greenstreet Berman Ltd asked Cardiac Catheter Laboratory managers a set of “quick fire” questions over the phone. The quick fire questions focused on obtaining where possible quantitative data on key performance measures (experimental and control group) and qualitative data around the perceived impact of the Catheter Laboratory Practitioner, factors that affect impact and utilisation of the Catheter Laboratory Practitioner (experimental group only).

Example questions include:

- do you have any vacancies for Nurses, Radiographers and Cardiac Physiologists?
- do you use multi skilled workers and when did you start using them? If using why? If not why not and what would make you start using them?
- do you know your average waiting time for angiograms?
- do you know your average door-to- balloon time?
- do you know how many angiograms on average are cancelled or delayed due to resource?
- are you a diagnostic Cardiac Catheter laboratory, intervention Cardiac Catheter laboratory or both?

The use of the quick fire questions improved the response rate within the experimental group (27 hospitals completed quick fire questions from 34 in the experimental group, a response rate of 74%). Although the impact was less significant for the control group (8 hospitals completed the quick fire questions from 94, a response rate of 4%).

Myocardial Ischaemia National Audit Project.

This provided the recorded PPCI recorded door-to- balloon time for all hospitals, within the experimental and control group from 2007 to 2010. The evidence provided average door-to-balloon time and demonstrated the trends in performance across a three year period.

Evidence from the Myocardial Ischaemia National Audit Project was used to provide a comparison of door-to- balloon between control and experimental group. This comparison was undertaken to help understand the current trends in door-to-balloon time, if the control and experimental group differed in terms of door-to-balloon time and whether there was potential for the Catheter Laboratory Practitioner to affect improvements in door-to-balloon time.

Patient experience

This data was gathered using a patient experience questionnaire. This questionnaire covered:

- overall satisfaction with the waiting time (referral to treatment)
- staff – patient communication of treatment and procedure
- patient care provided by cardiac catheter laboratory staff in terms of privacy, dignity, support
- level of support and attention provided by cardiac catheter laboratory staff
- level of patient confidence in the ability of the cardiac catheter laboratory staff
- overall satisfaction with the quality of care and treatment provided
- potential improvements catheter laboratory staff can make to improve the care and treatment provided to the patient.

The response rate for the patient experience questionnaire was relatively low and also biased towards the control group (five patients completed the patient experience questionnaire from one hospital in the experimental group, 108 patients completed the patient experience questionnaire from seven hospitals within the control group).

It should be noted that the patient experience questionnaire was not fully utilised across the project. Firstly its purpose was to gather baseline data for a before and after comparison. Secondly because it was highlighted by hospitals and other partners that from the patient perspective they would be unable to determine if they were treated by a team with a Catheter Laboratory Practitioner and hence provide data on the impact that Catheter Laboratory Practitioner had on their experience.

To supplement this, qualitative data regarding the impact the Catheter Laboratory Practitioner could have on patient experience was sought from Catheter Laboratory Managers who sent students on the course and the students themselves.

Cardiac Catheter Laboratory Manager interview

The Cardiac Catheter Laboratory manager interview was carried out with managers after the student had finished the course. This interview covered areas such as:

- Catheter Laboratory Practitioner impact on patient experience and cardiac catheter laboratory services
- multi-skilling model (adoption, application, enablers and barriers to application);

- staff collaboration and communication;
- impact on students promotional prospects;
- reasons for sending students on the course; and

Out of a possible 14 Cardiac Catheter Laboratory Managers, eight managers took part in the interview (a response rate of 57%), six of whom were utilising the Catheter Laboratory Practitioner in some form.

Catheter Laboratory Practitioner on-line questionnaire

All students who completed the course (17 students at time of reporting) were asked to complete Part B of an on-line questionnaire, 6 months after completing the course. Part A was completed in year 1 of the project.

The online questionnaire covered areas such as:

- the impact of the course on professional achievement and skills and knowledge
- the impact of new knowledge and skills on patient care
- the impact of new knowledge and skills on Cardiac Catheter laboratory services.

Out of a possible 17 students, 11 completed the on-line questionnaire (a response rate of 65%), seven of which were being utilised in some form as a Catheter Laboratory Practitioner.

Catheter Laboratory Practitioner interview

All students who completed the course (17 students at time of reporting) were asked to take part in an interview to supplement the data gathered from the on-line questionnaire. The interviewed covered areas such as:

- the level of utilisation of the Catheter Laboratory Practitioner and how the Practitioner is used within the Cardiac Catheter Laboratory
- perceived impact the Catheter Laboratory Practitioner can have on performance and patient care
- barriers experienced that affected utilisation of the Catheter Laboratory Practitioner
- practices and improvement areas to enhance utilisation.

Out of a possible 17 students, 10 took part in the interview (a response rate of 59%), 8 of which were being utilised in some form as a Catheter Laboratory Practitioner. This is a respectable response rate.

Site visits

Site visits were carried out to understand how hospitals were planning to implement the Catheter Laboratory Practitioner, the practices being implemented to enhance utilisation and the challenges that hospitals face. The site visits also investigated what support stakeholders such as the BHF, strategic health authorities etc could provide to help hospitals effectively implement the Catheter Laboratory Practitioner.

Observations of angiograms and angioplasties were undertaken with (experimental group) and without (control group) a Catheter Laboratory Practitioner. These observations were used to develop high-level process maps of the procedures and help qualitatively assess how the Catheter Laboratory Practitioner can change Cardiac Catheter Laboratory practice and the potential benefits this brings.

The site visits involved interviewing the Cardiac Catheter Laboratory Manager, Catheter Laboratory Practitioner(s). Seven site visits were carried out, six hospitals within the experimental group and one hospital in the control group.

APPENDIX B: QUICK FIRE QUESTIONS

- Do you have any vacancies for Nurses, Radiographers and Cardiac Physiologists?
- Do you use multi skilled workers and when did you start using them? If using why? If not why not and what would make you start using them?
- Do you know your average waiting time for angiograms?
- Do you know your average door-to-balloon time?
- Do you know how many angiograms on average are cancelled or delayed due to resource?
- Are you a diagnostic Cardiac Catheter laboratory, intervention Cardiac Catheter laboratory or both?
- Are the majority of your patients elective, emergency or both?
- How many Cardiac Catheter laboratories do you have?
- What are your staffing requirements for running the Cardiac Catheter laboratory?
- Why have you not sent anyone on the course?
- What does having a multi-skilled worker allow you to do which you could not do before?

APPENDIX C: DATA REQUEST

Background				
NHS trust				
Catheter Lab Manager				
Telephone number				
Email				
Number of elective patients the lab processes per year				
Number of emergency patients the lab processes per year				
Please describe your staffing requirements for operating the catheter lab				
Is this a local NHS policy or National Policy	Local Policy	Yes/No	National Policy	Yes/No

Calendar Year	2006	2007	2008	2009	2010
Performance measure					
Total number of procedural postponements, for each of the following years					
What was the average length of the postponements (Hours, days, months?)					
Average waiting time ² for all angiograms in weeks for each of the following years					
Average door-to-balloon time in minutes for each of the following years, (excluding out of hours response, if applicable)					
Average out of hours door-to-balloon time in minutes for each of the following years (if applicable)					
Total number of angiograms completed, for elective patients, for each of the following years					

² This is the waiting time from referral to treatment

Calendar Year	2006	2007	2008	2009	2010
Total number of angiograms completed, for emergency patients, for each of the following years					
Total number of PCIs completed, for elective patients for each of the following years					
Total number of PCIs completed, for emergency patients for each of the following years					
Number of complaints received by elective and emergency patients, for the following years ³					
Number of vacancies at the start of each year specified for:					
Nurse					
Radiographer					
Cardiac Physiologist					
Number of posts filled at the end of the year specified for:					
Nurse					
Cardiac Physiologist					
Radiographer					
Number of staff in the catheter lab who resigned or took early retirement for the following years					
Number of staff who have been made redundant for the following years					
Have you use multi-skilled workers ⁴ in the catheter lab for the following years	Yes/no	Yes/no	Yes/no	Yes/no	Yes/no

³ This only refers to complaints made by patients concerning the services provided by the catheter lab (e.g. procedures carried out, waiting times etc) and patient care while in the catheter lab

⁴ The use of the term Multi-skilled worker refers to an individual trained to practice aspects of the following three roles within the catheter lab: Radiographer, Cardiac Physiologist and Nurse.

APPENDIX D: PATIENT EXPERIENCE QUESTIONNAIRE

Hospital					
Age (years)		Male		Female	
Were you an elective or emergency patient (circle the appropriate response)		Elective		Emergency	
Patient Experience (please circle what you think is the most appropriate response for each question)					
How satisfied were you with the time that you had to wait from knowing about the procedure to it taking place?					
Very satisfied	satisfied	Not sure	unsatisfied	Very unsatisfied	Cannot answer

Please tick one box per question					
	Yes completely	Yes to some extent	Not sure	Not really	Not at all
During your visit to the hospital for your procedure did the catheter laboratory staff⁵:					
Clearly explain to you the details of your procedure/treatment?					
Provide you with enough information about your treatment/procedure?					
Treat you with respect and dignity?					
Give you enough privacy when being examined or treated?					
Make you as comfortable as possible?					

⁵ Please consider **only** the staff working in the catheter laboratory during your procedure

Talk to you and relieve any concerns you had regarding your procedure/treatment					
Help to put you at ease?					
Explain the reason for the angiogram in a way you could understand?					
Explain the risks of the angiogram in a way you could understand?					
During your visit to the hospital for your procedure did you feel:	Yes completely	Yes to some extent	Not sure	Not really	Not at all
Confident in the ability of the catheter laboratory staff					
The catheter laboratory staff provided you with high quality care					
The catheter laboratory staff provided you with enough attention and support					
Overall how would you rate the overall care and treatment provided to you by the staff within the catheter lab?	Very good	Good	Not sure	Poor	Very poor
What could the catheter laboratory staff have done to improve the care and treatment provided to you?					

APPENDIX E: CATHETER LABORATORY MANAGER INTERVIEW

Part 1 Background Information	
Name of trust	
Number of catheter labs in Trust	
Number of staff within the labs	
Please describe your staffing requirements for operating the catheter lab	
Is this a local NHS policy or National Policy	
Number of elective patients the lab processes per year	
Number of emergency patients the lab processes per year	
Contact details (for future follow up)	
Any other relevant information	

Part 2 – Impact on patient experience					
Q1 In your opinion to what extent has introducing cath lab staff who are multi-skilled ⁶ after completing the course:	Significant improvement	Some improvement	No improvement	Got worse	Got significantly worse
Improved the patient's experience of the catheter lab					
Improved patient diagnoses and treatment					
Improved the quality of care provided to the patient					
Improved the quality of communication and explanation of treatment					
Reduced diagnosis and treatment errors					
Led to faster diagnosis					
Q2 Why is this? Can you provide specific examples of how introducing cath lab staff who are multi-skilled after completing the course affected patient care?					

⁶ The use of the term Multi-skilled worker refers to an individual trained to practice aspects of the following three roles within the catheter lab: Radiographer, Cardiac Physiologist and Nurse.

Q3 Since introducing catheter lab staff who are multi-skilled after completing the course, do you think patients:	No	To some extent	Yes
Have more confidence in staff?			
Feel more at ease in the catheter lab?			
Wait less time for treatment			
Feel more supported by staff			
Q4 Why do you think this is?			

Part 3 Impact on cardiac catheter lab services as a result of introducing multiskilled workers into a cardiac catheter lab setting					
Q4 In your opinion what impact has introducing cath lab staff who are multi-skilled after completing the course had on:	Significant improvement	Some improvement	No improvement	Got worse	Got significantly worse
Procedural postponements					
Waiting times ⁷ for angiograms					
Turnover between cases					
Utilisation of the cath lab					
Response time out of hours					
Q5 Why do you think introducing multiskilled workers into a cardiac catheter lab setting has had this impact and can you provide specific examples of how introducing cath lab staff who are multi-skilled after completing the course affected service?					
Q6 In your opinion do you think the catheter lab runs more efficiently and effectively as a result of the student(s) being multi-skilled after completing the course? Why is this?					

Part 4 Multi-skilling model			
Q6 Since students have completed the course to what extent has the multi-skilled worker model been adopted within your cath lab	Full adoption	Partially Adoption	No adoption
Q7 Was the multi-skilled worker model adopted in the cath lab before sending professionals on the course	No	To some extent	Yes

⁷ This is the waiting time from referral to treatment

Q8 If adopted what are the reasons for adoption? (explore enablers). If not adopted, what are the reasons for non-adoption? (explore barriers) (<i>interview note: if adopted ask Qs 9&10, if not adopted ask Q11&12</i>)											
Q9 If adopted, what benefits does the adoption of the multi-skilled worker model bring to the cath lab, in terms of service and patient experience? Why?											
Q10 Does adoption of the multi-skilled worker model bring any disadvantages to the cath lab, in terms of service and patient experience? Why?											
Q11 If not adopted, what advantages does not adopting the multi-skilled worker model bring to the cath lab, in terms of service and patient experience and why?											
Q12 If not adopted, what disadvantages does not adopting the multi-skilled worker model bring to the cath lab, in terms of service and patient experience and why?											
Q13 Approximately, what proportion of the time do you think multi-skilled workers practice in the other professions	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%
	←-----										
Q14 Why is this?											
Q15 What are the enablers and barriers to ensuring multi-skilled workers practice in the other professions?											
Q16 Overall what do you think could be done to encourage the adoption of the multi-skilled worker model by more trusts?											
Q17 In your opinion what impact has introducing cath lab staff who are multi-skilled after completing the course had on staff turnover and filling vacancies?	Significant improvement	Some improvement	No improvement	Got worse	Got significantly worse						
Q18 What impact has this (answer to Q17) had on the cath lab, in terms of service and patient experience and why?											
Q19 Overall what impact has the multi-skilled worker model had on resourcing (Explore impact on turnover, number of posts, ability to manage work with fewer staff, staff attraction and number of applications.) and how does this affect the cath lab in terms of service and patient experience and why?											

Part 5 Collaboration and communication					
Q20 In your opinion what impact has introducing cath lab staff who are multi-skilled after completing the course had on cooperation and collaboration between professionals in the cath lab?	Significant improvement	Some improvement	No improvement	Got worse	Got significantly worse
Q21 Why is this? (explore enablers and barriers)					
Q22 What impact has (answer to Q20) had on the cath lab, in terms of service and patient experience and why?					
Q23 To what extent do other professionals in the cath lab accept multi-skilled workers? How have they reacted to multi-skilled workers? (explore reasons for answer)					

Part 6 Impact on students promotional prospects					
Q24 What impact do you think the course has had on the promotional prospects of the student(s)	Significant improvement	Some improvement	No improvement	Got worse	Got significantly worse
Q25 Why is this? (explore reasons and examples of impact on promotional prospects)					
Q26 Do you think that students who have attended the course are now achieving more in their work? Why?					

Part 7 Perceptions of students competence			
Q27 Have you had any complaints about multi-skilled worker(s) from patients or staff, when the multi-skilled worker(s) is working out of their original profession?	Yes	No	
Q28 Do you believe the multi-skilled worker(s) can perform all three roles to the necessary level required? (Diagnostic imaging, patient management and cardiac physiology)	Yes	To some extent	No
Q29 Are Cath Lab staff confident the multi-skilled worker(s) can perform all three roles to the necessary level required?	Yes	To some extent	No
Q30 Why is this (for all three questions) and what impact this has had on patient experience and cath lab service?			

Part 8 Sending students on the course			
Q31 Why did you send students on the course? And have those reasons been met?			
Q32 Are you planning to send more students on the course?	Yes	No	Do not know
Q33 Please provide an explanation for your answer?			

Part 9 Suggested improvements
Q34 What improvements/alterations/additions do you think could be made to the course to enable students to deliver better patient care?
Q35 What improvements/alterations/additions do you think could be made to the course to enable students to deliver better cath lab services?

APPENDIX F: CATHETER LABORATORY PRACTITIONER ONLINE QUESTIONNAIRE

Working with patients					
The course has helped increase my ability to:	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Communicate with patients					
Explain to patients the treatment they will receive					
Put patients at ease and ensure they are comfortable					
Communicate with patients about their concerns					
Communicate with patients about their medical history					
Effectively carry out procedures					
In your opinion what impact has the development of your new skills and knowledge since completing the course had on:	Significant improvement	Some improvement	No improvement	Got worse	Got significantly worse
the patient's overall experience of the catheter lab					
the quality of care provided to the patient					

patient diagnoses and treatment					
patient confidence in cath lab staff					
Speed of diagnosis					
diagnosis and treatment errors					

Skills and knowledge					
Please indicate the extent to which you agree or disagree with the following statements					
	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
The course has increased my skill and knowledge to the necessary level required of a multi-skilled worker in the areas of:					
Diagnostic imaging					
Patient Management					
Cardiac Physiology					
Overall I believe the course has enabled me to deliver better patient care	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Overall I believe the course has enabled me to deliver better diagnostic procedures and treatment within the cath lab	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Professional achievement					
Please provide an indication of agreement for the following statements					
The course has increased my promotional prospects	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
The course has helped me achieve more in my role and profession	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
How satisfied were you in your role before going on the course?	Very satisfied	Satisfied	Not sure	Unsatisfied	Very unsatisfied
How satisfied are you now in your role since completing the course	Very satisfied	Satisfied	Not sure	Unsatisfied	Very unsatisfied
Have you been promoted since completing the course?	Yes		No		
Have you taken up a post since completing the course?	Yes		No		
If yes what to?	Job title:				
Have you received a pay increase following completion of the course?	Yes		No		
If yes was this linked to a change in job title?	Yes		No		

Multi skilling model					
Since completing the course I have been able to undertake a multi-skilled role in the cath lab	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

In a typical working week, approximately what proportion of your time do you spend working within the following professions												
Cardiac physiologist	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%	
Radiographer	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%	
Nurse	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%	
How difficult has it been to undertake a multi skilled worker model within your cath lab	Very difficult		Difficult		Not sure			Limited difficulty		Not difficult		
Have you been accepted as a multi-skilled worker by the other professionals in the cath lab?	Yes				To some extent			No				
Was the model of multi skilling adopted in the cath lab before you went on the course	Yes				To some extent			No				
What could be done to increase to adoption of multi-skilled roles within cath labs (free text)												
Do you believe the multi skilled worker model will have a positive impact on patient care	Yes				To some extent				No			
Do you believe the multi skilled worker model will have a positive impact on the services provided by your cath lab	Yes				To some extent				No			

Impact on cardiac catheter lab services as a result of introducing multiskilled workers into a cardiac catheter lab setting⁸					
In your opinion what impact has the development of your new skills	Significant improvement	Some	No	Got worse	Got significantly

⁸ The information requested within this table requires rough estimations only. It is not necessary to obtain data in order to complete this table.

and knowledge since completing the course had on:		improvement	improvement		worse
Waiting times for angiograms					
Turnover between cases					
Utilization of the cath lab					
Response time out of hours					
Why do you think the development of your new skills and knowledge since completing has had this impact?					
Overall do you think your new skills and knowledge since completing the course has/will have a positive impact on the services your cath lab provides	Yes	To some extent		No	
In your opinion do you think your catheter lab runs more efficiently and effectively as a result of you becoming multi-skilled after completing the course?	Yes	To some extent		No	
Why is this?					

Working relationship					
	Significant improvement	Some improvement	No improvement	Got worse	Got significantly worse
In your opinion what impact has the development of your new skills					

and knowledge since completing the course had on working relationships between yourself and other professionals in the cath lab					
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Please provide an explanation for your answer (free text)

Do you believe improving collaboration and cooperation between staff in the cath lab has/will have a positive impact on patient care	Yes	To some extent	No
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Do you believe improving collaboration and cooperation between staff in the cath lab has/will have a positive impact on the services provided by your cath lab	Yes	To some extent	No
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Suggested improvements

Do you have any other comments you would like to make about the course regarding what could be done to enable you to deliver better patient care and diagnostic procedures and treatment within the cath lab?

APPENDIX G: CATHETER LABORATORY PRACTITIONER INTERVIEW

Are you practicing as a Multi-skilled worker (MSW)?

If the answer is Yes:

1. How?
 - a. What profession do you practice in the role of?
 - b. What proportion of the time?
 - c. What activities do you undertake in each role as a MSW?
 - d. Why do you not practice in certain disciplines (What are the enablers and barriers)?
2. What do you think are the benefits to patient care with you practicing as a MSW? (ability to communicate with the patient better).
3. Do you think the greatest benefit is with
 - a. emergency or elective procedures?
 - b. diagnostic or treatment?
 - c. Why? Which aspects specifically/where in the process (i.e. prep of patient)?
4. Are there any restrictions to you practicing as a MSW?
5. Has becoming a MSW changed your career development at all?
6. How has the course affected collaboration and cooperation between professionals in the lab?
 - a. What impact do you think this has had on patient experience?
7. Why were you sent on the course?
 - a. Has this need been met?
8. What did your trust do to support the introduction of a MSW?
 - a. Monitor you practice?
 - b. Plan for you to able practice in each of the disciplines (i.e. rotor you in regularly)?
 - c. Communicate and get buy in from other staff?
9. What has been the impact of you practicing as a MSW?
10. Do you think there are any risks with you working as a MSW?
11. What are your thoughts on the MSW model and its use within the lab?
12. How can adoption of the MSW model be encouraged and best supported?
 - a. What is needed from the sector and BHF etc?
13. Were you the only one from your hospital to attend the course? (in the same year or previously)

If the answer is no

1. Why do you not practice in certain disciplines (What are the enablers and barriers)?
2. What did your trust do to attempt to support the introduction of a MSW?
 - a. before course completion?
 - b. after course completion?
 - c. plan for you to able practice in each of the disciplines (i.e. rotor you in regularly) - Why do you think this has not happened?
 - d. communicate and get buy in from other staff?
3. Why do you think your lab has not adopted the model of multi-skilling?
4. How has the course affected collaboration and cooperation between professionals in the lab?
 - a. What impact do you think this has had on patient experience?
5. Why were you sent on the course (resource, performance, throughput, down-time)?
 - a. Has this need been met?
6. In what setting do you think the MSW model would be most effective? (multiple labs, emergencies, diagnostics, more than one MSW)
7. What do you perceive to be the biggest potential benefits of being MSW if you could practice?
8. Are there any risks to using MSW that you think need to be addressed?

APPENDIX H: SITE VISIT PROFORMA

Catheter Laboratory Manager Discussion

- Please describe the process from patient entry to operation? What are the key steps and key roles and responsibilities?
- How is your catheter laboratory team structured?
- Please describe your operating environment, i.e. patients, services, number of procedures, patient population etc.
- What role does multi-skilled worker undertake in the process from patient entry to operation?
 - What are the benefits of this in terms of service, throughput and care?
- Where within the process is the multi-skilled worker of most benefit?
- Has using a multi-skilled worker meant you can offer different services?
- How do you manage the multi-skilled worker and determine the roles they can undertake?
- What is your rationale for using a multi-skilled worker?
 - Why is this model of multi-skilling suitable for your operation?
 - Since completion of the course has the multi-skilling approach been adopted by other staff within the lab?
- What impact do you think the multi-skilled was has had on:
 - waiting times for angiograms?
 - turnover between cases?
 - utilization of the cath lab?
 - response time out of hours?
 - diagnostic procedures and treatment ?
 - number of postponements?
 - overall service provided by the cath lab?
- What impact do you think the multi-skilled worker has had on:
 - patient's experience of the catheter lab?
 - the quality of care provided to the patient?
 - quality of communication and explanation of treatment to the patient?
 - patients confidence in staff?
 - patient stress within when in the cath lab?
- Why do you think this is?
- What impact does multi-skilling have on career development and your ability to effectively manage resource and number of patients?

Student discussion (where applicable) – if not student interview use re-frame these questions for the lab manager

- What were your reasons for attending the course? Have these been met? Were you the only one from your hospital to attend the course? (in the same year or previously)
- To what extent do you think the course provided you with the necessary skills and knowledge to enable you to deliver better patient care, diagnostic procedures and treatment within the cath lab?
- Specifically to what extent do you think the course has enhanced your ability to:
 - communicate with patients?
 - explain to patients the treatment they will receive?
 - put patients at ease and ensure they are comfortable?
 - communicate with patients about their concerns?
 - communicate with patients about their medical history?
- To what extent do you think the development of your skills and knowledge from the course has helped improve:
 - waiting times for angiograms?
 - turnover between cases?
 - utilization of the cath lab?
 - response time out of hours?
 - overall service provided by the cath lab?
- Why do you think this is?
- To what extent do you think the development of your skills and knowledge from the course has helped improve:
 - patient's experience of the catheter lab?
 - the quality of care provided to the patient?
 - quality of communication and explanation of treatment to the patient?
 - patients confidence in staff?
 - patient stress within when in the cath lab.
- To what extent do you think the development of your skills and knowledge from the course has or would help reduce diagnostic error rates?
- What impact do you think the course has had or will have on your professional achievement and promotional prospects and why?
- What are your overall perceptions of the multi-skilled worker model?

- To what extent do you think the multi-skilled worker⁹ model will have a positive effect on patient care and services provided by the cath lab?
- How much time do you spend applying your new skills and knowledge from the course in the cath lab?
 - What are the enablers and barriers to applying your skills and knowledge developed on the course?
 - Are there certain roles that you perform more often than others?
 - Are there any restrictions to you practicing as a multi-skilled worker? (e.g. out of hours)
- To what extent do you think your lab has adopted the model of multi-skilling? Why do you think this has/not happened? What affect does this have on the level of service and patient care provided?
- Did you have multi-skilled workers within the lab before you were sent on the course? If so why?
- To what extent do your colleagues accept you as multi-skilled worker?
 - Has this differed between the three disciplines (Nurses, radiographers, physiologists)?
 - What factors do you think have contributed to this level of acceptance? (e.g. previous students on the course)

Observation of working in Catheter Laboratory

Things to look for or ask during observation:

- What is the staffing arrangement for the lab operation? Why? Is the arrangement specific to the procedure being observed?
- Is the multi-skilled worker being used, if yes why, if not why not? What are the advantages and disadvantage of each approach?
- What impact has the multi-skilled worker had on the staffing arrangement for the procedure being observed? Why?
- What roles and tasks does the multi-skilled worker undertake in the catheter lab (Nurse, Radiographer, Cardiac Physiologist)? Why is this?
- What benefits does this bring for patient safety, care and efficiency of the operation being undertaken – list out specific benefits within the operation.
- How many roles does the multi-skilled worker undertake? i.e. are they multi-tasking between roles?

⁹ The use of the term Multi-skilled worker refers to an individual trained to practice aspects of the following three roles within the Catheter lab: Radiographer, Cardiac Physiologist and Nurse

- What factors appear to affect the role and number of roles they can undertake – i.e. structure of lab, number of staff and roles in catheter lab, procedure undertaken, type of patient, number of cath labs and location of the labs?