

S H E R I F F ' S D E T E R M I N A T I O N

**UNDER THE FATAL ACCIDENTS AND SUDDEN DEATHS INQUIRY
(SCOTLAND) ACT 1976**

INTO THE DEATH OF

MRS JEAN ELIZABETH WILSON, 32 EDZELL STREET, COATBRIDGE

Held at AIRDRIE on: 04, 05, 06, 07, 08 and 11 October 2010

SHERIFF'S DETERMINATION

AIRDRIE: 14 DECEMBER 2010

The Crown were represented by Mr Jamie Lipton, Procurator Fiscal Depute, the relatives of Mrs Wilson by her son, Mr Alexander Wilson, NHS Lanarkshire by Mr Gerard Coll, Advocate, and Dr Samuel Millar by Mr James Stewart, Solicitor.

I heard evidence from eleven witnesses:-

- (1) Mrs Kirsty McKerr, the daughter of Mrs Wilson
- (2) Dr Marjorie Black, Consultant Pathologist, University of Glasgow
- (3) Dr James Annis, Junior House Doctor, Monklands District
General Hospital
- (4) Dr John Regan, Mrs Wilson's General Practitioner

- (5) Dr Jonathan Price, Associate Specialist in Renal Medicine, Monklands District General Hospital
- (6) Dr Mirghani, Associate Specialist in Vascular Surgery, Monklands District General Hospital
- (7) Dr Rosaleen McKenna, Registrar in General Surgery Monklands District General Hospital
- (8) Dr Samuel Millar, Consultant Interventional Radiologist, Monklands General District Hospital
- (9) Dr Ian Godbur, Department of Biochemistry, Hairmyres Hospital
- (10) Mr Roy Scott, Consultant Vascular Surgeon, Monklands General District Hospital
- (11) Dr Stuart Rodger, Consultant Renal Physician, Western Infirmary Glasgow

These, with the exception of Dr Godbur, were the positions they held in September 2006. Dr Godburn is the current head of the Department of Biochemistry for Lanarkshire Hospitals at Monklands, Wishaw and Hairmyres.

I also was referred to a number of Productions:

Label 1	Disc showing Angiogram of Mrs Jean Wilson on 12 July 2006
Production 1	GP Medical Records relating to Mrs Jean Wilson
2	Medical Records Monklands District General Hospital re: Mrs Wilson's care in 2006
3	Post Mortem Report
4	Copy Slides from research by Dr Price
5	Report by Mr Roy Scott dated February 2007

- 6 Letter dated 27 August 2007 by Mr Scott
- 7 Guidelines Flow Chart re: IVU or CT patients dated 30 January 2008
- 8 Guidelines Flow Chart re: Transarterial angiogram/angioplasty/stent patients dated 25 January 2008
- 9 NHS Lanarkshire Radiology Request Card
- 10 Radiological Interventional Checklist - Pre procedure
- 11 Standards for Iodinated Intravascular Contrast Agent Administration to Adult Patients – Board of the Faculty of Clinical Radiology, The Royal College of Radiologists - July 2005
- 12 Melormin - update guidelines for use in diabetics with renal impairment – 19 June 2009
- 13 Computer Print out re Mrs Jean Wilson - Biochemistry Laboratory Management Information – 19 September 2006 - 23 September 2010 re: Mrs Jean Wilson
- 14 Out of Hours reporting of markedly abnormal laboratory test results to Primary Care - Advice to Pathologists and those that work in laboratory medicine - September 2007
- 15 NHS Lanarkshire Radiology Request Card – 2010
- 16 Computer Print out re: Mrs Jean Wilson – Biochemistry Laboratory Management Information - 25 May 2003 - 28 June 2003
- 17 Computer Print out re: Mrs Jean Wilson – Biochemistry Laboratory Management Information - Results Inquiry 25 May 2003 – 19 June 2006.

At the conclusion of the evidence I received written submissions from all the parties. These were supplemented by oral comments.

Mrs McKerr confirmed that her mother had been born on 19 June 1939 and had died in Monklands District General Hospital at 5.20 pm on 30 September 2006. She had five children and at the time of her death had a partner who lived separately from her. Her home was at 32 Edzell Street, Coatbridge.

In 1988 she was diagnosed with kidney stones but these were successfully dissolved in the Deaconess Hospital, Edinburgh by Lithotripsy - a shock wave therapy which pulverizes the stones and causes them to break up.

Mrs Wilson had been a patient of the practice of which Dr Regan was a partner since 1966 although Dr Regan had only joined the practice in 2001. He referred to Production 1 for his evidence in relation to her GP care prior to that date and from then until 2006 was able to relate the circumstance of her health problems based on his own knowledge and the notes of his colleagues.

On 21 June 1990 an IVP test carried out at Monklands District General Hospital showed that both Mrs Wilson's kidneys were functioning well (Production 1, p.117). On 13 April 1995 no greatly abnormal results in relation to her kidneys were noted although her urea level was 7.0 which exceeded the normal range of 2.5 - 6.5. Her creatine level was 104 - within the then normal range of 62 - 124. She was seen at Monklands Hospital in June 1995 where her urea remained raised at 7.0 and her creatine was regarded as normal. (Production 1, p.102 - 105). It was concluded that the raised urea and normal creatine suggested mild dehydration.

On 09 March 2000 an ultra sound of Mrs Wilson's kidneys taken at Monklands Hospital showed no notable abnormality.

On 09 June 2000 a blood test taken at Monklands and reported to her General Practitioner showed that her urea level was now 4.3 and creatine was

106. The normal range for creatine levels for females had been revised to a maximum of 97 but Mrs Wilson's figure was not regarded as of any concern. It was well within an acceptable margin.

Mrs Wilson's health remained unremarkable until late 2001 when it was noted that she had suffered abdominal pains and that her appetite was affected causing her to lose weight. At the same time Dr Fiona Chalmers, Dr Regan's partner, noted evidence of Peripheral Vascular disease. Mrs Wilson's ability to walk a long distance was diminishing and in November 2002 an appointment was sought with a Consultant at Monklands District General Hospital.

Mrs Wilson and her General Practice were advised that there was a 47 week waiting list for out-patient appointments with Mr Brookes, the Consultant Vascular Surgeon. Dr Chalmers wrote again to the hospital on 30 January 2003 seeking a more urgent appointment as Mrs Wilson's leg pain was much worse and her ability to walk had deteriorated to the extent that she could only walk about 100 yards (Production 1, p.71).

In February 2003 Mrs Wilson underwent a Doppler Ultrasound at the Coatbridge LHCC Vascular Clinic which indicated only 47% of normal blood flow to her right leg. On 13 February 2003 Mr Scott replied to Dr Chalmers' letter of 30 January regretting the delay but pointing out that Mr Brookes had retired, a replacement had not yet been appointed and that there was considerable pressure on available clinic slots. There was a need to give priority to patients with limb threats, expanding aneurysms or symptomatic carotid disease at risk of stroke. He pointed out that Mrs Wilson who continued to smoke, despite repeated advice to desist, was in a lower priority group. (Production 1, p67).

In March and May 2003 Mrs Wilson suffered separate episodes of transient cerebral ischemia and as a result of a further letter from her GP practice she was seen by Mr Scott at his clinic on 23 October 2003. He repeated the

advice that she should stop smoking and urged her to walk regularly as far as she could. He arranged for her to be reviewed at a Vascular Clinic.

On 01 February 2004 Mrs Wilson had a further incident of transient dysphasia which, although it resolved quickly, caused her case to be referred back to Mr Scott. (Production 1 p.44). Mr Scott considered the information and arranged for a scan. She was seen in March 2004 by Mr Scott and at a Vascular Multiple Disciplinary Team meeting on 11 June 2004 it was decided that surgical treatment was not indicated and her medical treatment to attempt to reduce her risk factors would be continued. (Production 1 p.39). Arrangements were made for her to be seen at sick-monthly intervals at Monklands at Mr Scott's clinic.

Blood tests were taken and analysed at Monklands District General Hospital on 25 May, 27 June and 02 September 2003. The results of these tests were available on computer in June and September 2006. They were, 25 May – urea 6.5, creatine 111; 27 June – urea 7.2, creatine 130; 02 September – urea 8.0, creatine 141.

During 2003, 2004 and 2005 Mrs Wilson was repeatedly advised of the dangers and increased risks to her health and, in particular, her vascular problems, caused by her continual smoking. Mrs Wilson did on a number of occasions stop for a short period but then resumed. She attended the initial stage of a course to deal with the problems of quitting tobacco but left it after one meeting.

On 04 November 2005 Mrs Wilson saw Mr Scott for her six month review. He noted that her symptoms were unchanged and decided to review her condition in a further six months time.

On 05 May 2006 she was seen at Mr Scott's clinic by Dr Kaholla who noted a worsening of the pain in her right calf. No right femoral pulse could be found

nor were there any signs of pulses being present below. There was an absence of left femoral pulse (Production 1 p.32). Dr Kaholla arranged for a CT angiogram to be carried out and Mrs Wilson and her General Practitioner were notified of this.

On 12 July 2006 Mrs Wilson underwent, as an outpatient, a CT angiogram which was reviewed by Dr Millar. This procedure involves the injection of dye into the vein to assess the state of the blood vessels.

It was not the practice in 2006 to take a blood test for analysis by biochemistry before this procedure and none was done. Accordingly, although it was recognised that the use of the dye could produce a toxic effect on the patient's kidneys (although the extent of this would be considerably less because the injection was into the vein rather than the artery as is required prior to an angioplasty), no steps were taken to ascertain what was the state of Mrs Wilson's kidneys in July 2006 nor is there any note of her creatine or urea levels then.

Mrs Wilson's case was again reviewed by a Multi-disciplinary team on 25 August 2006. She had iliac disease and it was decided to consider angioplasty which would be undertaken by Dr Millar. It was the view of all at that meeting that because of the state of Mrs Wilson's arterial system that a bypass was not an option. Surgical intervention was also considered not to be a reasonable proposal because of the risks involved.

For a considerable time prior to 2006 Mrs Wilson had poor health in that she had had strokes and was on medication. She had increasing problems with her mobility due to deteriorating circulation which caused pains in her legs. By June 2006 she was only able to walk 100 yards and this had further diminished to 50 yards by September 2006. She had been advised to stop smoking but had not been able to do so. She had lost a considerable amount of weight and had little appetite.

On Monday 18 September 2006 Mrs Wilson was admitted to Ward 4 of Monklands District Hospital to enable Dr Millar to carry out an arteriogram which would outline the arteries leading from the aorta to each leg. This necessitated an injection of dye under local anaesthetic into the groin. If appropriate an angioplasty (insertion of a balloon stretching the narrowed vessels) and the placing of one or more stents would be undertaken. This was scheduled to take place the following day.

On her admission to hospital on 18 September 2006 Mrs Wilson was seen by Dr James Annis, who was a Junior House Doctor, involved in his first placement. He had been working in the hospital for approximately six weeks. He took Mrs Wilson's medical history and noted that the claudication symptoms had worsened and that she had now pain in both legs but that this was worse in her right leg. It was now noted that unlike previous occasions she was suffering pain on standing and that her walking was now limited to 50 yards. Her femoral pulse was weak but a chest examination showed normal breathing.

Dr Annis took blood samples for analysis and sent them to haematology and biochemistry. The results from haematology were received and considered by Dr Annis and those results (Production 2 ps. 138 and 140) were within normal range and gave no cause for concern. The results from biochemistry (p.103) indicated significantly raised urea and creatine levels. The respective figures were 22.5 and 427. The results showed that Mrs Wilson's kidneys were working at approximately 10% of their proper level. This report was not seen by Dr Annis but appears to have been initialed by another doctor on the ward. It is likely that this occurred during the afternoon of 19 September after Mrs Wilson had undergone the procedure with Dr Millar.

In 2006 the biochemistry department in Monklands Hospital dealt with approximately 1000 samples per day and the vast majority were analysed

routinely and the results issued by a computer print-out. Where the results were unusual they were referred to a biochemist for verification and this occurred in Mrs Wilson's case. The urea level of 22.5 and the creatine level of 427 while grossly in excess of the normal range, did not, based on the figures used in 2006, automatically result in the figures being specifically alerted to the ward. At that time had the creatine level exceeded 500 or the urea level exceeded 30, this would have occurred. Since 2006 the levels have been changed and while the urea level remains at 30 the creatine level has been reduced to 300.

The on-duty biochemist, Gillian Gray, did review the results in relation to Mrs Wilson but validated them so that they could be sent to the ward in the normal way. Dr Annis had not completed the request form indicating the procedure which Mrs Wilson was going to undergo. Accordingly, the biochemistry department had no reason to know that she was scheduled for an angiogram which has, by its very nature, additional risks in relation to kidney damage. Ward 4 was a surgical ward and the Biochemistry Department were entitled to presume that Mrs Wilson was scheduled for a surgical procedure.

The additional risks of kidney damage arise from the fact that to enable Dr Millar to perform the angiogram prior to any proposed angioplasty he requires to inject a dye into the groin area through an artery. It is appreciated that a portion of this dye will pass immediately to the kidneys where it is known to have a potentially toxic effect. Production 11 lists the essential information which should be sought from the patient before the contrast injection is undertaken; this includes information in relation to "renal problems." The document continues "in order to minimise the risk of contrast nephotoxicity the serum creatine level should be available in all non emergency patients who may have renal impairment."

In 2006 it was appreciated that the return of the paper copy of the results from Biochemistry could take 24 hours to reach the surgical ward (Ward 4) and accordingly the results were posted on the hospital computer and could be accessed by the doctor in the ward. They were on the hospital computer shortly after 3.48 pm on 18 September. It is not known why neither Dr Annis nor any other doctor saw these results until the following day.

In 2006 Dr Millar who worked in the radiology department did not have access to the biochemistry record which was available to the doctor in the ward. This has subsequently been rectified and all relevant departments within the hospital now are able to view the results of any blood test on a screen without waiting for the paper copy to be delivered.

On the morning of 19 September 2006 Mrs Wilson was seen by Dr Mirghani and after he had explained the procedure to her, including the risks involved, she signed a consent form (Production 2 p.45). Amongst the risks which he explained to her was the possibility of bleeding from the groin area and of kidney failure. He also told her that amputation of the leg was a possibility. Dr Mirghani was not aware of nor did he have access to the results contained on pages 103 and 138 and accordingly he had no information which indicated that Mrs Wilson's kidneys were severely impaired. He did however ensure that her platelet count was satisfactory and that her blood group was known so that if a transfusion was required the necessary blood was available.

Mrs Wilson then passed into the care of Dr Millar, Consultant Radiologist with particular experience and expertise in Vascular Interventional Radiology. Despite his twenty years' experience in dealing with angiograms and angioplasty procedures, because of the state of Mrs Wilson's condition he required to "tiptoe through the procedure."

The procedure involved the insertion of a needle into an artery and the injection of dye. Such an arterial injection results in part of the dye going

directly to the renal blood supply. The dye used (Optray) is one known to have a low risk of complications and the volume of dye used (90 mls) and the level of concentration of dye was lower than had been involved in the July procedure when the injection had been into Mrs Wilson's vein. It is however acknowledged that an injection into a vein goes round the body and dilutes whereas an injection into the artery will result in some dye going directly to the kidney in a concentrated form.

Having successfully injected the dye (and I am entirely satisfied that the injection did not puncture the artery other than at the site of insertion as would be normal) Dr Millar placed a wire through the diseased section to enable him to ascertain the state of the arteries. Label 1 shows the state of the arteries and the procedure undertaken by Dr Millar. He successfully completed an angioplasty procedure and thereafter place two stents in to hold the structure apart.

The procedure in Mrs Wilson's case was very difficult and Dr Millar experienced problems in passing the wire through the right side groin. He required to work using the left groin and its artery. He ultimately however succeeded in opening a blood supply to the right leg in particular and at the end of the procedure pulses could be felt in her feet. During the procedure it is an accepted and totally unavoidable consequence of the procedure that the wire will dislodge cholesterol emboli which are causing the limitation in the width of the artery. Such dislodged emboli could and probably did pass into the kidneys. This could worsen any problems in Mrs Wilson's already impaired kidneys.

Dr Millar considered that the aorta was severely diseased. His findings supported the view expressed at the multiple disciplinary team meeting in August that Mrs Wilson required urgent intervention and that because of the state of the arteries it would have been very difficult if not impossible to effect a successful surgical bypass. There was a major risk of gangrene

developing if steps had not been taken and this would have resulted in Mrs Wilson undergoing an amputation. The mortality rate in the period shortly after an amputation is high.

Dr Millar considered the procedure which he had undertaken to be “technically difficult” and reported a “hostile aorta.” As however he had succeeded in restoring an acceptable blood supply to Mrs Wilson’s feet and, in particular, through her right leg, he was entitled to regard the operation as a success.

There is always a risk of bleeding arising from the operation and Dr Millar was conscious of this. There had been minimal bleeding after the procedure which was to be expected as he had required to pass a wire through both groins and then loop it round close to the aorta and heart to ensure that the stents could be properly placed. Pressure had been placed on the wound site for eight minutes at the end of the procedure. Dr Millar thereafter began preparing his notes. His nursing team drew his attention to the fact that there was further bleeding around the groin and accordingly he applied pressure for a further fifteen minutes to ensure that bleeding had been stopped. Pressure bandaging was used to minimise the risk of further bleeding.

Had there been major bleeding in the immediate post-operative period there would have been a fall in Mrs Wilson’s haemoglobin, her blood pressure would have dropped and there would have been a rise in her heart rate. This did not occur in the forty-eight hours following Dr Millar’s procedure.

The information which Dr Millar was given immediately prior to him conducting the procedure (which was the first operation he performed that morning) made no mention of any renal problems. The form had not been completed in relation to such matters. In 2006 the card which would be sent to the radiology department did not make such matters mandatory and

accordingly Dr Millar had no way of knowing of Mrs Wilson's severe renal impairment as had been evidenced by the biochemistry results from the previous day.

The procedure has now changed totally in that a card (Production 15) requires to be completed in which any renal problems are highlighted and the guidelines contained in Productions 7 and 8 are implemented. The procedure will not be carried out unless the eGFR results are recorded. eGFR is the more accurate measure of renal function now used in place of the separate urea and creatine figures.

Further safeguards have now been introduced by Dr Millar himself. Before he is prepared to consider starting the procedure he requires a nurse to check and sign a risk management list form and immediately before starting he asks all his colleagues present if everybody is satisfied that it is safe to proceed and that all risk factors have been considered.

Had Dr Millar been aware of the terms of the biochemistry test results from 18 September (p.103) before he started, he would not have carried out the procedure on the morning of 19 September. He would have consulted with Mr Scott and also with renal physicians and unless he was convinced that Mrs Wilson's life would be in jeopardy if he did not proceed immediately he would have delayed the procedure. He would have waited until steps could be taken to ensure that Mrs Wilson was rehydrated and all other steps were taken to ensure that her kidneys were in the best possible state for the procedure. There is no evidence that Mrs Wilson's life would have been jeopardised by a short delay.

It is impossible to state with any certainty whatsoever what, if any, the effect of such a delay would have been as it is clear from the results of 18 September that Mrs Wilson's kidneys were severely impaired. Any rehydration or cessation of potentially problematic medication would probably

have had a very minimal effect. Because of the extent of Mrs Wilson's iliac disease it was essential that either Mr Scott or Dr Millar carried out any remedial procedure in the near future. Any excessive delay in either proceeding with the angioplasty or surgical intervention would have diminished Mrs Wilson's chances of survival as her condition was worsening naturally as evidenced by the deterioration between June and September. It would therefore have been necessary for Dr Millar and Mr Scott, if they had been made aware of the true state of Mrs Wilson's kidneys, to weigh up the potential effects of delaying for more than a few days against the risk of proceeding.

It is unlikely that Mrs Wilson's kidneys could ever have been restored to a condition which did not leave her still with drastically impaired kidney function. Any improvement would not have been great but any increase in kidney function would have raised the chances of her kidneys fighting successfully any toxic effects of the dye used by Dr Millar. It would also have raised the chances of tackling the effect of any cholesterol emboli which had been dislodged and reached the kidneys.

A number of factors contributed to the ultimate position which was that the angiogram/angioplasty was carried out without the steps to rehydrate Mrs Wilson and to flush her kidneys being carried out. These include –

- (a) that the biochemistry result of 18 September was not noted, recorded or acted upon;
- (b) the absence of any information to Dr Mirghani or Dr Millar of any problems and their inability to access the biochemistry results had he wished to do so;
- (c) the poorly completed cards requesting the biochemistry result which did not highlight the procedure which Mrs Wilson would undergo; and

(d) the incomplete information contained in the card sent to Dr Millar prior to the operation.

Mrs Wilson was then returned to the ward 4 and was nursed carefully and competently.

Later on 19 September Mrs Wilson was seen by Dr McKenna. Her attention had been drawn to the results from the biochemistry department of the blood sample taken the day before and she was concerned about this. She noted the creatine level of 427 and conducted a thorough examination of Mrs Wilson. In particular, she noted that her pulse, blood pressure and heart rate were normal. She arranged for further blood tests to be undertaken and authorised the withdrawal of certain drugs (p.250 and p.251) and arranged for Mrs Wilson to be referred to a renal specialist.

The blood tests authorised by Dr McKenna revealed that the urea had dropped marginally to 21.9 but the creatine had risen to 432. The need for IV fluids which Dr McKenna had authorised was given effect to.

Around 7.00 pm on 19 September Mrs Wilson was seen by the on-call physician who noted that her urea and creatine levels as shown on the hospital computer indicated that they had been within an acceptable range in 2003 although in excess of the normal. She, like Dr McKenna, noted evidence of dehydration and it was decided to persist with the rehydration of the patient with intravenous fluids and to discuss the case with the renal medicine team.

On 20 September Mr Scott, accompanied by Dr McKenna, saw Mrs Wilson. He noted that her urine output had been poor despite the intravenous fluids. He arranged for monitoring of her fluid intake and output. He also confirmed the need for an opinion from the renal unit.

Later on 20 September Mrs Wilson was seen by Dr Jonathan Price. He took a very full history from her (p.22 – 23) and concluded that there was no evidence of an allergic reaction to the contrast in the kidneys when he saw her. He reiterated the need for intravenous fluids and confirmed the withdrawal of the drugs authorised by Dr McKenna. He asked for further blood tests. His prognosis was that the increase in fluids would flush out Mrs Wilson's system to enable a baseline to be found in relation to her kidney function. Her blood pressure at this point was satisfactory (contradicting any suggestion that she was bleeding internally) and it was hoped that the urine output would improve. Unfortunately, this proved not to be the case.

On 19 September Mrs Wilson's intake was 1800 mls and her fluid out was 170. On 20 September the figures were 2000 mls and 610. On 21 September they were 1200 and 198 and on 22 September 5000 and 383. On 23 September the figures were 2750 and 400 and on 24 September 1399 and 314. It was evident to all the doctors involved in Mrs Wilson's care that her kidneys were not functioning satisfactorily, that she was not expelling urine and that she was undergoing renal failure.

On 21 September Mrs Wilson had, on Mr Scott's instructions, been moved to Ward 5, the Surgical High Dependency Ward because she had become increasingly confused and agitated and had pulled out her urinary catheter. To diminish the risk of overloading the circulation during the rehydration process (which could have led to heart failure) a control venous line was used. Despite the steps initiated by Dr McKenna and others including Dr Price, Mrs Wilson's creatine figures continued to rise marginally.

On 21 September Mrs Wilson was seen by Dr Hand, a Consultant Renal Physician. In a very full note (Production 2, p.25-26) he recorded his views that there was a "high probability of altherosclerotic disease of the renal vessels". He reached this conclusion after considering her previous history of

strokes, her "significant vascular disease" and her hypertension. A renal ultrasound had shown the kidneys were small. Dr Hand raised as two possible causes of a chronic renal problem developing into an acute one the release of cholesterol embolic and toxic dye into the kidney during Dr Millar's procedure on 19 September.

Dr Hand was of the opinion that the use of dialysis was "fraught" and that he did not anticipate renal recovery if dialysis was used long term. He considered that Mrs Wilson would have a very limited quality of life with a poor survival rate.

Mrs Wilson continued to be monitored within Ward 5 by the Renal Physicians, Mr Scott and his team of doctors and by nurses. Her condition did not improve despite the infusion of two units of blood on 23 September. On 25 September it was decided that haemodialysis would have to be undertaken and this commenced then. Although Mrs Wilson's urea and creatine figures improved to a limited extent her overall condition deteriorated.

On 27 September, because of the deterioration in her condition, Mrs Wilson was moved to the Intensive Treatment Unit where she remained until her death on 30 September. Her haemoglobin dropped to 4 on 28 September. She continued to be cared for by Mr Scott, the Renal Physicians principally Dr Price, and by intensive care support. A CT scan indicated that she had undergone a number of cerebral incidents but that there was no intracranial bleeding. Pneumonia had developed and it became evident that she was undergoing progressive multiple organ failure. Subsequent CT scans confirmed further brain infarcts.

Mrs Wilson died peacefully on 30 September at 5.20 pm within the Intensive Care Units after active treatment had been withdrawn following consultation with her family.

Because of the circumstances of her treatment and death no death certificate was issued and the matter was correctly referred to the Procurator Fiscal.

On 04 October 2006 on the instructions of the Procurator Fiscal, Dr Marjorie Black conducted a post mortem at the City Mortuary, Glasgow. Her report is Production 3. It confirms the findings of the CT scans undertaken on the last four days of Mrs Wilson's life that she had undergone "more recent established hypoxic Ischaemic damage." Her conclusion was that Mrs Wilson died as the result of multiple organ failure and sepsis following femoral angioplasty.

The post mortem showed Mrs Wilson's kidneys were small (combined weight 180g - normal 240 - 250) and histology revealed that it was "autolysed consistent with chronic renal problems with vascular changes in keeping with hypertension." There was "very severe complicated atheroma along the lengths of her aorta including narrowing of the organs of the renal arteries. There was evidence of a significant amount of blood passing into the small tissues. No identifiable source of this bleeding could be found.

As the direct result of Mrs Wilson's death and the circumstances which led up to it, as well as changes in hospital arrangements within Lanarkshire NHS, a number of alterations have been effected.

The limits beyond which the Haematology and Biochemistry departments will specifically alert the clinical staff of an unexpected abnormal result has been reduced.

The two departments, while conducting different and separate tests, are now more closely linked and the compilation of an eGFR figure is standard.

The Radiology request card (Production 15) has been reformulated. It, in particular, now includes a section for contrast media reactions, a requirement

to provide an adequate clinical history and makes the completion of an eGFR figure and the date to which it relates mandatory.

Productions 7 and 8 have been prepared, agreed and brought into effect. Their terms are widely circulated.

All surgical and nursing staff have been alerted to the importance of pre-operative urea and creatine results in patients who are to undergo an angiogram.

The practice whereby it was not considered necessary to have a blood test result prior to CT peripheral angiogram has ceased and all such patients will not undergo this procedure unless a current eGFR is available.

The need for a close liaison between renal physicians, the radiologists and the surgeons for renal impaired patients has been reinforced. Arrangements now exist for obtaining advice from the renal medicine experts prior to an angiography proceeding in relation to such patients.

The Consultant Radiologist responsible for the procedure ensures that the eGFR results are satisfactory. This may involve after consultation considering whether, in the light of the patient's overall condition and progress, the risks of proceeding are outweighed by the expected consequences of not.

The advantages of centralizing the expertise and specialist care involved in angioplasty has resulted in the moving of all such procedures to Hairmyres Hospital, East Kilbride, where Mr Scott and Dr Millar are now based.

Determination

I find and determine in terms of the Fatal Accidents and Sudden Deaths Inquiry (Scotland) Act 1976 Section 6(1)(a) that Jean Wilson, date of birth –

19 June 1939, and who resided at 32 Edzell Street, Coatbridge, died at 5.20 pm on 30 September 2006 within Monklands District General Hospital.

In terms of Section (1)(b) that the cause of her death was Multiple Organ Failure and Sepsis following Femoral Angioplasty carried out on 19 September 2006 and a significant blood loss into the tissues which occurred after 21 September.

In terms of Section 6(1)(c) I find that the reasonable precautions whereby her death might have been avoided were:-

1 The assessment of the state of Mrs Wilson's kidney function prior to a CT angiogram carried out in Monklands District General Hospital on 12 July 2006 by means of taking a blood sample and the analysis of that by the Biochemistry Department;

2 The institution of steps to improve as far as possible Mrs Wilson's kidney function thereafter prior to the angioplasty which was urgently necessary. Such steps in July 2006 could have included encouraging Mrs Wilson to increase her intake of fluids, the adjustment of her medication and the taking of further blood tests to assess her continuing renal condition.

3 On 19 September 2006 there was no system in place whereby the Radiology Department had direct access to the blood results relating to Mrs Wilson.

Since 2006 the procedure throughout NHS Lanarkshire and in particular within Monklands District General Hospital has been changed and blood samples are taken and analysed before a CT Angiogram and the results of all blood tests are now available on computer to all departments including the Radiology Department.

In terms of Section 6(1)(d) I find that the defects in the system of working which contributed to Mrs Wilson's death were:

1 A failure to check, note and act upon the blood test result from the Biochemistry Department which was available on 18 September but was not noted by any doctor including the one seeking the results, until the following afternoon;

2 The lack of any formal procedures to ensure that such results were checked, noted and acted upon by the ward which had sought them;

3 The failure of the doctor seeking the blood test result from Biochemistry to highlight that Mrs Wilson was due to undergo an angioplasty procedure with the consequential additional hazards to her kidneys.

4 The lack of a mandatory requirement that all recent haematology and biochemistry results should be included in any request for an angiogram or angioplasty procedure.

5 The lack of clear guidelines and procedures or system within the hospital whereby each department concerned with the case and treatment of Mrs Wilson was aware and made all other departments aware of her renal problems.

Again since 2006 the procedures within NHS Lanarkshire have been changed. All these defects have been addressed.

In terms of Section 6(1)(e) I find that Mrs Wilson's continued smoking after being repeatedly advised to desist may have contributed to the worsening of her iliac disease.

NOTE

This Inquiry was a complicated one and I am grateful to all those who in their separate ways presented or helped to analyse the evidence for me. Both Mr Coll and Mr Stewart, as would be expected, raised the relevant issues so far as their clients were concerned in cross-examination and provided helpful written submissions which they supplemented on the last day of the Inquiry.

Mr Wilson was restrained in his approach but highlighted matters of issue to the family. I found his written submissions of help in bringing to my attention the points of which the family wished me to comment. I believe that all the other people round the table would join me in expressing our admiration to Mr Wilson for the very difficult task which he undertook and for the thorough but moderate approach which he adopted. It is very common for relatives, in their grief, to make extreme or unjustified criticisms. Mr Wilson never did so and thus assisted the Inquiry considerably.

The principal thanks of all involved in this Inquiry must go to Mr Lipton for his very careful, thorough and professional analysis of all the evidence and his presentation of the evidence to the Court. I understand that this is the first FAI which Mr Lipton has conducted and he did so to the highest possible professional standard.

I had the privilege of seeing a photograph of Mrs Wilson which was shown to me by Mr Wilson on behalf of the family. That picture reinforced the impression which Mrs McKerr had given me in her evidence that she was a delightful person, loved by her family and involved with them. I join all the other parties in the Inquiry in expressing the court's deepest sympathy and condolences to all Mrs Wilson's relatives in their sad loss.

Mrs Wilson had been a patient in the same GP practice for many years. It was thus possible to trace her medical history from Dr Regan's evidence and

from an examination of Production 1. The first reference to there being problems in relation to her kidneys appears to be the presence of kidney stones in period up to her attendance at the Deaconess Hospital in Edinburgh in 1988. The stones were dissolved then and there is no evidence that the presence of stones within Mrs Wilson's kidneys had any relevance to her attendance at Monklands Hospital during 2006. Dr Millar's findings following the CT scan in July 2006 confirmed that the kidneys had no obstruction although there was presence of a stone visible. I have reached the conclusion that the presence of this stone is irrelevant when considering the circumstances of Mrs Wilson's death and that so far as her kidneys are concerned the important factor in the findings of 12 July is that there was no obstruction.

All parties were agreed in their submissions that I should find that Mrs Wilson died on 30 September 2006 at Monklands District General Hospital, Airdrie at 5.20 pm.

There was however disagreement as to what the contributory factors which led to her death were.

The Wilson family invited me to find that there was evidence of renal impairment from 02 September 2003 onwards and that this had not been detected either by her General Practitioner or by Monklands Hospital although she had attended both at her GP and at the hospital thereafter. Mr Wilson argued that the three blood tests taken in 2003 (the results of which were available at the time and thereafter) showed an increase in the urea and creatine levels consistent with deterioration in Mrs Wilson's kidney function. He suggested that had this been noted at the time, steps could have been taken to take further blood tests to ascertain whether this was a continuing problem and that remedial action could have been taken after 2003 to tackle any problem that might have existed.

I have given careful consideration to this argument but I am not prepared to make the finding which Mr Wilson sought.

I have reached this conclusion for a variety of reasons. Firstly, the rise between the three figures is not great and the figures are not grossly outwith the normal range. Secondly, the evidence established that in 1995 her urea level was 7 and remained so in June 1995. It was concluded at that time that Mrs Wilson was suffering from mild dehydration and an ultrasound of her kidneys in March 2000 confirmed that there was no abnormality. In June 2000 her urea level had dropped to 4.3 although her creatine level had increased marginally.

If Mrs Wilson's records showed that a previous raised urea level was due to mild dehydration which rectified itself in the ensuing years it would not have been reasonable to expect the hospital amidst the 1,000 tests they do each day to have highlighted and drawn attention to Mrs Wilson's results in 2003. They were not unduly abnormal and for a General Practitioner to have spotted the marginal increases shown in the three figures in 2003 is, in my view, an unreasonable expectation.

There is no evidence that Mrs Wilson exhibited any further signs in the period between 2003 and 2006 which would have justified taking blood tests and accordingly, I cannot conclude that there is sufficient evidence for me to make a finding that Mrs Wilson was exhibiting renal impairment in 2003 of such a nature that further steps should have been taken to investigate it at that time.

Despite repeated attempts to do so and constant cajoling from her medical advisers Mrs Wilson was unable to give up smoking and this undoubtedly did nothing to assist in relation to her deteriorating vascular condition. Because of the lengthy waiting lists for appointments to see a vascular surgeon it was initially thought that Mrs Wilson would require to wait nearly a year before

obtaining an appointment at Monklands Hospital. It is to Dr Chalmers' credit and that of the other doctors within her GP practice that they managed to draw to the attention of the hospital Mrs Wilson's deteriorating state and she was thereafter seen by Mr Scott.

Mr Scott's care and treatment of Mrs Wilson in the period up to and including August 2006 cannot be faulted or criticised. He encouraged her to remain active and walk, he repeatedly, both through himself and his junior doctors, reminded her of the dangers of persisting with her smoking and in the light of the expert evidence which I heard from Dr Rodger, he correctly assessed her condition and the best course of action for tackling it.

As a result of his consultation with Mrs Wilson in May 2006 he arranged for a CT angiogram to be carried out by the radiology department in July 2006. This was an appropriate and correct step to take as only in this way could the extent of the problems with Mrs Wilson's vascular system be detected.

As I have indicated on 12 July, the necessary CT angiogram was carried out. No blood test was carried out before this as in 2006 within Monklands Hospital this was not considered necessary. Accordingly, the state of Mrs Wilson's kidneys was not known before a toxic dye was injected into her vein to allow the angiogram to take place.

At that time and now it is recognised that the injection of such a dye can have a toxic effect on the kidneys. While it was accepted and known that the effect was diminished compared with the introduction of such a dye into the arterial system it was still a known risk factor and I consider that Mr Wilson is correct in inviting me to make a finding that bloods should have been taken and checked before his mother underwent the CT angiogram procedure in July 2006. Had that been done then any steps which could have improved the state of her kidneys could have been commenced then.

As a result of changes in the procedure since Mrs Wilson's death this omission will not occur again. Dr Millar explained to me by reference to Production 15 that no radiographer will undertake the procedure without knowing the relevant blood biochemistry in advance and that that information must be contained on the card. Without that information the procedure will not take place.

Mr Wilson was supported in this submission that I should make such a finding by Mr Lipton as well as Mr Coll and Mr Stewart.

Mr Wilson also highlighted the fact that in 2006 the radiology department did not have access to the biochemistry figures of any analysis of blood which had been carried out unless they were told the result by another department. This was despite the fact that the information was available on a computer screen to other departments and wards within the hospital. No explanation was given to me as to why this was the position and I understood Dr Rodger to be somewhat surprised that this was the position in 2006 although he was not expressly asked to comment on when such information had become available to doctors within his department at the Western Infirmary, Glasgow.

Again, the procedure has been totally changed between 2006 and 2010 and Dr Millar confirmed that he is now able, by accessing the records through a computer in his department, to ascertain all the information he requires. In any event, as he pointed out, the date of the latest test and the result has to be noted on the card requesting the examination. Without that information his department will not carry out an angiogram or angioplasty procedure.

It is impossible to know what the results of any analysis of a sample would have been in July 2006 because no such sample was sought. It is impossible on the information available to speculate what the state of Mrs Wilson's kidneys were at that time and whether the use of the dye in the July

procedure did any damage to her kidneys. There is no evidence that Mrs Wilson exhibited any adverse health effects following the 12 July procedure.

It is however more than likely that Mrs Wilson's kidneys were badly impaired immediately before July 2006 procedure and an opportunity to take steps to even minimally improving their functioning was lost. One such step would have been to encourage Mrs Wilson to increase her fluid intake.

In this connection it was pointed out by Dr Millar, Mr Scott and by Dr Price as well as by Dr Rodger that while it is known that the dye used in the CT Angiogram can by its toxicity affect the kidneys this is not invariable nor is there evidence that any harm done will necessarily be long-term.

At a multi disciplinary meeting held on 25 August at which Mr Scott and Dr Millar were present it was decided that surgical intervention was not appropriate but that Mrs Wilson required urgent treatment. Using Dr Millar's considerable expertise and experience it was decided to proceed with an angiogram and angioplasty with the use of stents to assist the flow of blood to Mrs Wilson's right leg in particular.

This decision cannot be faulted and was not subject to criticism by any of the parties. Accordingly, arrangements were made to admit Mrs Wilson as an in-patient to the hospital on 18 September 2006 with a view to Dr Millar carrying out the procedure on the morning of 19 September.

By this time Mrs Wilson was clearly very unwell. Her ability to walk was limited to 50 yards and the pain which she was suffering when moving had now developed to the extent that she felt it while merely standing. This indicated a further deterioration in her condition and emphasised the need for steps to be taken to try and rectify it.

On admission to the hospital she was seen by Dr Annis who as well as taking her medical history took a number of blood samples and sent them for analysis. The samples received by the haematology department was unexceptional and its results (Production 2, pages 138 and 140) were sent back to the ward. These results were known before Dr Millar started his procedure on the morning of 19 September. It was known at that time that Mrs Wilson's platelet was satisfactory and her blood group had been ascertained so that should a haemorrhage occur (a distinct possibility in view of the procedure involved) that the necessary blood supplies were available. Steps were also taken to ensure that an intravascular surgeon was available should an emergency operation be necessary.

Another sample was sent to biochemistry and the results were very abnormal (Production 2 p.103). They were considered by a member of the biochemistry staff and passed for notification to the ward. At that time only a creatine figure in excess of 500 or a urea figure in excess of 30 would have resulted in the biochemistry department contacting the ward directly and alerting them to the result. Since 2006 the creatine level for alerting the ward has been reduced to 300 although the urea figure remains the same.

It was suggested that a reasonable precaution which should have been in place was for the biochemistry department to alert the ward of the unusual figure. I have reached the conclusion that this would not be reasonable by the standards of 2006. More than 4% of samples analysed at that time displayed a creatine level in excess of 400 and there was at that time in place a system whereby the results were transmitted by computer to the ward for consideration by the doctor. The results were then confirmed in writing (page 103).

I believe by the standards of 2006 it would not have been reasonable to expect the biochemistry department to have specifically alerted ward 4 to these results. I am reinforced in that view on the basis that there was

nothing drawn to the attention of the biochemistry department to alert them to the fact that any kidney problems were of particular significance because of the procedure which Mrs Wilson was to undergo. Dr Annis had not, in using the form to request the biochemistry analysis, indicated the procedure which Mrs Wilson would be due to undergo the following day. It was, in my view, reasonable for the biochemistry department to presume that a request from a surgical ward for an analysis related to a surgical case and not to a radiological procedure which had a particular risk to the kidneys due to the dye used.

I do consider there is substance in the suggestion that a system should have been in place that ensured that the biochemistry (and haematology) departments were aware of what was involved in the procedures which the individual patient was to undergo. Without that information the true significance of any results in a particular case could be overlooked.

Again, this matter has now been rectified and the request for samples requires the doctor seeking the information to highlight why the sample is being requested. There is a further fallback safety point in that in relation to radiology no procedure will be undertaken without the necessary up-to-date results being available.

I believe that Mr Wilson is correct in his assertion that a reasonable precaution which could have been undertaken in this matter would have been for a system to exist whereby the doctor who took the sample and sent it for analysis to check the results when they became available and to note them on the records. Why neither Dr Annis nor any of his colleagues did so is not known although Mr Scott did hint that the reduction in junior hospital doctors' hours could have resulted in Dr Annis being off-duty at the time the results became available.

While this is a possibility I do not accept a satisfactory system existed at that time for ensuring that results which were being sought were read and noted as soon as they became available. If the results were not available when the doctor who sought them went off duty then arrangements should have been made for the results to be sought out and checked by another doctor.

In 2006 junior hospital doctors would have been aware of the obligation to check results when they came in and there is no explanation as to why the important and abnormal results from biochemistry were not read, noted and acted upon. The importance of ascertaining, noting and acting upon all haematology and biochemistry results was emphasised in the initial training given to all new doctors when they started at Monklands Hospital.

It is clear from the evidence of Dr Millar and Mr Scott that had those results been known before Dr Millar considered starting his procedure he would have stopped. He would have consulted Mr Scott, although if it had been drawn to the latter's attention before then it is unlikely that he would have necessarily have allowed the patient to pass into Dr Millar's care without consulting his radiological colleague. Dr Millar would have also consulted with the renal physicians to see what steps could be taken. A decision would have been made as to whether it was appropriate to delay the procedure further to allow rehydration and other steps to improve possibly Mrs Wilson's kidney function or whether it was necessary, notwithstanding the obvious risks, to proceed immediately.

I am satisfied from the evidence which I heard that had the results of the biochemistry analysis been known to Dr Millar he would not have continued with the procedure on the morning of 19 September but would have delayed it to allow the renal physicians to take steps to endeavour to improve Mrs Wilson's major kidney problems.

At that time based on the evidence of Dr Price, supported by Dr Rodger, Mrs Wilson's kidney function was limited to 10% of normal and this was, based on Dr Millar's findings in July 2006, a figure which related solely to kidney failure and not in any way to a blockage.

Mrs Wilson died of multiple organ failure which, in my view, was initiated by her kidney failure. It is therefore necessary to consider what, if any, information there is as to what caused that final kidney failure. It is also necessary to consider whether had Dr Millar and Mr Scott delayed the procedure because they knew of the biochemistry results, could Mrs Wilson's kidneys have recovered to a sufficient state as a result of rehydration and the alterations in her medication. Would the dangers of any kidney failure be lessened.

It is also necessary to consider what factors may have caused the further deterioration in Mrs Wilson's kidney function following Dr Millar's procedure and on this point there was a sharp disagreement between Mr Coll on the one side and Mr Lipton and Mr Wilson on the other.

Both viewpoints conceded that the kidneys could be damaged by the toxic effect of the contrast but it was accepted that the effect of this would wear off with the passage of time. Both accepted that a natural effect of the procedure carried out by Dr Millar was that emboli would be dislodged and would pass to the kidneys. In his final submission Mr Stewart pointed out that when she conducted her post mortem Dr Black had perhaps not been fully aware of the major difficulties and extent of the procedure carried out by Dr Millar and how close to the aorta itself he had required to work. As a consequence the likelihood of emboli descending through the body and reaching the kidneys was thereby increased.

Mr Lipton and Mr Wilson contended that the evidence established that the kidneys in their considerably weakened state must have been damaged by

the use of contrast although both accepted that the presence of emboli was an additional factor. Mr Coll argued that there was no evidence to suggest that the contrast had caused any damage. He contended that evidence given by Dr Rodger as well as Dr Price suggested that it was impossible to state that any damage there may have been to Mrs Wilson's kidneys as the result of the Angioplasty was not the anticipated one caused by loosened emboli.

I am satisfied that both factors have to be considered in relation to any deterioration in Mrs Wilson's kidney function and that accordingly both have to be considered as possible contributing factors to her death. While it is accepted that the dye will not always cause an adverse effect it frequently does and on a balance of probabilities it is more likely than not that it did for a short period. Similarly, emboli would normally have reached the kidneys post procedure particularly because of the area in which Dr Millar required to work.

Had Dr Millar and Mr Scott had the opportunity to delay the procedure there might have been a minimal betterment in Mrs Wilson's kidneys as a result of rehydration etc. and the intervention of renal specialists. The danger from loosened emboli would have remained exactly the same and might in fact have increased marginally if the procedure had been delayed.

It must be remembered that Mrs Wilson's condition was serious. As had been found at the August multiple disciplinary consultation, urgent steps were required and while it is certain that had the results from biochemistry been known prior to the procedure on 19 September that it would have been delayed, any such delay could only have been for a very short period Mrs Wilson's peripheral vascular disease would have continued to worsen further and if neither an angioplasty nor a surgical solution was attempted she would have had to undergo an urgent amputation. Evidence showed that the mortality rate following such a procedure is high.

Mr Wilson, in his final point on behalf of the family, indicated their concern that Mrs Wilson had given her consent after she had been given certain drugs prior to the procedure she was to undergo. There is no evidence whatsoever that Dr Mirghani did not obtain a full and valid consent from Mrs Wilson and that she was not in a fit state to give such a consent. While I appreciate the Wilson family's obvious upset that what both Mrs Wilson and they believed would be a short stay in hospital had such a tragic conclusion I am quite unable to find that Mrs Wilson did not give a fully informed consent to the procedure. No such suggestion was ever put to Dr Mirghani and I found his evidence as to the care and time he had taken in obtaining Mrs Wilson's consent impressive.

In his very helpful and full submissions Mr Lipton agreed with Mr Wilson and with others as to the particulars I should record in Section 6(1)(a).

He argued that the cause of death was as found by Dr Black namely, multiple organ failure and sepsis following femoral angioplasty. This undoubtedly is factually correct and I have so found. There was however a further factor arising from the evidence of Dr Black. She indicated that she had found large haematomas in groin area, the back of the right thigh and on the lower back and that she considered that the extensive bruising which she found was attributable to extensive blood loss into the lower tissues. This she felt could have compounded with the significant level of renal impairment from which Mrs Wilson was suffering and led to a failure of Mrs Wilson's other vital organs resulting in her death as a result of multiple organ failure and sepsis.

As Mr Lipton pointed out both Dr Scott and Dr Rodger confirmed that prior to the procedure on 19 September Mrs Wilson was suffering from a substantial level of renal impairment and both were of the view that the angiogram and angioplasty contributed to her kidney function deteriorating further.

Dr Rodger suggested two possible causes for the deterioration in Mrs Wilson's kidney function. They were contrast nephropathy and cholesterol emboli which had occurred during the angioplasty procedure.

I did not believe that he considered that these two possibilities were mutually exclusive. On the contrary, I was of the view that he indicated that both were more likely than not to be contributing factors.

Neither Mr Scott nor Mr Millar were of the opinion that the bleeding had been a significant factor leading to Mrs Wilson's death. I am entirely satisfied that any bleeding which occurred did not occur within the forty-eight hours that followed the procedure for the reasons which I have given earlier. There was no fall in her haemoglobin or her blood pressure nor was there any rise in her heart rate.

Accordingly, I do not consider that there is any evidence that the procedure itself caused any immediate significant blood loss. I however accept Dr Black's findings that there was extensive blood loss into the tissues although no immediate source for this could be found. I equally accept Dr Black's conclusion that this blood loss may have compounded the significant level of renal impairment from which Mrs Wilson was suffering and that this in turn led to the failure of her other vital organs which ultimately led to her death.

I have therefore concluded that there were three factors which led to the deterioration in Mrs Wilson's kidney function after 19 September.

Firstly, there was significant blood loss but this did not occur until at least 21 September and was in no way attributable to any failure whatsoever by Dr Millar. Nor do I think anything could have been done to rectify this due to her overall condition particularly as the source of the bleeding could not be found even at post mortem.

Secondly, I believe that contrast nephropathy was a factor. It is accepted that as a result of injecting dye into an artery there is a natural consequence that some of the dye will go to the kidneys and that it is recognised this can have an adverse affect. That affect however is not necessarily long-term and the commencement of rehydration should have flushed any effects from the kidney. Whether the kidneys had been further damaged as a result of the presence of the dye cannot be ascertained with certainty but it is certainly a possibility. It requires to be borne in mind that Mrs Wilson's creatine level did not rise significantly post procedure (See Dr McKenna's blood sample results) nor did Dr Price find any evidence on 20 September of the kidneys have suffered at that time from any adverse effects attributable to the dye.

Thirdly, as Dr Millar in his evidence stated, cholesterol emboli was dislodged in the course of this procedure as would be expected. Some of this could and would have found its way to the kidneys and would have caused further deterioration.

It is essential that I emphasise again that Dr Millar's procedure was carried out to the highest possible standard and that the dislodging of emboli is a totally accept and expected result of carrying out the procedure. It was essential that such a procedure be carried out for Mrs Wilson at some point and she was fortunate that somebody of Dr Millar's expertise and experience was available to carry this out. Tragically, due to factors totally beyond Dr Millar's control, Mrs Wilson subsequently died.

Mr Lipton supported Mr Wilson's contention that the absence of a blood sample prior to the CT angiogram on 12 July is a factor which I should highlight. He also supported Mr Wilson's contention that I should highlight the flaws in the procedure which existed on 18 September 2006 in relation to the dissemination of the result of the blood sample sent by biochemistry. As I have indicated, I consider that there is substance in both points and while

steps have now been taken to ensure that any such omissions will not occur again it is appropriate that I reflect these in my findings.

Mr Stewart, in his submissions, emphasised that Mrs Wilson's disease was in an advanced stage and a prognosis without appropriate intervention was poor. His contention, which I believe is correct, is that there were no reasonable precautions which Dr Millar himself could have taken which would have resulted in Mrs Wilson's death being avoided and there were no defects in his system of working although there were, Mr Stewart conceded, system failures within the hospital which led to Dr Millar having insufficient information prior to starting the procedure.

Mr Coll's task, as representing NHS Lanarkshire, was a difficult one. He required to balance the responsibility of each of their employees and comment on the systems which existed in 2006. He naturally in the course of his submissions, emphasised the changes which had been made in the procedures following Mrs Wilson's death and I have recorded these in the last few findings prior to this note.

In this connection he urged me to ensure that I did not make any findings based on hindsight. It would be very easy, he argued, to review the tragic circumstances of Mrs Wilson's death and in the light of the changes made subsequently, to argue that all of these changes should have been made before her death. I agree with this. I have endeavoured to restrict my findings, where they are critical, to matters supported by the evidence.

Dr Rodgers, in his evidence was very clear as to what was appropriate practice in 2010 and what was acceptable in 2006. I found his evidence of considerable help and of equal authority. In making my findings I have borne in mind the evidence which he gave (often supported by Dr Godbur) as to what information should have been available in 2006 and what procedures would have been in effect prior to September 2006.

Mr Coll invited me to make no adverse findings in relation to Dr Millar. I have no hesitation in doing so and on the contrary consider that Dr Millar did his task conscientiously and thoroughly based on the information available to him. I also agree with his contention that Dr Millar in his evidence emphasised the need to weigh up the risks of procedure against the benefits likely to be obtained and that he considered based on his findings in September 2006 that Mrs Wilson's condition appeared to have deteriorated since the time of her angiogram in July. This supports the view which I have formed that the timescale available to Mr Scott and Dr Millar to intervene in Mrs Wilson's case was limited and that they did not have a lengthy period of time to allow her kidneys to recover.

I also consider, based on the evidence which I heard from Dr Price, that it is exceedingly unlikely that Mrs Wilson's kidney function would have improved by any significant amount even if the renal physicians had been given an unlimited period of time to carry out their work. It also requires to be remembered that Mrs Wilson had already suffered a number of strokes and that she was in a weak condition as a consequence of her poor appetite and loss of weight as well as her vascular and renal problems.

Mrs Wilson's death had a profound effect on a number of people. Firstly and most importantly, to her family who lost a loving and much loved relative. It clearly also had a significant effect on the hospital and resulted in considerable changes in the procedures within the hospital. It affected members of the staff, including Dr Millar, but in particular Mr Scott. In the course of his evidence Mr Scott had been clearly profoundly affected by the circumstances of Mrs Wilson's death. In my view, he quite wrongly felt responsibility for it. There was no evidence whatsoever that Mr Scott did not act in a totally professional manner. When Dr McKenna drew to his attention the terms of the adverse biochemistry result he and his staff did everything possible for Mrs Wilson. Dr McKenna herself put into immediate

effect everything which could possibly be done and her thorough notes reflected the care which she gave to Mrs Wilson.

While I accept that Mr Scott will naturally feel that this was a death which occurred in his unit and will always wonder whether if certain procedures had been in effect or had been properly followed that Mrs Wilson could have survived, there is no evidence that any fault whatsoever is attributable to him personally.

Mrs Wilson was a very ill lady when she entered the hospital. The failure to indicate the procedure which Mrs Wilson was to undergo to the biochemistry department or to find out and appreciate the results which were available on 18 September are factors which diminished Mrs Wilson's chances. The fact that neither Dr Mirghani nor Dr Millar had access to those results was a further factor. The failure to complete properly the card requesting the procedure prevented Dr Mirghani and Dr Millar from realizing the true position and further diminished Mrs Wilson's chances. Her own condition, her persistence in smoking which increased the vascular problems she was suffering from as well the natural consequences of the procedure which was essential, namely, potential bleeding into the soft tissues and the dislodgement of emboli were further factors which diminished Mrs Wilson's chances of survival. Sadly, the combination of all these led to her death.