CORONERS ACT, 2003

SOUTH *AUSTRALIA*

FINDING OF INQUEST

An Inquest taken on behalf of our Sovereign Lady the Queen at Adelaide in the State of South Australia, on the 5th, 6th, 7th and 8th dates of December 2005, the 2nd day of February 2006, the 11th day of April 2006, and the 18th day of May 2006, by the Coroner's Court of the said State, constituted of Mark Frederick Johns, State Coroner, into the death of Emma Rose Pahl-Cadman.

The said Court finds that Emma Rose Pahl-Cadman aged 20 years, late of Amber Lodge, 4 Gordon Terrace, Morphettville died at the Flinders Medical Centre, Flinders Drive, Bedford Park, South Australia on the 18th day of December 2002 as a result of cardiac dysrhythmia/arrest in a 20 year old Down's Syndrome female following abdominal surgery on a background of underlying ventricular septal defect. The said Court finds that the circumstances of her death were as follows:

1. Introduction

1.1. Emma Rose Pahl-Cadman died on 18 December 2002 at the Flinders Medical Centre having been admitted on 13 December of that year. She was 20 years of age. A post mortem examination conducted by Doctors Jurgen Stahl and David Astill at the Flinders Medical Centre gave the cause of death as cardiac dysrhythmia / arrest in a 20 year old Down's Syndrome female following abdominal surgery.

1.2. Ms Pahl-Cadman presented at the Flinders Medical Centre on 13 December 2002 with a referral letter from her general practitioner. On examination it was noted that she had been vomiting for two days and her abdomen appeared slightly distended with some tenderness and guarding. Ms Pahl-Cadman was admitted.

2. Dr Justin Greenslade

2.1. Dr Greenslade is a member of the Royal Australian College of Surgeons and was the Senior Registrar in the hepatobiliary and upper gastro intestinal surgical unit at the Flinders Medical Centre in 2002. Dr Greenslade explained the role of senior registrar as one in which a surgeon who has obtained his or her qualification may gain further training in a sub-specialty surgery and in his case the sub-specialty was hepatobiliary and upper gastro intestinal surgery. He said that the senior registrar held a position in the hierarchy below consultants but above surgical registrars or advanced trainees.

2.2. Dr Greenslade gave evidence at the Inquest and stated that he was present at all of the ward rounds for Emma Pahl-Cadman. He stated that Ms Pahl-Cadman was admitted under the consultant Dr Chew.

2.3. The first ward round at which Dr Greenslade was present was the ward round for 14 December 2002. He stated that on examination Ms Pahl-Cadman was noted to be febrile. She had a temperature which was over 39 degrees. He described this as a significantly elevated temperature. He said her pulse rate was tending toward tachycardia and she had a slightly distended or bloated abdomen but on physical examination it was soft. He stated that Ms Pahl-Cadman did not appear to be in any pain when her abdomen was being palpated which was a significant finding. He stated that bowel sounds were noted to be present and blood tests were normal as were urine tests. Plain x-rays had been taken and these were examined. It was noted that on x-ray Ms Pahl-Cadman had dilated small bowel loops with no evidence of dilation of the colon or lower intestine. She had a chest x-ray which looked normal.

2.4. Dr Greenslade said that the small bowel loops can be indicative of a mechanical obstruction but it can also be indicative of an ileus which occurs when the bowel has shut down for any number of causes including inflammation and a gas build-up causes the dilation to occur.

2.5. Dr Greenslade stated that on that ward round of 14 December 2002 the clinicians present, including him, formulated a differential diagnosis of gastroenteritis or small bowel obstruction. He stated that the plan was to treat Ms Pahl-Cadman in a supportive fashion with rehydration and pain relief and to wait to see if any further diarrhoea manifested itself subsequently. In the meantime she would be observed.

2.6. Dr Greenslade stated that the clinicians were leaning towards a diagnosis of gastroenteritis because of Ms Pahl-Cadman's fever. He stated that he could not reconcile the existence of the fever with a mechanical small bowel obstruction unless there were a perforation of the bowel or dead bowel and that there was no evidence of that on physical examination. He stated that it is possible to have fever with gastroenteritis due to its infectious nature and for that reason he was leaning more towards the diagnosis of gastroenteritis.

2.7. At the ward round on 15 December 2002 the clinicians noted that there was some indication of improvement. Ms Pahl-Cadman had had a small bowel motion, and her vomiting had appeared to have become less severe and her fever had settled. The overall impression was that she was improving. They were therefore leaning more towards a diagnosis of gastroenteritis at that point although an entry in the notes for that ward round indicates that the possibility of doing a CT scan was raised for consideration.

2.8. Dr Greenslade was present at the ward round on the morning of 16 December and it was noted that overnight Ms Pahl-Cadman's condition had deteriorated somewhat and that there had been an attempt to insert a nasogastric tube which was resisted by Ms Pahl-Cadman. The nasogastric tube was not inserted. Ms Pahl-Cadman had been vomiting more profusely and her temperature had risen over 38 degrees. A physical abdominal examination showed no new signs such as to indicate an evolving problem with the abdomen such as perforation or dead bowel. At this stage Dr Greenslade stated that he was puzzled because he was unable to reconcile the ongoing fevers with the clinical state of her abdomen and so a decision was made to perform the CT scan that had been contemplated the previous day.

2.9. Dr Greenslade stated that at this point he was determined to try to rule out the possible diagnosis of small bowel obstruction, or to prove its existence.

2.10. On the morning of 17 December 2002 there was a further ward round and the situation on examination appeared to be unchanged in that Ms Pahl-Cadman was still vomiting, was still febrile with a temperature over 39 degrees. Her blood tests remained normal and her abdomen was examined with no new findings elicited. At that point the clinicians did not have the results from the CT scan available to them.

Therefore, a further review was planned for that afternoon and it was conducted by Dr Greenslade at 1600 hours.

2.11. At 1600 hours the results of the CT scan were available in the form of a provisional report which had to be obtained from the radiography registrar verbally. The registrar informed Dr Greenslade that the CT scan showed a dilated small bowel but there was a possibility raised as to whether the patient had a foreign body within the lumen of the small bowel. The radiologist said that he could not be certain of this and it was by no means definite. There was clearly no evidence that the bowel had been perforated and it appeared that the bowel had not lost its blood supply either. However based on the fact that she was showing no sign of clinical improvement and the fact that the CT scan had reinforced the possibility of a mechanical obstruction of the small bowel, a decision was made to operate on Ms Pahl-Cadman.

2.12. The contemplated operation was a laparotomy to determine the existence or non-existence of a bowel obstruction. Dr Greenslade explained that if such an operation had not been pursued and it proved to be the case that Ms Pahl-Cadman did in fact have a mechanical bowel obstruction she would be unable to recover from that and would die. On the other hand, Ms Pahl-Cadman had an increased risk for surgery by reason of a long standing cyanotic heart condition with what was called Eisenmenger Syndrome.

2.13. Dr Greenslade explained that Eisenmenger Syndrome is a condition that develops slowly in the context of a defect in the heart called a ventricular septal defect. This is a recognised complication of Down's Syndrome, being one of the congenital abnormalities associated with that condition. As noted, there is a defect in the heart which permits blood to flow from the higher pressure left side chamber through the defect into the right side of the heart where the blood is flowing into the lungs. That in turn leads to the circulation in the lungs being exposed to abnormally high pressures which leads to permanent changes in the blood circulation of the lungs and the result is pulmonary hypertension. Furthermore, as time goes by, a situation can develop where the heart flow actually reverses intermittently. Dr Greenslade described this as a to and fro effect through the defect in the heart with the result that the patient is unable to oxygenate blood adequately. The problem is that not all of the blood that should be flowing through the lungs to pick up oxygen is in fact doing so, because some of it is being bypassed straight back into the blood stream without

circulating through the lungs. Patients in this circumstance tend to have chronically low oxygen levels in their blood – in other words they have chronic cyanosis.

2.14. Dr Greenslade explained that the presence of Eisenmenger Syndrome was one reason for carrying out the CT scan rather than simply operating. He stated that the last thing he wanted to do was to operate on Ms Pahl-Cadman and be unable to improve her condition while exposing her to the risks associated with surgery.

2.15. Dr Greenslade explained that if the bowel were obstructed and it remained so obstructed Ms Pahl-Cadman would be unable to take any food or fluid orally. Eventually the obstruction would be likely to complicate in the bowel: for example, by eroding through the bowel wall causing a perforation or loss of blood supply. Therefore it was essential to carry out an operation.

2.16. Dr Greenslade consulted with Dr Chew and discussed the provisional CT findings and expressed his desire to operate. Dr Chew concurred with that proposal. That decision was made at around 1600 hours on 17 December 2002. Dr Greenslade then put in place appropriate steps for a theatre to be made available.

2.17. Dr Greenslade was asked to comment on an overview obtained by Dr Reiger in this case. Dr Reiger expressed concerns about the four day period between Ms Pahl-Cadman's admission and the decision to operate. Dr Greenslade commented that the most confounding issue for him was the presence of the fevers. His view was that if Ms Pahl-Cadman had had an uncomplicated small bowel obstruction due to a foreign body he would not have expected to see temperatures in the order of 39 degrees. He explained that this led to him putting more weight on the diagnosis of gastroenteritis in the early period. The next event in his mind was that there seemed to be an improvement on examination and this delayed the implementation of the CT scan.

2.18. Dr Greenslade described the surgery as technically straight forward. He stated that once access had been gained to Ms Pahl-Cadman's intestine he noted a point within the distal small bowel where there was a palpable foreign body, and beyond that point the bowel was collapsed indicating that it was a point of obstruction. He made an incision in the intestine near the point of obstruction and a foreign body was extracted from the bowel and the intestine was then closed. He stated that the foreign body once unfolded proved to be the thumb and three fingers of an examination glove which Ms Pahl-Cadman had apparently swallowed.

3. Dr Gayle Roberton

3.1. Dr Roberton is a specialist anaesthetist and has worked in that capacity at the Flinders Medical Centre since 1996.

3.2. She gave an account at T51 of the circumstances in which she came to examine Ms Pahl-Cadman on 17 December 2002. She stated that she was in the hospital as the anaesthetic consultant on call. Dr Greenslade approached her and told her about a patient he wanted to operate on later that day and gave a brief outline of what the operation would entail and what the patient's other problems were. The patient was Emma Pahl-Cadman. Dr Roberton stated that the senior anaesthetic registrar on duty that day was Dr Grewal, and as Dr Grewal was in the theatre anaesthetising another patient, Dr Roberton took it upon herself to go to the ward and see Ms Pahl-Cadman to assess her general condition and also to decide whether she needed to remain in the hospital to supervise Dr Grewal or not.

3.3. Dr Roberton stated at T52 that she could not obtain any information from Ms Pahl-Cadman because of her Down's Syndrome status. However, a family member was present with Ms Pahl-Cadman and Dr Roberton recalled that it was Ms Pahl-Cadman's aunt. Dr Roberton stated that Ms Pahl-Cadman's mother was not present and so she was unable to obtain all of the information she needed at that point, but she also stated that she had access to Ms Pahl-Cadman's hospital notes. At T53 Dr Roberton stated that she was keen to find out about Ms Pahl-Cadman's cardiac status and the notes contained a report of a recent consultation and examination with a cardiologist which gave her very good information as to Ms Pahl-Cadman's current cardiac status. She stated that the report was from Dr Robert Minson, cardiologist, and was dated 1 November 2002.

3.4. At T55 Dr Roberton explained that it is important to make enquiries as to cardiac status before the administration of anaesthesia because the drugs used to induce anaesthesia all depress the brain, the heart and the lungs, and it is necessary to assess the patient's ability to cope with the depression of those systems. Dr Roberton said according to Dr Minson's report, Ms Pahl-Cadman had a ventricular septal defect which was longstanding in nature. Ms Pahl-Cadman had had it from birth, she had a shunt from one side of the heart to the other, she was centrally cyanosed, peripherally cyanosed and the shunt had caused her to have pulmonary hypertension. Dr Roberton

stated that her conclusion from the report was that Ms Pahl-Cadman had very little cardiac reserve and she would not ordinarily want to anaesthetise somebody in Ms Pahl-Cadman's condition but that this status was normal for Ms Pahl-Cadman as Ms Pahl-Cadman had had it for many years and because of her pulmonary hypertension the condition was unlikely to ever get better.

3.5. At T60 Dr Roberton stated that in addition to the steps already taken to inform herself about Ms Pahl-Cadman's condition for anaesthesia, she also rang Ms Pahl-Cadman's mother at home.

3.6. At T60, Dr Roberton stated that her assessment, after carrying out all of the investigations referred to above, of Ms Pahl-Cadman's fitness to undergo anaesthesia was "it was very high risk" but that the choice for whether or not surgery would be undertaken was not Dr Roberton's to make. Ms Pahl-Cadman had a bowel obstruction which required surgery to treat, there was nothing that Dr Roberton could do to make Ms Pahl-Cadman better than she already was in preparation for surgery. She summarised the position as follows "I mean, it was very high risk, but I was hopeful that she would survive the operation and there was nothing I could do to make her any better".

3.7. Dr Roberton stated at T62 that having made this pre-anaesthetic assessment of Ms Pahl-Cadman, she talked to Dr Grewal about it and made sure that she was happy to anaesthetise Ms Pahl-Cadman. Dr Roberton then left the hospital.

3.8. Dr Roberton was asked to comment on the nursing record of Ms Pahl-Cadman's stay in the recovery room after surgery. At T68 Dr Roberton stated that in her opinion Ms Pahl-Cadman's status at the time of the last set of observations in the recovery room – 1955 – were that Ms Pahl-Cadman had made a good recovery from the anaesthesia. At T70, Dr Roberton was asked whether positive pressure ventilation would have assisted Ms Pahl-Cadman to increase her oxygen saturation levels. Her response was that this would not have assisted because during the operation it had been noted that positive pressure ventilation made the situation worse. Dr Roberton also stated at T70 that with the benefit of hindsight the only thing that might have made a difference to Ms Pahl-Cadman's outcome would have been monitoring on a cardiac monitor which might have meant the treating staff would have picked up an arrhythmia.

3.9. At T71, Dr Roberton was asked about an overview prepared in this matter by Professor Cade in which it was suggested that preoperative input from a cardiologist might have been beneficial. Her response was that she did have the benefit of Dr Minson's report and as far as she could see Ms Pahl-Cadman was in much the same stable condition in mid-December 2002 as she had been when Dr Minson wrote the report in early November of the same year. Her view was that she did not think that input from a cardiologist would have made any difference from an anaesthetic point of view.

3.10. At T73, Dr Roberton said that at the time she made the pre-anaesthetic assessment she could not obtain a consent to the surgery because Ms Pahl-Cadman's mother was not present. However, Ms Pahl-Cadman's mother came in to the hospital as a result of the telephone call from Dr Roberton and did provide consent to surgery to Dr Grewal prior to the commencement of the operation.

3.11. At T78, Dr Roberton confirmed her earlier evidence that the only step which could have been taken which might have made a difference to the outcome in Ms Pahl-Cadman's case, was monitoring with a cardiac monitor. However she stated that she could not say whether even with a cardiac monitor Ms Pahl-Cadman would have survived the arrhythmia which took her life.

3.12. In cross examination by Counsel Assisting at T259-T264, Dr Roberton acknowledged that, when she was interviewed by Senior Constable Elliott on 18 May 2004, she described the anaesthetic risk for Ms Pahl-Cadman as "significant", whereas in evidence in chief at Inquest she had described the risk (as already noted) as "very high risk" (T60). Finally, Dr Roberton conceded at T264 that I should prefer the answer she gave to Senior Constable Elliott in May 2004 to the answer given by her in examination in chief as her true assessment of Ms Pahl-Cadman in December 2002. However, with the benefit of hindsight, Dr Roberton would now assess Ms Pahl-Cadman's risk as very high.

3.13. At T256 Dr Roberton was asked about a proposition which was put by Professor Cade that the use of nitric oxide as an ancillary agent to anaesthesia may have been useful in Ms Pahl-Cadman's case. Dr Roberton answered that she was not aware of nitric oxide ever being used in theatre, that it may be used in ICU, but that her understanding is that use of nitric oxide is "still experimental". She acknowledged

that nitric oxide is useful in cases of pulmonary hypertension because it dilates the pulmonary vessels which should reduce the pressure in those vessels.

4. Registered Nurse Samantha Clark

4.1. Nurse Clark gave evidence that in December 2002 she was working in the recovery ward at Flinders Medical Centre. At T111, she was able to identify that she was on duty in the recovery room on 17 December 2002 when Ms Pahl-Cadman was returned from theatre. At T112-113 Nurse Clark said that looking at the notes she could say that at 1915 she spoke to Dr Grewal about Ms Pahl-Cadman's oxygen saturations which had been recorded as 48% on 6 litres of air and Nurse Clark made an entry in the notes that Dr Grewal was aware of the saturations being lower than 48% on 6 litres of oxygen but was "happy for patient to go ward as normal sats is (sic) 48% on air".

4.2. At T114 Nurse Clark gave evidence that by 1940 Ms Pahl-Cadman's oxygen saturation was 65% on 2 litres of oxygen.

4.3. Nurse Clark identified her last set of observations as having been done, according to the notes, at 1955. She stated that patients need to have three sets of observations to be done after they have awakened from anaesthesia before they may be allowed to leave the recovery ward. Nurse Clark stated that if the patient at this point fits certain criteria, it is possible for the recovery room nursing staff to sign them out of the recovery room. If not, it is necessary to have an anaesthetist sign the patient out. At T116, Nurse Clark stated that according to the observations at 1955 Ms Pahl-Cadman did not meet the criteria necessary to enable a member of the nursing staff to sign her out of the recovery room because her oxygen saturations were too low. She stated that she therefore called Dr Kishore who was another anaesthetist on duty in the hospital that night. Nurse Clark identified a note she made of her conversation with Dr Kishore:

> '8 o'clock, rang Dr Kishore to inform about saturations. Happy with patient to go to ward.'

4.4. While Nurse Clark did not have a specific recollection of her conversation with Dr Kishore, she was able to say that from her general practice she would have told Dr Kishore how Ms Pahl-Cadman was managing in recovery, how her observations were, what was written on the chart and would have told her specifically about

Ms Pahl-Cadman's saturations and would have asked Dr Kishore whether she would be prepared to provide a second opinion. She believed that she would have told Dr Kishore that she had called Dr Grewal already and that Dr Grewal was happy for the patient to go the ward on these saturations.

4.5. Nurse Clark gave evidence at T117 that following her telephone conversation with Dr Kishore, another nurse signed the recovery room sheet to signify that Ms Pahl-Cadman could be sent from the recovery room to the ward. Nurse Clark gave evidence that according to the notes she then wheeled Ms Pahl-Cadman in her bed up to Ward 5E.

5. Registered Nurse Paul Griffiths

5.1. Nurse Paul Griffiths is a registered nurse who was working in Ward 5E in December 2002. He said that on 17 December 2002 he held the position of acting clinical nurse and he was rostered on the late shift on that day. He stated at T130 that on the evening of 17 December he was responsible for primary nursing care of Ms Pahl-Cadman when she returned to the ward. He stated at T131 that his usual practice would be to perform a brief clinical assessment of the patient as soon as they arrived on the ward to ensure that their oxygen was running at the required setting, that they were reasonably comfortable, that their colour was normal and that IV fluids, catheters, drains were all in place and working. At T133-134 Nurse Griffiths stated that post-operatively patients returned to the ward are subjected to hourly observations for four hours, then two hourly observations for four hours, and then four hourly observations thereafter. Nurse Griffiths identified that he had carried out observations at 2015, 2115 and 2200 hours. At T137 Nurse Griffiths acknowledged that there was no record on any of the observations at those times of oxygen saturation levels having been taken. He was asked by his own counsel whether or not he would have carried out oxygen saturations levels on Ms Pahl-Cadman and at T137 he stated "they should have been done". When asked if he was able to say whether or not he would have done oxygen saturations he stated "I would have done it". He was asked if he was able to offer any explanation as to why there was no record of oxygen saturations and his answer was:

> 'Not at all. Even if it had a zero, I would have put "zero". If I had 100, I would put "100".'

5.2. I have looked at the special nursing report and the observations that were entered by Nurse Griffiths at 2015, 2115 and 2200. The form "special nursing report" has provision for the hour, the temperature, the pulse, the respiration, the blood pressure and "other observations". There are entries for each of the stated hours under each of the headings for temperature, pulse, respiration, blood pressure and other observations. The entries under "other observations" relate to the condition of Ms Pahl-Cadman's wound and the presence or absence of oozing. Bearing in mind that Nurse Griffiths' first response when asked if he would have carried out oxygen saturations was "they should have been done", and when pressed by his own counsel his response was "I would have done it", I find it difficult, in the absence of any written record, to accept that oxygen saturations were in fact taken by Nurse Griffiths. However, I note that when Nurse Griffiths was interviewed by Senior Constable Elliott on 12 February 2004 (Exhibit C12), he gave a very similar account; namely that he did not have any explanation as to why oxygen saturations were not recorded, but firmly believed that he would have carried out oxygen saturation observations. At T138 he explained that the device which can be used to record pulse and blood pressure could also be used to take the oxygen saturations. Assuming that this machine was used on each occasion that observations were taken it is reasonable to accept that the probability is that Nurse Griffiths did take oxygen saturations notwithstanding the fact that he did not record them. At T150 he readily accepted that he should have made notes of the oxygen saturation levels.

6. Registered Nurse Julie Bowman

6.1. Nurse Bowman is a registered nurse and gave evidence at the Inquest. Nurse Bowman was working at the Flinders Medical Centre in December 2002. On 17 December 2002 she was working on the night shift which commenced at 2145 hours on 17 December and continued until 0715 hours on 18 December.

6.2. By reference to the hospital notes (Exhibit C9) Nurse Bowman was able to inform the Court that she took over from Nurse Griffiths and conducted her first set of observations on Ms Pahl-Cadman at 2300 hours on 17 December 2002. She noted that Ms Pahl-Cadman's temperature was 39.6 degrees which is significantly elevated. However, she was aware that earlier in the evening Nurse Griffiths had noted an elevated temperature and had requested the attendance of a medical officer who had

by that stage attended. Nurse Bowman could not remember whether she had taken any steps to have the medical cover attend following her observation at 2300 hours.

6.3. At T162 Nurse Bowman speculated that she may have been in Ms Pahl-Cadman's room to fill up her intravenous drip at 2400 hours and she remembered going back into the room at around 0100 hours because another patient required attendance.

6.4. Nurse Bowman's notes recorded in the progress notes (Exhibit C9) at 0310 on 18 December 2002 are as follows:

> "Nursing 5E – On my 1st round @ 2215 patient was sleeping soundly. I went in to her to do her post op obs @ 2300. BP 115/56 pulse 120 temp 39.6
> …
> I was in the room both @ 2400 and 0100 filling IVT's of the other patients in the room. I left the room @ 0015 and patient was snoring loudly. I returned to the patient @ 0145 to empty N/G and IDC and take patients obs it was at this time I found patient unresponsive and not breathing – emergency button hit and CPR commenced immediately – crash team arrived patient was intubated given IV adrenaline and atropine with no effect – CPR ceased @ 0210. Mother notified, now present. Coroner notified, police attended. RIP'

6.5. In evidence at T168 Nurse Bowman stated that she was not certain if she returned to find Ms Pahl-Cadman unresponsive at 0145 or 0130 or somewhere between those two times.

6.6. At T168-169 Nurse Bowman gave evidence that she could not remember whether she checked Ms Pahl-Cadman's oxygen saturations at any time. She stated that she could not remember if an oximetry machine was available on the ward that night but her evidence was that often at that stage there was no machine available because the ward had only one machine and that seemed to be malfunctioning and down in maintenance. She stated that she would have done the observations if the machine were available to use but she was not sure if it was available. She was asked to assume that other evidence indicated the availability of a machine as that had been Nurse Griffiths' recollection and she stated that if there had been a machine she would have used it but qualified this by saying that she did not know that a machine was in fact available.

7. Dr Madhuri Kishore

7.1. Dr Kishore gave evidence at the Inquest. She stated that in December 2002 she was employed at the Flinders Medical Centre as an anaesthetic registrar. She stated that

she did not recall Emma Pahl-Cadman as a patient or any involvement with Ms Pahl-Cadman. She identified a record of an interview conducted with her by Senior Constable Elliott in March 2004 which was admitted and marked Exhibit C10. In that record of interview she was asked whether she had any recollection of a telephone conversation with a nurse in the recovery room at 2000 hours on 17 December 2002 and her answer in the record of interview was that "I have no memory of that conversation". She stated that as at the time of giving her evidence she still had no memory of that conversation. In these circumstances, and in the absence of any notations in the hospital notes actually made by Dr Kishore, Dr Kishore was unable to cast any further light on the cause and circumstances of Ms Pahl-Cadman's death.

8. Dr Nawkiran Grewal

8.1. Dr Grewal gave evidence at the Inquest by video link to London where she now lives. She is a Fellow of the Royal College of Anaesthetists and worked at the Flinders Medical Centre from September 2002 until February 2003. As already noted, she was the senior registrar on duty on the evening of 17 December 2002 and administered anaesthesia during Ms Pahl-Cadman's operation. She gave evidence at T235 that Dr Roberton had carried out the pre-anaesthetic consultation in relation to Ms Pahl-Cadman and then had a discussion with Dr Grewal as to the outcome of the pre-anaesthetic consultation. Dr Grewal was aware of Ms Pahl-Cadman's low oxygen saturation rates and her ventricular septal defect. Dr Grewal identified all of the entries on the pre-anaesthetic consultation form in the medical notes as being in her own handwriting, completed by her with information provided by Dr Roberton and Ms Pahl-Cadman's mother who had also signed a consent form. At T240 Dr Grewal gave evidence that there was no expectation that she would conduct her own pre-anaesthetic check but, (at T241) that she believed that she was in a position to form her own view as well as heeding that of Dr Roberton.

8.2. At T245 Dr Grewal said that given all Ms Pahl-Cadman's pre-existing conditions she regarded her as a patient at high risk for anaesthesia. She said that in hindsight, to minimise the post-operative risk, it would have been preferable if Ms Pahl-Cadman had had closer monitoring in a high dependency unit rather than the ward. She stated as her reason for this that Ms Pahl-Cadman would have been able to have had continuous monitoring of her oxygen saturation and also ECG monitoring. She stated

that if these conditions had been in place, it may have been possible to pick up an arrhythmia earlier.

8.3. At T247 Dr Grewal was asked whether she agreed with the opinion of Professor Cade that, having regard to the 48% oxygen saturation prior to the operation, the most important manoeuvre the anaesthetist could have done was to decrease the pulmonary pressures to keep the ventilation pressures low. Dr Grewal agreed with this opinion and stated very forthrightly that she was not aware of it at the time. She said that she would not have considered it at the time but would now consider it as an option.

8.4. She was also asked about the view of Professor Cade that inhalation of nitric oxide could have been employed to drop Ms Pahl-Cadman's pulmonary pressures and decrease her shunt. Dr Grewal agreed with this opinion but stated her understanding that nitric oxide has only been used in an intensive care setting and not in the theatre complex. However she agreed that it reduces pressures with patients with pulmonary hypertension. She agreed that with the benefit of hindsight the employment of nitric oxide could have been an option in Ms Pahl-Cadman's case.

8.5. At T251 Dr Grewal stated that it was her understanding at the relevant time that there were, on the general wards, machines that could measure oxygen saturation readings. She was asked how long monitoring of oxygen saturations should have continued in Ms Pahl-Cadman's case and stated "I would have thought with low readings it probably would have continued indefinitely".

8.6. Dr Grewal was asked about the recovery room record of 48% SAO_2 on air at 1915 hours and asked whether that prompted concern. Her response was that it did not prompt concern because it was similar to her oxygen saturations prior to going into theatre.

8.7. At T251, Dr Grewal stated that her opinion now is that in Ms Pahl-Cadman's case, ECG monitoring should have been considered together with oxygen saturation monitoring and that transfer to a high dependency unit where there is an ECG monitor should have also been considered.

9. Professor Cade

9.1. Professor Cade was asked to prepare a report for me in relation to this matter. He provided a report dated 9 March 2005 which was admitted in evidence at the Inquest as Exhibit C14. Professor Cade gave evidence at the Inquest. Professor Cade is the Director of Intensive Care at the Royal Melbourne Hospital, a position he has held for more than twenty-five years. He holds a Doctor of Medicine and a Doctor of Philosophy MD and PHD and a number of Fellowships of Royal and other colleges, including the College of Anaesthetics and the Joint Faculty of Intensive Care Medicine. He is extremely well qualified to provide an expert overview in this case.

9.2. In essence, Professor Cade had no criticism of the treatment afforded to Ms Pahl-Cadman in the lead up to the decision to perform the surgery. He stated that the notes provided a very plausible explanation for the time sequences of her investigations. He stated "it seemed very logical to me".

9.3. Professor Cade was asked about Eisenmenger Syndrome and the ventricular septal defect. He provided the following summary:

> 'With a hole in the heart, clearly the blood can communicate in an abnormal way. It can communicate between the left and right side in a way which it shouldn't normally do, which would normally of course go through the lungs, solely through the lungs. For a start, as the left sided pressures are much higher than the right sided pressures, the shunt is always left-right. But after some time, in some patients, the right side gets stronger and stronger and the shunt can reverse, so there is what's called pulmonary hypertension and a reverse shunt, and that's the essence of the Eisenmenger syndrome. That means that the shunt is reversed. There is venous blood going straight into the circulation, the patient is desaturated and may be cyanosed or blue, and that's a potentially unstable cardiac circumstance. While not terminal, it's a very serious complication.' (T176-177)

9.4. Professor Cade was asked about the pre-anaesthetic assessment undertaken by Dr Roberton. At T178 and T193 he described Dr Roberton's pre-anaesthetic consultation as entirely appropriate. However, at T194 he stated that although Dr Roberton had referred to Dr Minson's cardiac report, she did not properly take it into account. At T194:

> 'By "taking into account", I meant taking into account in the sense of altering the anaesthetic, adjusting the anaesthetic, having a different anaesthetic plan. Not just knowledge of the diagnosis, but having some plan to deal with it.'

9.5. It was then put to Professor Cade by Dr Roberton's counsel that the anaesthetic plan was ultimately a decision for Dr Grewal rather than Dr Roberton. At T194 Professor

Cade stated that it was a decision for the senior anaesthetist in charge of the theatre complex at the time. He stated that if the anaesthetist is a registrar, the decision should be one in which the consultant would participate.

9.6. It will be recalled that Dr Roberton gave evidence of having carried out the pre-anaesthetic consultation on Ms Pahl-Cadman, forming an assessment that her risk for anaesthetic purposes was significant (which she later revised to very high with hindsight). Dr Roberton then considered whether or not she should remain in the hospital to supervise Dr Grewal or whether Dr Grewal was capable of dealing with Ms Pahl-Cadman's anaesthesia alone. It will be recalled that at the time Dr Grewal was a senior registrar visiting from England, who was present at the Flinders Medical Centre for some five months from September 2002 until approximately February 2003. Having regard to Professor Cade's opinion, and matters which will appear in due course, also arising from Professor Cade's evidence, I find that Dr Roberton erred in failing to properly assess Ms Pahl-Cadman's anaesthetic risk status as very high, and then further erred in leaving an anaesthetic registrar to carry out what was in fact an extremely complex anaesthetic procedure. In finding that Dr Roberton erred in the sense just recited, I am of course not intending to find or suggest any criminal or civil liability on Dr Roberton's part; I remind myself that section 25(3) of the Coroners Act 2003 expressly prohibits any such finding or suggestion.

9.7. At T179, Professor Cade made the point that the cardiac experts in a major hospital such as Flinders Medial Centre are reasonably available to clinicians such as Dr Roberton. Professor Cade said that it was desirable that treating clincians "touch base" with other experts who know the patient well and understand the patient's previous underlying problems (T179). Professor Cade went so far as to say such consultation should always be routine. Of course, the evidence shows that no such consultation took place; Dr Roberton did no more than read and note the content of Dr Minson's report of early November 2002.

9.8. At T179, Professor Cade was asked whether he would expect Dr Grewal to do her pre-anaesthetic consultation of Ms Pahl-Cadman, rather than accept the information passed on to her by Dr Roberton. Professor Cade said "if a registrar is given a handover by a consultant anaesthetist and it's an operation that is scheduled for the next few minutes or very shortly, and the registrar themselves - I'm not aware of the status, I'm just giving a scenario - is otherwise giving an anaesthetic or just finishing a

previous list, then that sort of professional handover would seem to me to be entirely appropriate." In fact, the evidence shows that Dr Grewal was in exactly the position contemplated by Professor Cade in his hypothetical example; she was the anaesthetic registrar working in theatre and about to take over responsibility for anaesthetising Ms Pahl-Cadman while Dr Roberton was her supervising consultant. I find that Dr Grewal's decision to accept at face value the pre-anaesthetic assessment conducted by Dr Roberton was entirely reasonable in the circumstances.

9.9. At T180 Professor Cade stated that Ms Pahl-Cadman's pre-operative oxygen saturation of 48% on air was:

> 'That is an extraordinarily low saturation. It's totally out of proportion in that patient with any previous saturations that had been measured and indicates that the shunt, the right to left shunt, has been greatly increased.'

9.10. At T182 Professor Cade gave the following graphic description of Ms Pahl-Cadman's operative oxygen saturations during the operation of 48%, 65% and 67%:

> 'These are extraordinarily low saturations. They are below the level that any of us would have at base camp at Everest for example. They are below the levels that venous blood that's coming back from the body runs at. They are very, very low, and the difference between 48 and 66 shows that the shunt is fluctuating, that is fluctuating at a very low level.'

9.11. At T181 Professor Cade states that probably the most important manoeuvre that could be performed by an anaesthetist confronted with such extraordinarily low oxygen saturations in a patient would be to decrease the pulmonary pressures. He offered two methods to achieve that:

1. The ventilation pressures being provided to the patient via the ventilator during anaesthesia need to be low.

2. Professor Cade referred to what he described as a number of pulmonary bars well known to cardiologists and cardiac anaesthetists. He suggested that the use of inhaled nitric oxide would have dropped Ms Pahl-Cadman's pulmonary pressures and decreased the shunt. He stated that inhaled nitric oxide is "widely available in teaching hospitals and cardiac theatres".

9.12. Professor Cade was asked about a note which appears in the Accident and Emergency Department's records made when Ms Pahl-Cadman was first admitted on

13 December 2002 recording an oxygen saturation of 97% on air. I think it is fair to say that Professor Cade regarded this as a spurious result:

> 'Well, there are a number of problems with saturation measurements that can provide a spurious reading. I must say I, too, was somewhat surprised at the 97% and it's plausibility, but there are readings of 85-94, and there were readings in cardiology between 88 and 90, and I've taken those as the more valid baseline.' (T182)

9.13. I note that the South Australian Ambulance Service record of Ms Pahl-Cadman's journey to Accident and Emergency on 13 December 2002 gives oxygen saturation readings of 85%, 94% and 97%, and I assume these are the readings referred to by Professor Cade. I find that the reading of 97% was most probably a spurious reading which did not accurately reflect her actual oxygen saturation at the time.

9.14. At T184 Professor Cade expressed the view that rather than being discharged to the general ward, Ms Pahl-Cadman should have been admitted to a high dependency or intensive care area for more detailed management and monitoring. He elaborated:

> '..firstly, ECG monitoring, to make sure she didn't have a consequential arrhythmia from the hypoxia; secondly, saturation monitoring with a high quality monitor; but probably thirdly, some sort of blood pressure or circulatory monitoring, preferably with an arterial line, so that the blood gases could be intermittently measured and crosschecked against the saturation measurements.'

9.15. Of course the evidence shows that Ms Pahl-Cadman was instead placed in a general ward. No records were maintained of her oxygen saturations during the evening of 17 December, although Nurse Griffiths maintained that he did observe them. No measurement was taken by Nurse Bowman who, it will be recalled, even doubted that an oximetry machine was available. In the circumstances I am left with the impression that even if Nurse Griffiths is correct in thinking, contrary to Nurse Bowman's recollection, there was an available oximetry machine, and that Nurse Griffiths actually took readings, without recording them, it is unlikely that any action would have been taken in response to low oxygen saturations reported by the monitoring devices. I am of this opinion because of the position taken by doctors Roberton and Grewal that extremely low oxygen saturations were "normal" for Ms Pahl-Cadman.

9.16. At T185 Professor Cade was asked about the care received by Ms Pahl-Cadman on the general ward and was asked to assume that some oxygen saturation monitoring was conducted, together with other observations, on an hourly basis. He rejected this regime as "completely insufficient because the abnormalities that can occur, can occur

within seconds". He stated that hourly monitoring was incomplete and inadequate for a patient who has a significant underlying cardiac problem or other major illness. (T186)

9.17. Professor Cade was also asked at T186 about Ms Pahl-Cadman's rising temperature, culminating in a reading of 39.6 at 2300 hours on 17 December 2002. He said that the temperature was indicative of an infection which probably came from abdominal gastro enteral organisms which had found their way into the blood, and that appropriate treatment was blood cultures and antibiotics. Professor Cade stated that a patient with an acutely raised temperature of 39.6 degrees and with desaturation needed to have immediate medical officer attendance. It will be remembered that Nurse Griffiths, noticing the raised temperature, had requested the attendance of surgical nights medical officer; however no such attendance had occurred as at the time of death in the early hours of the next morning.

9.18. At T186-187 Professor Cade comments on the "mystery" of the failure to find the ventricular septal defect at autopsy. He gave evidence that there is cardiac literature to show that ventricular septal defects are sometimes hard to find at autopsy and that they are sometimes missed at autopsy. However, he thought it would be "really surprising that one as large as this would not have been seen".

9.19. However, Professor Cade did agree with the posited cause of death of cardiac dysrhythmia/arrest in a 20 year old Down Syndrome female following abdominal surgery. He added that the particular circumstance in this case of an acute hypoxic background would have increased the risk of ventricular fibrillation or cardiac arrest. At T188-199 Professor Cade addressed the issue as to whether Ms Pahl-Cadman's death could have been avoided in this instance. He stated "I believe it could have been avoided" and then gave the following evidence:

> 'For two reasons: firstly, because the shunting – there are methods of decreasing the amount of shunting and improving her oxygenation, and secondly, there are very good monitoring methods for following any potentially (sic) arrhythmia and, therefore, treating it. The reason I'm not prepared to be categorical is that such patients can have ventricular fibrillation and can die anyhow, this is not a well person to start off with.'

9.20. At T191 Professor Cade acknowledged that a fatal cardiac arrhythmia could not be ruled out even without the surgery. I believe it would be a fair summary of this evidence to say that measures which could have been taken were not taken and if they

had been taken Ms Pahl-Cadman's death may have been avoided. However, Professor Cade was accepting that he could not categorically say that Ms Pahl-Cadman's death would in fact have been avoided. I consider this to be a very reasonable position.

9.21. Finally, at T196, Professor Cade was asked whether, in the circumstances that existed immediately prior to carrying out the operation, it would have been reasonable to delay the surgery for a brief period in order to permit the involvement of a cardiac anaesthetist or cardiologist. He stated that as Ms Pahl-Cadman had no signs of any perforation or peritonitis or peritonism, there was "time up the sleeve so to speak" and a delay of a few hours would have been neither here nor there.

10. Dr Nicholas Rieger

10.1. Dr Rieger provided two reports for me and was called to give evidence. Dr Rieger is a general surgeon, an Associate Professor of Surgery with the University of Adelaide and a Senior Surgeon at the Queen Elizabeth Hospital and the Royal Adelaide Hospital. At T206 Dr Rieger stated that he did not have any major difficulties with the treatment Ms Pahl-Cadman received over the days following her admission. He acknowledged that in his first report he did raise a comment that there was a delay between her date of admission and the performance of the surgery. However on reflection he had modified his view and considered that Ms Pahl-Cadman's management between admission and the decision to perform the surgery was appropriate bearing in mind her other major health problems and the fact that one would not wish to rush into surgery with a patient having that background. In summary, he had no criticism of Ms Pahl-Cadman's treatment prior to the surgery being undertaken.

10.2. At T211 Dr Rieger was asked whether it would have been appropriate to seek the view of a cardiologist before the commencement of the surgery. He stated that by the time the decision for surgery was made it was "in some ways" difficult to get an appropriate cardiac review at that time. However, at T212 he agreed that the operation could have been delayed for a short period of time, stating:

> 'If a delay was to be done and seek a cardiac opinion and the operation deferred to the following morning when such staff were available, that is appropriate, so I'm not going to put a time factor on that.'

10.3. At T218, Dr Rieger was asked about the appropriateness of Ms Pahl-Cadman's transfer to the general ward. He stated that he did not think Ms Pahl-Cadman should have gone to a general ward after she had her surgery and her time in the recovery room. He thought that, because of her major problems with cardiac disease she should have been monitored very intensively. However, at T219 he refrained from saying that Ms Pahl-Cadman's death could have been prevented, preferring to say:

> 'It's whether the monitoring could therefore lead to an intervention that would prevent death. So its fine to watch and see something transpires; whether having those observations allows you to actually change an event, is another question. I can't answer that question.'

10.4. However, it was clearly Dr Rieger's opinion that the post-operative observations in the general ward were inadequate, and that intensive observations might have at least provided a chance for an intervention that would have prevented death.

10.5. At T219 Dr Rieger, like Professor Cade, expressed surprise that no ventricular septal defect was found at autopsy stating that he found it "quite extraordinary to be honest and I don't understand that at all".

11. <u>Dr Jurgen Stahl</u>

11.1. Dr Jurgen Stahl was called to give evidence. Dr Stahl is an anatomical pathologist and a Fellow of the Royal College of Pathologists. In December 2002 he worked at the Flinders Medical Centre as senior consultant in anatomical pathology. Dr Stahl countersigned the autopsy report in this case which was eventually admitted as Exhibit C2a. The report was produced following the performance of an autopsy upon Ms Pahl-Cadman to establish her cause of death which was carried out at the direction of the former State Coroner on 19 December 2002. Under the heading "Cardiovascular System" the report states amongst other things, "No ventricular septal defect is apparent macroscopically (? Spontaneous fusion)."

11.2. Under the heading "Clinicopathological Correlation" the following appears:

> 'The cause of death is not clearly delineated by the autopsy. However, given the past history of ventricular septal defect and the increased incidence of conduction defect in Down Syndrome individuals, the cause of death is considered to be cardiac arrest due to cardiac dysrhythmia precipitated, in part at least, by chronic pericarditis and surgery induced physiological stress.'
> (Exhibit C2a)

11.3. At T267 Dr Stahl stated that he supervised Ms Pahl-Cadman's autopsy and that it was performed by Dr David Astill who was a registrar at that time. Dr Stahl stated at T268 that he was not present during the autopsy. He also stated that he did not recall examining any of Ms Pahl-Cadman's body parts. However, at T276 he departed from this position, saying that once the autopsy was finished by the registrar, the internal organs would have been spread out to be viewed and the registrar would have called Dr Stahl in and he would have viewed the organs as laid out, looking at the heart, the lungs, the gastrointestinal tract, the spleen and so on. He would then have discussed these findings with the registrar. He confirmed that he went through that exact process in Ms Pahl-Cadman's case. Subsequently Dr Astill prepared the first draft of the autopsy report which Dr Stahl later went through, discussed with Dr Astill, and then Dr Stahl signed it on behalf of both of the doctors.

11.4. Senior Constable Elliott conducted an interview of doctors Stahl and Astill on 15 August 2003. As a result of that interview a statement was prepared. That statement was signed on 26 August 2003 by Dr Stahl. It was admitted in evidence and marked Exhibit C3a. That statement was prepared by Senior Constable Elliott from a taped interview he conducted with doctors Stahl and Astill. As a result of an application by counsel for Flinders Medical Centre and all of the staff of Flinders Medical Centre apart from Dr Grewal, the taped interview was transcribed. The transcription was admitted with counsel's consent as Exhibit C3b.

11.5. The statement (Exhibit C3a) and the transcription (Exhibit C3b) provided doctors Stahl and Astill an opportunity to revise their opinion about the likely presence or absence of the ventricular septal defect. They did not do so.

11.6. At T277 Dr Stahl gave evidence that he and Dr Astill could not see any evidence of a ventricular septal defect despite specifically looking for it. He stated:

> 'We opened the heart along the ventricles - along the right and left ventricles - and laid open the septum that separates the left from the right chamber, the big chamber, and to us that particular - that septum appeared complete. There was no defect there, there was no hole there, so that was enough evidence for us to say there was no evidence of a ventricular septal defect.'

11.7. At T279 the following appears:

> 'Q. How do you make that. When you say you opened the heart, you make an incision.
> A. Yes. Basically when you have the heart, you open it along - the heart has four chambers, as you know - and we open it along the atria, which are the four

> chambers, if you like, and cut a parallel to the septum, so we open both chambers parallel to the septum, and that gives us a chance to view the cardiac valves, the septum and the interior lining of the ventricles well. It's a routine method; simply done.'

11.8. Also on that page Dr Stahl stated that he was surprised not to find a ventricular septal defect because he understood that its existence was referred to in Ms Pahl-Cadman's hospital notes. He went on to say at T280 that he and Dr Astill went back to the literature and said "there is substantial evidence that even large defects can fuse spontaneously or, if not, they can be repaired by surgical means." Dr Stahl admitted that there was no evidence that the defect had been repaired by surgery in Ms Pahl-Cadman's case. At T280 Dr Stahl was asked whether the literature search conducted by him and Dr Astill revealed cases of spontaneous fusion in an adult. He stated that he did not recall any such cases. He stated that he did not think he had conducted many post mortems on persons with ventricular septal defects. He was asked if he was experienced in examining hearts to determine the existence of a ventricular septal defect but stated that he thought as a general anatomy pathologist he would be able to detect one, while commenting that he was not a cardiac specialist. He was asked whether he considered asking a cardiologist to examine the heart and replied in the negative. He was asked whether he considered seeking the Coroner's permission to retain the heart for further examination and answered that he did not because he felt confident that no further examination would reveal anything.

11.9. At T282 Dr Stahl was asked about a finding of the presence of pericarditis at autopsy and asked whether it was a possible cause of death. His answer was that he and Dr Astill considered it but thought it was probably less likely and that they always regarded it as a phenomenon secondary to something else that went on with the heart.

11.10. At T286 and following, Dr Stahl was asked to consider Ms Pahl-Cadman's oxygen saturation reading prior to surgery of 48% and then the readings of 48%, 65% and 67% during surgery, and the reading of 48% following surgery. He was then asked to comment on whether or not the ventricular septal defect would have been open as at the time of surgery and stated that he thought it was possible with those low saturation numbers "and that's about as far as I can really go with it". He was then asked about the suggestion in the autopsy report that the ventricular septal defect had spontaneously fused and responded that that suggestion was only based on the fact

they could not see the defect at autopsy. He stated that he could not recall looking at the oxygen saturation figures at the time of autopsy:

> 'I don't think we really looked at them. For some reason we didn't have access to them, or we just overlooked them. So, we were only looking at the sheer, the pure morphological evidence that was presented to us at the time of autopsy and our assumption was one purely based on that. We did not take those figures into account at the time.' (T287)

11.11. This statement is consistent with the following statement which appears in the transcribed record of interview (Exhibit C3b):

> 'That is what we look at as pathologists. We look at the shape and structure of things either with the naked eye or under microscope. That is all that we do. We do not test things biochemically, genetically or anything like that. So we just look at things and see what they look like under the microscope.'

11.12. In his evidence at Inquest, Dr Stahl was next asked about the report prepared by Dr Minson dated 1 November 2002 and asked if he looked at it when reviewing the medical notes at autopsy. He replied in the negative. He stated that he was sure that he did have the medical notes at autopsy but could not recall looking at the report from Dr Minson nor the oxygen saturation figures. He was then asked, having reviewed the report and considered the oxygen saturation figures, to comment on whether the ventricular septal defect would have fused or not. At T288 he stated "It does not appear to be the case." He was asked if the defect could just have been missed and he replied in the affirmative. He was asked if it was now his view that the defect would have still been present at the time of death and he replied affirmatively. He was then asked whether the cause of death as given in the autopsy report (Exhibit C2a) is appropriate and he stated "No, I think I would certainly modify it."

11.13. At T297-298 Dr Stahl was asked whether there were any signs on examination of the brain of a lack of oxygen leading to a hypoxic event. His response was that clinical changes in the brain resulting from hypoxia take time to develop and would not have been observed at autopsy in any event because insufficient time had passed. He was asked whether the absence of findings of significant damage to the brain from hypoxia at autopsy might indicate that the ventricular septal defect was not responsible for the hypoxic event and responded that this was a possibility but he did not think it was sufficient to exclude the defect as leading to the hypoxia.

11.14. At T300 it was put to Dr Stahl by counsel for Flinders Medical Centre and staff other than Dr Grewal that a possible cause of death was pericarditis secondary to a small

bowel infection precipitating a cardiac event that led to death. Dr Stahl agreed that this is possible. He also agreed that it was possible that Ms Pahl-Cadman suffered a cardiac event secondary to the pericarditis. Counsel then asked whether the statement that cause of death was not clearly delineated by autopsy would still stand today and he agreed. He also said that even if he had noticed the ventricular septal defect at autopsy he would not have been able to put that down as a definite cause of death.

11.15. However, after further examination Dr Stahl ultimately agreed that it is often possible after a post mortem examination to postulate more than one possible cause of death. He agreed however that in such situations the pathologist nevertheless expresses an opinion about cause of death and accepted that as the job of a pathologist. He agreed that the mere fact that one can postulate a number of different causes of death does not prevent a pathologist giving his or her professional opinion about cause of death. Finally, he was asked to give the Court his "best opinion now" of Ms Pahl-Cadman's cause of death and he stated:

> 'I am convinced that she died of a catastrophic cardiac, a sudden cardiac event and I think that it's due to a (sic) underlying ventricular septal defect that has led to reduced oxygen in her body, including her conduction system and has precipitated in a cardiac arrhythmia and sudden cardiac death, that is my personal opinion.' (T303)

11.16. It was very concerning that such an obvious physical defect as a 2.5 centimetre hole in the heart would not have been discovered at autopsy. In my opinion, based on the evidence I have heard, the ventricular septal defect must have been present at the time of Ms Pahl-Cadman's death. With that modification, I am content to accept the cause of death as expressed in the autopsy report, namely cardiac dysrhythmia/arrest in a 20 year old Down's Syndrome female following abdominal surgery on a background of underlying ventricular septal defect. In reaching this conclusion I refer also to the evidence of Professor Cade at T187 where he accepts the cause of death as stated in the autopsy report.

12. Recommendations

I recommend pursuant to section 25(2) of the Act as follows:

1. Flinders Medical Centre institute a stipulation that no patient with Eisenmenger's Syndrome be anaesthetised except by a Consultant Anaesthetist.

2. Flinders Medical Centre investigate the use of nitric oxide as an ancillary anaesthetic agent in the treatment of such patients.

3. Flinders Medical Centre manage such patients post operatively in the Intensive Care Unit until the Director of ICU certifies that the patient may be moved to the general ward.

4. Flinders Medical Centre require members of its pathology department to certify in their post mortem reports that they have read all relevant hospital notes relating to deceased patients and they have an appreciation of the deceased's underlying medical conditions.

Key Words: *Hospital death; Eisenmenger Syndrome; ventricular septal defect; Down's Syndrome*

In witness whereof the said Coroner has hereunto set and subscribed his hand and Seal the 18th day of May, 2006.

State Coroner

Inquest Number 28/2005 (3605/2002)