CORONERS ACT, 2003

SOUTH *AUSTRALIA*

FINDING OF INQUEST

An Inquest taken on behalf of our Sovereign Lady the Queen at Whyalla and Adelaide in the State of South Australia, on the 15th and 16th days of March 2006, the 12th and 13th days of April 2006, and the 17th day of July 2006, by the Coroner's Court of the said State, constituted of Elizabeth Ann Sheppard, a Coroner, into the death of Raelene Vicki Herbert.

The said Court finds that Raelene Vicki Herbert aged 29 years, late of 41 West Terrace, Cleve died at the Cleve District Hospital, North Terrace, Cleve, South Australia on the 3rd day of September 2003 as a result of respiratory depression, caused by morphine intoxication on a background of upper airways narrowing as a consequence of infectious mononucleosis. The said Court finds that the circumstances of her death were as follows:

1. Sequence of events

1.1. At the time of her death, Mrs Herbert was a married woman with two young children. Apart from having occasional migraine headaches, Mrs Herbert had generally enjoyed good health. On Monday 1 September 2003, she got up early and went to her place of work at a bank in Cleve. Mrs Herbert had not been feeling well overnight and by the time she got to work, felt much worse. She telephoned her general practitioner, Dr Rodney Kurtzer, who worked in the building next door and arranged for an urgent appointment to see him.

1.2. When Dr Kurtzer saw Mrs Herbert, it was obvious that she was unwell. Her major complaint was a sore throat, although Dr Kurtzer also noted the following:

> 'that she was cold and shivering, that she had muscular aches and pains and that her migraine was playing up. When I examined her she was feverish, the lymph nodes in the neck were enlarged and she had exudate or pus on both tonsils.' (T103 and Exhibit C7)

1.3. Dr Kurtzer diagnosed bacterial tonsillitis, a condition which Mrs Herbert had presented with from time to time previously (T102-104). He took a swab of the tonsillar exudate for culture and administered intramuscular Cilicaine. Dr Kurtzer also prescribed oral penicillin with the instructions for Mrs Herbert to take one 500 mg capsule four times daily. He recommended that Mrs Herbert take Ibuprofen 400 mg one tablet four times daily with food to help reduce the pain and swelling associated with her tonsillitis.

1.4. When Mrs Herbert returned home after seeing Dr Kurtzer, she went to bed and told her husband that she felt "crook/with a headache - and sore throat" (Exhibit C4). Mrs Herbert had filled the prescription for Penhexal capsules and either purchased Ibuprofen on the same occasion or retrieved some already in her possession from an earlier occasion. There is insufficient evidence to determine how many if any Ibuprofen tablets or Penhexal capsules which Mrs Herbert took from this time. At about 1:00 pm that day Mr Herbert left the house to purchase some food for his wife. (Exhibit C4)

2. <u>Tuesday, 2 September 2003</u>

2.1. The following morning, Tuesday 2 September, Mrs Herbert was still unwell. During the day, Mrs Herbert made a number of telephone calls to Dr Kurtzer's clinic to request a home consult but because of Dr Kurtzer's busy schedule that day, he was unable to attend her home until about 6:30 pm. When he did attend, Mrs Herbert complained of headache, nausea and vomiting, although Dr Kurtzer thought that Mrs Herbert looked better than when he last saw her (T105).

2.2. Dr Kurtzer stated in evidence that Mrs Herbert's requests for a home visit were unusual, because from past experience, for instance, when she had given birth, he had known her to be a fairly stoic patient with a high pain threshold. He explained that this made him take her complaints of pain more seriously than he might otherwise have done. When Dr Kurtzer examined Mrs Herbert, he found that her tonsils were not as swollen as previously, but they were still prominent. He saw a "thick tonsillar membrane" which indicated to him that Mrs Herbert may have been suffering from

glandular fever (Exhibit C7b). As it turns out, Dr Kurtzer was correct (Exhibit C2b, T195).

2.3. Dr Kurtzer stated in evidence that when considering pain relief for Mrs Herbert, his options were "really limited", although he did not make inquiry to determine what, if any oral analgesia had been ingested during the day, and what if any relief had been obtained from it (T106, T113). According to Dr Kurtzer, he believed that Mrs Herbert had told him on previous occasions, that oral analgesia prescribed in the past to deal with her migraine headaches, was generally ineffective. Whilst Dr Kurtzer's notes make no mention of this, I accept Dr Kurtzer's explanation that the notes represent only a brief summary of the knowledge that he accumulated about Mrs Herbert's health issues, during previous consults with her.

3. Decision to administer the first dose of morphine

3.1. Dr Kurtzer considered that Mrs Herbert's migraine had developed as a result of a combination of the severe intercurrent tonsillitis, which exacerbated her propensity for migraine. He also suspected that glandular fever may be a contributing factor in her headache. He decided to administer intramuscular morphine and in doing so, claims to have ruled out any known contraindications for the administration of this narcotic including any restriction to Mrs Herbert's upper airway (T106-108).

3.2. Dr Kurtzer knew that Mrs Herbert had never been given morphine before. This was a relevant factor when considering the appropriate dosage, although Dr Kurtzer does not appear to have attached significance to this (T113). Because Mrs Herbert had not received morphine before, she was regarded by pharmacologists and other medical specialists as "morphine-naïve". She was therefore more vulnerable to the adverse side effects of morphine such as respiratory depression, than a person would be who had developed tolerance to the drug having received repeated doses of it previously (Exhibit C11, T225).

3.3. In evidence, Dr Kurtzer explained that he had previously prescribed morphine to treat other patients with migraine. He explained that in his view, "it represents the end point for many people with severe and unrelenting migraine" (T109).

3.4. Dr Kurtzer obtained an ampoule of morphine from his emergency doctors bag and gave Mrs Herbert an intramuscular injection of 30 mg of morphine and 10 mg of

Maxolon (metoclopramide). The morphine was intended to deal with Mrs Herbert's pain and the Maxolon to alleviate nausea and vomiting. He chose a dose of 30 mg by calculating in accordance with a formula based upon Mrs Herbert's weight, which he estimated was approximately 90 kilograms. In fact the true weight in accordance with the records was closer to 84 kilograms at the time. According to Dr Kurtzer, he believed that a dose of 20 mg would be appropriate for a person weighing 90 kilograms and that adding a further 10 mg would also be appropriate, because Mrs Herbert was a young, otherwise healthy person and her level of discomfort required a higher dose. He claims to have given this dose of morphine to other patients previously and did not regard the dose as excessive (T110, T111).

3.5. If Dr Kurtzer had consulted the MIMS publication, which is available at no cost to all practitioners, he would have realised that the maximum usual dose for adults was 20 mg and that it was not calculated by reference to weight (Exhibit C10, T150-151).

3.6. When Dr Kurtzer left Mrs Herbert, he did not give any advice to Mr and Mrs Herbert about possible adverse side effects of the medication, but he did advise Mrs Herbert to come to his surgery the following day to have a blood test. This would enable him to confirm his suspicion that she was suffering from glandular fever (T112). Dr Kurtzer went home to eat, then he continued working. His day had commenced at around 5:00 am to deliver a newborn and ended about 11:00 pm after seeing two patients admitted to hospital that afternoon. Because he was the only medical practitioner in Cleve, Dr Kurtzer was always on call and carried a very heavy workload. According to Dr Kurtzer, before leaving the hospital, he told the nurses at "handover" that he had seen Mrs Herbert earlier and that she might require hospitalisation. The two nurses who were on the night shift stated in evidence that they had no recollection of seeing Dr Kurtzer that evening nor hearing his comments about Mrs Herbert (T36, T307).

3.7. By about 12:30 am, Mr Herbert could hear his wife vomiting. Dr Kurtzer had not long been in bed trying to get some sleep. Mr Herbert has since stated that he telephoned Dr Kurtzer at home and told him that his wife was "feeling really sick and was still crook' (Exhibit C4). According to Dr Kurtzer, Mr Herbert said that his wife felt unwell again, she was vomiting and her headache had come back (T180). Dr Kurtzer understood from the brief conversation with Mr Herbert that Mrs Herbert wanted to go to the hospital. Dr Kurtzer agreed that she should be admitted (T117). Without clarifying the status of Mrs Herbert's headache, he made a decision to order

another dose of morphine. According to Dr Kurtzer, it was his practice to insist that a patient be admitted to hospital if they needed a second dose of morphine (T145, T180).

4. Decision to administer the second dose of morphine

4.1. While Mr Herbert was preparing to drive his wife to hospital, Dr Kurtzer telephoned the hospital. In evidence, he explained that he could not recall who he first spoke to, but his practice was to ask for the registered nurse. He explained what occurred as follows:

> 'I rang the hospital. I cannot remember who I spoke to first. Normally in these sort of situations my practice would be to ask 'who is the registered nurse on duty?' I told them that Mrs Herbert was coming into hospital. I gave them a specific diagnosis of migraine and then I asked the person – I can't remember whether I spoke to the registered nurse or the enrolled nurse, but I then gave the order for a further 30 mg of morphine and this time I asked for 12.5 mg of Stemetil, which is just another anti-nausea drug. I would have then spoken to the other nurse on duty to confirm the order. Now, that is standard practice with any medication order per phone. The only exception to that is that sometimes they actually put the telephone on a speaker phone but then I ask for acknowledgement from the second party present by repeating back the order' (T117).

4.2. Because of the length of time since the first dose of morphine, Dr Kurtzer claimed that he had no hesitation in prescribing the same dose of morphine again (T118). He did not believe that there would be any "compounding" effect from the first dose. The return of Mrs Herbert's headache and vomiting suggested to Dr Kurtzer that she did in fact have glandular fever. When questioned about how this then caused him to order another 30 mg dose of morphine, Dr Kurtzer explained his reasoning as follows:

> 'I had provided definitive treatment in the community and there had been a recurrence of symptoms and if you have provided definitive treatment and the symptoms recur, then you need to start asking 'what is happening here? Do I have the wrong diagnosis? Could this be something else?', but in my mind, given my knowledge of glandular fever and the systemic effects that it has on patients, I thought to myself 'Well, then this probably does reflect that the underlying problem here that links this all together – why are her migraines so severe? Why has her migraine come back?' I had given a dose of morphine which I would have thought it was more than adequate to have treated her migraine headache which has come back, and I'm starting to ask myself 'Why'.'(T118)

4.3. Dr Kurtzer claims to have felt entirely comfortable about ordering this second dose of Morphine for Mrs Herbert (T119). Yet his alleged confidence in arriving at this decision is undermined by the questions which he claims to have pondered in reaching his decision. Before ordering the second dose, Dr Kurtzer didn't think to

question Mr or Mrs Herbert about what response if any Mrs Herbert had to the first dose of morphine. He failed to inquire in any detail about the nature of her symptoms. He was not to know whether in fact, the major problem was vomiting, rather than headache. Because Dr Kurtzer was not physically present with his patient when he ordered the second dose, he could not examine her throat or make any assessment of her condition generally. Yet Dr Kurtzer maintained that he felt "very comfortable about Mrs Herbert's upper airway" and saw no contraindication for giving the second dose of morphine (T119).

4.4. Dr Kurtzer stated that by admitting Mrs Herbert to hospital, she would be in a safe environment and at the very least would be checked every hour to see whether she was still breathing (T120, T142). He gave no instructions to either nurse about the need to make and record any more detailed observations and he did not give any instructions about possible adverse side effects of morphine which the nurses should look for. According to Dr Kurtzer, the two nurses on duty that evening were amongst the hospital's most experienced nurses and he believed that they would have contacted him if they had any concerns (T120).

5. The telephone order for morphine 30 mg at 12:30am, 3 September 2003

5.1. During the Inquest, there was a discrepancy in the evidence about whether Dr Kurtzer spoke by telephone with one or both nurses about Mrs Herbert's admission and medication order. Registered Nurse Hayley Price and Enrolled Nurse Kaeleen Darling were the two nurses on duty at the Cleve Hospital that evening.

5.2. According to Nurse Darling, when Dr Kurtzer telephoned the hospital, she took the call and heard him briefly outline the situation concerning Mrs Herbert. He mentioned that she had tonsillitis and possible glandular fever. She was to be admitted and given 30 mg of intramuscular morphine and 12.5 mg of Stemetil. According to Nurse Darling, Dr Kurtzer mentioned that Mrs Herbert had received morphine earlier in the evening and from what was said about that, she had the impression that the interval between the two doses was reasonable. In evidence, Nurse Darling claims to have handed the phone to Nurse Price for confirmation of the order in accordance with the common practice for telephone drug orders (T17-18). The evidence discloses that Nurse Darling mentioned this topic for the first time in a brief addendum statement in March 2005 (Exhibit C8b). Overall, Nurse Darling

appeared to struggle with much of her evidence at the Inquest. I formed the impression that she minimised her role concerning nursing responsibilities for Mrs Herbert and directed the major responsibility to Nurse Price.

5.3. In a short recorded interview conducted in September 2004, Nurse Price stated that when Dr Kurtzer phoned the hospital, he spoke only with Nurse Darling about Mrs Herbert's admission and the medication order. She learned from Nurse Darling that Mrs Herbert was to be admitted with possible glandular fever, migraine and nausea, and was to be given morphine and Stemetil. According to Nurse Price, she was unaware that Mrs Herbert had received an earlier dose of morphine (C5b). Nurse Price confirmed in evidence that she did not speak directly with Dr Kurtzer by telephone about Mrs Herbert (T306). She explained what occurred as follows:

> 'A. I was told that Raelene was going to be admitted with query glandular fever and with a migraine that had accompanying nausea and vomiting, so she was to be admitted for morphine and stemetil injection and to be settled.
>
> Q. Were you told what the medication order was while Nurse Darling was on the phone, or after she finished the phone call.
>
> A. She wrote it down while she was on the phone and told me afterwards.
>
> Q. Did you in any way confirm the order.
>
> A. No.' (T306)

5.4. Nurse Price impressed me as a truthful witness whose evidence on this topic was quite persuasive. Nurse Price's recollection of this incident in particular, seems to be reinforced by her remorse that on this occasion, she did not follow the "standard procedure" (T338). According to Nurse Price, this telephone order was unusual because as far as she could recall, on all previous occasions, Dr Kurtzer had given telephone drug orders to both nurses (T343-344). Nurse Price emphasised the point as follows:

> 'I can absolutely say I did not speak to him, because it's something that has plagued me ever since, because I always speak to him.' (T363)

5.5. I find that when Dr Kurtzer telephoned the hospital, he communicated his instructions to Nurse Darling and not to Nurse Price. Given that almost thirty months have passed between Mrs Herbert's death and the time when the witnesses came to give evidence at the Inquest, it would not be surprising if memories of some details have faded which might explain discrepancies on some topics. Regardless of the discrepancy on this topic, there is no suggestion that Dr Kurtzer's instructions were not carried out in accordance with his intention. Both nurses gave credible evidence that after

Mrs Herbert was brought to hospital, she was administered the medication which Dr Kurtzer instructed was to be given. The process of drawing up the morphine and the administration of the drug was witnessed and documented in accordance with the required procedure for drugs of dependence.

5.6. Nevertheless, the required procedure for telephone orders of drugs such as morphine, is well known to nurses and medical practitioners. The evidence enables me to find that there was a departure from these requirements in Mrs Herbert's case. I remind myself of the statutory prohibition in the Coroner's Act 2003, against making any finding, or suggestion of criminal or civil liability, and I expressly decline to do so (section 25(3)).

6. Admission to hospital

6.1. While Mr Herbert's children remained at home asleep, he drove his wife to the hospital. After dropping her there, he returned home to be with the children. He did not know that Mrs Herbert would be given another dose of morphine (T179).

6.2. Nurse Darling undertook the admission process. Mrs Herbert walked into the hospital and asked for a bowl, because she felt sick (Exhibit C8, T308). Although Nurse Darling had included this observation in a short typed statement made on the day of Mrs Herbert's death, by the time of the Inquest, she had forgotten this detail (T68). Nurse Darling took Mrs Herbert into room 3, near the nurse's station, where Mrs Herbert could be alone and would not disturb other patients who were sleeping. She recorded Mrs Herbert's admission observations which were in the normal range, apart from a slightly elevated pulse of 105 (Exhibit C8a). She claims to have weighed Mrs Herbert during the admission process, but did not record any measurement in the notes.

6.3. No inquiries were made at the hospital or recorded concerning Mrs Herbert's symptoms. She was not questioned about medication she may have consumed or received that day or what effect any medication had had on her symptoms. The "paperwork" required to be completed for Mrs Herbert's admission to hospital was undertaken by Nurse Darling (T309). Nurse Price conceded that it would have been appropriate to record any significant history as well as current medication in the nursing care and assessment forms. Apart from recording one set of observations, the normal forms required to be filled out for admission purposes were largely left blank.

According to Nurse Darling, she had the impression that Mrs Herbert's major complaint was lack of sleep and that she was admitted for a "rest" (T19). This misguided impression may have caused Nurse Darling to adopt a complaisant attitude to Mrs Herbert's admission overall.

6.4. According to Nurse Price, when Mrs Herbert arrived, she looked unwell and tired. She complained of nausea and migraine and didn't show any sign of respiratory distress (T330). She explained the situation as she saw it as follows:

> 'When we administered the morphine she was tired and needed rest, so I guess that was our first priority as such, to make her comfortable and let her rest.' (T364)

6.5. At 12:45 am Nurse Darling witnessed Nurse Price draw up and administer the morphine and Stemetil ordered by Dr Kurtzer. Neither nurse considered that a 30 mg dose of morphine might be excessive, although both nurses had very little knowledge or experience of the drug (T48, T316). Whilst Nurse Price conceded that she had access to MIMS, if she had any concerns, on this occasion, she says she trusted Dr Kurtzer's judgment and did not regard the 30 mg dose as unusual (T359). According to Nurse Darling, after the medication was administered, the cot sides were put up as a precaution and Nurse Price explained to Mrs Herbert that she should call for assistance if she needed to go to the toilet because she had been given a narcotic (T44).

6.6. Nurse Darling went back to Mrs Herbert's room at about 1:00 am to check on her and to ensure that she was able to use the call bell and light switch. There was a new born baby in hospital at the time who was crying. Mrs Herbert asked for her door to be closed. Nurse Darling compromised by closing the door over but leaving it open a little (T21, T46). When Nurse Darling left her room at about 1:00 am, it was the last time Mrs Herbert was seen alive.

7. <u>Nursing observations after administration of morphine</u>

7.1. According to Nurse Darling, a decision was reached between the two nurses that four hourly observation of temperature, pulse, respiration and blood pressure would be appropriate monitoring of Mrs Herbert. Nurse Price claimed that she had no recollection of discussing this with Nurse Darling, but believes that she would have regarded four hourly observations as appropriate in Mrs Herbert's case (T314, T328).

7.2. According to Dr Kurtzer, he assumed that once Mrs Herbert was admitted to hospital, the nurses would check whether the medication produced pain relief and that at least every hour Mrs Herbert would be checked to see whether she was comfortable and sleeping. Dr Kurtzer conceded in evidence that he should have given instructions to the nurses to check Mrs Herbert every hour to ensure that she was breathing (T127-128, T142). He did not believe that it was necessary for the nurses to wake her as long as they checked that she was still breathing (T203).

7.3. After leaving Mrs Herbert, Nurse Darling decided to take the opportunity to catch up on some paper work concerning “infection control”. It was not urgent work and it was unrelated to any direct nursing care of the patients in hospital at the time. According to Nurse Darling she went into the resource room at between 1:30 am and 2:00 am and remained there until 3:15 am. Nurse Darling claimed that although she was only about ten metres from Mrs Herbert’s room, she probably would not have been able to hear any sound of unusual breathing noises from that room (T73).

7.4. Part of nursing duties at Cleve Hospital during the night shift included hourly checks of all patients. These checks were usually of a fairly cursory nature and were referred to as “rounds.” This generally involved shining a torch close enough to each patient to see if they were still alive and breathing (T313,378). There was no method of recording whether these “rounds” were done or not. According to Nurse Darling, she assumed that Nurse Price would do “rounds” while she was in the resource room. She also claims to have assumed that Nurse Price would let her know if she was too busy to do the “rounds” (T73). According to Nurse Price, Nurse Darling did not tell her that she was planning to do her paper work on infection control (T333). Nurse Price maintained that they divided the bulk of the nursing duties between them and worked as a “team” (T303). Nurse Darling on the other hand gave a different account of some tasks which Nurse Price regarded as “shared”. According to Nurse Darling, the registered nurse did the hourly rounds unless they were busy (T24).

7.5. In a brief interview in September 2004, Nurse Price stated that she didn’t conduct any additional observations of Mrs Herbert because she was busy with another patient (Exhibit C5b). According to Nurse Price, there was no policy at the hospital which warranted additional observations for patients who had received narcotics (T314). She added in evidence at Inquest, that she was aware that narcotics may suppress breathing and for that reason when checking Mrs Herbert, she would have taken

particular notice of her breathing (T316). Nurse Price explained that she spent about one and a half hours with a new mother who had given birth that morning and was having trouble with feeding. She stated that she knew that a “round” of all patients was due at 2:00 am but assumed that Nurse Darling would do this (T321). Nurse Price did not tell Nurse Darling where she was going when she went to assist the new mother feed her baby (T333). According to Nurse Price, it was not until shortly after 3:00 am that she left this patient and decided to do the 3:00 am rounds.

7.6. Following the completion of oral testimony at the Inquest, additional statements from the two nurses were received into evidence. These statements were produced after a review of medical files from the hospital revealed that both nurses recorded observations made on patients other than Mrs Herbert at approximately 2:00 am, 3 September 2003. According to the statement of Nurse Darling, dated 12 May 2006, it is acknowledged that another female patient who I refer to as "B", was attended to at 2:00 am at which time, medication was given and observations were taken and recorded. Nurse Darling claimed not to recall this attendance, but accepted that her handwritten entries in the patient's medical file indicated that she did do what is recorded there. I have no reason to doubt what is stated by Nurse Darling in her fresh statement and find that it does not have any significant bearing upon the remainder of her evidence or her credibility generally.

7.7. In the fresh statement produced by Nurse Price, dated 12 May 2006, it is acknowledged that she performed observations on another female patient who I will refer to as "J" at approximately 2:00 am, 3 September 2003. According to Nurse Price, she now has no recollection of the attendance, but accepts that her handwritten entry indicates that she did attend the patient at this time. Nurse Price did recall that patient "J" was in a room directly opposite that of the mother and newborn who she had been attending between 1:30 am and 3:00 am that morning. As with Nurse Darling, I have no reason to doubt what is stated by Nurse Price in her fresh statement. Given the passage of time between Mrs Herbert's death and the time when the Inquest took place, I find that the fresh evidence does not have any significant bearing upon the remainder of her evidence or her credibility generally.

8. <u>Events at 3:15 am</u>

At 3:15 am when Nurse Price entered room 3, she noticed Mrs Herbert lying face down. Her face was fully into the pillow, her arms were either side of her and she was not breathing. Nurse Price turned Mrs Herbert over but was unable to rouse her. She called out to Nurse Darling who quickly responded and together they commenced resuscitation measures. Dr Kurtzer was contacted and arrived at the hospital within about five minutes or so. Once Dr Kurtzer arrived, he discovered that Mrs Herbert was in “asystole”, meaning that there was no cardiac activity. He intubated Mrs Herbert, ventilated her with oxygen, administered intravenous medications and continued resuscitation efforts without success until 4:05 am (T206).

9. <u>Post Mortem</u>

9.1. A post mortem examination was conducted by Forensic Pathologist, Professor Roger Byard at the Forensic Science Centre on 4 September 2003. Professor Byard was unable to estimate the time of Mrs Herbert’s death (T284). A sample of blood obtained at post mortem and subsequently analysed, confirmed that Mrs Herbert had been suffering from glandular fever at the time of her death (Exhibit C2b). Toxicology results also revealed the presence of 0.16 mg morphine in Mrs Herbert’s blood, which Professor Byard recognised as a possible cause of respiratory depression and death.

9.2. Post mortem examination revealed marked enlargement of both tonsils and significant narrowing of the upper airway. Professor Byard also noted cervical lymphadenopathy and splenomegaly, commonly seen in cases of glandular fever, although he did not regard these two findings as causative of death. Professor Byard considered that the significant narrowing of Mrs Herbert’s airway could have combined with the effects of morphine, together with a relaxation of pharyngeal tone, causing further narrowing of the upper airway, which he described as “stenotic” (Exhibit C2a).

9.3. Professor Byard suggested in his post mortem report, that a “clinical or pharmacological overview” might provide further information, given the amount of analgesia which was prescribed in Mrs Herbert’s case. This helpful suggestion resulted in a detailed analysis by pharmacologist Felix Bochner, which focussed upon the dangers of unsupervised, high doses of morphine administration. I say more about Professor Bochner’s report and evidence shortly.

9.4. In the course of Professor Byard's examination, he was struck by similarities between the features in Mrs Herbert's case and an earlier post mortem examination conducted a few years earlier, where a child had died with enlarged tonsils after being administered morphine. In fact Professor Byard wrote a short case report about that death, entitled "Unexpected death due to infectious mononucleosis" (Exhibit C2f).

9.5. To enable Professor Byard to examine the status of Mrs Herbert's upper airway, the tissues were dissected from the body. According to Professor Byard, rigor mortis, made it necessary to resort to this method of examination which he had done on countless occasions. In evidence, Professor Byard elaborated upon his examination as follows:

> 'Basically, her tonsils were enlarged and protruding into the airway and they were actually sticking together when I looked at them, so it was a combination of soft fleshy enlarged tonsils with this exudate, making everything stick together.' (T273)

9.6. Although he did not take measurements of the size of the tonsils, Professor Byard estimated that they were between 15 and 20 mm. Photographs were taken to demonstrate the nature of the restricted upper airway (Exhibit C2c, T269).

9.7. At Inquest, Dr Kurtzer was shown the photographs purporting to demonstrate the restricted upper airway. He was critical of the notion that they accurately demonstrated the state of Mrs Herbert's upper airway at the time of her death (T199).

9.8. According to Dr Kurtzer, the airway depicted, in no way reflected what he saw previously and was an artificial representation because of the way it was being held up, dissected from the tissues that would normally support it (Exhibit C2c, T199). He insisted that the airway was unobstructed by the tonsils when he performed his intubation procedure shortly after he was called urgently to the hospital. He acknowledged that the tonsils were still swollen when he saw them, but that they were about the same as they were at 6:00 pm the previous evening. In other words, in Dr Kurtzer's view, the airway was not compromised by the tonsils (T198). He explained the situation as follows:

> 'Mrs Herberts tonsils were enlarged but they were not occluding the airway and in no way did they present any obstruction to me passing a tube into her upper airway.' (T170, T197-198)

9.9. He classified the airway as a "Grade 1," regarded as the easiest type to intubate. He estimated that the tonsils were each no more than between a centimetre and a half in diameter (T195).

9.10. According to Professor Byard's post mortem report, given the state of Mrs Herbert's airway, as he judged it, there may have been signs of incipient airway obstruction such as snoring or gagging which might have been missed if she was isolated in a room with the door closed over. Professor Byard formed the opinion that Mrs Herbert died as a result of the combined affects of prescribed opiates and upper airway narrowing (Exhibit C2a).

9.11. After being referred to Dr Kurtzer's evidence on this topic, Professor Byard conceded that it was possible that the airway might have been bigger when Mrs Herbert was still alive and the obstruction might not have been as severe as it appeared during post mortem examination (T278). Professor Byard also acknowledged that it was noteworthy that when Mrs Herbert presented to hospital, she showed no obvious sign of restricted upper airway (T275, T295). Professor Byard expressed the view, that enlarged tonsils are easily passed over by an endotracheal tube and that ease of intubation is not necessarily indicative of an unrestricted upper airway (T280). He did concede, however, that he had not intubated a patient for some fifteen years and was not up to date with this procedure any more. Professor Byard stated that it was by reference to the countless examinations he had performed over the years, looking at upper airway structures, that enabled him to make the observations he did in Mrs Herbert's case. He regarded the tonsils as "strikingly large" compared with those he normally sees and that the airway obstruction observed was "too significant to ignore" (T280, T281). I accept Professor Byard's opinion that Mrs Herbert's tonsils were markedly enlarged compared with tonsils in the normal healthy individual. Whether in Mrs Herbert's case they were so enlarged prior to death that they restricted her airway is more difficult to determine, bearing in mind the evidence given by Dr Kurtzer on this topic.

9.12. Toxic shock was suggested as a possible cause of death by counsel for Dr Kurtzer. Professor Byard was unable to comment about this. I find that there is no evidence to support it as a plausible cause of death in Mrs Herbert's case (T290, T294).

9.13. Positional asphyxia was another possible cause of death put to Professor Byard for consideration by counsel for Dr Kurtzer. Professor Byard stated that he saw nothing which suggested to him that Mrs Herbert died as a result of having her head face down in bed, although had it occurred that way, he would not expect to find any signs indicative of it (T279). I say more about the cause of death later in these findings.

10. Toxicology – interpretation of results

10.1. After Mrs Herbert's death, toxicologist, Donald Sims identified a level of morphine calculated at 0.16 mg per litre in her blood. Mr Sims reported that at this level, it can be regarded as a "therapeutic concentration" (Exhibit C3a). However, upon more elaborate interpretation of the results by Professor Bochner, taking into account the broader circumstances leading to Mrs Herbert's death, the reference to "therapeutic concentration" can be misleading and needs to be qualified. Felix Bochner is an eminent professor of pharmacology at the University of Adelaide. His abbreviated curriculum vitae discloses that he is well qualified to comment upon the effects of morphine and how it is safely administered. According to Professor Bochner, the concentration of morphine detected in Mrs Herbert's blood needed to be interpreted cautiously. In his opinion, a concentration of morphine at 0.16 mg per litre in a morphine naïve person such as Mrs Herbert, would be considered a toxic level rather than a therapeutic level (Exhibit C11).

10.2. According to Professor Bochner, had this level of 0.16 mg been detected in a person who had required morphine regularly and long-term, it could be regarded as a therapeutic level. Mrs Herbert was not such a person. In her case, the level was sufficient to suppress respiration and cause respiratory arrest (Exhibit C11). In Professor Bochner's opinion, if Mrs Herbert did not have the morphine, she would not have died (T232). He acknowledged that the effects of glandular fever played a part in her death, but he was unable to estimate how much of a part it played. In his view, if Mrs Herbert was given a much lower dose of morphine, she would almost certainly have lived (T232).

10.3. In Professor Bochner's opinion, the cause of Mrs Herbert's death was "respiratory depression caused by morphine intoxication on a background of upper airways narrowing which was a consequence of infectious mononucleosis" (Exhibit C11, T232).

11. Precautions required when administering opioids

11.1. Professor Bochner has been chairman of the Royal Adelaide Hospital Drug Committee since 1984 and is partly responsible for the production of guidelines for Royal Adelaide Hospital staff concerning the administration of opioids including morphine. He explained that the guidelines came about as a result of a series of adverse events following the administration of morphine and other opioid drugs for acute pain management.

11.2. In reviewing the dose of morphine administered to Mrs Herbert on both occasions, Professor Bochner emphasised that the starting dose of morphine "is governed by age rather than weight and for a 29 year old, should have been between 7.5 mg and 15 mg by the subcutaneous or intramuscular routes every two hours as required." According to Professor Bochner, this is recommended in the Australian Medicine's Handbook 2003 and the Royal Adelaide Hospital guidelines which were applicable within the Royal Adelaide Hospital at the time. According to Professor Bochner, regardless of whether the type of morphine administered was of the tartrate or sulphate variety, the recommended dosage in accordance with the 2003 MIMS was similar. In both cases, the maximum recommended dose was 20 mg (Exhibit C11a).

11.3. Dr Kurtzer claimed to have been astonished when he received Professor Bochner's report in which he emphasised that the dose of morphine is calculated by reference to age rather than weight (T122).

11.4. Professor Bochner explained that a weight based calculation method applied perhaps fifteen years ago for morphine but changed over to the age base formula. He stated that he would have expected most general practitioners in 2003 to realise that morphine was calculated by reference to age although he conceded that only about six or so years ago, some practitioners at the Royal Adelaide Hospital remained unaware of the age based formula. The decision to produce guidelines was partly taken to address the problem (T234).

11.5. It is not difficult to understand that someone with Dr Kurtzer's hectic workload might not have much opportunity to keep up to date with changes in medical practice. But given the common use of morphine as a powerful pain relieving medication, it is surprising that Dr Kurtzer had not familiarised himself with the appropriate method of

dose calculation. This is especially important when bearing in mind the serious potential adverse effects in the event of error.

11.6. According to Professor Bochner, respiratory depression is a rare but potentially fatal adverse effect. He explained that death from morphine poisoning is nearly always due to respiratory arrest and rarely occurs if morphine is prescribed in accordance with recommended dose (in the absence of underlying lung dysfunction or airway obstruction) and if appropriate monitoring measures are in place (Exhibit C11). The administration of additional medications such as metoclopramide (Maxolon) and prochlorperazine (Stemetil), according to Professor Bochner, increase the potential sedative effect of morphine and therefore increase the risk of respiratory depression. Mrs Herbert received these medications in addition to the morphine.

11.7. In Professor Bochner's opinion, when a person is given repeated doses of morphine, they gradually develop tolerance to the drug, which means that larger doses are required to achieve the same effect. With repeated doses, one's tolerance to the adverse affects of morphine also increases. But in Mrs Herbert's case, because she was regarded as not tolerant to the effects of morphine, she needed to be monitored carefully to assess the pain relief obtained from the drug and the potential adverse effects, such as respiratory depression (Exhibit C11).

11.8. According to Professor Bochner, the intended thrust of the Royal Adelaide Hospital guidelines was to avoid adverse events by administering incremental, small amounts of subcutaneous, intramuscular or even intravenous opioid if the level of pain warranted this type of medication. When a patient receives the drug in accordance with the guidelines, they are closely monitored to look for adverse effects. In Professor Bochner's view, measuring the level of sedation by way of a "sedation score" is the best indicator of respiratory depression. This involves the nurse determining how easily a patient is roused from sleep. Scores range from 0 to 3, with 3 indicating severe sedation where the patient is difficult to rouse. If respiratory depression is identified, intravenous naloxone may be administered. According to Professor Bochner, naloxone is a very effective drug, which reverses the effects of respiratory depression if administered in a timely fashion.

11.9. The guidelines also call for measurement of respiration. A measurement of less than 8 breaths per minute, is said to be an indicator of possible respiratory depression (Exhibit C9, T213).

11.10. Professor Bochner explained that if he was in Dr Kurtzer's position, leaving aside the issue of appropriate choice of drug, he would probably have started with a 10 mg dose. He would have been prepared to give another 10 mg two hours later if the pain warranted another dose, provided that there were no sign of adverse effect (T220). He would have instructed nurses to monitor Mrs Herbert's pulse, sedation score and respiration rate at least hourly (T228). Simply checking hourly to see whether Mrs Herbert was still breathing, in accordance with Dr Kurtzer's expectations, was not enough in Professor Bochner's opinion.

11.11. With acute pain management, Professor Bochner considered that it was necessary to take a history from the patient to establish what medicines had been taken, in which case you might give a lower starting dose of morphine. In his view, one should proceed cautiously when considering the first dose (T238).

11.12. By calculating back to the administration of the first dose and by reference to the known "half-life" of the drug, Professor Bochner estimated that at the time Mrs Herbert received the second dose of morphine, approximately 5 mg would have remained in her body (T221, T227). Professor Bochner explained the potential danger as follows:

> 'In other words, increase the dose a little bit and you get a disproportionately large increasing effect. So that further milligrams would not have had any real observed respiratory depressive effect but 35 mg, if we assume there's 5 mg on board, might have been enough to go from no respiratory depression to respiratory depression because of the very steep dose relationship.' (T228)

11.13. Professor Bochner indicated that the peak concentration time would have been about forty-five minutes to an hour after administration, which happens to coincide with the time when the two nurses incorrectly assumed that the other was doing a 2:00 am "round" to check on all patients.

11.14. At the time of Mrs Herbert's death, Dr Kurtzer could not have been expected to know about the existence of guidelines then operating at the Royal Adelaide Hospital. As soon as he became aware of them, after receiving a copy of Professor Bochner's report in about January 2006, he and the director of nursing made efforts to obtain a

copy of them for use at the Cleve Hospital, but they were met with some resistance. Eventually, they obtained and implemented similar guidelines used in another regional hospital.

11.15. When Professor Bochner examined these guidelines introduced at Cleve District Hospital after Mrs Herbert's death, he considered that they were deficient in many respects and should not be followed. In his opinion, the morphine dosage specified was too high and the reference to the drug "Omnopon" should be deleted because it is no longer marketed. The reference to "pethidine" in the guidelines was regarded as inappropriate because most authorities strongly discourage its use. The three minute interval between observation and possible administration of the next dose of opioid was regarded as too short. Professor Bochner's observations highlight the potential deficiencies in information available to regional hospitals. Subsequently, the Royal Adelaide Hospital guidelines were said to be made available to the Cleve Hospital on condition that they be kept updated.

11.16. A protocol document entitled "standard orders", was received into evidence as an example of part of the current guidelines in use at Cleve hospital (Exhibit C8c). On closer examination it became obvious in the final days of the Inquest that this document contained directions to omit the need to check "pain score and sedation score" after the first hour of opioid administration, if the patient was sleeping, which is inconsistent with the thrust of the Royal Adelaide Hospital guidelines. Mr Keane, counsel for the Department of Health, advised that this has now been corrected. Professor Bochner emphasised in evidence that the whole point of giving drugs such as morphine in incremental doses, rather than large doses is to avoid the high peak concentrations of the drug which carry risks as well as benefits (T242).

12. <u>Administration of nalaxone</u>

Professor Bochner was asked about whether it might have been worthwhile to administer naloxone when Mrs Herbert was discovered at 3:15 am. In his opinion, which I accept, if Mrs Herbert was found unconscious, but her pupils were not fixed and dilated, naloxone might have been given to reverse the situation, but he thought that in Mrs Herbert's case, given that her pupils were noted by Dr Kurtzer to be fixed and dilated, it was probably too late (Exhibit C7b, T229).

13. <u>Cause of Death</u>

I accept Professor Byard's opinion that Mrs Herbert's upper airway was compromised by enlarged tonsils, together with sticky exudate, however, I am unable to determine with any certainty whether this factor played a major role or a negligible role in Mrs Herbert's death. Professor Byard's opinion is generally consistent with Professor Bochner's view about the cause of death, but there remains a difference in emphasis. The evidence satisfies me that if Mrs Herbert had not been given the morphine, she would have lived. I find that the cause of her death was, as expressed by Professor Bochner, "respiratory depression caused by morphine intoxication on a background of upper airways narrowing which was a consequence of infectious mononucleosis" (Exhibit C11, T232).

14. The role of morphine in treating migraine

14.1. Professor Bochner endorsed the approach advocated in "Australian Medicines Handbook 2003" which suggests that opioids should be avoided in the management of acute migraine because of the aggravation of gastro intestinal symptoms and the risk of dependence. Another reference relied upon by Professor Bochner is the "Therapeutic Guidelines Neurology 1997/98" which suggests that opioid analgesics should be used "with great reluctance and only after all other measures have been tried and failed". In "Harrison's principles of internal medicine" (2005 edition), it is recommended that "narcotic (opioid) use in migraine be limited to patients with severe, but infrequent headaches and unresponsive to pharmacological measures". The effect of these references amounts to a warning to all medical practitioners that the use of drugs such as morphine should be accompanied with great caution and if one needs to resort to them for acute pain management then it should be as a last resort.

14.2. It must be acknowledged that general practitioners such as Dr Kurtzer are faced with tremendous challenges in trying to manage acute severe migraines, particularly when practitioners are working without support, virtually around the clock.

15. Dr Kurtzer's professional qualifications and experience

15.1. Dr Kurtzer originally trained and qualified as a registered nurse. He was accepted into medical school at the University of Adelaide as a mature age entrant after graduating in Science with honours in 1983. During his undergraduate medical degree, Dr Kurtzer received instruction from Professor Bochner who was impressed

by Dr Kurtzer's compassionate attitude towards patients. He regarded him as a good student (T211). After graduating in medicine, Dr Kurtzer completed his internship at the Royal Adelaide Hospital in 1989 and over the following four years obtained experience and qualifications in neo natal paediatrics, obstetrics, anaesthetics and general practice at the Flinders Medical Centre. His first experience in private practice was as a sole general practitioner at Booleroo Centre, a remote area in the Southern Flinders Ranges.

15.2. When Dr Kurtzer took over the sole practice in Cleve in 2000, he took on between 1600 and 1800 patients. He inherited computerised medical records which he modified and improved. His practice required him to travel many kilometres on occasions and he was required to service the local Cleve Hospital. He was essentially the only medical practitioner in the Cleve area. Dr Kurtzer was and still is effectively on call twenty-four hours a day. I had the impression that he has been deeply affected by Mrs Herbert's death.

15.3. Dr Kurtzer explained on many occasions in evidence how he has reflected on all of his actions during the relevant period to reconstruct what he did and why. Unfortunately, Dr Kurtzer gave me the impression that his energy has been misdirected to some extent and might have been better focussed upon developing clear insight into how he came to administer the high doses of morphine in ignorance of the applicable recommended adult dose for a person in Mrs Herbert's situation. Some of Dr Kurtzer's evidence left me with reservations about his continuing practice concerning the administration of morphine, notwithstanding the tragic outcome for Mrs Herbert (T208-209). Out of an abundance of caution, I direct that a copy of these findings and a copy of Dr Kurtzer's evidence be brought to the attention of the Medical Board for its consideration.

16. Adequacy of nursing care

16.1. Hayley Price obtained a degree in nursing at the Whyalla Campus of the University of South Australia in 1999. The following year, she undertook a one year graduate nurse program at the Queen Elizabeth Hospital designed to provide support and guidance to new graduates. During this period, Nurse Price worked in the endoscopy unit, a respiratory ward and a surgical ward. In 2001, she commenced at Cleve Hospital as a part-time registered nurse. At Cleve, she worked five shifts per fortnight. In

evidence, Nurse Price conceded that as a relatively junior registered nurse, she took guidance from experienced enrolled nurses (T303 & T345). According to Nurse Price, when a patient like Mrs Herbert was admitted in the evening, it was regarded as appropriate to minimise questioning for completion of the paper work to enable them to sleep and rest (T305). Although she had only administered morphine on about six occasions in the time she had worked at Cleve hospital, she claims that she was aware that it was a narcotic which had the potential to depress respiration. She knew that Mrs Herbert would need assistance if she wanted to get out of bed, due to the likely effect of the drug, yet her behaviour that evening suggests that in fact she was not really thinking about the genuine possibility of serious adverse effects of the drug in this particular case. A more experienced registered nurse might have acted differently.

16.2. In evidence, Nurse Price readily acknowledged that she should have insisted on calling Dr Kurtzer back to confirm the telephone medication order. Had she done so, it is possible that she may also have obtained more information and guidance from Dr Kurtzer which would have alerted her to the importance of checking on her patient. If she was more alert to the possible dangers of morphine, she may not have allowed herself to be distracted by the new mother's feeding problems for a period of about ninety minutes. In the scheme of things, the feeding issue should not have taken priority over the welfare of someone who had been given a narcotic and left unattended.

16.3. Nurse Darling had about 20 years experience as an enrolled nurse and had worked at Cleve Hospital for most of that time. She explained that the main difference between her work and that of a registered nurse was the dispensing of medication, which was the responsibility of registered nurses (T15). According to Nurse Darling, the hospital was not particularly busy on the day of Mrs Herbert's death. The fact that she attended patient "B" at 2:00 am, indicates that had she thought of it, she could easily have checked on Mrs Herbert as well.

16.4. It is clear that neither nurse appreciated the potential seriousness of Mrs Herbert's situation, once she had been given the 30 mg of morphine. In the absence of additional information and instructions from Dr Kurtzer, they were relied upon to use their initiative and conduct themselves professionally. I find that the failure to ensure that Mrs Herbert was observed for over two hours following the administration of

30 mg of morphine, was a serious oversight by both nurses. If Mrs Herbert was checked at 2:00 am, it is possible that one of the nurses may have detected a problem which could have lead to timely intervention. However, in the absence of appropriate guidelines which call for measurement of the sedation level, I find that even if Mrs Herbert was noted to be "breathing" at 2:00 am, but no further checking was undertaken, her death may still not have been prevented.

17. <u>Director of Nursing, Cleve Hospital</u>

17.1. Evidence was called from Catherine Giersch, who is the director of nursing at Cleve hospital. According to Ms Giersch, Cleve hospital is a small regional hospital with twenty two beds comprising a mixture of aged care and acute patients. Ms Giersch completed hospital based training in nursing at Whyalla in 1975. Since that time, she has worked in a variety of regional areas. In 1991, Ms Giersch became the Director of Nursing at Cleve Hospital, following a period of four years working there as a registered nurse. In 2000, Ms Giersch took on the combined role of Executive Officer and Director of Nursing for the hospital (T371-372).

17.2. Ms Giersch explained in evidence that a registered nurse and an enrolled nurse are usually rostered to cover the night shift at the hospital. According to Ms Giersch, whilst they work as a team, it is the registered nurse who is accountable for everything which occurs during that shift (T376). Ms Giersch stated that on the evening when Mrs Herbert died, there were four or five patients occupying the acute beds, but none of these were acutely unwell. She did not detail the number of "long-stay" patients in hospital that evening, but indicated that they were "all settled", which I understand means that they did not require nursing care that evening (T411).

17.3. When asked about the appropriateness of a four hourly observation schedule for Mrs Herbert on the night of her death and whether she expected her to have been woken at 2:00 am for full observations, Ms Giersch was unwilling to commit herself at first, but later in evidence said that she would not have expected nursing staff to wake a sleeping patient one hour after receiving morphine. She added that she would have expected respirations to be counted and a pulse to be taken if possible without waking the patient (T381, T388).

17.4. According to Ms Giersch, she would not have regarded a dose of 30 mg morphine as excessive, had she received the order from Dr Kurtzer for Mrs Herbert (T386).

Ms Giersch confirmed that MIMS was available as a reference for nurses at the hospital together with therapeutic guidelines (T384).

17.5. When asked to explain why Ms Giersch would not have regarded a dose of 30 mg morphine as excessive, she stated the following:

> 'Because it wouldn't have been an uncommon dose for us to be administering at the hospital. We had administered numerous doses of morphine 30 mg over the years I've worked there, without adverse effects, so no, I wouldn't have queried it.' (T386)

17.6. This answer is concerning, given the available information governing recommended dosage at the time. Ms Giersch went on to indicate that she believed that the dose was calculated by reference to weight and that she was aware of that dose of morphine being given to patients who were much smaller than Mrs Herbert without adverse consequences. I am not prepared to accept that Ms Giersch's level of awareness concerning morphine dosage typifies that of experienced, senior registered nurses in this State.

17.7. Ms Giersch was asked to explain what she would have done if she was in Nurse Price's position that evening. She explained that she would have telephoned Dr Kurtzer back to confirm the order and to obtain information about Mrs Herbert's condition and any medications which had been prescribed or administered earlier. She would have administered the morphine without questioning the dose and then would have checked on Mrs Herbert about fifteen minutes later to see whether it had an effect and then checked her on the hourly "rounds" (T394-395). She was critical of the lack of admission documentation in Mrs Herbert's medical notes.

17.8. When asked about how she keeps up to date with developments in other hospitals and changes to medical and nursing practice, Ms Giersch explained that there were monthly meetings held in Adelaide for Directors of Nursing, but that she rarely attended them.

18. Adequacy of communications between Dr Kurtzer and nursing staff

18.1. Professor Bochner was critical of the inadequate instruction from Dr Kurtzer to nurses for observations necessary following the administration of morphine. I endorse those criticisms and find that the communication was inadequate.

18.2. I suspect that if he was not so exhausted, Dr Kurtzer may have taken greater care with his communication with the nurses. He may also have been more willing to examine Mrs Herbert again in hospital before making the decision to administer the second large dose of morphine. The chronic shortage of medical practitioners in regional areas of South Australia is a serious problem for patients who rely upon them and for the practitioners who struggle to cope with the demands placed upon them.

18.3. Nurses are also professional people who are expected to use their initiative and act competently within the limits of their training and experience. This is especially important in regional areas where there is little support and much responsibility. Unfortunately, it is not easy to attract and retain competent, experienced nurses in regional areas. According to Ms Giersch, the Cleve Hospital now relies upon agency nurses to meet the demand for staff.

18.4. The development of "systems" which minimise harmful outcomes for patients is to be encouraged. Medical practitioners and nurses will inevitably make unintentional errors in the course of their work from time to time. It is in everyone's interests to explore ways of minimising errors by devising supportive systems where possible. It is very regrettable that the guidelines for administration of morphine, developed by the Royal Adelaide Hospital were not in operation at the Cleve Hospital at the time of Mrs Herbert's death. I find that if suitable guidelines had been in place, Mrs Herbert's death could have been prevented.

19. Recommendations

In accordance with the provisions of Section 25 (2) of the Coroner's Act 2003, the following recommendations are made in anticipation that they may prevent or reduce the likelihood of or recurrence of an event, similar to the event, the subject of this Inquest.

1. That the Minister for Health give consideration as to how the Department might provide assistance in the regular dissemination of information to Directors of Nursing in regional hospitals concerning developments relevant to patient safety and welfare in a manner which would promote consistency of practice between the larger hospitals and smaller regional hospitals.

2. That the Minister for Health make necessary arrangements as soon as possible to ensure that all hospitals within the State are alerted to the Royal Adelaide Hospital guidelines for the administration of intermittent subcutaneous and intravenous opioid administration for acute pain management.

Key Words: Hospital treatment; Morphine (Morphine Toxicity); Nursing care;

In witness whereof the said Coroner has hereunto set and subscribed her hand and

Seal the 17th day of July, 2006.

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Coroner

Inquest Number 12/2006 (2462/2003)