CORONER'S COURT
OF NEW SOUTH WALES

Inquest:	Inquest into the death of Lorraine Barnes
Hearing dates:	21 to 24 October 2019
Date of findings:	13 December 2019
Place of findings:	Coroner's Court of New South Wales at Lidcombe
Findings of:	Magistrate Derek Lee, Deputy State Coroner
Catchwords:	CORONIAL LAW – manner of death, hospital care and treatment, nasogastric tube insertion, fine bore nasogastric tube, enteral feeding, Wollongong Private Hospital, malnutrition, x-ray studies, radiology review
File number:	2016/136574
Representation:	Dr K Sant, Counsel Assisting, instructed by Ms K Hainsworth (Crown Solicitor's Office) Mr W Windsor SC for Health Care Corporation Pty Ltd (trading as Wollongong Private Hospital), instructed by Minter Ellison Ms K Burke for Dr P Marantos, Dr R Ramakrishna and Dr D Glenn, instructed by Moray & Agnew Mr J Downing for Dr M Liu, instructed by Meridian Lawyers Mr G Gemmell for Dr G Barclay and Dr Y Cheng, instructed by HWL Ebsworth Ms C Melis for Dr D Nguyen, instructed by Meridian Lawyers

Findings:

Mrs Lorraine Barnes died on 1 May 2016 at Wollongong Private Hospital, Wollongong NSW 2500. The cause of Mrs Barnes' death was sepsis, with aspiration pneumonitis being an antecedent cause. Iatrogenic injury to the right lung, dementia, diverticulitis and a urinary tract infection were all significant conditions contributing to Mrs Barnes' death. Misplacement of a fine bore nasogastric tube resulted in concentrated nutritional supplements being inadvertently deposited into Mrs Barnes' right lung, rather than the stomach, and perforations to the right lung. Insertion of the fine bore nasogastric tube was precipitated by the development of malnutrition and electrolyte disturbances following insufficient nutritional intake during Mrs Barnes' hospital admission.

Recommendations:

To the Chief Executive Officer of Wollongong Private Hospital (**the Hospital**):

1. I recommend that the Hospital review its *Resuscitation/End Of Life, Appropriate Intervention Orders* form, giving consideration to the need to clearly distinguish between invasive and non-invasive forms of nutritional support, and specify the type of nutritional support that is to be provided to a patient.

2. I recommend that the Hospital review its policy relating to the insertion of fine bore nasogastric tubes to ensure that they are able to be inserted on weekends and public holidays at the Hospital. Specific consideration should be given to whether, when a fine bore nasogastric tube is required for feeding on a weekend or public holiday, it should be able to be inserted on an acute ward. The review should take into account: (a) the new process for radiology review that ensures a radiologist looks at any x-ray relevant to correct placement of a nasogastric tube immediately when it is taken on a weekend or public holiday; and (b) the evidence of Professor Susan Kurrle given during the inquest as to the impact of delays in feeding older people and frail patients.

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1. Introduction

1.1 Mrs Barnes had a complex medical history requiring a number of hospital admissions in the period immediately preceding her death. On 9 March 2016 Mrs Barnes was admitted to Wollongong Hospital. She was later cleared for discharge on 14 March 2016 but, due to her increased care needs, her discharge home was deferred and she was transferred to Wollongong Private Hospital. Over the next seven weeks Mrs Barnes' condition deteriorated, primarily as a result of her refusing to eat. Measures were taken to address this, together with Mrs Barnes' other conditions, but they proved to be unsuccessful and Mrs Barnes later died on 1 May 2016.

2. Why was an inquest held?

2.1 Under the *Coroners Act 2009* (**the Act**) a Coroner has the responsibility to investigate all reportable deaths. This investigation is conducted primarily so that a Coroner can answer questions that they are required to answer pursuant to the Act, namely: the identity of the person who died, when and where they died, and what was the cause and the manner of that person's death. All reportable deaths must be reported to a Coroner or to a police officer.

2.2 The circumstances of Mrs Barnes' admission to Wollongong Private Hospital, from the point of being ready for discharge to her death some seven weeks later, raise a number of questions about the manner of her death. Accordingly, an inquest was held to examine issues relevant to these questions.

2.3 Inquests have a forward-thinking, preventative focus. At the end of many inquests Coroners often exercise a power, provided for by section 82 of the Act, to make recommendations. These recommendations are made, usually, to government and non-government organisations, in order to seek to address systemic issues that are highlighted and examined during the course of an inquest. Recommendations in relation to any matter connected with a person's death may be made if a Coroner considers them to be necessary or desirable.

3. Mrs Barnes' life

3.1 Inquests and the coronial process are as much about life as they are about death. A coronial system exists because we, as a community, recognise the fragility of human life and value enormously the preciousness of it. Recognising the impact that a death of a person has, and continues to have, on the family and loved ones of that person can only serve to strengthen the resolve we share as a community to strive to reduce the risk of preventable deaths in the future.

3.2 Understanding the impact that the death of a person has had on their family only comes from knowing something of that person's life and how the loss of that life has affected those who loved that person the most. Therefore it is extremely important to recognise and acknowledge Mrs Barnes' life in a brief, but hopefully meaningful, way.

3.3 Mrs Barnes was born in 1930. She was a talented dancer and swimmer as a child. In her teenage years she competed at a high level in swimming, winning many awards and attracting the attention of renowned swimming coach, Forbes Carlisle. In her later years Mrs Barnes used her talent and shared her swimming knowledge and skills to teach many others to swim.

3.4 Mrs Barnes later met and married her husband, Norm, and together they bought a block of land where they later built their family home. They had four sons together, and at the time of her death Mrs Barnes had seven grandchildren and two great-grandchildren.

3.5 Mrs Barnes later became a high school teacher, working hard to complete many courses whilst at the same time raising her family whilst her husband was working permanent night shifts. One of her sons, Grant, describes Mrs Barnes' life as one of determination and struggle but never at the expense of others.

3.6 Mrs Barnes excelled in hobbies such as sewing, cake decorating and singing. She was a very active member of her local church, with her faith being a very important part of her life. Mrs Barnes was known to be a person of utmost integrity, to have a strong code of ethics, and to always selflessly put the needs of others ahead of her own.

3.7 There is no doubt that Mrs Barnes is deeply missed by her family and those closest to her.

4. Admission to, and treatment at, Wollongong Hospital[1]

4.1 Mrs Barnes had a complex medical background which included Alzheimer's dementia with mild cognitive decline, gastro-oesophageal reflux disease, hiatus hernia, diverticulitis, chronic obstructive pulmonary disease, and Sjogren's disease (an autoimmune condition). Between January and early March 2016 Mrs Barnes was admitted to Wollongong Hospital (the public, tertiary referral hospital in Wollongong).

4.2 Mrs Barnes' most recent admission to Wollongong Hospital occurred on 9 March 2016. She presented with low blood pressure, decreased oral intake and a fever. She was diagnosed with, and treated for, a urinary tract infection. On 10 March 2016 a risk assessment was conducted in view of Mrs Barnes' anticipated discharge. The assessment included a malnutrition screening tool which noted that Mrs Barnes' weight was estimated at 53 kilograms, that she was not obviously underweight or frail, and that she had a body mass index in the average range.

4.3 On 14 March 2016 Dr Peter Marantos, a general and respiratory physician, reviewed Mrs Barnes and indicated that she could be discharged home. At the time it was noted that a blood test on 11 March 2016 recorded an albumin[2] measurement of 22. It was also noted that Mrs Barnes was able to walk 60 metres independently.

4.4 Prior to her admission, Mrs Barnes' son, Grant, had been caring for her at home. At the time of Mrs Barnes' discharge some concerns were raised about Grant's ability to continue to care for his mother, given her increased care needs. On this basis, an option was extended to transfer Mrs Barnes to Wollongong Private Hospital (**WPH**) for additional convalescence and recovery time. Dr Marantos expected that Mrs Barnes would only require a further one or two day's admission.

[1] The factual background has been drawn from the helpful closing submissions of Counsel Assisting.
[2] Albumin is a protein made by the liver, which carries substances (including hormones, vitamin C, and enzymes) throughout the body. Low albumin levels can indicate liver or kidney dysfunction.

5. Admission to, and treatment at, Wollongong Private Hospital

5.1 Mrs Barnes was subsequently admitted to WPH under the care of Dr Marantos. It appears that the initial period of Mrs Barnes' admission was uneventful. By 17 March 2016 Mrs Barnes was considered ready for discharge subject to results of a repeat urine test (which was not performed at that time).

5.2 On 18 March 2016 it was noted that Mrs Barnes ate very little at dinner. On 19 March 2016 it was noted that Mrs Barnes was unwell, had refused lunch and complained of nausea, and had an episode of incontinence of faeces. Nursing records thereafter make frequent references to her tolerating only small amounts of food or not eating meals at all.

5.3 Dr Marantos reviewed Mrs Barnes on 19 March 2016 and started her on ciprofloxacin (an antibiotic to treat bacterial infection). Blood tests were taken (which were the first since Mrs Barnes' admission on 14 March 2016) which revealed abnormal haemoglobin, increased C-Reactive Protein (**CRP**)[3], and low albumin and potassium levels. Dr Marantos considered that Mrs Barnes might have been experiencing a flare-up of her Sjogren's disease and requested a consultation with Dr Raj Ramakrishna, a haematologist. Dr Ramakrishna considered that Mrs Barnes' Sjogren's disease was inactive but suggested some further investigation.

5.4 During the period from 20 to 23 March 2016 nursing notes generally recorded that Mrs Barnes was tolerating only small amounts of diet and fluids.

5.5 Further blood tests on 24 March 2016 revealed continued low potassium and albumin levels, together with low calcium, low phosphate (despite phosphate replacement) and low magnesium. Dr Marantos and Dr Ramakrishna both reviewed Mrs Barnes on the same day. Dr Marantos considered it likely that Mrs Barnes had malnutrition, and discussed his diagnoses of Alzheimer's and Sjogren's disease with Grant. Dr Ramakrishna requested further imaging tests in order to exclude lymphoid malignancies. No evidence of was subsequently found of any such malignancies.

5.6 Further blood tests on 26 March 2016 revealed low potassium. This prompted a review by Dr Kevin Woo, a Career Medical Officer (**CMO**). Dr Woo noted that Mrs Barnes was already on Slow K (a potassium supplement), and arrange for blood tests to repeated on 27 March 2016. This showed slightly increased potassium levels although Mrs Barnes' albumin level remained low. Later on 26 March 2016, Mrs Barnes developed a temperature, which prompted review by Dr Michael Liu, another CMO. On examination, Mrs Barnes said that she felt comfortable and her chest was noted to be clear with a normal abdominal examination.

5.7 On 28 March 2016, Dr Ramakrishna noted that Mrs Barnes was unwell with decreased diet. Another CMO, Dr Yem Lim Cheng, also reviewed Mrs Barnes. He queried a urinary tract infection (**UTI**) but noted that Mrs Barnes was afebrile with no symptoms of a UTI. Urine tests performed on 26 March 2016 and 29 March 2016 showed no significant growth on culture.

30 March 2016 – Review by dietician

5.8 On 29 March 2016 an enrolled nurse noted that Mrs Barnes was not compliant with meals and that her blood pressure was on the low side. She stated that she needed to be seen by a

[3] A plasma protein that rises in the blood with inflammation from certain conditions.

dietician[4]. This resulted in Mrs Barnes being reviewed the following day by a dietician, Sally-Ann Hodgson. She noted Mrs Barnes' abnormal biochemistry with decreased haemoglobin, decreased protein, decreased albumin, increased CRP and abnormal iron studies. Ms Hodgson noted that Mrs Barnes had reduced oral intake and estimated her intake on 30 March 2016 to be equivalent to 200 calories. Mrs Barnes told Ms Hodgson that she weighed 53 kilograms. Mrs Barnes had not been weighed at WPH by the time of Ms Hodgson's review.

5.9 Following her review, Ms Hodgson formulated a plan for Mrs Barnes which included oral nutrition, prompting for meals, having Mrs Barnes' weight checked, a food record, and further follow-up.

5.10 Mrs Barnes was also reviewed by Dr Marantos on 30 March 2016. He queried whether Mrs Barnes was experiencing a recurrence of her pseudomonas infection[5] and recommenced ciprofloxacin.

5.11 Dr Marantos reviewed Mrs Barnes the following day on 1 April 2016. He noted that Mrs Barnes had diarrhea, and that her earlier urine cultures showed no evidence of urinary tract infection. He directed that the ciprofloxacin be increased.

5.12 On 5 April 2016, Mrs Barnes was noted to be refusing to eat and saying she was tired. On that day she was refusing to sit out of bed. She was reviewed by Dr Marantos who said there was no evidence of UTI and noted her stool was negative for Clostridium difficile (bacterial infection of the large intestine). He asked that oral intake be encouraged.

6 April 2016 – Further review

5.13 Ms Hodgson reviewed Mrs Barnes again on 6 April 2016 and noted that Mrs Barnes had reported nausea and refused oral intake apart from drinking three nutritional resources which Grant had persuaded her to drink. Ms Hodgson also noted that Mrs Barnes was not remembering to eat or drink, and that she required strict direction in this regard. Ms Hodgson formulated a plan consisting of high protein, high energy supplements, having Mrs Barnes' family assist with menu planning, and checking Mrs Barnes' weight. However, no weight was recorded on Mrs Barnes' patient care plan that day, or for 7 April 2016 to 14 April 2016.

5.14 On 6 April 2016 Mrs Barnes was also seen by Dr Ramakrishna who asked that her blood results be checked the next day. That was done on the morning of 7 April 2016 at 6:20am. Several results were more abnormal (in the sense of further from the normal range used by that laboratory) than when last checked 10 days before, on 27 March 2016. It was also noted that Mrs Barnes' creatinine level was high and that her Estimated Glomerular Filtration Rate (**eGFR**)[6] had decreased. Mrs Barnes was subsequently seen by a CMO and her potassium was increased.

8 April 2016 to 14 April 2016

5.15 On 8 April 2016, Mrs Barnes was again reviewed by a CMO in the morning who noted that her potassium was still low. She was also seen by Dr Marantos who charted Slow-K and magnesium aspartate.[7] It appears that Dr Marantos formulated a plan to recheck Mrs Barnes' potassium and

[4] Page 114, Tab 43.
[5] A severe infection caused by common bacteria in a person with a weakened immune system, particularly in a hospital setting.
[6] An overall measure of kidney function.
[7] A mineral supplement used to prevent and treat low magnesium levels in the blood.

magnesium levels on 9 April 2016 with a view to discharge. However, Mrs Barnes developed a high temperature on 10 April 2016 and remained in bed for much of the day.

5.16 Dr Marantos reviewed Mrs Barnes on 11 April 2016 and noted that her CRP and Erythrocycte Sedimentation Rate (**ESR**)[8] markers were high, and that her haemoglobin level was low. Dr Marantos considered that that there may have been an exacerbation of Sjogren's disease but his differential diagnosis was infection with possible vasculitis (inflammation of the blood vessels). Dr Marantos discussed the situation with Dr Ramakrishna and also consulted Dr Roman Jaworski, a rheumatologist. Dr Jaworski confirmed that Sjogren's disease would not account for Mrs Barnes' clinical presentation and later considered, after seeing Mrs Barnes on 13 April 2016, that vasculitis would also be unlikely to account for the high CRP and ESR levels.

5.17 On the evening of 11 April 2016 Mrs Barnes developed a high temperature and tachycardia.[9] She was seen by Dr Khoury, a CMO, and by Dr Ramakrishna who recommenced ciprofloxacin and ordered concentrated albumin. Mrs Barnes was reviewed by Dr Nguyen, another CMO, later that evening who noted that Mrs Barnes' potassium level was still low, despite replacement, and that she had sinus tachycardia with possible ST depression and possible ventricular ectopics.[10] Dr Nguyen queried a non-elevated STEMI[11] and also noted Mrs Barnes' low potassium levels. She ordered potassium chloride overnight and albumin to start in the morning. Dr Nguyen reviewed Mrs Barnes' ECG later that night, and noted ST depression and that ventricular ectopics continued.

5.18 Over the next several days, nursing records indicate that Mrs Barnes largely stayed in bed, eating little or nothing at all, despite encouragement, and was vague at times. By 13 April 2016, Mrs Barnes was refusing to shower, refusing all food, and staying in bed for most of the day.

14 April 2016 – Admission to Intensive Care Unit

5.19 This continued on 14 April 2016 when Mrs Barnes continued to refuse to eat, despite encouragement. In the afternoon, Dr Pong, CMO, reviewed Mrs Barnes in view of her recent clinical findings. Mrs Barnes was noted to be confused and to have respiratory symptoms with increased respiratory rate. A diagnosis of diverticulitis[12] was noted as a possibility, and a decision was made to transfer Mrs Barnes to the Intensive Care Unit (**ICU**) where she was to have intravenous antibiotics and electrolyte replacement. Dr Jagarlamudi, an ICU specialist, reviewed Mrs Barnes on the ward and thought that she may have a lung infection.

5.20 Mrs Barnes remained in the ICU from 14 April until 17 April 2016. She developed abdominal pain on the morning of 16 April 2016 and an urgent abdominal CT was performed which was suggestive of acute diverticulitis causing incomplete large bowel obstruction and dilated bowel loops. A surgical consult was arranged with Dr Soni Putnis, a colorectal surgeon, who indicated that treatment options included surgery, or a more conservative approach with intravenous antibiotics. Dr Julie Nguyen, ICU CMO, discussed the option of surgery with Grant. As it was considered that Mrs Barnes' prospects were poor, it was agreed that treatment should proceed conservatively.

[8] A test that measures the degree of inflammation present in the body.
[9] A higher than normal resting heart rate.
[10] An irregular heart rhythm due to premature heartbeat.
[11] Non-ST elevation myocardial infarction, a type of heart attack.
[12] An inflammation or infection in one or more small pouches in the digestive tract.

17 April 2016 to 24 April 2016

5.21 On 17 April 2016 Dr Putnis assessed Mrs Barnes and reviewed the recent CT scan results, which suggested that Mrs Barnes had a mild diverticulitis without evidence of a large bowel obstruction. On this basis Mrs Barnes was discharged from the ICU to the general ward. The following day Dr Putnis reviewed Mrs Barnes again and noted that she had no abdominal pain and that her abdomen was soft and non-tender, and that no further colorectal input was required.

5.22 Over the next several days Mrs Barnes continued to not eat and largely remained in bed. On 20 April 2016 Mrs Barnes had an episode of vomiting and her potassium was noted to still be low, despite intravenous supplements. Mrs Barnes was also noted to have refused all medications on that day, as well as on the following day. At that time, consideration was given to insertion of a nasogastric tube (**NGT**) if hospital staff were unable to give medications and food orally.

5.23 Dr Marantos reviewed Mrs Barnes on 22 April 2016. He noted a mildly distended abdomen and requested an abdominal x-ray to exclude a possible small bowel obstruction. This was subsequently performed and showed no significant change from the last examination.

24 April 2016 to 29 April 2016 – Initial insertion of nasogastric tube and palliative care review

5.24 On 24 April 2016 Mrs Barnes was noted to have become more unwell and was vomiting. Dr Marantos considered the possibility of a bowel obstruction. An abdominal CT was performed which suggested ongoing diverticulitis and generalised ileus.[13] A NGT was inserted to decompress any bowel obstruction. Dr Putnis reviewed Mrs Barnes and considered that ileus secondary to the electrolyte disturbance was likely. A chest x-ray performed after the NGT insertion showed changes in the right lung. Subsequent radiology review noted the changes were consistent with aspiration and that there was no bowel obstruction.

5.25 Dr Martin Sterba, an intensivist, reviewed Mrs Barnes on 24 April 2016. It was noted that Mrs Barnes progressively deteriorating and that any active management of her condition would involve intubation and ventilation. Dr Sterba suggested that palliative measures be undertaken and discussed this with Dr Marantos. On 25 April 2016 the issue was discussed with three of Mrs Barnes' sons in attendance, particularly Grant who clearly stated that he would not want any aggressive life-sustaining measures. Nursing records on and about 27 April 2016 indicate that Mrs Barnes was frequently confused and distressed, often calling for a nurse or her help, when a nurse was actually present, and sometimes when a nurse was holding her hand.

5.26 Dr Gregory Barclay, a palliative care physician, saw Mrs Barnes on 27 April 2018 and discussed the options for care with her and her family. At that time, Mrs Barnes was still being treated for aspiration pneumonia and had a NGT in place for an ileus. Dr Barclay noted that Mrs Barnes' family wished for the antibiotics and treatment of the ileus to continue, although they were content to proceed on a palliative care pathway if Mrs Barnes' condition worsened.

5.27 On 29 April 2016 the NGT was removed. However, Dr Marantos flagged the possibility of nasogastric feeding if Mrs Barnes' oral intake remained poor. Dr Marantos also raised with Grant the possibility of transferring Mrs Barnes back to Wollongong Hospital, and it was indicated that Grant would need to discuss this with other family members.

[13] Inability of the intestine to contract normally and move waste out of the body.

30 April 2016 – Insertion of nasogastric tube for feeding

5.28 On 30 April 2016 it was decided to reinsert an NGT for feeding purposes. This was undertaken by Dr Cheng, the ward CMO. Dr Marantos advised Dr Cheng that Mrs Barnes had a large hiatus hernia[14] that could make insertion, with the target being the stomach, more difficult. Dr Cheng unsuccessfully attempted to insert the NGT at around 2:15pm, and later attempted insertion again at about 3:00pm with Grant present to calm his mother. The intention was to insert the NGT 60 to 65 centimetres into the stomach, but it could only be inserted 50 centimetres before encountering resistance. A chest x-ray was performed at about 3:45pm (**the First X-ray**) to ensure that the NGT had been inserted in the stomach and not in the lung, which is a known complication.

5.29 Dr Cheng reviewed the x-ray and saw that the NGT was below the diaphragm but was bent ninety degrees after the diaphragm. Whilst this indicated that the NGT was not in the lungs, Dr Cheng was unsure if it was in the correct position for usage. Dr Cheng asked Dr Nguyen to assist, and upon reviewing the x-ray Dr Nguyen considered the NGT to be in the correct position. Dr Nguyen noted that the NGT was under the diaphragm but not far enough to be at the level of the stomach. As both Dr Cheng and Dr Nguyen were unsure of the positioning of the NGT it was initially decided to leave the NGT in place and seek radiology advice, as removing it and then re-inserting it again (if it was indeed correctly positioned) would cause unnecessary distress to Mrs Barnes. However, whilst the advice was being sought Mrs Barnes started to cough and became agitated so Dr Cheng decided to remove the NGT.

5.30 Shortly afterwards, Dr Derek Glenn, radiologist, rang back and advised that the NGT was located in the hiatus hernia and could be used if it was pulled out five centimetres (or 10 cm on Dr Glenn's account). However, the call was terminated before Dr Glenn could be advised that the NGT had already been removed.

5.31 Dr Cheng asked Dr Nguyen to reinsert the tube, which she did. At around 4:40pm or 4:50pm a second x-ray was performed to check the positioning of the NGT (**the Second X-Ray**). Dr Cheng and Dr Nguyen subsequently reviewed the x-ray together on a computer. They noted that it appeared very similar to the First X-Ray with Dr Cheng noting that the NGT was positioned in a kinked manner under the diaphragm. In actual fact, Dr Cheng and Dr Nguyen were indeed inadvertently reviewing the First X-Ray. The Second X-Ray showed that the NGT was in the lung, rather than the gastrointestinal system.

5.32 This inadvertent error was due to Dr Nguyen's mistaken assumption that the file on the computer which she was reviewing was of the chest x-ray which had most recently been performed. However, the software used by WPH at the time did not automatically sort and display sort x-ray studies in chronological order in all panels within the software. The Second X-Ray was subsequently reviewed and reported on by Dr Lim, radiologist, when he attended work on 2 May 2016. Dr Lim noted: "*The tip of the NG tube lies in the lower right lung base pass the right main bronchus. This should be withdrawn and resited. There are bands of atelectasis right base. No pneumothorax*". It is evident that this report was not available to Dr Cheng and Dr Nguyen on 30 April 2016.

5.33 Instead, as Dr Cheng and Dr Nguyen believed that they were viewing the First X-ray, Dr Cheng withdrew the NGT five centimetres, consistent with the advice provided by Dr Glenn, and

[14] A protrusion of the stomach through the diaphragm and into the chest

secured it. Dr Cheng noted that Mrs Barnes began to cough but this later settled. Ms Hodgson subsequently reviewed Mrs Barnes, with a feeding regimen arranged and NGT feeding commenced.

5.34 At about 7:00pm on 30 April 2016, Dr Cheng performed a handover to Dr Liu. Dr Cheng advised Dr Liu that there had been difficulty inserting an NGT but that it was eventually successfully inserted after two attempts. Dr Cheng also advised Dr Liu that although the NGT was in a hiatus hernia, Dr Glenn, the on-call radiologist, had confirmed that it was correctly positioned.

5.35 During the night of 30 April 2016, Mrs Barnes was observed to be unsettled, to have a high temperature, and to be calling out to nursing staff. Dr Liu was informed and he reviewed Mrs Barnes the next morning at about 7:30am or 8:00am. Dr Liu noted that Mrs Barnes still had a high temperature, and elevated heart rate and respiratory rate with upper airways noises and crepitations in both lung bases. Dr Liu formed an impression of aspiration pneumonia and ordered that the nasogastric feeds be ceased, and had Mrs Barnes sat upright. Dr Liu consulted with Dr Marantos, who agreed with the cessation of the nasogastric feeds and prescribed intravenous antibiotics. Dr Liu subsequently removed the NGT after noting that white frothy fluid appeared in her mouth when water was inserted into it.

1 May 2016 – Insertion of further nasogastric tube and Mrs Barnes' death

5.36 At about 9:30am on 1 May 2016, Dr Liu inserted another NGT to about 65 centimetres with minimal difficulty. A chest x-ray was ordered and after review Dr Liu withdrew the nasogastric tube to 50 centimetres. A further x-ray was taken and when it was reviewed Dr Liu believed the NGT to be in a similar position to the NGT which had been inserted on 29 April 2016. Dr Liu directed nursing staff to push a small amount of water into the NGT. After 5 to 10 millilitres were inserted, fluid was noted in Mrs Barnes' mouth, and Dr Liu ordered nasogastric feeding to cease.

5.37 A subsequent report of the x-ray of 1 May 2016 showed that the NGT was doubled back on itself in the right lower lobe of the lung, and that the right main bronchus had been intubated resulting in laceration of the right lung. The NGT ended at the right lung base with no associated pneumothorax.

5.38 At about 12:50pm on 1 May 2016 Mrs Barnes was found to be unresponsive. A medical emergency team was called and attended at approximately 12:53pm. As Mrs Barnes was not for resuscitation, no cardiopulmonary resuscitation was performed. Mrs Barnes was subsequently pronounced deceased at 12:55pm.

6. What was the cause of Mrs Barnes' death?

6.1 Mrs Barnes was subsequently taken to the Department of Forensic Medicine at Wollongong. Dr Bernard I'Ons, forensic pathologist, performed an autopsy on 10 May 2016. The post mortem examination identified two perforations and one tear in the right lung. The first perforation was in the front upper lobe, with a tear below it, which appears to have been caused by the NGT and entering back into the lung tissue. The second perforation was at the bottom of the right lower lobe, on the front, which appears to be where the NGT exited the lung.

6.2 The post-mortem examination also revealed small bowel adhesions, although the remaining gastrointestinal system was unremarkable, except for the liver which showed quite severe fatty

changes with mild chronic information. It was also noted that the kidneys also showed evidence of chronic inflammation, but the remainder of the genitourinary system was also unremarkable. Dr I'Ons noted that Mrs Barnes had, during her admission, required prolonged management in relation to a number of medical issues including sepsis, electrolyte imbalances, respiratory distress secondary to aspiration pneumonitis, chronic malnutrition, and ileus secondary to diverticulitis.

6.3 Dr I'Ons ultimately opined that the cause of death was sepsis with aspiration pneumonitis as an antecedent cause. Iatrogenic injury to the right lung, dementia, diverticulitis, and urinary tract infection were all noted as significant conditions contributing to the death.

7. Issues for consideration

7.1 Prior to the commencement of the inquest a list of issues was circulated amongst the sufficiently interested parties, identifying the scope of the inquest and the matters to be considered. That list identified the following issues:

(a) The cause or causes of the deterioration in Mrs Barnes' health over several weeks whilst she was an inpatient at Wollongong Private Hospital.

(b) The adequacy of medical review and oversight whilst Mrs Barnes was an inpatient at Wollongong Private Hospital, including the adequacy of the medical response to the deterioration in her health.

(c) How Mrs Barnes came to develop severe malnutrition with low potassium and other deranged electrolytes whilst in hospital and the adequacy of any response to her decreased intake of food and development of malnutrition.

(d) How nasogastric tubes came to be inserted into Mrs Barnes' lung on two occasions shortly before her death with resultant damage to the lung.

(e) The failure to detect that the nasogastric tubes were in the wrong place in a timely manner.

(f) The adequacy of any policies and procedures relating to the insertion of nasogastric tubes in place at Wollongong Private Hospital.

7.2 In order to assist with consideration of some of these issues, expert opinion was sought from Professor Susan Kurrle, a senior staff specialist geriatrician. Professor Kurrle prepared two reports addressing these issues and also gave evidence at the inquest.

8. What was the cause, or causes, of Mrs Barnes' deterioration while she was an inpatient at Wollongong Private Hospital?

8.1 By 14 March 2016 Mrs Barnes's condition had stabilised as her UTI had been treated. On that day Mrs Barnes had been reviewed by a physiotherapist and it was noted that she was mobilising sufficiently, able to walk 60 metres, and no longer required standby assistance. On that basis Dr Marantos requested that Mrs Barnes be discharged home. Mrs Barnes was eager for this to occur, however Grant was concerned about meeting her increased care needs. Dr Marantos made arrangements for a registrar to discuss this issue with Grant, with an indication that Mrs Barnes could be transferred to WPH if Grant was unable to take her home.

8.2 In evidence Dr Marantos described Mrs Barnes' subsequent admission to WPH as a "*transitional arrangement*" to allow time before Mrs Barnes returned home. He explained that the issue was more about obtaining services for Mrs Barnes with a view to her returning home, rather than one of rehabilitation.

8.3 By 17 March 2016, following review, Dr Marantos remained of the opinion that Mrs Barnes was clinically well and ready for discharge. However, Grant indicated that some additional time was needed before he was ready for his mother to return home.

8.4 By 19 March 2016 Mrs Barnes' condition had changed and she was found to be clinically unwell. She was refusing to eat and mobilise, and was complaining of nausea and abdominal pain. Nursing records indicate that from at least this date onwards Mrs Barnes was only eating very little, or refusing to eat at all. This appears to have been the primary cause of Mrs Barnes's deterioration during her admission to WPH.

8.5 In evidence Ms Hodgson indicated that Mrs Barnes needed approximately 1023 to 1309 calories per day. However when Ms Hodgson saw Mrs Barnes on 30 March 2016 she noted that Mrs Barnes' oral intake was only estimated to be 200 calories. In evidence Professor Kurrle explained that eating every day is required to keep a person's health at a reasonable level, and that an older person can become frail more quickly if they are not eating. She explained that a person remaining in bed and not mobilising, as occurred with Mrs Barnes, places them at greater risk.

8.6 By 24 March 2016 Dr Marantos considered that Mrs Barnes' low potassium and albumin levels were likely caused by malnutrition. Ms Hodgson formed the view by 6 April 2016 that Mrs Barnes was at high risk of developing malnutrition. She indicated that Mrs Barnes' low albumin levels were consistent with severe malnutrition.

8.7 Repeat blood tests during the course of Mrs Barnes' admission showed consistent electrolyte disturbances. Of particular concern were Mrs Barnes' low potassium levels. In evidence Dr Marantos indicated that some of the levels (for example, on 7 April 2016) were considered to be considered life-threatening as they placed Mrs Barnes at risk of cardiac arrhythmia. This was clearly recognised as Dr Marantos ordered a Holter monitor to record Mrs Barnes' heart activity. The continued difficulty with Mrs Barnes' electrolyte disturbances was one of the primary reasons which resulted in her admission to the ICU on 14 April 2016.

8.8 At the time of admission the ICU consultant, Dr Veerendra Jagarlamudi, queried the possibility of diverticulitis. Accordingly, a review was sought from Dr Putnis, colorectal surgeon, on 17 April 2016 who assessed Mrs Barnes as having mild diverticulitis without evidence of large bowel obstruction. On 18 April 2016 Dr Putnis saw Mrs Barnes again and noted that her abdominal examination was unremarkable, indicating that no further colorectal input was indicated. On 24 April 2016 Mrs Barnes was noted to be febrile and vomiting. Further review was sought from Dr Putnis who considered that an ileus was likely, secondary to electrolyte disturbances which needed to be addressed to allow for improved bowel function.

8.9 **Conclusions:** The evidence therefore establishes that the primary cause of Mrs Barnes' deterioration was her inadequate nutritional intake, as a consequence of her refusing to eat at all, or only eating small amounts which did not meet her caloric requirements. Mrs Barnes subsequently developed malnutrition with associated electrolyte disturbances. It does not appear that Mrs Barnes' mild diverticulitis was a significant contributing factor to her deterioration.

9. Was there adequate medical review and oversight during Mrs Barnes' admission, and was the medical response to her deterioration adequate?

Malnutrition

9.1 As noted above, it was recognised that from at least 18 or 19 March 2016 onwards Mrs Barnes' oral intake was poor and needed to be addressed. Repeated attempts were made by nursing staff, and Grant, to encourage Mrs Barnes to eat. Dr Marantos said that he also repeatedly encouraged Mrs Barnes to eat and that when he enquired why she did not do so the answers he received varied from an indication from Mrs Barnes that she would eat to an indication that she did not feel like eating. He explained that because of Mrs Barnes' dementia it was difficult to obtain a clear answer and coherent history.

9.2 Ms Hodgson explained that in order to minimise the risk of malnutrition to Mrs Barnes a plan was formulated which included continuing to provide her with a high protein, high energy diet; providing protein resource drinks; and providing food that Mrs Barnes might enjoy, and that was also nutritious, in order to tempt her to eat more. However, Ms Hodgson agreed that this plan did not have its intended effect because Mrs Barnes continued to not eat or drink.

9.3 Ms Hodgson indicated that it was important to serially check Mrs Barnes's weight. Although Ms Hodgson did not this herself as a matter of practice, she made a request for it to be done. However at the times of her review she found no evidence of Mrs Barnes's weight being recorded. Ms Hodgson also found no evidence of any estimates of Mrs Barnes's calorie intake between her reviews. She agreed that this was a significant knowledge gap in the sense that without a record being kept it was not possible to gauge whether the attempts to prompt Mrs Barnes to eat were actually effective. She agreed that it was insufficient to simply record that Mrs Barnes had refused a meal and that the information she, as a dietician, required was how many calories Mrs Barnes was consuming each day.

9.4 Ms Hodgson said that she requested a food record be prepared for Mrs Barnes but initially said that she was not aware of one being done. However in cross-examination she was taken to a number of food records[15] and agreed that in March and April 2016 she had access to such records which assisted in the assessment and management of Mrs Barnes, but which contained minimal information from which calorie intake could be determined.

9.5 In evidence, Dr Marantos was asked whether he diagnosed malnutrition as at 24 March 2016. He explained that he was concerned that Mrs Barnes was becoming malnourished due to her reduced oral intake and low potassium level. On this basis he explained that he made efforts to increase her intake with supervised feeding by nursing staff. He agreed that he did not refer Mrs Barnes to a dietician at the time, but explained that he subsequently was made aware that a dietician had become involved in Mrs Barnes' care. Dr Marantos said that Mrs Barnes' low

[15] Exhibit 1, pages 1691-1710.

albumin level could be attributed to malnutrition, but also explained that low albumin could be attributed to a number of differential causes. He explained that he thought that Mrs Barnes' dietary intake was a slightly significant factor which is why he wanted Mrs Barnes to go home in the care of her son. On this basis Dr Marantos asked the Nurse Unit Manager to facilitate the discharge planning process.

9.6 **Conclusions:** In evidence, Dr Marantos emphasized that he was not a dietician. Notwithstanding, by 24 March 2016 Dr Marantos considered that Mrs Barnes' electrolytes disturbance was likely due to malnutrition. In evidence Ms Hodgson was asked whether it was possible for nursing staff to refer a patient to a dietician. Ms Hodgson indicated that it was generally the case that a doctor would make such a referral. On this basis, there was an opportunity therefore for Ms Hodgson to be involved in Mrs Barnes' care earlier than when she eventually reviewed Mrs Barnes on 30 March 2016. Counsel for Dr Marantos accepted that it would have been more appropriate if Dr Marantos had, either himself or through a request made a nursing staff, referred Mrs Barnes to a dietician at an earlier point in time.

Care needs and services

9.7 If Mrs Barnes had been discharged directly from Wollongong Hospital to home she would have been eligible for a Community Packages (**ComPacks**) service. This is a non-clinical, short-term case managed program of community care available for up to 6 weeks from the time of the transfer home, to help patients gain independence and prevent readmission to hospital. However such a model of care is not available to patients discharged from private hospitals.

9.8 Professor Kurrle noted: "*It is unclear because of [Mrs Barnes'] multiple medical problems whether going home would have helped, but older people tend to do better in their own environment and she stopped eating within a day of being told she would not be going home. Adequate provision of post-emission services may have helped to this*".[16] In evidence Dr Marantos also indicated that it was his view during Mrs Barnes' admission to WPH that she may do better at home.

9.9 It is plainly evident that Grant was concerned about caring for his mother at home given her increased care needs. Accordingly, information about the non-availability of a ComPacks service if Mrs Barnes were to be transferred to WPH was clearly important. In evidence Dr Marantos was asked whether he discussed with Grant that a ComPacks would be unavailable if Mrs Barnes were transferred to WPH. Dr Marantos said that no such discussion took place, but explained that he directed his registrar to discuss transition arrangements with Grant. Dr Marantos subsequently acknowledged that this discussion did not cover the issue of ComPacks availability.

9.10 Dr Marantos was also asked whether he discussed this issue with Mrs Barnes herself in the context of her possible discharge from Wollongong Hospital. He said that he discussed Mrs Barnes' progress with her and that an assessment was made, based on input from allied health staff, that she did not require assistance. On this basis, Dr Marantos explained that the issue of ComPacks availability was never brought up. Notwithstanding, Dr Marantos acknowledged he could have given consideration to discussing it.

9.11 Counsel for Dr Marantos submitted that the availability of a service such as ComPacks fell within the domain of discharge planning, which is frequently performed by registered nurses. However

[16] Exhibit 1, page 1274.

the evidence establishes that Dr Marantos was aware of Grant's concerns about his mother's increased care needs at the time the transfer to WPH was suggested. The evidence also establishes that Dr Marantos was aware of the availability of the ComPacks service.

9.12 **Conclusions:** On this basis, Dr Marantos ought to have informed Mrs Barnes and Grant (or, at least, asked his registrar to do so) of the implications of Mrs Barnes' transfer to WPH in relation to the availability of the ComPacks service. It should be emphasised that it cannot be said with any certainty whether Mrs Barnes' discharge from Wollongong Hospital, and the availability of a ComPacks service, would have resulted in any material difference to the eventual outcome. This is because both Professor Kurrle and Dr Marantos acknowledged that a home care environment may not have helped Mrs Barnes given her multiple medical problems.

Case conferencing

9.13 In her first report Professor Kurrle expressed this view: "*Despite involvement of a number of different medical specialists, and allied health staff including physiotherapy and dietetics, and the social worker and discharge planner, there was also no evidence of a case conference called by Dr Marantos where Mrs Barnes' issues could be discussed with the family members, Mrs Barnes herself, and nursing staff…A case conference resulting in a care plan in which family, patient, and staff were involved may well have assisted in the management of Mrs Barnes*".[17]

9.14 In evidence Professor Kurrle explained that a case conference represented an opportunity for all health professionals to discuss issues relevant to a patient, and develop a care plan as opposed to a treatment plan. She explained that a care plan includes medical treatment but also considers future issues such as discharge and activities of daily living.

9.15 No case conference was held during Mrs Barnes' seven week admission to WPH, despite several different medical specialists and allied health staff being involved in her care. In evidence Ms Hodgson, Dr Barclay, and Dr Ramakrishna all indicated that they would have been willing to attend a case conference if requested. In evidence Professor Kurrle was asked at what point should a case conference have been held during Mrs Barnes' admission. Professor Kurrle indicated that a case conference would ideally be held within one to two weeks of admission. She explained that in aged care units across New South Wales case conferences occur on a weekly basis. In Mrs Barnes' particular case, Professor Kurrle noted that Mrs Barnes had stopped eating and developed other concerns within the first two weeks of her admission, and that there was a good opportunity to hold a case conference in this period to discuss her future care.

9.16 It was suggested to Dr Marantos that by 14 April 2016, after obtaining opinions from Dr Ramakrishna and Dr Jaworski, he was aware that there was no evidence of lymphoid malignancy, vasculitis, lupus, or Sjogren's disease. On this basis it was suggested that it would have been a good idea to have a multidisciplinary meeting to discuss the best treatment plan. Dr Marantos said that by 14 April 2016 Mrs Barnes was very unwell and that a multifaceted approach was taken to investigate the cause of the elevation in her inflammatory markers. He explained that a case conference at the time would not have been appropriate because Mrs Barnes was clinically unwell.

9.17 Later in his evidence Dr Marantos was asked again about whether consideration was given to a case conference. He explained that a case conference was held with the family on 25 April 2016

[17] Exhibit 1, page 1269.

in order to discuss the decompressive NGT, what issues had developed, and what the treatment plan was. However, Dr Marantos acknowledged that apart from nursing staff no other healthcare professionals were present on 25 April 2016. Dr Marantos was asked if he discussed with the family what treatment options were available if Mrs Barnes continued to not eat despite Grant's willingness to assist. He indicated that he did not recall if nasogastric feeding was discussed, but explained that it was his usual practice to raise it with family members as an option in the normal management of a patient. However Professor Kurrle expressed the view that what occurred on 25 April 2016 was a family conference, which involves a treating doctor answering questions from a patient's family. She said that this did not replace the case conference process which would have involved bringing a number of healthcare staff together.

9.18 In evidence David Crowe, the Chief Executive Officer of WPH, indicated his awareness of case conferencing in a rehabilitation setting, and the benefits of it generally particularly in relation to acute care. He acknowledged that case conferencing in Mrs Barnes' case could have assisted in directing care particularly with many different specialists involved different points. He acknowledged that it would have been beneficial to discuss Mrs Barnes' care with her family using a case conference model. Mr Crowe expressed his intention for WPH to implement a policy that requires case conferences to occur for patients who meet certain criteria warranting that course. The steps taken by WPH in this regard are encouraging.

9.19 **Conclusions:** Given the acknowledgment made by Mr Crowe, an opportunity to hold a case conference was missed during the entirety of Mrs Barnes' admission to WPH. Her refusal of food and development of clinical concerns in the first two weeks of her admission represented at least one opportunity for a case conference to be held during this period. As Mrs Barnes had been admitted under the care of Dr Marantos, it was primarily his responsibility to call such a conference. The evidence establishes that WPH did not discourage it and that other clinicians involved in Mrs Barnes' care would have been receptive to it. It is acknowledged that there was interaction between Dr Marantos and other clinicians regarding aspects of Mrs Barnes' care. However, this should not have been seen as a substitute for a case conference. Such a case conference could have been used to collaboratively formulate a care plan, and Mrs Barnes' family could subsequently be appropriately and clearly informed about it.

The decision to commence nasogastric feeding

9.20 Dr Marantos acknowledged that he did not discuss the possibility of nasogastric feeding with Mrs Barnes or Grant if Mrs Barnes continued to not eat. He said that following his review of Mrs Barnes on 22 April 2016 he spoke with the family about Mrs Barnes' eating and drinking issues. He explained that the possibility of enteral feeding was in the "*back of my mind*". He was asked, if this was the case, whether he considered it would have been a good idea to take the opportunity to meet with the family and discuss the possibility of enteral feeding before it actually occurred. Dr Marantos explained that at the time the family were involved intensively in the feeding process and that he did not think that nasogastric feeding was needed at the time, and therefore no discussion about it took place.

9.21 Later in evidence Dr Marantos was asked again about discussions he had with Mrs Barnes' family by 29 April 2016 when nasogastric feeding was being considered. Dr Marantos indicated that he considered nasogastric feeding would be used for as long as necessary and that a decision would be made as to when it could be removed based on Mrs Barnes' progress, with review on an ongoing basis. It was suggested to Dr Marantos that nasogastric feeding did not

resolve the underlying reason why Mrs Barnes was not eating. He explained that nasogastric feeding was going to assist by providing nutrition to Mrs Barnes and that it was hoped that progress would be made in managing diverticulitis and continuing to provide treatment for aspiration pneumonia. It was suggested to Dr Marantos that despite this it did not change the fact that Mrs Barnes was declining to eat. Dr Marantos maintained that nourishment from nasogastric feeding could result in a change in Mrs Barnes' demeanour resulting in gains from a psychological approach in encouraging her to eat.

9.22 Professor Kurrle was asked whether it would have been good practice to have held a conference with Mrs Barnes' family at the time nasogastric feeding was being considered. She indicated that in view of the fact that Mrs Barnes had been seen by a palliative care physician at around the time that a decision was made for nasogastric feeding, this could be discussed with the family to explain why it was being done and the consequences of not doing it. Professor Kurrle said that it would have been ideal for a case conference involving the family to have taken place before 30 April 2016 so that a decision could be made about nasogastric feeding. Professor Kurrle said that it was important for the family to understand that the insertion of a NGT is unpleasant and that, once inserted, could remain in place for weeks. She said that the reason why Mrs Barnes was declining food should also have been discussed. She expressed the view that because Mrs Barnes had been declining food for a long period of time it was difficult to see that this would change with nasogastric feeding. On this basis there was a missed opportunity to hold a conference with the family, prior to 30 April 2016, so that the implications of nasogastric feeding, and how it fit within the overall care treatment provided to Mrs Barnes, could be adequately explained.

9.23 In evidence Professor Kurrle was taken to the *Resuscitation/End Of Life, Appropriate Intervention Orders* form (**the End of Life form**) completed on 11 April 2016 in the context of a discussion between Grant and a CMO. Whilst the End of Life form provided for whether ongoing management options such as artificial nutrition and hydration supplementation would be provided, it did not specifically indicate if NGT feeding would be used. Professor Kurrle indicated that it would be important to differentiate between management options involving the offering of food and supplements, as opposed to an option using a more invasive NGT. Professor Kurrle explained that due to the unpleasantness of having an NGT inserted it would be an improvement if the End of Life form distinguished between non-invasive nutritional support and invasive forms of feeding (such as via NGT or percutaneous endoscopic gastrostomy[18]). Professor Kurrle indicated that in her experience she had seen similar forms containing such a distinction, and that such a distinction provides clarity for clinicians completing such forms.

9.24 Having regard to the above Counsel Assisting submitted that a recommendation ought to be made to WPH recommending review of the End of Life form to provide for such a distinction. Senior counsel for WPH submitted that duplication should be avoided on the basis that the End of Life form already provides for identification of ongoing management options, and that information relating to nutrition management and feeding is already included in a patient's medical records.

[18] Known as PEG feeding, involving a flexible feeding tube placed through the abdominal wall and into the stomach.

9.25 **Conclusions:** The evidence establishes that insertion of a NGT is a significant clinical step in the care of a patient. Insertion is an unpleasant procedure for a patient and carries with it implications particularly if a NGT remains inserted for an extended period. The evidence also establishes that there is a need for clarity between invasive and non-invasive forms of nutritional support, and separate consideration being given to the need for either form of support. This issue is particularly relevant to end-of-life care for a patient and ought to be included on the relevant form in clear terms, even though such information may be found elsewhere in the clinical record. Therefore it is desirable to make the following recommendation.

9.26 **Recommendation:** I recommend to the Chief Executive Officer of Wollongong Private Hospital (**the Hospital**) that the Hospital review its *Resuscitation/End Of Life, Appropriate Intervention Orders* form, giving consideration to the need to clearly distinguish between invasive and non-invasive forms of nutritional support, and specify the type of nutritional support that is to be provided to a patient.

10. Insertion of the nasogastric tubes and the adequacy of any relevant policies and procedures

10.1 It is convenient to deal with the issues concerning the insertion of the NGT on 30 April 2016 together. It is clear that on that day Dr Nguyen inadvertently inserted a NGT into Mrs Barnes' right lung rather than into her stomach. Misnavigation is a recognised complication of NGT insertion. In Mrs Barnes' case the procedure was complicated by the presence of a hiatus hernia. In accordance with accepted clinical practice a chest x-ray was performed to verify correct placement of the NGT. The inadvertent misplacement of the NGT on 30 April 2016 was clearly shown on the Second X-ray.

10.2 When reviewing the x-ray images Dr Nguyen and Dr Cheng used a software platform called InteleViewer. Accessing the images required the following steps:

(a) A user logging into InteleViewer;

(b) Entering a patient's name to perform a search. This produces a list of all studies performed on the patient. The studies in this panel are not displayed in chronological order.

(c) In order to display available studies in chronological order a user has to click on a "*study date*" button. This has the effect of reordering available images according to date and time.

(d) Double-clicking on a particular image in order to access and view it.

10.3 It appears that the following factors contributed to the misunderstanding by Dr Nguyen and Dr Cheng that they were viewing the Second X-ray, when in actual fact they were viewing the First X-ray:

(a) A lack of understanding that available studies within InteleViewer for a patient are not displayed in chronological order by default;

(b) Inconsistency in time stamping on available studies which resulted in the timestamp on the First X-ray being in a smaller font than the timestamp on the Second X-ray.

10.4 In order to address the factors identified above, WPH has taken a number of steps including:

(a) Requiring CMOs who have not previously worked a shift at WPH to attend on a radiographer who can demonstrate how to use InteleViewer;

(b) Making quick reference cards available in each ward containing instructions on how to use InteleViewer;

(c) Embedding training guides and manuals into the InteleViewer system;

(d) Including training in, and a demonstration of, how to use InteleViewer during the WPH orientation program for new nurses and employed CMOs; and

(e) Ensuring that there is consistency in time stamping of studies within InteleViewer, with the largest possible font used for time stamping.

10.5 In evidence Dr Glenn explained that the order in which studies are displayed in InteleViewer is dependent on the previous search that may have been conducted by a user. In 2016 users accessed InteleViewer with generic login details. The possibility of each user having their own individual login details was considered as a possible solution to the above issues. It was thought that this would allow individual users to set studies to be sorted chronologically within InteleViewer by default. However, Mr Crowe indicated that this was possible solution was tested shortly before the inquest but indicated that studies still reverted to being displayed in random order upon a subsequent login. Mr Crowe indicated that he was unsure whether the difficulty was associated with the software package or the operating system but undertook to attempt to resolve this issue with Dr Glenn and information technology services in view of an operating system upgrade planned at WPH for the week after the inquest.

10.6 The possibility of having images displayed in chronological order in the search panel as a default setting within InteleViewer was also explored during the evidence. However Dr Glenn explained that this is not a lockable feature within InteleViewer and that limiting search parameters in this way would reduce the functionality and usefulness of using the software. Mr Crowe indicated, having heard the evidence of Dr Glenn, that whilst it would be ideal to have studies default to be displayed in chronological order in the search panel he understood that by doing so would limit the search functionality of the software.

10.7 The Second X-ray was taken on a Saturday. As it was a weekend it was not reported on by a specialist radiologist until Monday, 2 May 2016. Mr Crowe expressed the view that because there is less staff on weekends, public holidays, and after hours there is a greater risk of x-rays being ordered to confirm the position of a NGT not being reported on in a timely manner. As a result WPH amended its policy regarding NGT insertion so that the current position is that insertion is not permitted after hours, on weekends or on public holidays except in the ICU.

10.8 There are a number of factors relevant to this policy amendment. Firstly, Dr Glenn explained in evidence that under present radiology service arrangements, and with the advent of smartphone technology, images of x-rays taken outside usual business hours are now sent immediately to on-call radiologists for review. This allows for a radiologist to promptly advise clinicians managing the care of a patient of any relevant findings. Secondly, the amendment raises questions regarding the delay that might be occasioned to patients for whom NGT insertion

might otherwise be indicated during weekends (in the case of older and frail patients), long weekends, and extended public holiday periods. In this regard Professor Kurrle explained that a delay of two days over a weekend would be acceptable for most patients, provided that adequate fluid replacement was available. However, Professor Kurrle expressed concern that a delay of even one day for an older patient would be problematic, as they are likely to become frail more quickly if they are not eating. Professor Kurrle also expressed concern regarding delays of more than two days (noting that a delay of five days would be too long) for other patients in general, as feeding virtually every day is required to maintain reasonable health levels.

10.9 Counsel Assisting submitted that a recommendation should be made recommending that WPH consider changing its policy relating to the insertion of fine bore NGTs so that they are able to be inserted on acute wards during weekends and public holidays. Senior counsel for WPH submitted that such a recommendation serves no purpose and is unnecessary due to a number of factors:

(a) Urgent insertion of a fine NGT during a public holiday period is able to be performed by transferring a patient to the adjoining Wollongong Hospital;

(b) Alternatively, insertion of a fine bore NGT during a public holiday period could be performed in real time in one of the radiology rooms within WPH;

(c) Further to points (a) and (b) above, insertion of a fine bore NGT is always available within the ICU, with Mr Crowe explaining that intensivists and nursing staff are supportive of the current policy;

(d) WPH is mindful of the types of patients is prepared to admit during holiday periods, noting that they are all elective patients and are generally "less sick" and patients who might require fine bore NGT insertion.

10.10 Policy review at WPH occurs every three years and following particular relevant incidents. In evidence Mr Crowe indicated that it was premature to give consideration to amendment of the relevant NGT insertion policy having regard to the above factors, and other changes which have been made at WPH. However in evidence, Mr Crowe acknowledged that such an issue could be revisited in due course.

10.11 **Conclusions:** It is acknowledged that Mr Crowe gave his evidence prior to Professor Kurrle's evidence. It is also acknowledged that there was no evidence before the inquest as to the circumstances in which fine bore NGT insertion within the ICU occurs, and no specific evidence as to the availability and process of patient transfers to Wollongong Hospital and the radiology rooms within WPH for fine bore NGT insertion.

10.12 These acknowledgments are not intended to be critical. Rather, they serve to highlight that an opportunity for further consideration ought to be taken by WPH in light of the evidence that was available at the inquest, particularly from Dr Glenn (regarding the availability of timely radiology review of x-rays outside usual business hours) and Professor Kurrle (regarding the clinical risks in delaying the feeding of elderly and frail patients). In the circumstances it is necessary to make the following recommendation.

10.13 **Recommendation:** I recommend to the Chief Executive Officer of Wollongong Private Hospital (**the Hospital**) that the Hospital review its policy relating to the insertion of fine bore nasogastric tubes to ensure that they are able to be inserted on weekends and public holidays at the Hospital. Specific consideration should be given to whether, when a fine bore nasogastric tube is required for feeding on a weekend or public holiday, it should be able to be inserted on an acute ward. The review should take into account: (a) the new process for radiology review that ensures a radiologist looks at any x-ray relevant to correct placement of a nasogastric tube immediately when it is taken on a weekend or public holiday; and (b) the evidence of Professor Susan Kurrle given during the inquest as to the impact of delays in feeding older people and frail patients.

11. Acknowledgments

11.1 Before turning to the findings that I am required to make, I would like to acknowledge, and express my gratitude to Dr Kathy Sant, Counsel Assisting, and her instructing solicitor, Kathleen Hainsworth of the Crown Solicitor's Office. Their assistance during both the preparation for inquest, and during the inquest itself, has been enormous. I also thank them for the sensitivity and empathy that they have shown in this matter.

12. Findings pursuant to section 81 of the *Coroners Act 2009*

12.1 The findings I make under section 81(1) of the Act are:

Identity
The person who died was Lorraine Barnes.

Date of death
Mrs Barnes died on 1 May 2016.

Place of death
Mrs Barnes died at Wollongong Private Hospital, Wollongong NSW 2500.

Cause of death
The cause of Mrs Barnes' death was sepsis, with aspiration pneumonitis being an antecedent cause. Iatrogenic injury to the right lung, dementia, diverticulitis and a urinary tract infection were all significant conditions contributing to Mrs Barnes' death.

Manner of death
Misplacement of a fine bore nasogastric tube resulted in concentrated nutritional supplements being inadvertently deposited into the right lung, rather than the stomach, and perforations to the right lung. Insertion of the fine bore nasogastric tube was precipitated by the development of malnutrition and electrolyte disturbances following insufficient nutritional intake during Mrs Barnes' hospital admission.

13. Epilogue

13.1 It is most distressing to know that the last weeks of Mrs Barnes' life was spent in hospital rather than in the company of family and loved ones. This is particularly so given how much of Mrs

Barnes' life had been devoted to caring for the needs of others, and placing those needs selflessly above her own.

13.2 On behalf of the Coroner's Court of NSW, I offer my deepest sympathies and most respectful condolences to Mrs Barnes' family and friends for their most painful loss.

13.3 I close this inquest.

Magistrate Derek Lee
Deputy State Coroner
13 December 2019
Coroner's Court of NSW