QUEENSLAND COURTS

CORONERS COURT OF QUEENSLAND

FINDINGS OF INVESTIGATION

CITATION:	**Non-inquest findings into the death of AC**
TITLE OF COURT:	Coroners Court
JURISDICTION:	BRISBANE
DATE:	04/12/2017
FILE NO(s):	2015/1566
FINDINGS OF:	Ainslie Kirkegaard, Coronial Registrar
CATCHWORDS:	CORONERS: elective spinal surgery; Surgery Connect Program; private hospital; patient history taking; pre-operative assessments; obstructive sleep apnoea; ICU admission for post-operative monitoring; timely reporting of investigation findings for medical review.

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AC was a 76 year old man who died suddenly at a metropolitan private hospital on 24 April 2015. He was a retired truck driver having driven heavy vehicles for over 50 years.

AC's death was reported to the coroner because the cause of his sudden unexpected death was unknown and occurred while recovering from elective spinal surgery performed on 22 April 2015.

AC's medical history

Review of AC's medical records (a tertiary hospital, a metropolitan private hospital, another metropolitan private hospital, general practitioners, Dr L consultant neurosurgeon) shows he had a history including gastro-oesophageal reflux, hypercholesterolaemia, hypertension, severe obstructive sleep apnoea (diagnosed 2007, for which he was unable to tolerate CPAP), upper airway obstruction, prostate cancer, ischaemic heart disease, aortic stenosis, depression and anxiety. He was obese with a body mass index (BMI) of 40. He was taking a range of regular prescription medications. He also had hearing loss.

AC underwent a sleep study in September 2007 which diagnosed moderate to severe obstructive sleep apnoea and severe, reversible nasal obstruction. He was recommended to undergo an early CPAP titration study and trial a nasal steroid. He declined the scheduled CPAP trial advising he would reschedule it once he recovered from knee surgery. AC had a right total knee replacement at Logan Hospital in June 2008.

In November 2008, AC was diagnosed with widespread high grade prostate cancer and renal cell carcinoma. He was treated with radiation therapy and underwent a right laparoscopic nephrectomy at a tertiary hospital in March 2009. He remained under regular outpatient review by the urology team for these issues. As a result of his diagnosis AC became actively involved in promoting awareness of prostate cancer.

AC was referred to the tertiary hospital neurosurgical team for review of worsening cervical myelopathy causing worsening hand dysfunction. He had presented to his general practitioner in May 2008 with numbness, some weakness, pain and tingling in his left hand and intermittent tingling down his legs. This was initially investigated with a cervical spine x-ray which showed extensive spondylosis C3/4, C4/5, C6/7. A nerve conduction study was normal. CT scan showed some encroachment of the C4 and C7 nerves. He was then referred for neurosurgical review.

An MRI performed in November 2008 demonstrated bilateral spinal stenosis and C7 nerve root compression and grade 1 retrolisthesis of C3/4 with thecal sac compression. The referral for neurosurgical review was made urgent.

AC was seen in the tertiary hospital Neurosurgical Outpatient Clinic on 16 February 2009. An MRI scan demonstrated a significant C3/4 spinal canal stenosis mainly due to anterior disc disease with similar change in the spinal cord. It was determined that AC required a C3/4 anterior cervical discectomy with neural decompression and fusion. He underwent this surgery at the tertiary hospital in May 2009. There is nothing in the material available to me indicating there were any surgical and anaesthetic complications.

He was followed up as an outpatient and noted to have some ongoing altered sensation and pins and needles. Carpel tunnel studies excluded carpal tunnel syndrome and repeat CT scan confirmed no dislodgement or movement in the actual prosthesis.

Although AC recovered well from his knee surgery, he developed right knee issues over the following 12 months which orthopaedic review attributed to patella arthritis. This review, undertaken in November 2009, noted AC had some low back pain which the orthopaedic surgeon suggested may be due to spinal canal stenosis compounding the knee problem.

When reviewed by the tertiary hospital neurosurgical team in outpatients in January 2010, AC was noted to be making a steady recovery with improving walking and hand function.

An MRI performed in February 2010 demonstrated a minor degree of cord compression at the site of the previous surgery in the setting of a persistent grade 1 C3/4 retrolisthesis. There was multilevel disc change everywhere and multiple level foraminal stenosis. AC was experiencing lower limb sciatica in the left knee and calf.

When seen by the tertiary hospital neurosurgical team in November 2010, AC reported ongoing low back pain and bilateral sciatica, worse on the left side, which was affecting his mobility. There was some relatively significant moderate to severe focal canal narrowing at L3/4 and some moderate broad based disc protrusion at L5/6 but these were not compressing or displacing the S1 nerve root. The neurosurgical team considered his symptoms consistent with the MRI findings of his lumbar spine. Given at that time he had not tried much in the way of conservative management, this was the recommended first option. He was commenced on an analgesic regime of paracetamol and PRN Endone in addition to Mobic. It was also recommended that a trial on Endep might assist with some of his radicular pain. The neurosurgical team would then reassess AC with a view to consideration of lumbar laminectomy and review his cervical spine.

It appears he received a lower back cortisone injection at the tertiary hospital in August 2010 with some effect. There is reference in the general practitioner notes to AC having deferred spinal surgery in July 2011 as he was out of the country at the time.

AC developed progressively worsening constipation over 2011 resulting in a referral to the tertiary hospital Surgical Outpatients Clinic. He subsequently underwent gastroscopy and colonoscopy which revealed gastritis and diverticulosis respectively. He was noted to have tolerated both procedures well.

AC continued to experience painful sciatica. He remained on the surgical waiting list. By January 2012 his sciatica was getting worse so his general practitioner sent another urgent referral to the tertiary hospital neurosurgery department. He was reviewed in the Neurosurgical Outpatient Clinic in July 2012 and given another cortisone injection. This gave him relief for 10 days after which the pain returned. He was then commenced on Lyrica, with good effect. As at September 2012, AC was anticipating his spinal surgery would proceed in two months' time.

Towards the end of 2012, AC was experiencing ongoing pain and was very frustrated with his pain management. He had been commenced on Gabapentin by the neurosurgical team. As at December 2012, he was told the spinal surgery was planned for early 2013.

By June 2013 AC was very depressed about his ongoing sciatica. He was distressed about not having had the spinal surgery and was holding out hope it would relieve his pain. He had a discussion with the general practitioner about his obstructive sleep apnoea. He is noted to have declined the previous sleep study recommendations because he felt the sleep clinic were pushing him to buy an expensive CPAP machine. He declined the general practitioner's recommendation that he have another sleep study, especially given his truck driving. He is noted to have made it very clear that even if he was forced to buy a CPAP machine he would not use it.

As at late July 2013, AC had all but given up hope on having spinal surgery. In August 2013, his general practitioner wrote to the tertiary hospital neurosurgery department again seeking advice as to whether surgery was planned or not. This letter resulted in a phone call to AC advising the spinal surgery was planned for the next fortnight.

AC was reviewed the tertiary hospital Neurosurgical Outpatient Clinic on 14 October 2013. It was noted he had been waiting an L3/4 laminectomy for "a number of years now". He was still on the elective waiting list at that time. AC was still troubled by ongoing back pain. He was noted have functional decline since his last outpatient review, reporting he was unable to pick things up off the floor and having difficulty dressing himself. He was prescribed Lyrica 150mgs twice a day but not taking the morning dose due to excessive drowsiness through the day.

The neurosurgical team considered AC needed surgery as soon as possible to rectify his back situation. He was still on the waiting list and private options were being considered but it was felt, from a public point of view, that he could be considered for minimally invasive surgery of the back. He was considered to be carrying a little bit too much weight at that time and agreed to a weight loss program before further review in three months' time with repeat MRI to assess his suitability for surgery.

AC underwent another sleep study on 23 October 2013. This was arranged by his general practitioner as part of the medical re-certification process for his heavy vehicle driver's licence renewal. The study diagnosed severe obstructive sleep apnoea and again recommended a CPAP titration study and weight loss. He was reviewed by a respiratory & sleep physician and agreed to CPAP titration. On examination his BMI was 34 and his oropharynx was noted to be crowded.

AC is noted to have been very reluctant to use CPAP. He was very angry at the prospect of losing his heavy vehicle driver's licence and subsequently transferred his care to another medical practice.

AC was eventually referred to the Surgery Connect Program for his spinal surgery.

Surgery Connect Program

The Surgery Connect Program is a government initiative designed to reduce pressure on elective surgery waiting lists in public hospitals.

Under this program, Queensland Health enters into service contracts with private hospital providers to deliver surgical services for public patients. I am advised the Program usually supports the treatment of category 2 (to be treated within 90 days) patients who have not received surgery or who will not receive surgery within clinically recommended timeframes. The Program connects with private health care facilities to deliver surgery after public surgery options have been exhausted by a Hospital & Health Service.

The referring Hospital & Health Service provides the Program with a suitability form with the patient's details, consent to participate in the Program and the outpatient consultation notes and test results.

Under the Program, a surgeon who assesses the patient at the Hospital & Health Service may, after assessment by a Hospital & Health Service case manager, be asked if he or she wishes to care for the patient or for the patient to be referred to another surgeon. Alternatively the patient is referred to a private health care facility for surgery. In either case, the surgery is then performed by the surgeon in his or her private capacity. Generally, the private surgeon will consult with the patient in his or her private rooms, assess and investigate the patient as necessary and recommend the patient for surgery in a private hospital at which the surgeon operates on private patients. The private surgeon will also refer the patient to an anaesthetist.

I am advised the Program does not assess a patient's suitability for surgery in terms of surgical or anaesthetic risk – these assessments fall to the Hospital & Health Service staff, surgeon and anaesthetist who have assessed the patient in the public hospital and placed the patient on the elective surgery waiting list, and then upon the private hospital staff, surgeon and anaesthetist who arrange for or perform the surgery and anaesthetic in the private sector.

Under the Surgery Connect Services Agreements current at the time of AC's death, the hospital was required to report to Queensland Health within one business day any adverse incident arising from the surgery (for example, intensive care admission, unexpected transfer, readmission or return to theatre) and notify Queensland Health of any sentinel event (including death). The Surgery Connect Program Business Rules also require the surgeon to provide adverse incident information to the private hospital for assessment and follow up within the hospital's clinical incident framework.

AC was referred to Dr L, consultant neurosurgeon, through the Surgery Connect Program. Dr L reviewed him on 6 December 2013 and considered AC's symptoms and lower limb issues were related to residual canal stenosis and foraminal stenosis affecting the L4/5 nerve roots. He felt AC required more extensive surgery than he was initially listed for and recommended working him up towards a L3-S1 decompression fusion procedure. This surgery was performed by Dr L at another metropolitan private hospital in December 2013.

The spinal surgery in December 2013
Review of the other metropolitan private hospital records shows a preadmission assessment was undertaken on 18 December 2013. This process specifically prompted AC for information about any respiratory problems which were noted as sleep apnoea. There is a notation that he was anticipating results for this on 20 December. He is noted as having no previous anaesthetic complications.

AC was admitted for the surgery on 23 December. Dr L consented him to the L3-S1 MAS PLIF procedure that day.

He was assessed preoperatively by a physician. He told the physician he had been told after previous surgery he had a small airway. The pre-operative ECG showed sinus rhythm, first degree AV block. On examination he was noted to have a soft ejection systolic murmur at the left sternal edge. A pre-operative echocardiogram revealed mild aortic valve stenosis with normal left ventricular systolic function and no wall motion abnormalities. There was a mild troponin elevation attributed to chronic renal impairment. The physician identified his untreated severe obstructive sleep apnoea as a perioperative risk but considered him to be low risk from a cardiovascular perspective given the normal echocardiogram. The physician recommended close monitoring of his post-operative respiratory pattern and follow up of the sleep study results and referral to a respiratory physician if necessary.

AC underwent the surgery on 24 December. He was for planned intensive care unit admission post-operatively.

While there were no acute surgical complications, AC developed progressive haemodynamic instability with an elevated heart rate and dropping blood pressure requiring inotrope support towards the later stage of the surgery (from 11:00am – 12:30pm). He was transferred to the intensive care unit post-operatively as planned.

He was extubated on Christmas Day and gradually weaned off the noradrenaline. He then developed atrial fibrillation on 26 December. He was reviewed by a consultant cardiologist on 27 December who ordered intravenous and then oral Amiodarone and anticoagulation. AC remained in rate controlled atrial fibrillation until 30 December when he reverted to sinus rhythm. The consultant cardiologist then stopped the Amiodarone and anticoagulation and placed him on low dose aspirin. AC was transferred to the ward that day where he remained in sinus rhythm with a first degree AV block.

He was discharged home on 7 January 2014 for outpatient follow up with the consultant cardiologist.

I am advised by the Surgery Connect Program that AC was not referred back to the Metro South Hospital & Health Service after this surgery.

AC's post-operative course
Dr L reviewed AC on 31 January 2014 noting he had made an excellent recovery to date.

AC saw the consultant cardiologist in his rooms on 4 February 2014 and was noted to

be recovering well from his spinal surgery. The consultant cardiologist noted AC had presented to the Logan Hospital on 11 January 2014 with bilateral pedal oedema. He was commenced on Frusemide but subsequently stopped taking it. A chest x-ray was done showing clear lung fields. The consultant cardiologist felt the pedal oedema was unlikely to be due to cardiac failure; rather AC's weight might be a contributing factor.

The consultant cardiologist performed an ECG which showed sinus rhythm with first degree AV block (as noted previously) and was otherwise normal. On examination AC's blood pressure was elevated (158/83), a grade 2/6 aortic ejection murmur was audible, his lungs were clear and he had mild bilateral pedal oedema. The consultant cardiologist considered him to be stable from a cardiac perspective. He recommended weight loss and increased mobility. The consultant cardiologist wrote to AC's general practitioner (copied to Dr L and the other metropolitan private hospital) advising that AC did not require any intervention for his mild aortic stenosis but recommended this be monitored with yearly echography. He provided a referral for this to occur.

It is apparent from the other metropolitan private hospital records and correspondence from the consultant cardiologist that Dr L was well aware of AC's post-operative cardiac issues and his further management.

AC experienced ongoing pain management issues requiring hospital admission and referral to the other metropolitan private hospital and the tertiary hospital pain management programs in 2014. He remained under Dr L's care.

In March 2014, AC was booked for a category 1 outpatient upper gastrointestinal endoscopy at the tertiary hospital for dysphagia. He presented for this procedure on 24 June 2014. The procedural report indicates the procedure had to be abandoned due to severe hypoxia as he desaturated to 25% during the upper endoscopy. The report identified AC as a significant anaesthetic risk due to him having severe obstructive sleep apnoea. A recommendation was made at this time that his anaesthetic risk should be discussed in clinic prior to any further procedures.

Subsequent correspondence from the gastroenterology clinic to AC's general practitioner refers to AC having told the Gastroenterology Registrar that he had previously had significant troubles with anaesthetic even with a general anaesthetic for a spinal surgery. He described having had cardiac complications as a result.

The spinal surgery in April 2015

When reviewed by Dr L in January 2015, AC was experiencing pain across the lower back radiating through the hips and into the groin. CT scan showed sacroiliac dysfunction. On Dr L's recommendation, AC had bilateral sacroiliac injections with local anaesthetic and steroid.

When seen again by Dr L in March 2015, AC reported the injections gave him "glorious relief" for four days. He had recently had left knee surgery from which he was reportedly recovering quite well. There is no information available to me to indicate whether he experienced any anaesthetic, surgical or post-operative complications with the orthopaedic surgery. Unfortunately the pelvic girdle pain had returned. Dr L considered he would be a suitable candidate for sacroiliac arthrodesis under the Surgery Connect Program and wrote to AC's general practitioner advising his intention

to liaise with the Program for funding for this surgery.

The Surgery Connect Program Director has since advised that no document or note of any contact has been able to be located which predated the second surgery performed by Dr L. The tertiary hospital has also confirmed that AC was not referred back to it as a public patient. As such he underwent further surgery without ever having been re-referred to Surgery Connect by the tertiary hospital despite the initial referral being some two years earlier.

AC was admitted to a different metropolitan private hospital on 22 April 2015 for an elective bilateral sacroiliac arthrodesis performed by Dr L.

AC participated in a pre-admission process which generated a patient history form signed by him. This document included a section titled Pre Anaesthetic Health Information which poses a range of questions including:

- Have you had any previous operations?
- Have you or any family member had any reactions/side effects to anaesthetic?

AC's responses to these particular questions did not reference the previously abandoned endoscopy and associated anaesthetic issues at the tertiary hospital in March 2014 or the issues he experienced with the first spinal surgery in December 2013.

He was assessed on admission as a high risk of venous thromboembolism requiring both mechanical and pharmacological prophylaxis post-operatively.

A pre-anaesthetic assessment was undertaken by a consultant anaesthetist. The notes of this assessment do not reference AC's history of obstructive sleep apnoea or upper airway obstruction. Again there is no reference to his previous surgical or anaesthetic issues.

In contrast to his pre-operative management at the other metropolitan private hospital in December 2013, AC was not reviewed by a physician pre-operatively and nor was he planned for ICU admission post-operatively.

The surgery itself appears to have been uncomplicated. However shortly after 11:32am, while still in the post anaesthetic care unit, AC experienced an unwitnessed oxygen desaturation (80%, down from 90%) requiring a rapid response involving the application of a rebreathing bag and administration of Narcan. A nasopharyngeal airway was inserted. AC's oxygen saturations subsequently returned to 95-99% with supplemental oxygen via Hudson mask at 10L per minute. He remained under observation in recovery for several hours before being transferred to the ward at around 1:00pm.

AC was discharged to the ward on supplemental oxygen via Hudson mask at 5L/minute with instructions for the nasopharyngeal airway to remain in place overnight and for continuous oxygen monitoring. He had an indwelling catheter and was on Patient Controlled Analgesia (PCA). Mechanical venous thromboembolism prophylaxis in the form of compression stockings (TEDs) and "scuds" (Sequential Compression Device) were also in place.

A nursing entry made at 10:00pm that evening noted AC maintained oxygen saturations at 98% while receiving supplemental oxygen 5-6L via Hudson mask but his oxygen saturations decreased to 88% when on room air. AC reported feeling like the mask was inhibiting his breathing. He is documented to have told staff he had a "sinus issue". He was given encouragement to keep the mask on.

The next nursing entry made at 5:15am on 23 April notes AC was on supplemental oxygen (6L via Hudson mask) overnight. A further nursing entry at 10:40am notes his oxygen saturations were 98% on this level of oxygen therapy but decreased to 80% whenever he removed the mask for any length of time. His oxygen saturations recovered quickly when the mask was reapplied.

AC had two large sputum plugs during breathing exercises with the physiotherapist that morning. He was for chest physiotherapy and further review that afternoon, and encouraged to mobilise as able.

In Dr L's absence, another consultant neurosurgeon reviewed AC later that morning and requested physician review of his chest and fluids. AC was noted to be comfortable and mobilising.

A nursing entry made at 2:10pm indicates AC was being encouraged to use triflo and educated to inhale not blow. He had mobilised to the toilet with the rollator that morning and had spent time sitting out of bed in a chair. He was refusing to use the PCA but accepted Panadol. His oxygen saturations remained above 96-98% while on the Hudson mask but decreased when he removed the mask.

When reviewed by the physiotherapist at around this time, AC was noted to have reduced air entry bibasally. He was for hourly incentive spirometry exercises (triflow).

At an unknown time after 3:00pm, Dr C was reviewed by a consultant physician who noted multiple respiratory issues including increased BMI, query tracheal stenosis or laryngeal web, obstructive sleep apnoea (cannot tolerate CPAP) and pulmonary embolus as "always of concern in this setting". AC's calves were noted to be soft and non-tender at the time of examination. The consultant physician's notes indicate the sequential compression device (SCD) already ordered for AC was disconnected at that time. The consultant physician ordered a chest x-ray, ECG, supplemental oxygen and use of SCDs, heparin from the next day (though there is a notation to the effect "started today" in the margin). The consultant physician noted there was no current indication for a CT pulmonary angiogram.

The chest x-ray was taken but does not appear to have been reviewed or reported thereafter. There was no chest x-ray report in the copy of the hospital chart provided to me.

It appears the last set of nursing observations was taken at around 9:30pm.

The medical record contains ECGs performed at 9:48pm and 9:50pm which both note atrial fibrillation, abnormal rhythm ECG. The earlier ECG also notes moderate intraventricular conduction delay. AC's heart rate was noted as 79 and 77 beats per

minute respectively. There is no reference to this information in the progress notes and no indication whether this information was conveyed to the consultant physician or any other medical officer.

A nursing entry at 10:15pm notes AC's oxygen saturations remained in the low-medium range 92-97% on room air, dropping to 82% on room air. An indwelling catheter was reinserted as he had been incontinent of urine and there was concern this could contaminate the surgical wounds. His compression stockings and SCDs were noted to be place at that time.

According to a retrospective nursing entry made at 3:00am on 24 April, AC had been resting in bed most of the previous afternoon. He complained of discomfort in his back which seemed to improve after repositioning with pillows. He was encouraged to wear his oxygen mask. His oxygen saturations decreased to 88% on room air but increased to 98% with the mask on.

AC had asked for help to mobilise to the toilet as he felt the urge to move his bowels. He was assisted by a nurse and used the rollator to mobilise. He was then helped back to bed and set up for sleep. He reportedly voiced no concerns at that time. The time this occurred is not documented in the retrospective nursing entry.

At around 2:05am, a nurse entered his room in response to an alarm on his IV machine. He looked grey, his eyes were closed and he was making gurgling noises. He was unresponsive. The nurse immediately activated the call button and called out for help. AC was gurgling and frothing from the mouth. The nurse could not find a pulse and commenced CPR. Another nurse arrived with the Medical Emergency Team trolley and assisted resuscitation efforts. The Medical Emergency Team arrived within minutes but despite continued resuscitation efforts AC was unable to be revived.

According to the retrospective resuscitation notes, AC was last seen alive approximately five minutes prior to his collapse when he was escorted to the toilet by nursing staff. These notes include the comment "Pt currently prior to bathroom was short of breath as known to caring doctors".

A retrospective medical entry made by the intensivist who responded to the Code Blue makes reference to the chest x-ray performed on 23 April showing "elevated R hemidiaphragm" and an ECG performed at 9:48pm that evening showing "AF 79bpm". The intensivist's note refers to AC having mobilised to the bathroom with a nurse approximately five minutes prior to the Code Blue at which time he was noted to be GCS 15 and not to be complaining of increased shortness of breath or chest pain. AC had not used his Patient Controlled Analgesia at all over 23-24 April.

Autopsy findings

An external examination and partial internal autopsy (neck, chest and abdomen only) were performed at the John Tonge Centre on 1 May 2015. The final autopsy report issued on 29 December 2015. Autopsy revealed an enlarged heart, moderate to severe coronary atherosclerosis (noted to be at least focally severe calcified coronary atherosclerosis) and signs of significant chronic respiratory disease with a small calibre trachea and bronchi as well as mild pulmonary atherosclerosis (a feature of pulmonary hypertension). There was no evidence of pulmonary embolus. The

bilateral surgical wounds over the thighs were noted to be clean and dry.

Taking these findings and the clinical history into account, the pathologist attributed the death to coronary atherosclerosis in the context of obesity, obstructive sleep apnoea and recent surgery to treat osteoarthritis.

The metropolitan private hospital clinical review outcomes
The hospital undertook a Critical Systems Review of the care provided to AC. I was provided with a copy of the final review report in March 2016.

The review identified the following issues as contributing factors to the adverse outcome for AC and made the following recommendations to address those issues:

1. ***The pre-operative Alert Form did not reflect AC's history of obstructive sleep apnoea – ordinarily this would be documented as an "Anaesthesia Alert"***

   In this regard, I note this information was readily available to hospital staff as AC had disclosed it in his Patient Health History form. This document included a section titled Airway which asked specific questions about sleeping problems or snoring (ticked yes, with snoring underlined), sleep apnoea (ticked yes, with notation "no machine").

   I was unable to locate a copy of the pre-operative Alert Form in the copy of the hospital chart provided to me. This was subsequently provided to me in June 2017 with advice that it did form part of AC's chart but it was unknown why it was not included in the copy of the chart provided at the time AC's death was reported to me.

   The Alert Chart was completed by a nurse and clearly relies solely on information provided by AC. The anaesthetic alert section contains specific prompts for difficult intubation, sleep apnoea, COPD. It is completed with the entry "NIL".

   The review recommended all staff be reminded that the Alert Sheet information is required for clinical handover and must be accurate. I am advised this issue was discussed by the then Quality Manager in nursing leadership forums and ward meetings during the months following AC's death.

2. ***The seriousness of AC's medical history and the low threshold for elective admission of patients with obstructive sleep apnoea to the hospital's intensive care unit was not obvious to the consultant anaesthetist.***

   The review reinforced the importance of ensuring complete pre-operative work up of patients, including those with obstructive sleep apnoea and other co-morbidities, and consideration of routine booking of these patients to ICU for post-operative monitoring. I am advised that by 30 June 2015, ICU willingness to accept patients with obstructive sleep apnoea had been communicated via the hospital's medical committee structure including the Medical Advisory

Committee and Anaesthetic Morbidity & Mortality meetings. As the ICU is always willing to admit patients with obstructive sleep apnoea for post-operative monitoring, this remains a matter to be raised for consultation with the anaesthetic team after conducting their pre-anaesthetic assessments on a case by case basis.

3. ***The utilisation of risk screening tools and pre-operative communication with physicians to manage medically complex patients.***

4. ***Comprehensive patient history was not provided by referring public hospital as part of arrangement to undertake elective surgical procedures for public patients at the hospital (Surgery Connect).***

   The review recommended the complete patient file be requested from referring Queensland Health hospitals for any Surgery Connect patient undergoing elective surgery at the hospital.

   We now know AC was never referred back to the tertiary hospital as a public patient; nor was he re-referred to the Surgery Connect Program by the tertiary hospital prior to the second spinal surgery. Consequently there was no prompt via the Program for the tertiary hospital to provide the hospital with patient records for AC.

   Nonetheless I am advised that as at September 2017 this issue had been discussed between the metropolitan private hospital and the Surgery Connect Program.

   I am also advised that effective from December 2015, the Surgery Connect Agreement specifically includes a clause that requires the referring public hospital to provide all patient records, and any other relevant medical records, when referring patients to private providers under the Program.

5. ***No plan for following up investigation results arising from:***
   - ***Lack of physician documentation of plan following results***
   - ***Lack of physician follow up of chest x-ray and ECG results***
   - ***Nursing staff deferral to request physician review of ECG result to following morning***

   The review recommended discussions be held by the Patient Care Review Committee to determine the physician role for follow up of results and documenting plans for communication of investigation results. I am advised it was the consensus of various committees that the requesting medical officer is responsible for documenting the communication plan following completion of investigations and for follow up of results for any investigations ordered.

   The review also recommended that consideration be given to standardising nursing practice following completion of diagnostic tests after hours, including a requirement for nursing staff to convey results to the requesting medical officer as a matter of course and/or seek review from an ICU medical officer if concerned. I am advised that as at June 2015 the consensus was for results

of any investigations ordered after hours should routinely be conveyed to the requesting medical officer when they become available.

Response from the consultant anaesthetist

I provided the consultant anaesthetist an opportunity to explain the process by which he undertook his pre-anaesthetic assessment of AC and his consideration of AC's postoperative monitoring needs.

The consultant anaesthetist recalled seeing AC in the Day Admission area at the hospital early on the morning of his surgery, 22 April 2015. He says the history he takes from a patient is reliant on accurate patient reporting of their medical conditions.

He explained that a Patient Health History Form is compiled by the patient or nursing staff prior to the patient's admission to hospital. He recalled this form was available to him on the morning of surgery and noted AC's obstructive sleep apnoea but failed to generate an anaesthetic alert.

The consultant anaesthetist noted that AC suffered from low back pain and a radicular leg pain. He also had benign prostatic hypertrophy. He says he routinely asks patients directly about obstructive sleep apnoea and cardiac disease and did not note them to be present on questioning AC. The consultant anaesthetist documented only the positive findings in his medical history.

The consultant anaesthetist acknowledges the Patient Health History does note AC suffered from obstructive sleep apnoea but didn't use a CPAP machine. He suggests this is often interpreted as a sign of milder obstructive sleep apnoea and may not have generated an alert for this reason. The consultant anaesthetist observes that the use CPAP machines is prohibitive for some patients and suggests the non-use of CPAP should not be seen as a sign of mildness of disease or that CPAP has not been recommended in the past. In combination with AC's now known history of previous problems, his not using CPAP is a cause for concern about compliance rather than relief that his obstructive sleep apnoea was not severe.

The consultant anaesthetist noted that AC's actual weight of 122kg was 12kg heavier than he had disclosed in his Patient Health History, giving him a BMI of 40. He explained that his notation of no problems with previous anaesthetics was based on information provided by AC – there were no previous anaesthetic records available to the consultant anaesthetist to corroborate or refute this assertion.

The consultant anaesthetist noted AC had slightly decreased renal function and high cholesterol but otherwise normal blood tests. His ECG showed first degree heart block. He described this as not unusual at AC's age and not requiring further investigation.

On this information, the consultant anaesthetist assessed AC as not requiring more intensive monitoring in the postoperative period than that routinely provided for elderly patients with some comorbidities undergoing significant surgery. There was no referral from the tertiary hospital, previous anaesthetic notes or sleep studies to help alert the consultant anaesthetist to the severity of AC's obstructive sleep apnoea, cardiac or other comorbidities.

The consultant anaesthetist explained how his practice has changed over the last two years:

- His anaesthetic group uses a cloud based preoperative booking system which allows uploading of patient alerts and preoperative tests or referrals
- He contacts patients who have significant comorbidities prior to surgery in order to satisfy himself they are fit for surgery and will refer patients for optimisation if he has any concerns
- He reviews the Patient Health History thoroughly even when there are no anaesthetic alerts
- He has an increased awareness of the risks associated with obstructive sleep apnoea and anaesthesia, and uses the STOPBANG screen for patients he suspects may have obstructive sleep apnoea
- He actively organises High Dependency Unit or Intensive Care Unit admission for postoperative care of higher risk patients, having regard to his preoperative assessment and the patient's perioperative response
- He continues to give a thorough handover to recovery staff highlighting any concerns about obstructive sleep apnoea, cardiac status or other issues impacting on their ability to care for his patients.

The consultant anaesthetist participated in the hospital's Medical Advisory Committee discussion of AC's death and also presented his case for discussion at the hospital's Anaesthetic Morbidity & Mortality Committee meeting. Surprisingly, as at the time of providing his statement the consultant anaesthetist was yet to receive a copy of the hospital's Critical Systems Review.

The consultant anaesthetist acknowledged the hospital's Intensive Care Unit is happy to accept elective patients with obstructive sleep apnoea or other significant comorbidities for postoperative monitoring – this has always been the case but has been highlighted further at the hospital's Morbidity & Mortality meetings.

He advises there is no screening tool for obstructive sleep apnoea in place at the hospital and has been told this was "under consideration". None of the seven Brisbane hospitals he works at use a specific screening tool for this condition and the College of Anaesthetists does not have a specific position statement on obstructive sleep apnoea. That said, there are areas in the hospital's Patient Health History form that document cardiac and obstructive sleep apnoea history and these are conditions about which patients are reportedly always questioned.

Response from the consultant physician

I provided the consultant physician an opportunity to explain his expectations/intentions in relation to the investigations he ordered on 23 April 2015 and how this was communicated to the nursing staff.

I received the consultant physician's response on 10 July 2017. The consultant physician advised he was not invited to participate in the hospital's Critical Systems Review but would have welcomed the opportunity to do so.

The consultant physician says he told nursing staff that the chest x-ray and ECG should be performed that evening and he would review AC first thing the next morning.

He says his intention was to determine whether CPTA was warranted. He says he also told nursing staff to contact him if there were concerns or any adverse change in AC's condition.

The consultant physician explained that his approach was informed by AC being alert, comfortable, communicative, not dyspnoeic and having an oxygen saturation of 97% (with supplemental oxygen 6L via Hudson mask). The only positive clinical findings at that time was AC desaturated on room air and there was bibasal diminution of air entry to his lungs. The consultant physician described these findings as to be expected in a morbidly obese man who had undergone spinal surgery 36 hours previously and who was not yet fully ambulant. The consultant physician noted AC had a regular heart rate of around 80 beats per minute (from oximetry) and satisfactory haemodynamics.

The consultant physician noted the ECG was performed approximately four hours after his review of AC and showed atrial fibrillation but not with rapid ventricular response, namely a rhythm requiring follow-up but not urgent intervention and probably a more benign rhythm than the prolonged first degree heart block recorded on admission.

The consultant physician explained he has always considered the follow up on investigations as his responsibility, not that of the nursing staff. Nevertheless, he welcomes nursing staff advising him when results become available, and indicating any concerns they might have. In his experience, the level of communication at the hospital has been "generally good". The consultant physician clarified that he works predominantly in the intensive care unit rather than the wards.

Response from the tertiary hospital

I provided the tertiary hospital with an opportunity to consider the hospital clinical review finding that it had not received comprehensive medical history information from a tertiary hospital as the referring hospital.

As at 29 June 2017, the tertiary hospital advised it had not been advised directly of those concerns by the metropolitan private hospital and nor had it been briefed by the Department of Health as to the exact nature of those concerns. This prompted them to write directly to the metropolitan private hospital about the issue.

The tertiary hospital clarified there was no request for additional records at the time of referral for the initial surgery nor any time prior to the second surgery by Dr L.

I am advised that all Surgery Connect Patients are referred from the tertiary hospital with a summary of their medical record including the integrated electronic medical record since December 2016.

Changes to the Surgery Connect Program

I am advised the Surgery Connect Suitability Screening Form has undergone significant development and updating since the time of AC's referral in 2013.

It is reassuring to see that the current Suitability Screening Form incorporates a section for relevant medical information with specific prompting for information about the patient's co-morbidities, allergies, problems with anaesthetic, current medications,

previous procedures and infection control alert. It also incorporates a patient questionnaire which specifically asks whether the patient or their family ever had a problem with an anaesthetic, with space to insert notes in response to this question.

I am advised that from 2016, the Surgery Connect Program has assigned staff to manage surgical specialties. This involves at least weekly monitoring of patients via a reporting dashboard to assess if their outpatient consultation/surgery has been performed; reviewing the discharge correspondence from the private hospital and providing a copy to the referring Hospital & Health Service during and at the end of the patient's care by the surgeon in order to inform future patient care.

I understand the Program is currently under a governance review and proposed new Standing Offer terms are currently being negotiated with providers. These proposed new terms include:

- a requirement for the referring Hospital & Health Service to provide specified information on referral of the patient (including the patient's comorbidities and patient record);
- clarification that the provider remains responsible for undertaking its own assessment of the patient; and
- a requirement for providers to provide the Program with a comprehensive report of the procedure within 24 hours, any discharge summary and copies of referrals of the patient to the patient's general practitioner in order to facilitate continuity of patient care.

Findings required by *Coroners Act 2003*, s.45

Identity of the deceased: [de-identified for publication purposes]

How he died: AC died from an acute cardiac event 36 hours after undergoing elective spinal surgery at a metropolitan private hospital.

AC had significant comorbidities warranting thorough pre-operative assessment. This occurred prior to his first spinal surgery at a different private hospital in December 2013. That process incorporated physician review (with pre-operative ECG and echocardiogram) and identified his obstructive sleep apnoea as a perioperative risk. As such he was a planned post-operative ICU admission. He developed atrial fibrillation two days post-operatively prompting consultant cardiologist review and treatment with Amiodarone and anticoagulation.

Despite his significant co-morbidities, AC did not undergo pre-operative physician assessment prior to the second spinal surgery at the metropolitan private hospital. Despite AC having disclosed his sleep apnoea in the patient history form during the pre-admission process, this did not generate an anaesthetic alert as it should have done. Further, the consultant anaesthetist's pre-anaesthetic assessment failed to elicit information from AC about either the sleep apnoea or his recent post-operative and anaesthetic complications. As a result, AC was not identified as

requiring routine ICU admission for post-operative monitoring.

As occurred following the first spinal surgery, AC developed atrial fibrillation within 48 hours post-operatively. Although AC was seen by a consultant physician for respiratory issues on the afternoon prior to his death, the findings of the chest x-ray and two ECGs performed that evening were not reported to either the physician or any other medical officer. Had AC been in a monitored environment post-operatively, the abnormal heart rhythm would certainly have been identified and managed in a more timely way. That said, whether escalation for medical review and/or transfer to ICU on the evening of 23 April 2015 would have changed the outcome for AC can only be speculated upon.

There were multiple missed opportunities to have maximised the potential for a different outcome for AC. I am satisfied the metropolitan private hospital has carefully examined these shortcomings and taken steps to address them, particularly in relation to improving its pre-operative assessment processes with a view to better identifying patients requiring routine ICU admission for post-operative monitoring. I am also satisfied that the consultant anaesthetist has reflected on his involvement in AC's care and since changed his practice to ensure more comprehensive pre-anaesthetic assessment.

As AC's second spinal surgery appears not to have been arranged under the Surgery Connect Program as first thought, there was no opportunity for the Tertiary hospital to have provided AC's recent patient history to the metropolitan private hospital. This meant the recent anaesthetic complications were otherwise known only to AC and his general practitioner. The events following the first spinal surgery in December 2013 were known to AC and Dr L. While Dr L performed the second spinal surgery, it remained the anaesthetist's responsibility to perform a thorough pre-anaesthetic assessment.

Fundamentally, the events leading to AC's death demonstrate the importance of careful patient history taking. For reasons known only to AC, he did not disclose his recent surgical and anaesthetic complications either when completing the Metropolitan private hospital pre-admission process or to the consultant anaesthetist during the pre-anaesthetic assessment. He was known to be determined to have surgery as his pain was impacting significantly on his quality of life. However, careful questioning could and should have elicited information which would have identified AC as a clear candidate for post-operative monitoring in an intensive care environment.

Place of death: A metropolitan private hospital

Date of death: 24 April 2015

Cause of death:
1(a) Coronary atherosclerosis
2. Obesity; obstructive sleep apnoea; osteoarthritis (recent surgical procedure)

I close the investigation.

Ainslie Kirkegaard
Coronial Registrar
CORONERS COURT OF QUEENSLAND
4 December 2017