QUEENSLAND COURTS

OFFICE OF THE STATE CORONER

FINDINGS OF INQUEST

CITATION:	**Inquest into the death of Christopher Hammett**
TITLE OF COURT:	Coroner's Court
JURISDICTION:	Southport, Brisbane
FILE NO(s):	2005/33
DELIVERED ON:	28 November 2012
DELIVERED AT:	Brisbane
HEARING DATE(s):	13–14 December 2010, 10–13 April, 16–20 April, 27 April 2012
FINDINGS OF:	John Hutton, Coroner
CATCHWORDS:	CORONERS: Inquest – Death in a medical setting, appropriateness of medical care, policies and procedures, post operative death by aspiration pneumonia, lack of care by post operative medical staff.

REPRESENTATION:

Counsel Assisting:	Mr David Funch
Michael Gibbons:	Mr DC Shepherd i/b Legal Aid
Healthscope (Pacific Private & Allamanda Hospitals):	Mr TD Gardiner i/b Minter Ellison Lawyers
Ms Jennifer Valentine:	Mr JJ Allen i/b Roberts & Kane Solicitors

Findings required by s45

Pursuant to section 45(2) of the *Coroners Act 2003* I find as follows;

A. the deceased person is Christopher Hammett
B. Christopher Hammett died as a result of a series of errors albeit lack of care on the part of the medical and nursing staff caring for him when he was a post operative patient at the Pacific Private Hospital
C. Christopher Hammett died at 3:51am on the 23 April 2005
D. Christopher Hammett died at the Gold Coast Hospital, Southport, Queensland
E. Christopher Hammett's death was caused by aspiration pneumonia due to, or as a consequence of, coronary atherosclerosis, following, an elective operation at Pacific Private Hospital on the Gold Coast which was performed on the 22 April 2005.

John Hutton
Coroner 28 November 2012

Discussion, Evidence and Circumstances leading up to death

On the 23 December 2004, Christopher Hammett was referred by his general practitioner, Dr Exelby, to Dr Scott-Young for unresolved back pain.

On the 18 January 2005, Dr Scott-Young performed an orthopaedic review on Mr Hammett.

On the 11 March 2005, Dr Scott-Young performed a further orthopaedic review on Mr Hammett and on this date, Mr Hammett signed a consent form for an L5- S1 disc replacement operation.

Dr Scott-Young had a divided practice whereby he would operate on fit and healthy people at the Pacific Private Hospital and those who were elderly or suffering heart disease and other co-morbidities were operated on at the Allamanda Hospital. This arrangement was because there were no medical staff present at the Pacific Private Hospital after hours, unlike the Allamanda Hospital which provided after hours medical care.

Because of his young age, Mr Hammett was considered sufficiently healthy to be operated on at the Pacific Private Hospital.

On the 18 April 2005 Mr Hammett underwent an EEG which indicated a normal heart; this meant that he could be operated on at the Pacific Private Hospital.

On the 22 April 2005 between the hours of 5:00pm and 6:05pm Dr Scott-Young operated on Mr Hammett and Dr Dennis Wooller was the anaesthetist.

The operation itself was uneventful and took about 53 minutes. During the operation Mr Hammett's oxygen saturations were maintained at 99% and after the operation he was extubated and transferred to the Post Anaesthetic Care Unit (PACU).

Whilst in this unit, Mr Hammett was cared for by two registered nurses, Nicholas Turrell and Christine Proud. At this time he was the only patient in PACU.

Around the time of Mr Hammett's transfer from the operating theatre to the PACU, he suffered a significant oxygen desaturation event.

At approximately 6pm when Mr Hammett observations were last recorded in the operating theatre, the anaesthetic record indicates oxygen saturations of 99%.

The first recorded observation in PACU at 6.25pm, indicated oxygen saturations at 64%. The observations recorded whilst Mr Hammett was in PACU are recorded on the table below.

Time	Conscious State	Ventilation	Colour	O2 Sat%	Temp	Pulse	Resp	BP	Wound Dressing	C	W	S	M	Drain	Comments
18.25	0	1	2	64	35	68	12	121/76	Dry & Intact					√	Guedels inserted jaw support
18.35	0	1	2	82		73	14	120/75	"					√	Jaw supported Dr Wooler notified & attended
18.45	0	1	2	87		85	14	127/84	"					√	R/By Dr Wooller
18.55	2	2	2	99		70	14	131/89	"					√	Guedels removed. PCA commenced
19.05	2	2	2	100		69	14	136/90	"					√	4/10 pain 1857 Bolus 2mgs → PCA self medicating

Whilst in PACU, Mr Hammett received two further bolus doses of morphine about 2mg each. This was administered at about 7.17pm and 7.18pm. This is about the time he was transferred from PACU to the accommodation ward.

Upon discharge from PACU to the Accommodation Ward, Mr Hammett's discharge score at PACU was noted as 10-10; this indicated a full recovery.

This is not exactly true as his oxygen saturations were down and he had to be given 4mg of morphine at around the time of transfer.

The Desaturation Event

Dr Wooller said that Mr Hammett's oxygen saturations were excellent during surgery and the oxygen saturation measurements ceased being recorded at the time he was transferred from the operating theatre to PACU.

This transfer involved a distance of some 15-20 metres and a 30 second walk from the operating theatre to PACU. Dr Wooller said he personally took Mr Hammett to the PACU, supporting his airway as he travelled and providing supplementary oxygen during the transfer. Dr Wooller assumed Mr Hammett must have had an obstructed airway which caused his oxygen saturations to decline from 100% in the operating theatre to 64% as later observed in the PACU.

Acting on this assumption, Dr Wooller had guedels inserted in Mr Hammett along with jaw support.

The observation chart shows that Mr Hammett's oxygen saturations rose to 87% over a 10 minute period after Dr Wooller ensured a clear unobstructed airway. Dr Wooller said this was not ideal, but not unusual.

RN Turrell said the first observations of Mr Hammett would have been taken about 30 seconds after entering the PACU. Upon the patient entering the PACU an Oximeter clip is placed on the patient's finger almost simultaneously and a reading is taken about 30 seconds after the device has been placed.

RN Proud said the observations at 6.25pm were taken within minutes of Mr Hammett entering PACU and as he was the only patient in the room in PACU he would have been under the constant observation of both nurses.

RN Proud agreed that Mr Hammett's oxygen saturation levels of 64% were extremely unusual and confusing. Whilst the oxygen saturations were 64% she noted that two minutes later it had risen to 80% which is what she said, she would have been looking for.

This caused RN Proud concern as she notified Dr Wooller and told him of the desaturation event. As a result of this, Dr Wooller attended the PACU but according to RN Proud, did not physically examine Mr Hammett and his attendance was limited to a short conversation with the nursing staff before he exited the PACU.

Despite Mr Hammett's alarming oxygen desaturation, Dr Wooller was of the opinion he could be discharged to the Recovery Ward. Dr Wooller was of the opinion that despite the desaturation event he suffered in the PACU his situation did not warrant further investigation after he had been discharged to the ward. Dr Wooller was of the opinion the oxygen desaturation event was caused by an airway obstruction which once treated would be resolved.

This is despite the fact the desaturation could have also been caused by an aspiration.

Dr Wooller did not examine Mr Hammett for an aspiration; he just assumed the desaturation event in this case was more likely to have been caused by an airway obstruction.

It is apparent Dr Wooller, as the anaesthetist, did not consider all possibilities in his management of Mr Hammett.

In other words he should have treated Mr Hammett for the worst case scenario and hoped for the best. Ignoring the possibility of aspiration as opposed to an obstruction proved fatal in this case.

Transfer from PACU to the Accommodation Ward

Between 7.15pm and 7.40pm, Mr Hammett was transferred from PACU to the Accommodation Ward and placed in the care of RN Dean Manton.

The evidence of the handover from PACU to RN Manton is in dispute. RN Manton took over care of Mr Hammett from RN Turrell. RN Manton says in evidence that RN Turrell did not advise him of the desaturation event in PACU during handover.

He further stated that had he been advised of the desaturation event he would have advised the nursing shift coordinator with a view to having Mr Hammett transferred to Allamanda Hospital.

He said he would not have accepted Mr Hammett onto the ward due to the lack of medical cover available overnight. RN Manton's recall of the events is corroborated by Mr Hammett's wife, a nurse; she gave evidence as she was present in her husband's room at approximately 7.30pm when her husband was brought in.

She said there was a verbal handover between the PACU nurse and RN Manton but nothing was mentioned about the desaturation event in PACU.

Mrs Hammett said Christopher complained of being in pain and RN Manton removed his oxygen mask and replaced it with nasal prongs. She remained at her husband's bedside until about 9.15pm.

Whilst under RN Manton's care, Mr Hammett was observed half hourly in accordance with the frequency prescribed until RN Manton completed his shift. Mr Hammett during this time was in considerable pain and between

7.19pm and 9.57pm he pressed his narcotic infusion request button 125 times over a two hour and 38 minute period.

This amounted to an average of one button press for every one minute and 15 seconds. This contradicts RN Manton's evidence that Mr Hammett was not in pain. However when cross examined during the inquest, RN Manton then agreed that given the requests for narcotic as recorded above, Mr Hammett must have been in pain.

RN Manton said he would have called Dr Wooller had the patient been writhing around in bed in a lot of pain. This is despite Christopher Hammett's frequent requests for pain relief.

It would appear that whilst Mr Hammett was in RN Manton's care, his oxygen saturations remained stable but from the hospital charts, one can see that the oxygen flow was increased from three litres initially to four then to five.

It is obvious from this that Mr Hammett's oxygen saturations were only kept up by an increase in flow.

This should have alerted RN Manton to the serious nature of Mr Hammett's condition. Instead all he did was turn up the oxygen.

RN Manton did not alert Dr Wooller to this fact and Dr Wooller for his part said he would have liked to have had the nursing staff notify him of Mr Hammett's oxygen saturations being maintained by increasing the flow of oxygen. He said had he been notified of this condition he would have been aware there was an underlying problem and he would have attended the hospital and assessed Mr Hammett more closely.

RN Manton agreed that Dr Wooller's instructions on the patient controlled analgesia infusion order, authorised oxygen therapy to the extent specified by Dr Wooller.

In doing what he did, RN Manton admitted he ignored Dr Wooller's prescription in relation to oxygen therapy and instead applied his own oxygen therapy without referring back to Dr Wooller.

In fact when asked why he disregarded Dr Wooller's order and applied his own oxygen therapy, RN Manton said that based on his own experience he felt it was a prudent thing to do.

RN Manton's management of Mr Hammett during his shift showed nothing less than a serious lack of care for Mr Hammett. RN Manton inappropriately took it upon himself to diagnose Mr Hammett's low oxygen saturations as being a combination of sleep apnoea and the use of morphine.

He then, without referral to the anaesthetist just increased the oxygen flow in order to treat what he considered the problem to be.

Had RN Manton reported back to Dr Wooller, the doctor would no doubt have attended and treated Mr Hammett appropriately.

Accommodation Ward 10pm to Midnight Registered Nurse Michael Gibbons and Enrolled Nurse Jennifer Valentine

Between 10 and 10.15pm RN Michael Gibbons and EN Jennifer Valentine commenced their shifts in the Accommodation Ward and assumed care of Mr Hammett.

EN Valentine said that Mr Hammett was requesting a drink of water. She sought advice on this and was advised by RN Gibbons to give him a chip of ice instead and keep an eye on his oxygen saturations.

Later on she changed Mr Hammett's nasal prongs with a Hudson Mask however when she did this, she failed to attach the Hudson Mask to the oxygen supply and within a matter of minutes she noticed his oxygen saturations decline.

She then alerted RN Gibbons who attended and corrected her mistake by connecting the line to the oxygen supply. During this period she noticed the oxygen saturations had dropped into either the 70's or 80's.

She says she put the mask back on Mr Hammett and instructed him to breath.

RN Gibbons told the inquest that at handover RN Manton told him Mr Hammett's recovery was unremarkable and he had a history of sleep apnoea. He also said RN Manton had referred to Mr Hammett as a whimp because he was continually complaining of high pain levels.

RN Manton denied this however Mr Hammett's pain levels are corroborated by his recorded requests every one minute and 15 seconds for more analgesia.

While in the care of RN Gibbons and EN Valentine, RN Gibbons did not check the patients; he relied solely on EN Valentine to check on all the patients while he remained at his station.

Around 10.15pm, EN Valentine said she noticed that Mr Hammett had removed his oxygen mask. She also observed that his oxygen saturations were 'low'. Around 10.30pm Mr Hammett's final self administered dose of morphine was delivered.

During the period from discharge from the PACU at 7.15pm to 10.30pm there were 139 recorded demands for morphine. Despite coming on about 10.30pm, RN Gibbons did not visit Mr Hammett until one hour later at 11.30pm when he administered an intravenous dose of Keflin.

Around 12 midnight, EN Valentine said she observed Mr Hammett had again removed his mask. She replaced it and told him to breath up. She then continued to conduct observations of other patients.

EN Valentine admitted overwriting entries in Mr Hammett's chart. She said she would return to him and his mask would be off, she would record his observations and place the mask back on.

She said his oxygen saturations would then rise so she would write a new high entry over the top of the initial lower entry which she had previously observed. She said some of the columns were positioned differently to that which she was used to at the Tweed Hospital so she would accidently write the entries in the wrong column.

When questioned as to why she would continue to repeat the same error, specifically why she would record his oxygen saturations and place the mask on his face and then overwrite the initial entry with a higher reading on each occasion that she performed this observation, she responded 'I can't answer that'.

In her interview with police, EN Valentine claims to have checked Mr Hammett every 10 minutes between midnight and 10am.

She said during this period his oxygen saturations were low but she thought it was because he kept pulling the mask off.

At the inquest she again described his saturations as being low but she could not be sure as to what level they were dropping. She said during this period he was conscious but he seemed confused like he was drugged and slurring. EN Valentine told the inquest that RN Gibbons did not assist her in performing observations with any of the patients that night.

It would appear RN Gibbons left the entire ward observations to an enrolled nurse and did not participate.

Between 1am and 2am, RN Gibbons finally attended Mr Hammett at the request of EN Valentine because she was concerned about his low oxygen saturations.

RN Gibbons put a re-breather mask on him, checked his pulse and then went and had a break. RN Gibbons told the inquest the oxygen saturations were 78% and they came up into the low 80's after he put the re-breather mask on him.

He denied this represented an emergency situation and said that when the oxygen saturations rose to about 84% he was satisfied this intervention had been successful and then he left for his break and had a sleep.

It is interesting, that notwithstanding the fact RN Gibbons used a re-breather mask which was situated on an emergency trolley he did not accept the situation he was in with Mr Hammett was an emergency in itself and in fact the re-breather mask was an emergency instrument he had placed on Mr Hammett from the emergency trolley.

The dire situation did not appear to dawn on RN Gibbons at that stage. By this time, Mr Hammett was unconscious, and RN Gibbons just assumed he was sleeping.

RN Gibbons however then accepted he did not know whether he was asleep or unconscious because he did not attempt to wake him. RN Gibbons said he did not give EN Valentine any advice on the management of patients prior to going on his break. He said he had never worked with EN Valentine before and had no reason to mistrust her. He believed her to be a competent nurse because she had brought Mr Hammett's condition to his attention at 1.00am.

EN Valentine said that at 1am Mr Hammett's oxygen saturations were 69 at 10 litres of oxygen, respiratory rate 16 and blood pressure at 100/60. She said between 1am and 2am she did not check on him again because RN Gibbons had told her his saturations were coming up. Given the fact she was the only person on the ward she was too busy to get back to him sooner as Gibbons went on his break.

EN Valentine told police that at approximately 2am she checked on Mr Hammett and observed he was 'dusky' in colour, his eyes were partially open; she could not rouse him and could tell he was comatose.

She said about this time she received a phone call from RN Karen Faulkner at the Tweed Hospital. EN Valentine said she told RN Faulkner she could not rouse Mr Hammett and that he had low oxygen stats and asked how low a person's oxygen stats get when they have sleep apnoea. Faulkner said it sounded as if the patient was 'narced' and she should notify RN Gibbons and ring the nursing supervisor. EN Valentine said when she went to fetch RN Gibbons at 2am he was asleep.

Because of Mr Hammett's now dire condition, an ambulance was immediately called and it was arranged for him to be moved to the Gold Coast Hospital.

After the ambulance left, EN Valentine observed RN Gibbons removing papers from Mr Hammett's chart; he told her to photocopy them. RN Gibbons then altered the observations.

During the inquest, RN Gibbons produced a photocopy of Mr Hammett's chartwork. He confirmed he took photocopies of the chart prior to making alterations. He did not tell anyone about this.

RN Gibbon's lack of participation with the care of Mr Hammett can only be described as grossly unprofessional and lacking the care one would expect from a registered nurse.

At 3am, an ambulance delivered Mr Hammett to the Gold Coast Hospital where paramedics were in the process of applying CPR and upon arrival the following observations were noted;

1. temperature 36
2. pulse – nil
3. respiration – nil
4. blood pressure – nil
5. oxygen saturations measured with a pulse oximetry – 35% fractional inspired O2 concentration 100%.

At 3.51am, resuscitation efforts were ceased and Mr Hammett was pronounced at the Gold Coast Hospital.

The Post Mortem Examination and Analysis

The Autopsy:

An autopsy was performed on the body of Mr Hammett; it consisted of a full internal autopsy together with toxicology. The pathologist who performed the autopsy noted as follows:-

> *Lungs: there are scatted polymorphonuclear leucocytes in the alveolar spaces throughout all the lobes together with intra-alveolar haemorrhage. In areas, the haemorrhages is profuse especially in the basal regions and is associated with septal damage. A few bronchioles and bronchi show acute inflammation. The picture is that of aspiration with resultant chemical pneumonitis and haemorrhage. The presence of polymorphonuclear leucocytes indicates presence of changes of at least 4 hours.*
>
> *Coronary arteries: The occlusions of both distal right coronary and left anterior descending arteries are confirmed as due to atherosclerosis. No acute changes are noted but the occlusions appear to be severe histologically.*
>
> *Heart: There is scattered hypertrophy of myocytes. There is patchy mild subendocardial fibrosis in the posteroseptal aspect of left ventricle. No acute ischaemic changes are noted. No inflammation is noted. The atrioventricular node is unremarkable.*
>
> ***Summary and Interpretation***
>
> *The deceased had undergone disc replacement of the L5-S 1 joint (lumbosacral joint) on 22 April 2005 in Pacific Private Hospital. The surgery was performed under general anaesthesia and had apparently gone uneventfully. He was observed in the post-operative ward for a short interval before being sent back to the ward. He was given infusion of morphine on demand (self infusion) during this period. Apparently, the oxygen saturations were noted to be dropping in the early hours of midnight. He was noted to be unarousable shortly after with oxygen saturations dropping to 53% (usually above 95%).*

Resuscitation was initiated but he could not be revived. He was transferred to Gold Coast Hospital before being declared dead at around 3.51am on 23 April 2004.

The post-mortem examination confirmed the surgery. There was minimal soft tissue haemorrhage. No haemorrhage was noted within the abdominal cavity. The prosthetic joint and disc were noted to be in place. The underlying spinal canal (which contains the spinal cord) was intact.

The heart showed scattered atherosclerosis in the coronary arteries. In particular, the distal circumflex artery as it became the posterior descending artery showed significant atherosclerosis with occlusion up to 75%. In keeping with this finding, chronic ischaemic changes were present in the distribution of this artery (fibrosis in the posteroseptal left ventricle). The distal aspect of the left anterior descending artery also showed fairly significant atherosclerosis with occlusion between 50 to 75%.

The lungs are congested, heavy and poorly aerated. Histology showed pneumonitis throughout the lungs associated with haemorrhage and alveolar septal darnage. There was presence of acute bronchiolitis and bronchitis. All the features inferred the origin of the problem to be aspiration. Since no food was present in the stomach cavity, he had developed chemical pneumonitis (due to stomach acid) causing haemorrhage and inflammation. The histology features were consistent with changes of at least four hours prior to death.

In view of the circumstances, it would be likely for the aspiration to either occur as a result of the surgical process (a known complication of anaesthesia known as Mendelson's syndrome) or as an adverse effect of morphine administration (which is capable of inducing even in therapeutic level). Reviewing the anaesthetic notes made during surgery did not reveal oxygen desaturation during the surgery, which indicated that aspiration probably occurred after surgery. Morphine is also known to cause nausea and vomiting. It is dose related and may occur in therapeutic levels.

The aspiration was mild initially and became extensive later when the inflammatory reaction had established, causing the deterioration detected clinically. This condition was potentially reversible if detected earlier.

Another significant condition that he had was ischaemic heart disease. There was significant coronary atherosclerotic occlusion with fibrosis, albeit mild in the heart. It was unlikely for the heart problem to be responsible for death as the clinical picture was not consistent with that condition. However, pneumonitis of the lungs would impair oxygenation and this might exacerbate the ischaemic

(lack of oxygenation) condition of the already vulnerable heart. Thus, the heart condition would have contributed significantly to death.

A blood test showed markedly elevated tryptase, which is a marker for anaphylactic shock. Tryptase is known to rise alter death. The post mortem examination was only performed on 26 April, which was more than three days after death, rendering the level unreliable. In addition, the clinical circumstances were not similar to that of an anaphylactic shock.

The toxicology results showed presence of drugs of therapy; lignocaine and ropivacaine in therapeutic level. Morphine was within the known therapeutic range.

The cause of death in my opinion was due to aspiration pneumonia with significant contribution by the heart condition.

Cause of Death

1 (a) Aspiration pneumonia, due to, or as a consequence of
2. Coronary atherosclerosis'

The report of Dr Keith B Greenland

Dr Greenland was commissioned to provide a report and opinion regarding the management of Mr Hammett. In doing so, Dr Greenland received all of the relevant coronial material which was provided to him and made the following observations:-

Summary of the patient's condition and management on 22/04/2005 and 23/04/2005

'At 17:00 hours, Mr. Christopher Hammett (the patient) underwent an L5-S I disc replacement under general anaesthesia at Pacific Private Hospital. His surgery was completed at approximately 18:05 hours. The patient received 5mg morphine during his surgical procedure. As the toxicology reports mention lignocaine and ropivacaine were detected, I presume that the ropivacaine was injected into the wound at the completion of surgery, for postoperative pain relief:

The PACU report indicates that the patient's initial pulse oximetry reading (Sa02) on arrival at 18:25 hours was 64%. A Guedel airway was inserted and jaw support was performed. The anaesthetist was notified and attended the patient. Sa02 at 18:35 hrs and 18:45 hrs were 82% and 87% respectively. The Guedel airway was removed at 18:55hrs when the patient's Sa02 was 99%. His morphine PCA was started at 18:55hrs when the pain score was 4/10. A bolus dose of2mg morphine was given at 18:57hrs. The next two Sa02 at 19:05hrs and 19:15hrs were 100% and 94%. The patient was discharged from P ACU at 19:15hrs, with a pain score of 3/10.

The Gemstar pump history indicates that two additional 2mg morphine boluses (total loading dose 6mg morphine) were given to the patient at approximately 19:15 and 19: 16hrs (note: the time on the Gemstar pump was approximately 1.5 hours ahead of the actual time. The times given in this report are adjusted to the actual time based on this correction factor). There does not appear to be any notation in the medical notes (including the PACU report) of these two additional morphine doses having been administered.

The patient's discharge score was I0, indicating full recovery. However, the prolonged period of desaturation he experienced during the period from 18:25 - 18:45hrs should have resulted in a longer stay in PACU. The twenty minutes of Sa02 above 90% is insufficient. Further, the administration of additional morphine boluses for pain relief should have been followed by at least 30 minutes of observation. It is for these reasons I am concerned that the patient's stay in PACU was too brief for the clinical scenario. The ongoing issues of respiratory compromise in the ward appeared to have started in the immediate postoperative period.

It is likely that the low Sa02 in PACU and the ward may be due to one of two conditions. Firstly, it is likely that the patient had airway obstruction during his transfer from the operating theatre to PACU. The level of desaturation the patient experienced is likely to occur if he had pre-existing upper airway compromise from obstructive sleep apnoea, and if the transfer distance time was prolonged. Airway obstruction leads to atelectasis (collapse of the distal airways and alveoli- air sacks). Reinflating collapsed alveoli requires deep breathing, coughing and an erect or semierect posture. These manoeuvres have not been mentioned in the PACU report. Secondly, it is likely that regurgitation and pulmonary aspiration has occurred at this stage. Both the aspiration and the lack of recruitment of collapse alveoli are likely to have significantly contributed to the ongoing hypoxaemia suffered by the patient in the ward.

The first set of observations after the patient's arrival in the ward was recorded at 19:40hrs. The Sa02 at this time was 93% on 3L/min oxygen. At this stage the morphine dose was noted at 11mg and the patient's pain score was 7/10. The following observations from 19:40-21:40hrs showed Sa02 93-94% and pain score 6-8/10 (mostly 7-8/10). The patient's oxygen therapy was changed from nasal prongs to a Hudson mask (indicating further increased requirements for oxygen) at 20:40hrs (recorded interview of Dean Manton RN- evening shift). Notably, the patient was still showing signs of respiratory compromise with a significantly low Sa02 while he was receiving supplementary oxygen.

The high pain scores and the frequent morphine demands (139 demands) shown in the Gemstar pump history indicated poor pain management during this time. The Gemstar history indicated that the last delivered morphine dose was given at approximately 22:30hrs. (00:04hrs on the pump history). There were no further patient demands from 22:30hrs until 02:20hrs (23/04/2005) when the pump was stopped. Collateral history from Jennifer Valentine indicated that she spoke to the patient at 22:00hrs (Sa02 was 89%) and then

spoke to his wife on the telephone. She then went back to him and found him snoring with Sa02 of 80%. This may have occurred after the final self-administered morphine bolus at 22:30hrs.

A close of intravenous Keflin was given in the ward at 23:30 hrs (in addition to the dose at17:30hrs administered in the operating theatre, 'OT') but there were no associated remarks concerning the patient's condition in the observation chart or in the progress notes.

The observations at 24:01 hrs, 01:00hrs and 02:00hrs were difficult to read, due to changes. However, the Sa02 at 24:01hrs appeared to be 85% (there was no oxygen supplementation mentioned at this time). The morphine close at this time was 33mg which was unchanged from 22:30hrs. At this time, the patient was asleep. I presume he was then woken and the level of consciousness score was given as 2 (awake and alert). The patient was asked if he had pain at this stage and he stated "no". The enrolled nurse claimed to have checked him frequently between 24:01 and 01:00hrs (every ten minutes).

The next observations at 01:00hrs showed a Sa02 of 60%. The patient's colour section of the circulation observations was changed from 2 (normal colour) to 0 (dusky). Supplementary oxygen flows were increased to 101/min (by a non-rebreathing oxygen mask ordered by the registered nurse). There was no mention of any further action taken by the start: The Sa02 at 02:00hrs was very difficult to read, but appeared to be in the 50's. Again oxygen supplementation flows were increased this time to 151/min. Further action only took place at 02:30hrs when naloxone was given (02:40hrs), medical staff were notified, and the Queensland Ambulance Service was arranged to transfer the patient to the Gold Coast Hospital.

The question of when the patient could be resuscitated was difficult to answer and may be seen as irrelevant in the overall view of this case. The lack of appropriate monitoring from21:40 – 24:01hrs represented a serious breach in the nursing care of this patient. The patient's clinical condition deteriorated significantly over the period from 22:30 - 24:01hrs without appropriate nursing action having been taken. This has been confounded by the lack of suitable response to the patient's deteriorating clinical condition from 24:0 l - 02:30hrs.

Summary

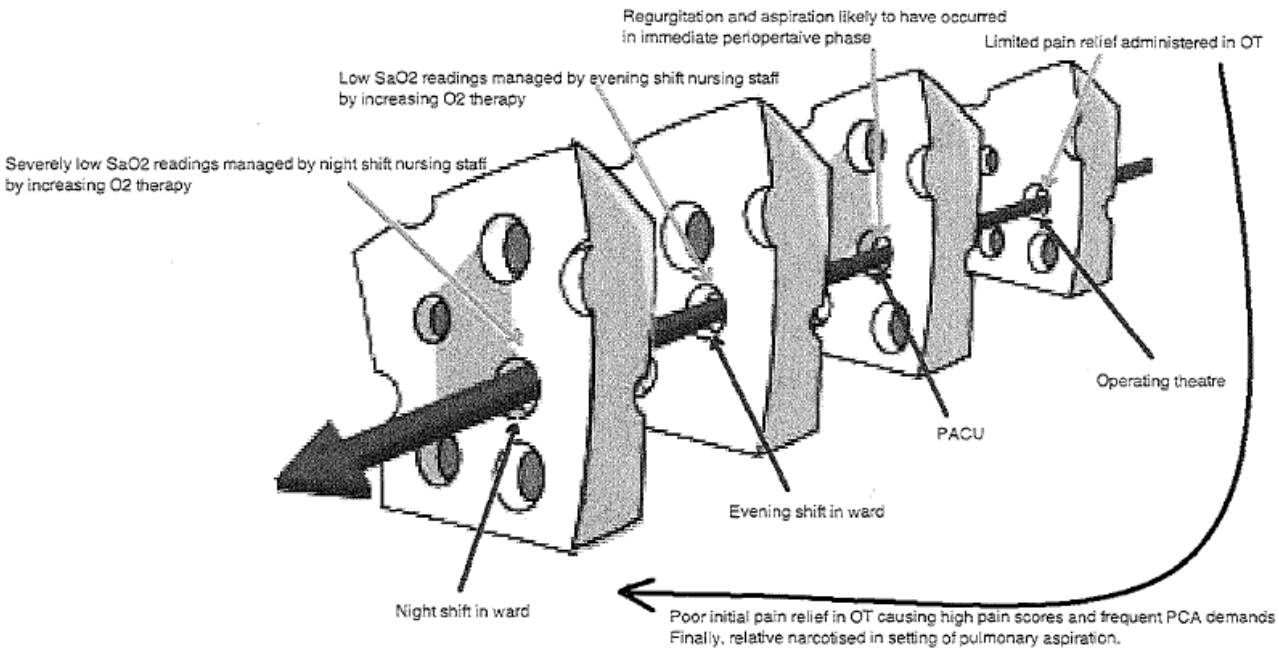
Human errors in this case follow the 'swiss cheese model' (Figure 1 and Table 1) outlined by Professor John Reason[1]3. That is, there has been a series of errors which in isolation were unlikely to have led to major harm to the patient. However, when combined together, these errors have led to this patient's death. Further, the errors have escalated in seriousness from the use of a limited and probably inadequate pain relief in OT, problems with PACU management of low Sa02, poor nursing management of low Sa02 in the evening nursing shift, to serious issues with the professional standards of the nursing night shift.

[1] Reason J Human error: models and management. BMJ 2000;320: 768-70.

Regarding Dr. Greg Comadira's evidence on Day 10 (page 757): 'I think he aspirated either at extubation or early in recovery':-

I agree that the Sa02s in the ward showed pulmonary pathology and indicated that aspiration was likely to have occurred in the immediate postoperative period (alter extubation, during transfer to PACU and/or in PACU itself). This ongoing problem with aspiration pneumonia compromised the patient's condition to the point where increased usage of the morphine PCA led to relative narcotisation of the patient.'

Figure 1: Swiss cheese model from Professor John Reason's work on human factors in error.



Dr Keith Greenland is highly regarded as an anaesthetist and fulfils the following roles:

1. Senior Staff Anaesthetist
   Department of Anaesthesia and Perioperative Medicine
   Royal Brisbane and Women's Hospital

2. Senior Clinical Lecturer
   University of Queensland

3. Honorary Associate Professor
   Department of Anaesthesiology
   Faculty of Medicine
   Hong Kong University

During the inquest, Dr Greenland was extensively cross examined by Counsel, however notwithstanding this cross examination Dr Greenland maintained his opinions and reinforced his opinions with reasoning. He did not differ at all from the opinion as contained in his report.

Having heard the evidence at inquest I can only agree with Dr Greenland's concise summation and analysis (especially his Swiss Cheese Model). Christopher Hammett's death could have easily been avoided as he passed from carer to carer but at each stage, failure to identify the cause of his desaturation compounded until his condition became fatal.

Mr Hammett's demise was due to a series of compounding errors on the part of the medical and nursing staff responsible for his care after his discharge from the operating theatre commencing, prior to his admission to PACU.

Reporting Offences or Misconduct s48 Coroners Act 2003

48 Reporting offences or misconduct

(1) A reference in this section to information does not include information obtained under section 39(2).

(2) If, from information obtained while investigating a death, a coroner reasonably suspects a person has committed an offence, the coroner must give the information to –

(a) for an indictable offence – the director of public prosecutions; or

(b) for any other offence – the chief executive of the department in which the legislation creating the offence is administered.

(3) A coroner may give information about official misconduct or police misconduct or police misconduct under the Crime and Misconduct Act 2001 to the Crime and Misconduct Commission.

(4) A coroner may give information about a person's conduct in a profession or trade, obtained while investigating a death, to a disciplinary body for the person's profession or trade if the coroner reasonable believes the information might cause the body to inquire into, or take steps in relation to, the conduct.

(5) In this section –

(a) licenses, registers or otherwise approves the carrying on of the profession or trade; or

(b) can sanction, or recommend sanctions for, the person's conduct in the profession or trade.

As stated in section 48(4), I believe the conduct of the medical and nursing staff charged with the post operative care of Christopher Hammett is such that it warrants an investigation by the disciplinary body namely the Australian Health Practitioner Regulation Agency.

Accordingly I direct that a transcript of these inquest proceedings together with the exhibits, particularly Dr Greenland's report be forwarded to that Agency for further investigation.

Coroner's comments s. 46 Coroners Act 2003

Not only did Dr Greenland supply a report which is mentioned herein, he also identified areas of concern in the peri-operative management. I accept Dr Greenland's concerns as identified by him and his comments and commend them pursuant to s. 46 accordingly.

In providing his report, Dr Greenland identified areas of concern in the peri-operative management as follows:

Site	**Area of Concern**	**Possible solutions/Considerations**
Operating Theatre	Uni/bimodal analgesia used	Multimodal analgesia should be considered as standard
Operating Theatre/Transfer to PACU	?Obstructed airway/?aspiration	
PACU	Poor SaO2 over 20 minutes	Anaesthetist to review with need for arterial blood gas analysis, ?CXR and consider admission to high dependency unit
	Morphine boluses given	• Need to review implementation of policy to record all narcotic boluses given to patient. • Need to review policy which requires minimum length of stay in PACU after narcotic administration • Need to review policy which requires minimum length of stat in PACU after prolonged period of desaturation
Ward	Low SaO2 requiring escalating O2 therapy	• Need to review policy of notifying medical staff if saturations below critical level. • Need to review PCA order forms which have no set notifications criteria. • Need to review appropriate nursing:patient ratios. • Need to review appropriateness of shift coordinator being in

		separate hospital and geographically isolating Pacific Private during emergencies. • Need to review lack to appropriate observations of patient with PCA pump. • Need to review competency of nursing staff who fail to understand fundamental signs of respiratory compromise. • Need to improve education of acute pain management – liaison between Pacific Private Hospital and RBWH Acute Pain Management Team is recommended. There is a need to establish Acute Pain Management Service Protocols including appropriate nursing observations and treatment with ongoing education and consultations.

Finally I note that at the time of the inquest, the proprietor of both the Pacific Private Hospital and the Allamanda Hospital, namely Healthscope Limited was not the proprietor of the Pacific Private Hospital or the Allamanda Hospital at the time of Mr Hammett's death on the 23 April 2005.

At that time of Mr Hammett's death, Nova Health Pty Ltd was the proprietor of both hospitals.

It should be noted that Healthscope Ltd purchased both hospitals on 26 May 2005 after Mr Hammett's death.

I close the inquest.
John Hutton
Regional Coroner
Brisbane