The Coroners Act 2009

IN THE LOCAL COURT
OF NEW SOUTH WALES
CORONIAL JURISDICTION.

No. 1767 of 2008.

INQUEST INTO THE DEATH OF HELEN SAMANTHA GRAINGER

FINDINGS

This is an inquest into the death of Helen Samantha Grainger which occurred on 29 April, 2007. Ms. Grainger was born on 4 July, 1977. She was a member of a very close knit family and her mother and father, Sharon and David Maidment, a sister, Rowena Olejnik and other members of the family attended court on each day of the inquest. Sadly, Helen's husband, John Grainger, did not take part in the inquest and I was told

by Mrs. Maidment that he has *"moved on"* but it is good to know that Mr. Grainger has allowed Helen Graiinger's family of origin to maintain a close and loving relationship with her son, Hayden, who was born on 9 August, 2005.

The Inquest

The inquest was heard at Newcastle on 19 and 20 December, 2011, at Belmont on 7, 8, 14 and 15 May and at Raymond Terrace on 9 May, 2012. Dr. P. Dwyer of Counsel appeared as Counse assisting the Coroner, instructed by Ms. M. Heris of the Crown Solicitor's Office. Mr. G. Butler of Counsel appeared for various medical and nursing staff of *Lambton Road Day Surgery*, most particularly, Dr. Adrian Wenck, and Mr. R. Cavanagh of Counsel appeared for the family, instructed by *Legal Aid NSW*. The *formal* documents including the *P79A* Report, the *ID* Certificate, the Autopsy Report prepared by Dr. Kasinathan Nadesan, Senior Specialist Forensic Pathologist at the Department of Forensic Medicine, Newcastle and the accompanying Certificate of Analysis of the Division of Analytical Laboratories are, jointly, **EXHIBIT 1**. The *Officer in Charge* of the investigation was Detective Senior Constable Danielle Weber and it is she who prepared the Coronial Brief which is **EXHIBIT 2**.

Those appearing to give evidence at the inquest included:-

- The Officer in Charge;
- Dr. Harrison Mellows;
- Enrolled Nurse Christine Roussos;
- Dr. Sue Brumby;

- *EEN* Suzan Hayman;
- *EN* Sara Onslow;
- Registered Nurse Lyn Ashford;
- *RN* Bronwyn Harris;
- Paramedic John Gleeson;
- Dr. Robert Loblay;
- Dr. Adrian Wenck;
- Dr. Paul Forrest; and
- Dr. David Barnes.

Helen Grainger

Helen Grainger's mother, Mrs. Sharon Maidment and her sister, Rowena, addressed the inquest to provide an personal insight into her late daughter's personality, character and history. Helen was the oldest of three daughters of Sharon and David Maidment. She lived all her live in the Hunter area. She was gregarious and outgoing, an enthusiastic and skilled cook, a voracious reader with an artistic and creative flair. She is described by her sister as *"bright and knowledgeable."* As a girl, she loved dancing. She was very much a family oriented person and, in the early days, was always keen to help her mother care for her younger sisters, Rowena and Anna.

Most especially, she was a loving mother to Hayden and the tragedy is that that little boy lost his mum when he was only about 20 months of age. That is a loss which can never be made up but Helen's family are determined to help him keep a place for Helen in his heart.

Helen Grainger is sadly and deeply missed by her family and all those who were involved in the inquest would wish to join me in expressing sympathy at their very sad loss.

The Referral

According to Dr. Harrison Mellows, Helen Grainger's general practitioner from about 1984 until her death, she suffered from *Polycystic Kidney Disease*. Additionally, in 2007, she was overweight and she was asthmatic. And so, when she fell pregnant for a second time, Dr. Mellows referred her to her Renal Physician, Dr. R. Nanra who discussed with Mr and Mrs. Grainger the *"possible adverse effects"* of the pregnancy which might lead, he advised, to *"acute renal failure."* Rather than referring her to Dr. AHB Gillies or Dr. PR Trevillian as had been suggested by Dr Nanra, Dr. Mellows referred Helen Grainger to *Lambton Road Day Surgery* for termination of the pregnancy and told her that, in his view, the procedure would not be available to her at *John Hunter Hospital* because it did not involve a general anaesthetic but merely a sedation. I am not sure that termination would not have been available to Helen Grainger at *John Hunter Hospital* and neither am I aware why Drs. Gillies or Trevillian were not consulted.

The Procedure

Helen Grainger attended *Lambton Road Day Surgery* on 26 April, 2007. The procedure was to be carried out by Dr. Sue Brumby and Mrs. Grainger was attended not by an Anaesthetist but by a General Practitioner, Dr. Adrian Wenck, who practiced as a Sedationist. Mrs. Grainger was introduced to *EN* Christine Roussos for admission

and counselling and to note what Dr. Brumby described as the *"normal risks"* pertaining to the procedure and then, at about 9am, to Dr. Brumby for a brief consultation to obtain Mrs. Grainger's written consent and to discuss particular issues including renal function and various other medical issues. In Dr. Brumby's opinion, Helen Grainger's case was not so complex as to warrant a referral to *John Hunter Hospital*. Mrs. Grainger then saw Dr. Wenck whose *"usual practice,"* he told the inquest, was to examine and consult with the patient.

It was Dr. Brumby who decided that *Zylocaine* and *Adreneline* should be injected into the cervix and that *Cephalosporin* should be employed as an antibiotic agent and she gave instructions to Dr. Adrian Wenck to provide a *test dose* of *Cephalosporin* which he did, allowing about three minutes to elapse in order to test for a reaction. No adverse reaction being seen, Dr. Wenck went ahead. It might be said and, indeed, it is said by Dr. Loblay, specialist immunologist, that the better course would have been to start the patient on a course of antibiotic therapy some days prior to the procedure but Dr. Barnes, a Consultant Respiratory and Sleep Physician, told the inquest that such is not practical and neither is it to be expected of practitioners at establishments like the *Lambton Road Day Surgery*.

The procedure was uneventful and Mrs. Grainger was taken to *Recovery* at 9.40am. According to *RN* Ashford, a recovery nurse, Mrs. Grainger *"was conscious and settled initially with no complaints of pain or discomfort."* Clinical observations were pulse 83, oxygen saturation

95% and she was drowsy but awake. Shortly after arriving in Recovery, she asked for her Ventolin puffer which was handed to her about 15 seconds after she requested it. She was sitting up in bed and took a few puffs and, in Ms. Ashford's recollection, *"her oxygen level dropped from 95% and her skin appeared pale in colour"* and she appeared to struggle for breath.

Adrenaline

Dr. Wenck was called into *Recovery* at 9.42 am. He recognised *anaphylaxis* in the patient. Oxygen was administered via a mask along with nebulised *Ventolin* was administered. Then, according to his notes composed within half an hour of Helen Grainger being taken to hospital, he administered *"adrenalin 1 mg in 10mls given – 9.42 despite O.T. sats still mid-high 90s."*

According to *RN* Harris with whom Dr. Wenck agrees, the *adrenaline* was injected from a *minijet* syringe.

The Director of Nursing, *RN* Bronwyn Harris recalls that *"then Helen just sort of crashed and I called the counsellor in and asked her to call 000 for an ambulance and tell them we had a respiratory arrest. Right at the same time, Helen stopped breathing and an urticarial rash developed around Helen's back and abdomen and spread up to her face."*

There is nothing in *RN* Harris' report of these events to suggest that the *adrenaline* was administered over time and *RN* Ashford's evidence, likewise, suggests that there was a single *bolus* dose – *"at 9.42 intravenous*

adrenaline 1 mg in 10 mls by Dr. Wenck." Dr. Brumby, who had been engaged in theatre, entered *Recovery* at 9.45 to find that *"Dr. Wenck had given the patient adrenaline and other medication."* In the contemporaneous *Medical Emergency Reporting Form* completed by *RN* Ashford, reference is made to *"Adrenaline IVI, 1 mg, 9.42"* and in her *Nursing Report* Ms Ashford wrote *"IVI adrenaline 1 mg in 10 mls given 9.42."*

All of this suggests, it seems to me, that there was but one administration of *adrenaline* which was given by Dr. Wenck but, in a supplementary statement submitted shortly before the resumed hearing of the inquest, he says *"at 9.42 I commenced giving adrenaline 1 mg in 10 mls with a 0.5 ml bolus into her cannula. Over the next few minutes, I slowly injected more of the adrenaline watching for its effects. My recollection is that at some point during this time, a saline drip was connected to the cannula as well. At 9.45 (as recorded in the clinical notes) I administered hydrocortisone (solu-cortef) in between doses of adrenaline from the minijet."*

Misses. Harris and Ashford were not challenged regarding their recollection of Dr. Wenck's *adrenaline* administration.

It seems to me that Dr. Wenck's recent recollection of these events is mistaken and that the clear probability is that, when he entered the recovery room, he administered not a series of small doses of *adrenaline* to Mrs. Grainger but one single dose amounting to almost 1 mg in 10 ml as his *aide memoir* records.

Dr. Robert Loblay is the Director of the Allergy Unit in the Department of Immunology at the *Royal Prince Alfred Hospital* at Camperdown and he gave expert evidence to the inquest on a variety of matters but, primarily, on the safe administration of adrenaline, particularly to patients experiencing *anaphylaxis*. Dr. Loblay, like two other experts, Dr. Forrest and Dr. Barnes, and Dr. Wenck himself recognise that *"adrenaline is the drug of choice for first line emergency treatment of anaphylaxis"* but it has a narrow *"therapeutic index"* – a narrow margin of safety between effective therapeutic doses and doses which are toxic. According to Dr. Loblay, *"route of administration, concentration and rate of administration are all critically important in this regard."*

In support of his view, Dr. Loblay referred the inquest to a wall chart containing guidelines endorsed by the *Royal Australian College of General Practitioners* and the *Australian and New Zealand College of Anaesthetists* entitled *"Medical Management of Severe Anaphylactoid And Anaphylactic Reactions"* which, for a severe anaphylactoid reaction in adults, prescribes adrenaline 1:1000 intramuscularly. The appropriate dose for average adults of 50 to 100 kg is 0.50 ml.. A severe *anaphylactoid* reaction is defined in these guidelines as including *hypotension* (shock), *bronchospasm* (wheezing), lanyngeal oedema and/or *arrythmias* (cardiac arrest).

The guidelines continue that *"if there has been little or no response to the IM dose of adrenaline, 5 mg/kg*

should be administered slowly into the intravenous line and repeat at 5 minute intervals depending on response. If the patient remains shocked, start an adrenaline infusion (preferably by a central venous line), commencing at 0.25 microgrammes/kg/minute, and titrating as required to restore blood pressure."

The chief thrust of Dr. Loblay's evidence to the inquest is that he agrees with these guidelines and he maintains that, if Dr. Wenck administered a single dose of almost 1 mg in 10mls adrenaline to Mrs. Grainger, as I think he did, the patient would have been likely to have developed an *arrhythmia*, most likely a *ventricular tachyarrhythmia*, causing *cardiorespiratory arrest* and appearing similar to *RN* Harris' observations noted earlier.

Dr. Loblay would accept that there are circumstances where, as an initial response, a patient might need *IV* rather than *IM adrenaline* but, in his opinion, only where the patient is *in extremis* and then, only in regulated doses at not less than 5 minute intervals in a carefully controlled environment where the patient's heart rate, blood pressure and cardiac output are carefully monitored.

At the time the *adrenaline* was administered, Helen Grainger was very ill but Dr. Loblay doubts that she was *in extremis*. She was sitting up. She was breathing albeit labouring. She was conscious and speaking. In his view, she was not yet in a situation where *IV adrenaline* was appropriate. Further, in Dr. Loblay's opinion, the overall dose of adrenaline administered -

almost 1 mg, was vastly in excess of what Helen Grainger needed or could tolerate as a single dose or even in the series of small doses now suggested by Dr. Wenck. The guidelines, a copy of which was probably hanging on the wall of the recovery room, prescribed 5 minute intervals between *IV* doses whereas Dr. Wenck now says that he administered the full *minijet* in 8 minutes.

Drs. Barnes and Forrest, the one a specialist Respiratory and Sleep Physician and the other a specialist Anaesthetist disagree with Dr. Loblay in two respects. Firstly, they do see Helen Grainger as having been *in extremis* or as near as makes no odds at the time the *adrenaline* was administered. They make the point that a precise assessment of this matter is difficult to make given there was no *ECG* undertaken and no blood pressure recording and they told the inquest that Helen Grainger's position at the time was *"rapidly deteriorating"* and so dire as to justify an *IV* administration of *adrenaline.*

Secondly, they would not be critical of Dr. Wenck if he had administered the whole of the *minijet* at one time and they believe that the proper course in such a case was to administer the *adrenaline* and watch carefully the reaction. To Drs. Barnes and Forrest, the situation was so critical by the time Dr. Wenck arrived in *Recovery* that he might have administered a bolus dose even in the absence of ideal monitoring. But Drs. Barnes and Forrest are guarded in their opinions because the absence of effective monitoring means that they cannot be certain of the precise effect of the *adrenaline*. As Dr.

Forrest told the inquest *"there is no evidence of tachycardia or hypotension and, without monitoring, I cannot tell whether Helen had a heart arrhythmia."*

To Drs. Barnes and Forrest the cause of Helen Grainger's death is probably not the *adrenaline* but the *cephalosporin induced anaphyaxis* for which the *adrenaline* was prescribed.

Dr. Loblay has not resiled from his initial view that *"Mrs. Grainger was given too much adrenaline, too quickly via a route that was inappropriate in the circumstances and that this was the most likely cause of her cardiorespiratory arrest."* But it seems to me that in doing what I think he did, Dr. Wenck has followed a professionally acceptable course which, even if in apparent conflict with the guidelines, is endorsed as acceptable in the challenging circumstances in which he found himself by two of the three senior experts appearing at the inquest.

Monitoring

Each of the experts is critical of the absence of adequate monitoring and recording while the patient was in *Recovery*. Blood pressure, pulse rate, oxygen saturation levels and cardiac function should all have been monitored and recorded. In the event, only pulse and oxygen saturations were recorded. Dr. Wenck's recollection, five years after the event, is that blood pressure was monitored although, for no adequate reason of which I am aware, not recorded but there is no other evidence to establish that. Cardiac output was not monitored by *ECG* although the necessary machine was

available in the clinic. It was simply not used even though it is clear that, where adrenaline is to be used, a clear appreciation of the patient's cardiac output is of the essence.

Intubation

According to Dr. Barnes, *"the sole problem in Mrs. Grainger's emergency management was the inability to establish an adequate airway and adequate oxygenation, resulting in severe hypoxic brain damage."* In his view, the critical issue was Dr. Wenck's lack of *anaesthetic* expertise when an emergency situation arose. Dr. Barnes allowed that *"Dr. Wenck is clearly experienced in IV sedation but he has not been required to perform an endotracheal intubation since 1994.. …his expertise is adequate unless a major emergency occurs where endotracheal intubation is required."*

Like Dr. Barnes, Dr. Forrest was critical of Dr. Wenck's failure to intubate Mrs. Grainger and he noted that the time taken to secure an airway with an *endotracheal* tube from the onset of severe respiratory failure was about 15 to 20 minutes, during which time, Mrs. Grainger was in cardiac arrest for about 8 to 12 minutes (depending upon which version of the time of the arrival of the paramedic is accurate.)

In her *Nursing Report*, *RN* Ashford recorded the administration of *adrenaline* at 9.42am, the administration of *solu-cortef* at 9.45am and that, at 9.47am, pulse was absent and *CPR* commenced. On her version, paramedics arrived at 9.55am and intubated Helen Grainger almost immediately and without

apparent difficulty. Dr. Wenck disputes these timings and the issue is clouded by the ambulance records which have paramedics arriving at 9.58am. The evidence does not allow me to determine how much time Dr. Wenck had, once he had exhausted his attempts to intubate the patient, to try other methods of establishing an airway, perhaps by way of an emergency *tracheotomy* as Dr. Forrest thought might have been possible or by use of muscle relaxant drugs which were available in the clinic though not on the *crash cart*.

On any version of these timings, it is clear that Helen Grainger was without ventilation for an unacceptable period of time and the evidence is that Dr. Wenck found intubation of the patient extremely difficult. Paramedic Gleeson had no difficulty intubating her but he is a man of over thirty five years experience in such matters who undertakes the procedure perhaps 20 times per year. Dr. Wenck, on the other hand, had not intubated a patient since 1994.

Helen Grainger may well have been extremely difficult to intubate. She was obese and there was probably a degree of swelling in the upper airwaves added to *"the underlying asthma with superimposed bronchial obstruction as a component of the anaphylactic reaction."*

The case underscores the importance of providing practical, up to date training in life support for sedationists who must be fully prepared to deal with such emergencies.

Cause of Death
I find that Helen Samantha Grainger died at *John Hunter Hospital*, Newcastle on 29 April, 2007 of Hypoxic Encephalopathy consequent upon Cardiorespiratory Arrest arising from either an excessive intake of Adrenaline or Anaphalyxis, on a background of Cephalosporin Allergy.

Recommendations

1. To the Australian and New Zealand College of Anaesthetists, that the guidelines on sedation and/or analgesia for diagnostic and interventional medical or surgical procedures PS 9 (2010) be amended so as to require *"non-Anaesthetist Medical Practitioners"* to undertake, at not less than 12 monthly intervals, comprehensive and practical training in advanced cardiac and life support at not less than twelve monthly intervals;
2. To the Royal Australian College of General Practitioners and the Australian and New Zealand College of Anaesthetists, that appropriate and effective steps be taken to publicise to *"non-Anaesthetist Medical Practitioners"* providing sedation and/or analgesia the Guidelines entitled *"Medical Management of Severe Anaphylactoid and Anaphylactic Reactions.*

Magistrate Scott Mitchell,

Deputy State Coroner.
Belmont.
15 May, 2012.