OFFICE OF THE STATE CORONER

FINDINGS OF INQUEST

CITATION:	**Inquest into the death of Brendan Scott KAY**
TITLE OF COURT:	Coroner's Court
JURISDICTION:	Townsville
FILE NO(s):	COR 2684/06(3)
DELIVERED ON:	21 April 2009
DELIVERED AT:	Townsville
HEARING DATE(s):	8 July, 19 August, 17,18,19 November 2008
FINDINGS OF:	Ms S Tonkin, Coroner
CATCHWORDS:	CORONERS: Inquest – infant death, sub-glottic stenosis, extreme prematurity, chronic lung disease, SIDS, prolonged intubation, inter-hospital communication and discharge procedures, baby capsule.

REPRESENTATION:

Counsel Assisting:	Mr Justin Greggery
Queensland Health:	Mr TD Gardiner (Minter Ellison Solicitors)

Brendan Scott Kay was born to Jennifer Kay and Dwayne Jack on 9th June 2006 at the Tully Hospital. He weighed 1006 grams. He was delivered at 26 weeks and 2 days and was thus approximately 14 weeks premature.

Background in Townsville

Brendan was immediately transferred to the Neo-natal Intensive Care Unit (NICU) at Townsville Hospital for specialist care. Due to his prematurity (specifically his lungs, his condition being described by Dr Guan Koh, neonatologist at NICU, as chronic lung disease ,common in babies of such prematurity) he was intubated and ventilated from birth for 71 of the 83 days he was at NICU. After extubation, he received "CPAP" (Continuous Airway Pressure), delivery of positive air pressure through nasal prongs, to assist his breathing.

Prolonged intubation is a life-saving procedure in such young babies, which involves the insertion of an endotracheal tube into the wind pipe. Unfortunately it has the associated potential complication of rubbing on the wind pipe causing swelling and narrowing of the airways causing stridor (inspiratory high pitched noise). Brendan developed this condition. Townsville Hospital Director of Neonatology, Dr Whitehall said that laryngeal stenosis (used often in this case interchangeably with the term sub-glottic stenosis) is a recognised uncommon complication of long term intubation and ventilatory support. He had observed approximately 5 children out of the 700 or 800 young babies he had treated in the last seven years develop laryngeal stenosis from intubation. Dr Cartwright preferred the term sub-glottic stenosis, and considered it more accurate than laryngeal stenosis, due to the location of the narrowing in Brendan below the larynx.

A number of the very severe difficulties Brendan faced as a result of his prematurity were resolved at NICU in Townsville, including feeding difficulties, infections, and abdominal distension, however the stridor remained. A rigid bronchoscopy performed on 25th August at Townsville by an ENT surgeon diagnosed Brendan with stenosis (narrowing) at the subglottis (the lower third of the larynx), the narrowest part of the airway, where the cricoid cartilage is situated. This explained the stridor.

Transfer to Brisbane

As there was no paediatric Ear Nose and Throat specialist in Townsville, Dr Yogavijayan Kandasamy, one of the Townsville neonatal staff specialists, after consultation with Royal Brisbane Women's and Children's Hospital (RBWH) NICU in Brisbane, decided to transfer Brendan with his mother to Brisbane to further investigate and if necessary, treat the stridor. They travelled by RFDS on 30th August 2006. Brendan had reached a weight of 2177 grams, and was taking feeds of 160mg/kg per day. He was 83 days old. After so long in the Townsville NICU, his mother who had remained by his side fully involved in his daily care, had developed quite a close and mutually respectful and trusting relationship with the medical and nursing staff there.

Investigations in Brisbane

Brendan's condition was eventually investigated in Brisbane, after delays due to the unavailability of theatre time, on 7th September, 2006 by rigid bronchoscopy and laryngoscopy by Dr Christopher Perry, the consultant paediatric ENT surgeon (Otolaryngologist, Head and Neck Surgeon). Dr James Earnshaw, first year ENT trainee with Royal Australian College of Surgeons assisted him.

When Jennifer and Brendan had initially arrived in Brisbane, Jennifer had been upset by Dr Earnshaw's remark that he did not understand why Brendan had been sent to them. Dr Perry's investigation revealed mobile and healthy vocal cords, and healthy lower trachea and bronchi, with clinically insignificant subglottic stenosis, which was dilated with the scope. A 2.5 mm ETT passed with ease with a small leak. Brendan had minor airway trauma.

He was ventilated for 24 hours after the procedure, and then required 4 days of CPAP and 3 days of dexamethasone to reduce the swelling. No surgical intervention was considered necessary. He was ready for discharge home, and was now 104 days old, tolerating demand feeds and weighed 2,800g. His mother was attending to all his daily care requirements more than adequately, and she was keen to get back home as she had no family support in Brisbane. Stridor was still present but only when he was disturbed or feeding.

At RBWH, Dr David Cartwright, Director of neonatology, in consultation with Dr Barry Steinberg, Consultant Paediatrician, considered there was no further need for Brendan to be in hospital and that he should be discharged directly home. This decision was not influenced by availability of beds in Townsville. His mother was so keen to get home that she proposed to go by train, however Dr Cartwright took the firm view he should transfer by air to Townsville, as he was too young for the long train journey.

Return to Townsville

About 90% of inter-hospital transfers occur by RFDS fixed wing aircraft, the balance 10% by Careflight helicopter.

A RFDS "back transfer" opportunity became available via Mackay, so on 20th September 2006 Brendan and his mother flew back to Townsville. It is unusual for patients being discharged directly home to be transported by RFDS, as that transport is usually reserved for inter-hospital transfers. In this case, as a booking had been made in early September when it seemed Brendan could not undergo investigation in Brisbane after all, the booking, which involved return to Townsville Hospital, remained in place. QCC, usually responsible for such transfers, was not advised by RBWH of the updated plan which was now for Brendan to go direct to home at Tully.

On the flight his heart rate, respiratory rate and oxygen saturation were monitored, and apart from the sensor becoming detached from his foot and being reattached to his hand, there was nothing remarkable. Jennifer however gave evidence that his oxygen saturation dropped to 28 then gradually picked

up to 60 then mid 80's. She did not say anything at the time to Nurse Debbie Schmidt, the RFDS escort.

On arrival at Townsville airport around 6pm (which was later than originally expected when the plan was made for Brendan to take this flight), they were met by Brendan's father Dwayne, in the family car. Nurse Schmidt rang Townsville NICU to ensure Brendan was not expected there and was told by a nurse in management that he was not. (It was in fact the Special Care Nursery that was expecting him, and they were not consulted.) Brendan took a normal bottle feed, of 80ml, and was then installed in the baby capsule in the back seat. About 31km before Ingham Jennifer felt Brendan's hand was limp, and he had gone quiet. She realised he had stopped breathing.

Attempted resuscitation

Dwayne attempted CPR while Jennifer gave him instructions she was receiving over the phone. She called the ambulance which met them at the BP Service station at Ingham and transferred him, whilst continuing resuscitation efforts, to Ingham Hospital where he was blue, limp but still warm, with no breath and no pulse detectable, but some pupil responsiveness to light. Dr Brett Scott, who had one year's experience with intubation of such young babies, initially tried to insert a 3.5mm ET tube (expecting it to fit a child of Brendan's size), and then a 2.5mm tube, commencing at about 8.45pm. He later heard that Brendan had sub-glottic stenosis, which he then realised was consistent with the difficulty he had inserting the larger tube. CPR continued. Despite all attempts, Brendan was unable to be revived. Dr Guan Koh, the neo-natologist who had been significantly involved with Brendan's care at NICU, travelled urgently to Ingham in the hope of assisting with resuscitation however Brendan was already dead when he arrived at 2300 hours.

His life was pronounced extinct at 2300 hours on 20th September 2006 at Ingham Hospital.

Autopsy

Professor David Williams conducted an autopsy on 22nd September 2006 at Townsville Hospital and issued his report concluding that the cause of death was "laryngeal stenosis", on the basis that this was the most significant of 3 significant abnormalities he found on examination. He photographed the larynx, preserved in formalin, some days after the autopsy, to demonstrate the narrowing of the airway he observed.

Professor Williams further noted the presence of features consistent with attempted resuscitation. In relation to the respiratory system, he reported:

"The epiglottis has a moth eaten appearance and the entry to the larynx is normal but there is laryngeal stenosis approximately 4 mm distal to the laryngeal inlet. ...gastric contents are noted to be present in the main bronchi".

Histological examination of the larynx revealed:

"marked congestion and also mild to moderate chronic inflammation at the laryngeal inlet. In the more severely narrowed areas of larynx, there is extensive laryngeal oedema in the submucosa."

He noted petechial haemorrhages in the heart, which tend to be more common in deaths involving a lack of oxygen, and very common in SIDS, as well as inflammation around one coronary artery, and thirdly a giant cell hepatitis in the liver. He did not discount that Brendan may have had a coronary artery spasm that could not be recognised at autopsy, sufficient to cause death.

This was the first autopsy in over 30 years' experience in forensic pathology Professor Williams had undertaken involving a child with subglottic stenosis. In relation to the onset of stenosis and its development, he said he would defer to the opinions of ENT surgeons. He was unable to put a time frame on the development of the laryngeal narrowing to the point that it would cause death. He accepted that the appearance of the epiglottis and the oedematous features of the soft tissue in the larynx were probably evidence of trauma resulting from the attempted intubation with the 3.5mm ET in Ingham.

The parents were advised of the autopsy results by letter from the Coroner enclosing the Post mortem examination report.

Issues

Brendan's parents were understandably most upset. Jennifer had been assured before leaving Brisbane that his condition of sub-glottic stenosis was not clinically significant, however the evidence from the post mortem report was that within 12 hours of discharge, he had died of the very condition for which he had gone to Brisbane for investigation. Her faith in the medical specialists in Brisbane was completely destroyed.

To add to her concerns, she heard from Dr Koh that Townsville Hospital had been expecting Brendan to come back overnight on his return from Brisbane, and that Dr Koh was very surprised to hear that they were going direct from Townsville airport, home to Tully with no overnight observation at NICU. He said they normally have babies over-nighting in NICU before discharge to places like Tully. Clearly there had been a miscommunication between the hospital in Brisbane and NICU.

She was also concerned about his oxygen saturation on the flight, and felt the nurse accompanying them, Debbie Schmidt, was not watching and responding to the monitor.

Jennifer requested that an inquest be held to investigate what appeared to her to be incompetence in diagnosis and treatment, as well as incompetence in communication between the hospitals. She had good reason to believe that these issues must have contributed to Brendan's completely unexpected death.

Under s.8 of the *Coroner's Act 2003*, Brendan's death was reported to police as a "reportable death" as doctors attending Brendan were unable to issue a death certificate naming the cause of his death.

The issues for investigation by the inquest were identified by me as:

(a) the cause of Brendan's death;
(b) whether there were any inadequacies in the Queensland Health discharge procedures and if so did they contribute in any way to the death;
(c) was the care provided by the Royal Brisbane Women's Hospital to a standard expected of professional health carers?
(d) are there any changes to the management of neonates being repatriated to their homes in regional areas involving coordination with regional health service providers that could reduce the chance of death occurring in similar circumstances in the future?

Cause of death

The Root Cause Analysis investigation carried out by Queensland Health referred to in more detail under the heading

"Co-ordination between RBWCH and regional health providers" postulated as follows:

Possible modes of death:

- *Hypoxia due to central apnoea (unlikely due to no history of apnoea and aspiration)*
- *Asphyxiation due to obstruction of airway subglottic (unlikely as anatomical and no acute oedema. No stridor noted by mother)*
- *Asphyxiation due to reflux and positional due to capsule?? (gastric contents in lower airway)*
- *Laryngo, tracheomalacia with airway obstruction (no floppy larynx noted)*

and went on to make the following comments on the post mortem examination:

- *Only performed transverse section at laryngeal inlet. No longitudinal sections performed or photographed*
- *Gastric contents in the airways could have been the result of resus or could have been causative of the asphyxia*
- *Airway diameter not measured.*

At the inquest, opinions varied as to the cause of death.

Dr Guan Koh, Clinical Director, Institute of Women's and Children's Health, a neo-natal specialist at Townsville Hospital, who attended Ingham Hospital where he found that Brendan was already deceased, was of the opinion that Brendan died of aspiration of gastric contents with a background of sub-glottic stenosis. Dr Scott in Ingham had reported that Brendan had milk in his mouth when he commenced intubation. Gastric contents were found present in the main bronchi by Professor Williams.

Professor Williams noted however that there was no inflammatory response in the lungs to the presence of the acidic stomach contents, which would be expected if the contents had entered the lungs while Brendan was alive, supporting Dr Whitehall's conclusion (below) that the milk came up after Brendan died. Professor Williams also concluded that rather than causing death, the presence of the milk was an artefact of resuscitation.

I do not accept that Brendan was asphyxiated by aspiration of his stomach contents, in view of this evidence. I am satisfied that the milk in his mouth when being resuscitated was most likely the result of the resuscitation attempts including CPR in the car and not likely to have played any part in his death.

In relation to SIDS as an alternative cause of death, Professor Williams spoke of his personal dislike of the category, as it involves not finding a definite cause of death, resulting in his experience, in a lack of closure for the parents. As a result of a personal experience with a SIDS death his personal opinion is

"that it's better to have a cause of death than no cause of death because people, when there's no cause of death, are always a bit prone to ask questions in a ..somewhat suspicious way". (Transcript p 2-55 line 12)

The majority specialist opinion (Drs Kandasamy, Whitehall (Director of Neonatology Townsville Hospital), Alcock (Staff Specialist Neonatologist Townsville Hospital), Perry, and Cartwright, was that the cause of death in Brendan's case is unknown, and that the death falls into the category of SIDS (Sudden Infant Death Syndrome), with an underlying condition of or associated with sub-glottic stenosis, and extreme prematurity.

Dr Whitehall's evidence was that there is no research that shows that SIDS is associated with laryngeal stenosis, and indeed plenty of evidence that SIDS is associated with extreme prematurity and chronic lung disease. He believed that it is likely that gastric contents came into the bronchi after death as a result of associated relaxation of valves and sphincters, and not that the baby asphyxiated or drowned after vomiting, as he had no history of reflux. He commented that the narrowing of the airway, photographed by Professor Williams must have happened after death, as otherwise the baby could not have breathed nor fed, which clearly he was able to do until just before Ingham, approximately one hours distant from Townsville. There was no event in his opinion short of an anaphylactoid reaction such as after a bee sting, that could have caused such rapid narrowing from a functional although narrowed airway to completely closed as in Professor Williams' photographs. He conceded that the swelling may have been caused by the intubation during the attempted resuscitation at Ingham hospital, subsequent to Brendan being found in the car to have stopped breathing. Professor Williams' own evidence supports this likelihood:

"*perhaps the effect of eventually achieving intubation, artefacts creep in. I see things that are recorded in my histological description, bits of airway*

lining get knocked off and haemorrhage occurs, and congestion." (Transcript p2-46 line 19)

Dr Perry's evidence was that within 10 minutes of the insertion of the bronchoscope for the purpose of his investigation, acute oedema or swelling of the airway can occur and accordingly such procedure has to take place with intensive care facilities available. It is not surprising in light of this evidence, that Brendan suffered extreme swelling reported by Professor Williams in the course of the resuscitation. Dr Cartwright's evidence supports this conclusion also.

All the evidence supports the view that Brendan's condition was stable prior to his discharge from RBWH and on his arrival in Townsville. None of the evidence supports a conclusion that the condition of sub-glottic stenosis caused his death.

I am satisfied that the swelling observed by Professor Williams in the soft tissues of the larynx was not present when Brendan stopped breathing in the car and is an artefact of resuscitation. I am further satisfied that the cause of his ceasing to breathe in the car, and the mechanism of his death are unknown, and that the death should be categorised as a SIDS Death, associated with sub-glottic stenosis and extreme prematurity.

Q Health discharge procedures

On 4th September Dr Gary Alcock Neo-Natologist on duty in Townsville received a call from Brisbane to say that Brendan was being sent back to Townsville NICU without being investigated. He successfully lobbied for the investigation to be done given the complication for mother and baby involved in returning to Brisbane later.

At around 10.30 or 11am on 20th September, Dr Cartwright was made aware of an RFDS flight that could take Brendan back to Townsville. A call was made by Edwina Gomes to Townsville Hospital to say that this would happen but that he did not need to go to Townsville Hospital before discharge home. The Brisbane Registrar, Dr Rachel Susman phoned Dr Kandasamy to tell him and to arrange a follow-up appointment in a few weeks' time in Townsville with further ENT review in Brisbane in December.

At 7.00am the same day, Dr Koh in Townsville received notice of a phone request from QCC in Brisbane for Townsville Hospital to accept Brendan and sent a message to say that was acceptable. This arose because of the earlier booking for him before Dr Perry's investigation, when it was expected that he would be returned to Townsville Hospital without being investigated. At that time he was not yet well enough to return home. Dr Goh was expecting him all day on 20/9/06, and was shocked that evening to hear that he was at Ingham Hospital at 9pm being resuscitated.

The confusion that occurred, and of which the parents became aware after Brendan's death, from Dr Koh, was unacceptable, and added to their suspicions that the discharge procedures were deficient. Additionally

Jennifer's evidence was that in Brisbane she was told several times that Brendan would be returned to Townsville Hospital for 24 hours' observation before discharge home. It must be remembered however that in Brisbane she also strongly expressed her desire to get home and Drs Cartwright and Steinberg took her wishes into account when deciding that Brendan could go straight home.

I am not satisfied that had Brendan returned to Townsville Hospital for observation before driving home to Tully that would have prevented his death. As a premature infant with chronic lung disease, he was at risk of unexplained death, and the overwhelming expert opinion, which I accept, is that this could have occurred at any time following his discharge.

Standard of care at RBWCH

I am satisfied that the care Brendan received at RBWH was of world class standard. Understandably, as she had no family support in Brisbane Jennifer was keen to go home as soon as she could. She had been intimately involved in Brendan's daily care since his birth and was familiar with the medical procedures and the monitoring of his functions as a result. She did not know the staff in Brisbane, and had built a strong relationship with the staff in Townsville.

It is unfortunate that Dr Earnshaw commented to her that he did not know why they had been sent to Brisbane, as it was already very trying for her to have had to make that journey. His comment was insensitive, although it was probably intended to reassure her that Brendan's condition did not seem severe. Dr Earnshaw and his colleagues see the acute cases, and he was in a good position to make an initial assessment on the basis of his experience, which was confirmed by Dr Perry's investigation in theatre.

It is also unfortunate that it initially appeared that Brendan's investigations would have to be postponed and Jennifer and he would be required to travel to Brisbane again later, due to problems with theatre time, however as it happened, theatre time became available.

Jennifer mentioned issues she had with the standard of nursing care; however there will always be shortcomings and imperfections particularly in the eyes of vigilant parents and following an event such as this death.

The Townsville specialists all spoke highly of the qualifications and experience of the Brisbane neo-natal specialists and I was extremely impressed with their professionalism and concern. There is no basis for criticism of the care they provided or the decisions they made.

In relation to her concerns that Brendan's oxygen saturation dropped to dangerous levels on the RFDS flight back to Townsville, and was not observed by Nurse Schmidt, Dr Perry's evidence was that an oxygen saturation of 30 is very dangerous. It would have been very obvious. The child would be a very dusky grey or blue colour. He had only observed such a low level in a theatre situation which required intervention to improve the

oxygen level. Dr Koh said that on the flight, Jennifer had told him that Brendan had gone well during the flight and she expressed no concern about the flight. I am not satisfied that there was any deficiency at all in Nurse Schmidt's monitoring of Brendan on the flight. Jennifer must have been mistaken, or have misread the monitor or been confused by the dropping out of the monitor momentarily resulting in Nurse Schmidt moving it from his foot to his hand.

I am satisfied that following Brendan's death, in reflecting on her relationships with staff in Townsville and in Brisbane, and in the context of the cause of death given by Professor Williams, Jennifer understandably felt critical of the Brisbane hospital staff. That unit was much bigger and busier, and she had not formed relationships of the same quality with the Brisbane staff. This would no doubt have coloured her opinion of them.

Co-ordination between RBWH and regional health providers

Queensland Health conducted a Root Cause Analysis Investigation to identify steps that could prevent an event such as this in the future.
The following recommendations (not unanimously adopted by all participants) resulted from that:

> -That the Queensland Clinical Coordination Service, neonatal Services in RBWH and Townsville Hospital co-develop a cognitive aid/checklist for back transfers from SE Queensland to North Queensland, to ensure that the appropriate level of clinical escort and logistics planning occur.
>
> -RBWH and Townsville Hospital implement a policy that neonates returning from tertiary care in Brisbane be routinely transferred back to Townsville Hospital prior to discharge home.
>
> -Neonatal services provide advice to all parents regarding safety issues of transportation including infant car restraints-e.g. the Australian Transportation Safety Bureau Brochure issued to all parents.

These recommendations were made after identification of

- the increased risk of a baby with sub-glottic stenosis suffering asphyxia leading to death;
- the likelihood of the final part of the journey by road home occurring in the dark contributing to delayed recognition of asphyxia leading to death;
- the necessity of feeding the baby during travel because of the large distance, and the increased likelihood that the baby would regurgitate and aspirate leading to asphyxia and death.

In relation to the risk thought to possibly exist in relation to car restraints for neonates, it was noted that in this case the baby had reached full term by the time he travelled. Concern was expressed at the risk that parents might be tempted to hold babies in their arms rather than restrain them in the hope of avoiding airway obstruction, thus placing these infants at greater risk of injury in the event of an accident. A car seat challenge was not considered warranted.

The investigation identified a need for improved communication between RBWH neonatal consultant staff and surgical subspecialties, specifically in relation to direct consultant to consultant communication before and after definitive interventions.

It was also noted that Brendan was known by 2 different surnames, Tozer and Kay, which very likely gave rise to confusion and may have contributed to the miscommunication between RBWH and Townsville Hospital and QCC. Consistency of name is important.

In the meantime the procedures have been altered and QNETS has been established to coordinate medical transport of neo-natal and paediatric patients between hospitals in Queensland. It has been co-located with QCC to maximize relevant communication in relation to patient transfers. Dr Mark Stewart Elcock, Director of the Statewide Clinical Co-Ordination and Retrieval Service based in Townsville, interpreted the records relating to Brendan's transfer. He acknowledged that whilst communication in relation to retrievals and transfers has improved via the new system, which has been in place since February 2007, it is still not perfect. He commissioned the root cause analysis following Brendan's death.

He agreed that consultant to consultant communication would be ideal, but pointed out that the consultants are not necessarily easily available because of their other commitments e.g. to other hospitals and to their private practices, and that it is not necessarily practical to expect that they be involved in the frontline communication in relation to transfers. His opinion was that the complete integration of the neo-natal/paediatric transfer service and the adult service would result in the best utilisation of resources and added that advertising was occurring for a new Statewide Director in January 2009, which he believed would improve the situation. I am satisfied that measures have been taken and continue to be refined to address the issue of communication.

Dr Cartwright spoke of two specific changes that had been made to improve communication issues so that in his view the same miscommunication would not arise again:

- One nursing discharge coordinator coordinates all transport systems communication into and out of the nursery;

- Communications regarding the transport go through the QNETS neonatal paediatric coordinator co-located with the Queensland Clinical Coordination Centre (QCCC) and that person is in possession of all the details.

He considered that these two changes have resulted in a major improvement to the system and he could not think of any recommendations for further improvement.

I am not satisfied that the miscommunication contributed to Brendan's death.

Formal findings

I am required under s 45 (2) of the *Coroners Act 2003* to make the following formal findings:

Who the deceased person is: Brendan Scott Kay born on 9th June 2006

When the person died: 20th September 2006.

How the person died: Brendan had developed sub-glottic stenosis as a result of prolonged intubation following his extremely premature birth at 26 weeks. His condition having been fully investigated, and found to be clinically insignificant, and having reached full-term, he died following discharge from hospital. His condition had been stable. He stopped breathing in his baby capsule in his parents' car shortly after a flight from Brisbane during which his functions were fully monitored. He had a feed shortly before setting out on the car journey. He was unable to be resuscitated. The mechanism of his death is unable to be found.

Where the person died: Ingham Hospital

What caused the person to die: Sudden Infant Death Syndrome against a background of sub-glottic stenosis associated with extreme prematurity.

Recommendations made during inquest

I may, under s 46 of the *Coroners Act 2003* comment on anything connected with a death investigated at an inquest that relates to

(a) public health or safety; or
(b) the administration of justice; or
(c) ways to prevent deaths from happening in similar circumstances in the future.

Dr Guan Koh prepared a list of his recommendations which I have paraphrased as follows:

- appointment of a paediatric ENT surgeon in Townsville
- Central Coordination being required to call the medical consultant or registrar on call at both hospitals in relation to transfer arrangements
- Communication between consultants or if not possible, between junior doctors at both hospitals about plans for the baby who is to be back transferred
- Better communication of messages received in relation to a patient, to the consultant/registrar/nurse on duty that day within the department
- Training in CPR for all parents of babies with chronic lung disease
- Saturation check for one hour of babies with chronic lung disease in the baby car restraint before travel
- Parents to be seated next to baby while travelling to better observe baby.

- Avoid baby travelling at night (after dark). Clinicians should be more aware of distances and logistics of travel to ensure travel arrangements minimise the likelihood of travelling at night.
- Avoid giving baby a full feed if it is the first car trip.
- Create a simple access phone number for parents of babies wit ha chronic condition to enable contact with the on-call neonatologist consultant or registrar.
- All babies back transferring from Brisbane should transit in Mackay, Townsville or Cairns before returning to smaller centres
- The post mortem results should be provided to the senior clinicians involved with the care of the deceased patient.
- Patients should not be posted the results of the post-mortem. The results should be communicated by a trained person.

Many of these measures are already in place in Townsville and Brisbane.

Three journal articles were provided in relation to car restraints:

Sudden infant deaths in sitting devices, A Cote, A Bariram, M Deschenes, G hatzakin, Arch Dis Child 2008; 93: 384-389 downloaded from www.adc.jmj.com

Safe Transportation of Premature Infants, Committee on Injury and Poison Prevention and Committee on Fetus and Newborn, Pediatrics 1991;87;120-122downloaded from www.pediatrics.org

Safe Transportation of Newborns at Hospital Discharge, Committee on Injury and Poison Prevention, Pediatrics 1999;104;986-987 downloaded from www.pediatrics.org

The results of the studies reported were inconclusive, however noted incidents of unexplained deaths amongst newborns less than 37 weeks gestation travelling in car seats. It is suspected that they may have suffered airway compromise due to their position.

Dr Kandasamy indicated that Townsville Hospital is already saturation monitoring babies of less than 37 weeks in car capsules prior to their discharge, and that despite the inconclusive nature of the literature, he supports the practice. He acknowledged that the practice would be very resource intensive to implement in every case, and might not be widely supported for both that reason and that the research results are inconclusive. It should be noted that Brendan had travelled all the way from Brisbane to Townsville via Mackay in a capsule with saturation monitoring in place all the way, which was probably longer than he would have been monitored in hospital in Townsville had he been re-admitted. He had demonstrated no difficulties.

Given the significant difference of opinion between the specialists involved in Brendan's treatment and Professor Williams as to the cause of death, and the absence of any formal consultation between the experts following an

unexpected death, Dr Whitehall supports the establishment of a system of death review with neonatologists and paediatricians and the pathologists in these kinds of death, to reach consensus on the cause of death. I consider that this would be a wise innovation.

In relation to the issue of whether babies on back-transfer should routinely overnight for observation in the referring hospital (in that case Townsville on return from Brisbane) before discharge home, Dr Gary Alcock, Neonatology Staff Specialist, Townsville Hospital, said that consideration should at least be given to that question by the consultants before back-transfer. None of the doctors were of the opinion that this would necessarily have made any difference in Brendan's case, and I accept that view.

Coroner's recommendations

1. Active consideration should be given by the clinicians in all cases as to whether neonates returning from RBWH to the referring hospital should be returned for observation at the referring hospital before discharge however there is no basis for a blanket policy in this regard;
2. Where possible babies with chronic lung disease born prematurely should travel in daylight after discharge home, where travel exceeding 30 minutes is involved, and full feeds should be avoided. Parents should also be seated next to the capsule, for maximum observation;
3. Where a death occurs within one month of hospital discharge, the post-mortem examination report should be provided as soon as it is available (promptly) to the treating hospital for provision to the relevant clinicians;
4. In the case of deaths in the first year of life, the forensic pathologist should consult with the treating clinicians in an effort to agree on the cause of death.

It would have been ideal in this case for the parents to have received the post-mortem examination report in a more supportive environment, given the cause of death given by Professor Williams; however it is difficult to frame a recommendation that would cover such cases without placing an overly onerous duty on the Coroners Office and on Medical Staff. If the PM report were provided to the medical practitioners as per recommendation 3, then they would be in a better position if contacted by the parents to offer expert interpretation and support.

I accept that Queensland Health has been trying to recruit a paediatric ENT specialist in Townsville and the making of a recommendation by me has no practical value.

I also accept that improvements have been and are continuing to be made in relation to co-ordination of patient transfer, and that the matter is in hand. The miscommunication has been identified in this case and I make no specific recommendation.

Given the lack of professional consensus on car restraints, I am not prepared to recommend that saturation monitoring be carried out in all cases, due to the imposition on already stretched resources.

The Court wishes to convey its deepest sympathy to Jennifer and Dwayne at the loss of their son Brendan.

The inquest is closed.

S. Tonkin
Coroner
Townsville
21 April 2009