CORONERS ACT, 2003

SOUTH *AUSTRALIA*

FINDING OF INQUEST

An Inquest taken on behalf of our Sovereign Lady the Queen at Adelaide in the State of South Australia, on the 9th, 10th and 11th days of May 2017, the 5th, 6th and 7th days of February 2018 and the 2nd day of March 2018, by the Coroner's Court of the said State, constituted of Mark Frederick Johns, State Coroner, into the death of Ike Jordan Zerk.

The said Court finds that Ike Jordan Zerk aged 14 years, late of 1596 Barossa Valley Way, Altona, South Australia died at the Women's and Children's Hospital, 72 King William Road, North Adelaide, South Australia on the 12th day of March 2015 as a result of ventricular arrhythmia on a background of congenital aortic valve disease. The said Court finds that the circumstances of his death were as follows:

1. Introduction and cause of death

1.1. Ike Jordan Zerk was 14 years of age when he died at the Women's and Children's Hospital on 12 March 2015. He had collapsed at the Williamstown oval at approximately 6:45pm that evening after finishing his football training. Despite considerable resuscitative efforts Ike could not be revived. A pathology review was performed by Dr McIntyre of Forensic Science South Australia who expressed the opinion that Ike's cause of death was ventricular arrhythmia on a background of congenital aortic valve disease, and I so find[1].

1.2. Shortly after his birth Ike was noted to have a cardiac murmur and an echocardiogram revealed severe aortic stenosis. He had otherwise been feeding well and was thriving. At the age of 2½ weeks he was admitted to the Women's and Children's Hospital for a cardiac catheterisation. A balloon dilatation of the aortic valve was performed and Ike

[1] Exhibit C1a

made a satisfactory recovery. He was discharged into the care of Dr Adams, cardiologist, for the necessary follow-up reviews.

1.3. Severe congenital aortic stenosis is to be found in less than 1% of the paediatric population[2]. Dr Adams gave evidence that the balloon valvuloplasty was not the definitive procedure that would allow Ike to live a normal life. In fact, he would require further procedures to be performed[3]. As a matter of fact, Ike was regularly reviewed by Dr Adams in the years following that first procedure which was carried out at the Women's and Children's Hospital in Adelaide.

1.4. Unfortunately the next surgery that Ike would require could not be performed in Adelaide. Instead it would be necessary to refer him to the Royal Children's Hospital in Melbourne for the necessary surgery.

1.5. In November 2004 Dr Adams reviewed Ike, who was then 4 years old, and referred his echocardiogram report to Dr Christian Brizard who was the Director of Cardiac Surgery at the Royal Children's Hospital in Melbourne to consider whether further intervention should be attempted prior to Ike starting school the following year. Ike's case was reviewed by a team consisting of cardiac surgeons and cardiologists as the Royal Children's Hospital in Melbourne in March 2005. The team concluded that there was insufficient information upon which to base a decision at that time and Dr Christian Brizard wrote to Dr Adams to advise that they would like to re-present Ike's case with a more developed history and investigations[4].

1.6. In May 2006 Dr Adams reviewed Ike again and noted that Ike remain asymptomatic, but that he was becoming more active and was beginning to play some sporting activities. Dr Adams reviewed his images on that occasion and formed the view that the aortic valve was bicuspid[5] and had fused at the non and right coronary cusps. Dr Adams arranged for the images to be reviewed by the team in Melbourne because he thought that it would be necessary to consider intervention.

1.7. The images were duly considered by the Melbourne team in July 2006 and their recommendation was that he required aortic valve repair. Preparations were then made

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42[2] Transcript, page 22
[3] Transcript, page 243
[4] Exhibit C8, page 43
[5] A normal valve is tricuspid

by Dr Adams with Ike's parents for the necessary arrangements to be made for travel to Melbourne and that occurred in September 2006.

1.8. The aortic valve repair surgery was performed by Dr Yves D'Udekem D'Acoz (Dr D'Udekem). He said that tricuspidisation of the aortic valve was performed with three cusp extension technique. He explained that the normal aortic valve is made of three cusps that open and close and that Ike's valve was bicuspid, meaning that two of the cusps had fused together during the development of the heart. During the surgery he cut open the larger of the cusps to make it tricuspid using patches of pericardium treated with glutaraldehyde. Dr D'Udekem said that this type of repair lasts for between 5 and 15 years before further surgery is required[6].

1.9. After that successful aortic valve repair Ike continued under the care of Dr Adams until his death in 2015. In the later years Dr Adams was reviewing Ike at approximately 12 month intervals. This Inquest focussed particularly on the last two reviews, the first of which was in December 2013 and the second and more important was in September 2014, only six months before Ike's death. I will review the evidence in more detail below.

2. The evidence of Ike's mother

2.1. Ike's mother gave evidence that from about the age of 8 Ike started to get involved in physical activities and that she and her husband always spoke about sport at their appointments with Dr Adams[7]. She said they understood from Dr Adams that Ike was allowed to do physical activity and sport, but Dr Adams instructed that if he felt tired or if he felt he could not do something, that he was to stop and rest[8]. Mrs Zerk's own observations of Ike in this period were that if he became tired he would stop what he was doing and generally he seemed to be fine approaching his physical activity within moderation[9]. He became involved in football and also played cricket and rode his bicycle. All of these activities were drawn to Dr Adams' attention[10]. Mrs Zerk explained that she and her husband wanted reassurance that these activities were safe. She said that Ike loved his sport but knew his limits and was never the first one in a

[6] Exhibit C13
[7] Transcript, page 15
[8] Transcript, page 16
[9] Transcript, page 16
[10] Transcript, page 16

running race, but was usually near the back[11]. He was very good at school, he loved maths at which he excelled, and he played the guitar. In short, he had a healthy balance in his interests.

2.2. Ike's mother gave evidence of the only physical symptom she ever observed in Ike that might have been a symptom of his heart disease. She said that in approximately March 2014 Ike had been jogging at the start of football training when he felt a bit dizzy and little bit sick. She said that she was at the supermarket when she received a phone call from one of the trainers to tell her what happened and she collected Ike and took him straight home. When she picked him up she said that he was not short of breath and told her that he had been running, that he felt a bit sick and a bit dizzy so he stopped[12]. Mrs Zerk said that she informed Dr Adams of this at the next appointment which was in September 2014. This was the only symptom that might be heart related that Ike ever reported[13].

2.3. Mrs Zerk gave evidence as to Ike's height and weight. In January 2015 Ike was 185 centimetres tall and his weight was 74 kilograms which is tall for his age. His mother said that he had always been on the taller side, but that he did have a big growth spurt in the couple of years before his death[14].

2.4. Mrs Zerk gave evidence about the appointment with Dr Adams in September 2014. Upon arrival at the appointment Ike was taken into a procedure room where his echocardiography was performed by an echocardiographer. That happened before Dr Adams saw Ike. Shortly afterwards they were called into Dr Adams' room for the consultation. Mrs Zerk said that Dr Adams told her that things were fine. They discussed Ike's sporting activities and Dr Adams restated that if Ike noticed anything such as shortness of breath he was to stop. She said:

> 'Which is what he would always tell us about.' [15]

From which I infer that he regularly referred to the topic of signs to look for. She said that Dr Adams said that Ike would know if something was wrong, for example if he was able to run a certain distance one week and not be able to do it the next week, that

[11] Transcript, page 17
[12] Transcript, pages 18-20
[13] Transcript, page 21
[14] Transcript, pages 23, 25
[15] Transcript, page 33

would be a sign of something being wrong[16]. Mrs Zerk told Dr Adams about the dizzy spell that Ike had experienced at training and she said that Dr Adams had said that it could have been attributable to a lot of factors but that he did not seem to think that it was an indicator of something being wrong.

2.5. She said that Dr Adams performed an electrocardiogram and reported that there was a 'slight change'[17]. She said that he did not go into any specifics, but said that there was nothing to be concerned about. She said that he stated that he would send the pictures to Melbourne for a second opinion[18]. Mrs Zerk also said that Dr Adams said that he wished to discuss surgery with the Melbourne team[19]. She said that before she left his rooms she asked him if he would let them know if anything needed to be done and he agreed[20]. She said at the end of the consultation Dr Adams said he would see them in 12 months[21]. This is significant because Dr Adams' evidence is different on this point.

2.6. Mrs Zerk said that on the question of physical activities Dr Adams advised that Ike was not to over exert himself[22] and that he would probably not do so at a young age[23]. She said that Dr Adams had mentioned shortness of breath as a symptom to look out for early on[24].

2.7. Mrs Zerk was questioned about whether Dr Adams ever advised that Ike would need to reduce his physical activity as he neared his next surgery and she responded in the negative. She said that she understood Ike could do as much as he could tolerate and was considered safe by his parents and Dr Adams[25]. She acknowledged that he gave an example of how children as they get older tend to push themselves harder by giving an example of a rower who as an older teenager was very competitive and pushed himself beyond limits[26]. However, she was very firm in her evidence that at no time did Dr Adams say that Ike could not play any particular sport[27]. She said that his advice related more to progressive decline in his ability to do physical activity, but

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[16] Transcript, page 34
[17] Transcript, page 34
[18] Transcript, page 35
[19] Transcript, page 47
[20] Transcript, page 36
[21] Transcript, page 38
[22] Transcript, page 55
[23] Transcript, page 56
[24] Transcript, page 57
[25] Transcript, page 70
[26] Transcript, page 71
[27] Transcript, page 71

acknowledged that she understood from Dr Adams that Ike should not push himself to the brink or over exert himself to an extreme[28].

2.8. Mrs Zerk gave evidence that the 2015 football season was to be Ike's last season of football because she and her husband had decided that he should not continue at a more senior level. She said they knew that at a more senior level the game would become more competitive, but she said that they were never told by Dr Adams that he was not to continue[29]. She did acknowledge however that the advice that Dr Adams had given she and her husband over the years did inform their decision that Ike should stop his football[30]. She was well aware that after Ike underwent his next round of surgery he would be anticoagulated for life and therefore would be unable to play football at all[31].

2.9. Mrs Zerk gave evidence about the day of Ike's death. She said that the previous night she, her husband and Ike had gone to a show in the city and they were quite late in returning. As a result Ike was likely to be tired the following day and she made the decision to keep him home from school the following morning. In fact, she and her husband were picking some grapes that day and Ike was allowed to stay home and assist them. Ike's grape picking was clearly not unduly taxing and he ate and drank well during the day. He was obviously not unduly tired from the grape picking activities because he expressed a wish to go to football training that night and his father duly took him to the training session. Ike was not lethargic at all.

3. The evidence of Mr Zerk

3.1. Mr Zerk's evidence was broadly in line with that of his wife. On the topic of the decision not to play senior football the following passage of evidence is relevant:

> 'Q. Was there a decision that was being made as a family about whether your son, if he didn't have the procedure that required him to stop sport, he would actually be reducing his sport anyway as he got older before the operation.
>
> A. Yes he was always going to reduce his sport as he got older, yeah.
>
> Q. Before the Ross procedure.
>
> A. He knew he'd never play senior football.
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> Q. And why was that.

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[28] Transcript, page 72
[29] Transcript, page 75
[30] Transcript, page 77
[31] Transcript, page 77

A. Because you just get bigger and - well, the main reason, I believe, is that he could get bumped by a bigger person and when you're playing with kids it wasn't as important but when you're playing against bigger bodies you don't want to get bumped anywhere which could affect his heart.

Q. Is that something you just assumed or something you were told.

A. That's something we were told.

Q. And who told you that.

A. Dr Adams told us that - I'm sure he did, yep.' [32]

That evidence was given in chief, but in cross-examination Mr Zerk was more reluctant to concede that a decision had been made by he and his wife that Ike would cease his football before he reached a senior level irrespective of whether the surgery had occurred by then or not[33].

3.2. On this point I find that Mr Zerk's evidence in chief is to be preferred because it marries with the evidence of his wife about the decision to cease football after the 2015 season. It is notable that Mr Zerk's evidence is clear that the decision was informed by advice from Dr Adams[34], a concession Mrs Zerk was less ready to make.

3.3. Unlike Mrs Zerk's evidence, Mr Zerk said that he did not recall Dr Adams referring to shortness of breath while exercising as a symptom to be wary of[35] and denied that Dr Adams had said that Ike should not engage in sport that pushed him to the limit of his physical activity[36]. I prefer Mrs Zerk's evidence on these topics in that she agreed that Dr Adams referred to shortness of breath as a symptom[37] and that she agreed that Dr Adams had said that Ike should not in his physical activities push himself to the brink or over exert himself to an extreme[38].

4. Dr Adams

4.1. Dr Adams has been a cardiologist since the 1970s and he retired in December 2016. Thus at the time of his dealings with Ike he was a very experienced cardiologist. He was a Fellow in Paediatric Cardiology at the Royal Children's Hospital in Melbourne in 1976 and in April 1977 he moved to the Adelaide Children's Hospital as a consultant

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[32] Transcript, page 112
[33] Transcript, pages 115-116
[34] Transcript, page 112
[35] Transcript, page 124
[36] Transcript, page 134
[37] Transcript, page 57
[38] Transcript, page 72

cardiologist until commencing in private practice as a paediatric and adult cardiologist in 1986[39]. Dr Adams said that there is a wide variation in the severity of aortic stenosis in the general population, but Ike had severe aortic stenosis. He said that very early in his treatment of Ike, which was even before the ballooning of Ike's aortic valve, he would have outlined the severity of the problem to Ike's parents. He said he would have explained to them that the ballooning procedure would not be the last intervention required for Ike to live a normal life and that he would have emphasised that patients with Ike's condition are prone to develop bacterial endocarditis if bacteria enter the bloodstream and this can commonly occur at the time of dental treatment or other septic surgical procedures and in those instances Ike would require antibiotic cover[40].

4.2. Although Dr Adams could not recall after so many years precisely what he would have said to Ike's parents about signs and symptoms to look out for and the level of activity that Ike should be engaging in, he gave his evidence based on his general practice. He said that he would have advised parents of a young child with severe aortic stenosis to look out for situations in which the child started becoming short of breath or complained of chest discomfort or funny feelings in the heart as well as any episodes of loss of consciousness[41]. Dr Adams explained that he believed it is extremely difficult to stop a child from doing exercise or playing games but that it is important to sow the seed as early as possible that people who have severe aortic valve problems should not be pushed to extremes of exercise and he believes that he would have said words to that effect to Ike's parents from time to time over the 14 or so years he treated Ike[42].

4.3. Dr Adams believed that he and Ike's parents would have spoken many times about exercise and the fact that Ike should not be pressed to limits and if untoward symptoms appeared, to advise him. He described the symptoms to look out for as increasing shortness of breath with activity, chest discomfort, palpitations which the patient often describes as an unusual feeling in the chest, presyncope or syncope[43]. Dr Adams said he would always discuss symptoms at every consultation and he had no reason to believe that he would not have done so[44].

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[39] Exhibit C15
[40] Transcript, page 243
[41] Transcript, page 347
[42] Transcript, page 247
[43] Transcript, page 252
[44] Transcript, page 253

4.4. Dr Adams said that as children move into the period between 9 and 10 years to the mid-teens it is important for them to know what they should and should not be doing[45]. He said that one of his practices was to illustrate limitations by examples and he related an example of a teenager who was a rower and was participating at a high level and who did experience symptoms from over exertion, but ceased the activity before anything serious happened.

4.5. Finally, Dr Adams said that he told Ike's parents many times that he should not be engaged in heavy physical activity[46].

4.6. Conclusion

I accept and find that Dr Adams did provide general advice of the kind that he asserted in his evidence. Indeed, it is apparent that the message about pushing to the limits or extremes of exertion were received and understood by Ike's parents who diligently guided his sporting and physical endeavours throughout his life, including the decision to cease his participation in football after the 2015 season when he would have moved into the seniors and been exposed to a more competitive level.

4.7. The progression of Ike's condition

Dr Adams said that by 2006 Ike remained asymptomatic but there had been an increasing degree of aortic stenosis and the development of some aortic regurgitation. He said that he was monitoring the degree of obstruction of flow through the aortic valve which had been progressively worsening with time[47]. Dr Adams said that the degree of obstruction in the aortic valve is determined by echocardiography and by identifying the mean gradient of pressure in the aortic valve expressed in millimetres of mercury[48]. Dr Adams said that he referred Ike to the Royal Children's Hospital in Melbourne in 2006 and Ike had the surgery to which I have previously made reference for the aortic valve repair.

4.8. Dr Adams said that from approximately the age of 6 to 12 years it could be expected that Ike would not be requiring further surgery, but would need to be carefully followed. He said that it is important not to race into the next group of surgical procedures because

[45] Transcript, page 254
[46] Transcript, page 273
[47] Transcript, page 248
[48] Transcript, page 248

they are bigger operations and some of them require long term anticoagulation and that it is better for a patient to be of reasonable size or approaching adulthood[49].

4.9. The December 2013 consultation

Dr Adams saw Ike on 5 December 2013. On that day Dr Adams wrote a letter to Ike's general practitioner, Dr London, and the letter was also copied to Dr Brizard at the Royal Children's Hospital in Melbourne[50]. In the letter Dr Adams noted that Ike had remained asymptomatic from a cardiac point of view, but had grown quite dramatically and was around 6 feet in height. The letter stated that there was mildly increased velocity through the left ventricular outflow tract and the 'corrected aortic pressure gradient was 35mmHg so he certainly had mild to moderate aortic stenosis'. He also said that Ike's aortic regurgitation however was moderate to severe now.

4.10. The letter stated that at the time Dr Adams did not believe that Ike needed surgical intervention, but that he would send Ike's data to Melbourne 'just to get their views on what sort of surgical procedure they would look at next. As you would probably recall, he had a balloon aortic valve dilation as a neonate and went on and had an aortic valve repair in 2006 when the bicuspid aortic valve was repaired and made tricuspid'. The letter noted that Dr Adams would see Ike in about nine months and 'I will wait to see what the feeling is in Melbourne about what type of procedure to look at next and the timing of such, but I do not believe it is necessary just at this stage'.

4.11. Dr Adams' file[51] contains the echocardiogram report performed on 5 December 2013. Significantly, it records the mean pressure gradient over the aortic valve as 46.5mmHg. Under the heading 'details' it states:

> 'Corrected mean pressure gradient equals 43mmHg.'

Those words are attributable to the echocardiographer who performed the study.

4.12. This letter was never received by the Royal Children's Hospital team. Both Dr D'Udekem and Dr Brizard stated that they had no record of ever having received such a letter. Dr Adams said that he had no record of receiving a response to that letter, but that it was not unusual not to receive a written response to a letter written to the Royal Children's Hospital in Melbourne. He said often he received a telephone call in

[49] Transcript, page 251
[50] Exhibit C8, page 81
[51] Exhibit C8, page 83

response or an email. He said that he had a recollection of speaking to Dr Brizard about Ike and his best recollection of the timing of that conversation was that it occurred in early 2014, but he did not recall what was discussed with Dr Brizard[52].

4.13. Dr Adams was asked about this letter and he commented that the reference to an increased velocity through the left ventricular outflow tract was indicative of aortic regurgitation. He said that the presence of aortic regurgitation made it more difficult to be precise about the actual assessment of the aortic stenosis[53]. He said that in mixed aortic disease, where a patient has aortic stenosis and also regurgitation, it is difficult to determine how much of the mean pressure gradient is attributable to one or the other. He said that it often makes calculations extremely difficult, but 'you can usually proceed with a correction in the equation'[54]. Thus it was that in the letter Dr Adams referred to the mean pressure gradient as being 35 rather than the figure of 46.5 which appeared in the report itself and he said that he had applied a calculation to make the adjustment[55].

4.14. I find that Dr Adams' letter of 5 December 2013 was not received by the team at the Royal Children's Hospital in Melbourne. The reason for this is unclear. Certainly a copy of the letter does appear in Dr London's notes[56]. Dr Adams claims to have a recollection of speaking with Dr Brizard in early 2014, but there is nothing to corroborate this. If it did occur, the contact must have been initiated by Dr Adams and not Dr Brizard because in the absence of receiving any correspondence from Dr Adams, Dr Brizard would have had no reason to initiate such contact. Dr Adams could not recall the import of the conversation that he thought he had with Dr Brizard, nor did he make any note of it anywhere.

4.15. On any view Dr Adams should have followed up the Melbourne team to obtain their views on the December 2013 data. His suggestion that he may have done so is noted, but there is no record of it. The importance of this matter is that, as will be seen in due course, a further letter and data that came from Dr Adams' consultation with Ike later in September 2014 was also never received by the team at the Royal Children's Hospital in Melbourne. On any view it should have been clear to Dr Adams by the time he came

[52] Exhibit C15a, page 6
[53] Transcript, page 257
[54] Transcript, page 258
[55] Transcript, page 259
[56] Exhibit C6

to send the correspondence in September 2014[57] that there was a need to follow-up receipt of that correspondence which proved to be crucial. He was by then fixed with the knowledge that his correspondence of 2013 had either not been answered at all, or if he did speak with Dr Brizard earlier in the year, had not been received. In those circumstances it was incumbent upon him to exercise great caution with his subsequent correspondence.

4.16. The September 2014 consultation

As I have said, Dr Adams next saw Ike in September 2014. On that occasion he again arranged for an echocardiogram to be performed upon Ike and the report appears in his notes[58]. He also wrote again to Dr London and again the letter announced that it had been copied to Dr Brizard and Dr D'Udekem at the Royal Children's Hospital in Melbourne. The letter was as follows:

> 'I saw this young man again on the 11th September 2014. He said that he was having no cardiac symptoms and was certainly growing dramatically at present.
>
> Today he was in sinus rhythm, Blood pressure was 120/70. His impulse was probably normal. He had a grade 2 to 3 ejection systolic murmur at the base and grade 2 to 3 aortic regurgitant murmur along the left sternal border. His echocardiogram showed that his left ventricle was certainly upper limit normal size but had normal function with mild to moderate LVH. There was moderate aortic stenosis and moderately severe aortic regurgitation. His ECG shows LVH with some STT wave changes.
>
> It is now 8 years since he had his aortic valve repair with Yves d'Udekem and I felt that it was worth just sending the data for discussion again as to what you felt may be the next procedure for him. I suspect he may get a little taller but probably not much more than he was at present although he is only just over 14.' [59]

4.17. The echocardiogram report for the consultation of 11 September 2014 records a mean pressure gradient over the aortic valve at 57.7mmHg. The proper interpretation of this is a matter I will deal with later in this finding.

4.18. The evidence of both Dr Brizard and Dr Dr D'Udekem was that neither the letter nor the echocardiogram report, nor any other data, was received by them or their team. Certainly no copy of it appears on the notes from the Royal Children's Hospital in Melbourne[60]. Dr Adams said that he had posted the letter himself at the post office near his rooms. He mentioned that there was more than one letter and in saying that I took

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[57] It was actually sent in October 2014, a month later
[58] Exhibit C8, page 91
[59] Exhibit C8, page 90
[60] Exhibit C9

him to be referring to the copies that needed to be despatched to Melbourne, bearing in mind that the letter itself was addressed to Dr London. Indeed, the letter appears to have been received by Dr London as it appears on his file[61], although it does not appear that the accompanying echocardiogram report did in fact accompany it. Dr Adams did not follow-up the correspondence with the team in Melbourne and there had been no response from them, nor any further action by Dr Adams as at the date of Ike's death. Dr Adams acknowledged that he had no record of receiving a response from the Royal Children's Hospital in Melbourne. Dr Adams said that it was in his mind that the Royal Children's Hospital may have suggested Ike undergo surgery in Melbourne in 2015. He was thinking that Ike was 'getting close to needing further surgery, possibly within the next 12 months'[62]. For that reason he was interested to know the views of the team in Melbourne. He said that in the period after he learned of Ike's death he contacted the Royal Children's Hospital in Melbourne and was told that there was no record of his letter of 11 September 2014 and the enclosed material having been received[63].

4.19. In his examination in chief Dr Adams conceded that it would have been more prudent for him to have sought more information about Ike's actual level of physical activity[64]. He was asked in examination in chief about an expert's report received by the Court from Dr Robert Justo of the Lady Cilento Children's Hospital in Queensland and in particular whether there was anything in Dr Justo's report with which he disagreed. He advised that there was nothing with which he disagreed[65].

4.20. I will come to Dr Justo's evidence and his report later in this finding, but for the time being I do note that Dr Justo had this to say about the topic of communications between Dr Adams and Royal Children's Hospital in Melbourne:

> 'Given that failures of communication had previously occurred (no response to 2013 letter), Dr. Adams would have been wise to have an action in place to ensure that he followed up on his correspondence if no reply was received. This could either have been an early clinical review appointment or a system in his office, which followed up on correspondence that did not receive an answer in an appropriate time. Past experience suggests that he could have received a response in 3-4 months.' [66]

[61] Exhibit C6, page 38
[62] Exhibit C15a
[63] Exhibit C15a
[64] Transcript, page 261
[65] Transcript, page 261
[66] Exhibit C16

4.21. It was notable that Dr Adams did not offer that concession in as many words in his evidence in chief.

4.22. Under cross-examination he had this to say:

> 'Q. And looking back on what happened with review of Ike from 2012 to 2015 when he passed, when looking back at the fact that you were the specialist they were relying on, is there anything you can say about failures in your system that has led to his death.
>
> A. The biggest failure is the failure to have actually been able to speak to the people in Melbourne. Presumably they say they received - I mean it's quite incredible that they've received neither 2013 or 2014. That has never happened in any of my other patients, although I have had records lost on being sent to the Children's Hospital in Melbourne, as have many other people.
>
> Q. That's a Melbourne failure.
>
> A. Yes.
>
> Q. I'm talking about your failure.
>
> A. I've just told you my failure.
>
> Q. Your failure was not to follow it up.
>
> A. Yes. ' [67]

4.23. In my opinion, Dr Adams' failure to follow-up his correspondence to the Melbourne team is made worse by what should have been his awareness that the 2013 letter had also not been received. In September 2014 when he was preparing the letter to Dr London he should have noted that there had been no response to his letter of December 2013. If he did have a conversation early in 2014 with someone from Melbourne as he claimed, he would have also turned his mind to the fact that whoever it was he spoke to would have informed him that his correspondence had not been received. Whichever way he looked at it, he should have turned his mind to the fact that his last letter, which itself could be construed as seeking guidance from the Melbourne team about the next steps, had apparently not been received. This should have made him all the more careful to ensure the arrival of the correspondence he was sending in September 2014. The significance of that correspondence will appear below. He failed to ensure that the September 2014 correspondence was indeed received by the Melbourne team. That was a part of his care for Ike and a part of his duty as a cardiologist. If indeed he did post the correspondence himself his duty did not end there. In my opinion he ought to have made telephone contact with the Melbourne team

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[67] Transcript, page 272

to advise that his letter was being despatched and, if he heard nothing, to have put in place a mechanism to ensure that the matter was followed up in a timely manner. He did not do so and that is a glaring failure in his practice.

4.24. What advice should have been given to Ike and his parents at the September 2014 consult

Dr Adams conceded in cross-examination that with a reading of 57.5 for the mean pressure gradient across the aortic valve in September 2014 Ike should not have been doing any 'physical activity at all, probably'[68]. I do not take Dr Adams here to be saying that Ike should have literally remained immobile. In the context in which the evidence was given it is plain that Dr Adams is conceding that he ought to have advised that Ike should have ceased sport and any similar physical activity until he had been assessed for surgery[69]. In fact, Dr Adams did not provide any such advice. It would appear that he simply reiterated his usual message about not engaging in heavy physical activity[70].

4.25. Advice given re follow-up review

Dr Adams was asked whether he told the parents as stated by Mrs Zerk that he would see Ike in 12 months and he denied this[71]. He said that he would have handed the parents a 'slip' to be handed to the receptionist as they paid the account on the way out and the slip would have required the receptionist to make a follow-up appointment in three months[72].

4.26. It is notable that in his witness statement[73] he made no mention a later claim that he planned a follow-up appointment within three months as he later suggested in his evidence[74].

4.27. I find that Dr Adams did not complete a three month slip as suggested by him in cross-examination. I find that he in all likelihood he simply said he would see them in 12 months. That does not mean that at the time he was not assuming he would see them sooner if the Melbourne team indicated that surgery was required sooner: as he said at page 11 of his witness statement[75]:

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68 Transcript, page 272
69 Transcript, page 272
70 Transcript, page 273, 275, 276
71 Transcript, page 315
72 Transcript, page 291, 311, 312
73 Exhibit C15a
74 Transcript, page 311
75 Exhibit C15a

> 'If surgery was recommended by the RCH Group I would review Ike with his parents to discuss the recommendations; if Ike and his parents agreed to the surgery I would then make arrangements for Ike's name to be placed on the list for surgery at RCH including getting WCH involved in the process. '

That commentary in his statement is consistent with the view I have expressed above.

4.28. The reported dizziness

It is clear on the evidence that Mrs Zerk certainly did make mention of the reported episode of dizziness. Dr Adams clearly did not remember this as is clear from all of his evidence.

5. The evidence of Dr D'Udekem and Dr Brizard

5.1. Dr D'Udekem made a witness statement[76] and gave oral evidence and Dr Brizard made a witness statement[77]. Dr D'Udekem was asked whether he had any criticism of Dr Adams' practice of writing a letter to a general practitioner and sending a copy to the specialist when he was effectively seeking the specialist's opinion. He made it plain that he thought that was an appropriate practice and that it was clear enough to him that Dr Adams was wanting to 'discuss the case for surgery'[78]. It was suggested that Dr Adams' letter of September 2014 should have been a referral for surgery, but was in fact not. In my view it is not to the point whether it was a referral for surgery or not. It would have been quite clear to the doctors had they received the correspondence what was being asked of them. In my view, nothing turns on this point.

5.2. Dr D'Udekem said that the cut-off numbers for the indication for surgery are 50mg of mercury for the mean gradient and 100mg of mercury for a peak gradient[79]. He was asked what his advice would have been had he received the echocardiogram report of September 2014 and his evidence was that he would have decided to operate. He gave a timeline of approximately three months in which to do so[80]. Dr D'Udekem was of the opinion that an adverse cardiac event for Ike was foreseeable as at September 2014 in the sense that it was something that could happen. It was his opinion that if Ike had

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[76] Exhibit C13
[77] Exhibit C4
[78] Transcript, page 151
[79] Transcript, page 170
[80] Transcript, page 172

received surgery within the recommended timeframe and had he remained relatively inactive while awaiting surgery, his death could have been prevented[81].

5.3. Dr D'Udekem was asked about the statement that Dr Brizard gave in which he said that he would have recommended surgery within three to six months in Ike's case[82]. Dr D'Udekem did not suggest that Dr Brizard might be wrong by allowing six months for surgery given his own estimate of three months. Rather, he accepted that it was a matter upon which opinions might differ as is often the case in the medical field[83].

6. The expert opinion of Dr Justo

6.1. Dr Robert Justo is a paediatric cardiologist at Lady Cilento Children's Hospital in Brisbane. He is the Director of the Cardiology Service in Queensland and an Associate Professor with the University of Queensland. He is undoubtedly an expert in his field.

6.2. He provided a report in this matter[84]. The most pertinent point that he made in his opinion is:

> 'The threshold in most Australian paediatric centres for intervention for aortic valve stenosis is when the mean gradient reaches 50 mmHg.'

He went on to say:

> 'When the gradient exceeds 50 mmHg I would restrict most sporting activities until treatment had occurred.' [85]

6.3. Dr Justo was asked about the echocardiogram report of September 2014. He commented that it was a good quality study and noted that there was mild hypertrophy of the left ventricle. He also noted the report gave the mean pressure gradient of mercury at 57mmHg. He noted that when measuring gradients through the aortic valve the echocardiographer looks at the valve in different views and the 57mmHg measurement was taken from a right parasternal view which is the measurement that will give the highest gradient. He also noted that the report showed that there was a significant amount of aortic valve regurgitation or leakage across the valve. Dr Justo said that he was aware that where aortic stenosis is associated with regurgitation there

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[81] Transcript, page 173
[82] Exhibit C4
[83] Transcript, page 200
[84] Exhibit C16
[85] Exhibit C16

is a 'potential for the gradient to be exacerbated as a measurement'[86]. However he said that he was not aware from literature in the paediatric population that, contrary to Dr Adams' approach, there should be an adjustment made for that factor. As he said 'we do not take that into account when we are formulating the decisions'[87]. In any event, having analysed the report, he noted that the left ventricle was mildly hypertrophied and not dilated. He said that if there were a lot of leakiness in the valve generally the ventricle will become dilated and bigger than normal. In Ike's case it was normal for his size and that caused him to think that the stenosis was probably the predominant problem in Ike's case[88]. Dr Justo said that he was not aware of any formula of the kind referred to by Dr Adams in his evidence, but noted that there may be formulae that are used in adult patients and that are published in adult patient literature, just not in the paediatric world[89]. He emphasised that once the mean pressure gradient reaches 50 that meets the criteria for intervention[90] and he added that this would be fairly uniform in practice which he did not think varied too much around the country[91].

6.4. Dr Justo talked about his practice of discussing these matters with parents and their sick children and said that it has been his practice to mention the mean pressure gradient number and to refer to it at each visit to put in context for the patient how rapidly the gradient was changing. He said he would also be talking about activity levels until the surgery happened, but he emphasised that the surgery was 'not an urgent thing, in the sense that it doesn't have to happen next week'[92]. He said that in a case such as Ike's he would expect surgery to occur between three and six months but acknowledged that in some families with particularly busy schedules and school activities it would be possible to 'push it out a little bit longer and I probably wouldn't have a big issue with that'[93]. Dr Justo said that he would have advised that Ike not play football until the operation happened[94].

6.5. Dr Justo said that he did not know what he would have made of the single reported instance of a dizzy spell and noted that it is a matter of clinical judgment rather than a

[86] As asserted by Dr Adams
[87] Transcript, page 328
[88] Transcript, page 329
[89] Transcript, page 329
[90] Transcript, page 330
[91] Transcript, page 331
[92] Transcript, page 332
[93] Transcript, page 332
[94] Transcript, page 334

black and white decision[95]. Dr Justo was asked whether he would be prepared to permit the timing of the surgery to be pushed out as far as 12 months in a case such as Ike's and he responded that he would not do that routinely. He said that there might be occasions where there are extenuating circumstances with particular families involving practical issues and in such circumstances he would discuss it with the family but that if it were to be pushed out in such a manner he would want to review the patient regularly between three and six months[96]. He explained that there is a risk assessment taking place in these deliberations:

> 'So because aortic valve stenosis is a disease for life and you have recurrent procedures and those procedures do have risk judging the timing is we have these rules but we all bend the rules just a little bit to make it work for the family I guess. Sudden death is a rare event but it certainly does happen and so it's a really difficult thing to manage a rare event in a family growing up with this disease. It's not easy.' [97]

And later he said that it becomes a joint decision with the family[98]. I took him to be saying that his preference would be for the surgery to occur within the three to six month timeframe, but that if a family had pressing reasons to push it out further, he might permit that to happen provided that there was a fully informed discussion with the family about the risks, but that it would be important for the family to understand that one of the risks was sudden death, albeit a rare event.

6.6. Putting the matter in further perspective, Dr Justo gave the following passage of evidence:

> 'The heart has a very great reserve. So the left ventricular myocardium is very strong and what happens when you get stenosis of the valve the muscle thickens and becomes stronger and it will pump against the gradient. So certainly people with much higher gradients than 57 would be asymptomatic performing quite normally within the community but they have this risk of sudden death which is unpredictable with that.' [99]

6.7. Dr Justo was not critical of Dr Adams' habit of writing a referral by writing directly to the general practitioner and copying the letter to the intended referring specialist[100].

6.8. Dr Justo was asked again about the risk deliberations involved in Ike's case after September 2014. He said:

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[95] Transcript, page 335
[96] Transcript, page 335
[97] Transcript, page 336
[98] Transcript, page 336
[99] Transcript, page 339
[100] Transcript, page 351

> 'The risk at those low gradients[101] with what his heart looks like, the risk is sudden death which is a low risk, but there. It's not a risk of heart failure as such because we have also discussed previously how there are people out there who have much higher gradients than this who are asymptomatic or can be asymptomatic.' [102]

Dr Justo was drawing a distinction between two things that might follow if a person such as Ike was not treated. One is the tragedy of sudden death which Dr Justo described as an acute event. The other possibility is where sudden death does not occur. In that category he talked about patients with much higher readings who were asymptomatic. He described their disease process as a more chronic process. He said that such people could take years or decades for the disease process to work its way through to death[103].

6.9. Dr Justo said he would have made a note of the reported dizziness that was mentioned by Ike's parents to Dr Adams[104]. He said he might not make the note in his file, but probably would have done it by way of inclusion in his letter[105]. He said that he did not think that it would influence the decision of the timing for the needed surgery, but would be useful history[106].

6.10. Dr Justo was not critical of the way in which the letter of September 2014 was written. He said it is always good to seek an opinion rather than to ask a surgeon to do an operation[107].

6.11. Dr Justo said that if he had heard nothing back from the correspondence that was sent in September 2014 it would be appropriate to 'chase it down'. He said that he would have thought that two or three months would be a reasonable timeframe to get a response from Melbourne and inferentially he would have followed it up after that[108]. This passage of evidence again indicates Dr Justo's position on the question of whether surgery itself was urgently required.

6.12. Dr Justo was asked about written information for families of patients in Ike's circumstances and whether his service uses such documents and he responded in the negative. He was asked if he saw a benefit in the application of a national standard

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[101] Here he is describing the gradient of 57.7 as 'low'
[102] Transcript, page 355
[103] Transcript, page 335
[104] Transcript, page 335
[105] Transcript, page 356
[106] Transcript, page 356
[107] Transcript, page 357
[108] Transcript, page 358

with respect to the mean pressure gradient and his response was that the paediatric cardiologists are 'a really small community ... we know what one another does'[109]. He was lukewarm on the notion of a national standard for the mean pressure gradient[110].

7. Conclusions

7.1. I find that had the all-important echocardiogram report of September 2014 found its way to the team at the Royal Children's Hospital in Melbourne, Ike would have been listed for surgery within three to six months. However, even if the letter had made its way to Melbourne there is no reason to assume that Dr Adams would have seen the need to advise Ike and his parents to cease sport and other demanding physical activities pending surgery. He would have done so if prompted by the team in Melbourne, but they may very well have assumed, having regard to Dr Justo's evidence and that of Drs D'Udekem and Brizard, that there would be no need to tell Dr Adams to do this as they would have done it themselves and therefore assumed that Dr Adams would have the knowledge to provide the same advice. Clearly he did not.

7.2. Had the report made its way to Melbourne, Ike's parents would have become aware of the need to prepare for surgery. It is quite clear from their evidence and their high level of concern for Ike's wellbeing that they themselves would have made the decision to cease Ike's sport immediately. He would not have been at football practice in March 2015. Indeed, he would likely have had his surgery well before then.

7.3. Dr Adams should have advised Ike and his parents to cease robust physical activity from September 2014, and informed them that it was now time to be considering surgery. That would not necessarily mean inducing panic in them by suggesting that the matter of surgery was urgently required and that Ike should be treated as an invalid in the meantime. A common-sense approach would have been appropriate.

7.4. Dr Adams should have been far more diligent in ensuring that the all-important echocardiogram report of September 2014 did in fact make its way to the Melbourne team. He had good reason to be alive to the possibility that it might not arrive as intended. He had relatively recent experience with the correspondence of December 2013 clearly not having arrived, a fact of which he should have been well aware. Even if that experience were not front of mind it should have become front of mind when he

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[109] Transcript, page 364
[110] See generally his evidence at Transcript, page 365

commenced the consultation with Ike and his parents in September 2014 because he should have been refreshing his memory as to what occurred at the last consultation and what he himself had done on that occasion, namely forwarding the 2013 echocardiogram report to the Melbourne team. He should have taken steps to determine why the previous material had not arrived and to ensure that it did not happen with the echocardiogram of September 2014.

7.5. When Dr Adams had not heard anything back from the Melbourne team some three months later he should have followed up. It appears that he had completely forgotten about the matter however. He had no proper system in place for ensuring that such correspondence would be followed up. The nearest thing he had to a system, if one could call it that, was the ‘slip’ which he said he handed patients to arrange for a follow-up at three or six months if something less than 12 months were required. However, I did not accept his evidence that he actually provided such a slip in the present case, nor that he ever turned his mind to seeing the Zerk’s again as early as three months. Clearly he thought he would hear something from Melbourne and that would be the next trigger that would prompt some action on his part. In short, he had no safety net and he ought to have.

7.6. I find that Ike’s death was foreseeable and was preventable, but for Dr Adams’ failure to advise that he cease unduly robust physical activity and, secondly, that he ensured the September 2014 echocardiogram was actually provided to the Melbourne team. I am not persuaded in view of Dr Justo’s evidence that it would be appropriate to recommend that a fixed guideline of 50mmHg be established for surgical referral. Instead I intend to recommend that the Minister for Health raise this matter with his interstate counterparts with a view to encouraging the profession to give consideration to the publication of guidelines.

7.7. I find that Ike was not sick on the day of his death and had not been kept home from school for that reason. I find that Ike’s family were diligent in caring for Ike’s medical condition and would have followed any instructions as to Ike abstaining from robust physical activity if it had been given. I find that Dr Adams did not tell Ike’s parents about the significance of the echocardiogram reading. I find that Mr and Mrs Zerk did tell Dr Adams about the dizzy spell. I find that it was reasonable for the Zerk family to assume that in the absence of having heard anything from Dr Adams about any response from the Melbourne team that there was nothing that should put them on the alert in

respect of the second opinion that they understood he was going to obtain from that quarter.

7.8. I find that had Ike been passed over to the Melbourne team in all likelihood a repair would have been done earlier than the date of his death and that as a consequence he would have survived.

8. Recommendations

8.1. Pursuant to section 25(2) of the Coroner's Act 2003 I am empowered to make recommendations that in the opinion of the Court might prevent, or reduce the likelihood of, a recurrence of an event similar to the event that was the subject of the Inquest.

8.2. I recommend that the Minister for Health raise the issue of whether it would be appropriate to recommend that a fixed guideline of 50mmHg be established for surgical referral with his interstate counterparts with a view to encouraging the profession to give consideration to the publication of guidelines in this matter.

8.3. The health system is South Australia consumes billions of dollars, and at a national level, billions more. In a system that vast, it is absurd and unacceptable that the life of an otherwise healthy 15 year old should be put at risk by reliance upon the ordinary mail service. There is no paediatric cardiac surgery service in Adelaide. Therefore it is necessary to send information to the services in Melbourne. There must be a failsafe mechanism for that to happen, whether the patient is a public patient at the Women's and Children's Hospital, or a private patient of a cardiologist such as Dr Adams.
I recommend a mandatory system be instituted for all cardiologists treating paediatric patients, under which they must register the patient with the Women's and Children's Hospital, and the patients data must be provided to the Women's and Children's Hospital as and when it is gathered. The Women's and Children's Hospital should then be responsible for forwarding the reports to the team in Melbourne when that is required. Short of recommending that a paediatric cardiac surgical service be commenced in Adelaide, nothing less than the supervision of the safe transmission of crucial data by the Women's and Children's Hospital can suffice.

Key Words: Heart Disease; Medical Treatment - Practitioner

In witness whereof the said Coroner has hereunto set and subscribed his hand and

Seal the second day of March, 2018.

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State Coroner

Inquest Number 4/2017 (0431/2015)