FINDINGS, RECOMMENDATIONS and COMMENTS of Coroner Simon Cooper following the holding of an inquest under the *Coroners Act* 1995 into the death of:

Melinda Shirley Miller

Record of Investigation into Death (With Inquest)

Coroners Act 1995
Coroners Rules 2006
Rule 11

I, Simon Cooper, Coroner, having investigated the death of Melinda Miller with an inquest held at Hobart in Tasmania make the following findings.

Hearing Dates

26th, 27th, 28th February, 28th March and 7th May 2018 at Hobart in Tasmania

Representation

Ms J Ansell Counsel Assisting the Coroner
Ms J Rudolph for the Tasmanian Health Service
Ms A Darcey for Dr Mandy Evans

Introduction

1. Melinda Shirley Miller, mother of two adult children, Mark and Sarah, died unexpectedly at her home in Goodwood between about 6.30pm on Wednesday 21 August 2013 and 1.00pm on Thursday 22 August 2013.
2. Ms Miller was a devoted and much loved mother. At the inquest into her death her children both spoke eloquently of their acute sense of loss. Photos[1] provided by Sarah illustrate vividly her happy engagement with her family and enjoyment of her life.
3. Born on 1 July 1955 to Rena and Terrence Miller, Ms Miller was 58 years of age at the time of her death. She had not worked for many years and lived alone.
4. She had suffered from serious mental illness for many years. She was first admitted as an inpatient to a mental health facility aged 23 when diagnosed as suffering from paranoid schizophrenia or bipolar disorder (the evidence on the point differed but it is unnecessary to make any particular finding about which was her initial diagnosis). A number of admissions, very many drugs and other treatments (including depot antipsychotic medication and electroconvulsive therapy) were used over the years to try and treat her illness. Over the years whilst her symptoms remained essentially the

[1] Exhibit C37.

same her diagnosis altered slightly in that the consensus of medical opinions seem to be that she was suffering from bipolar disorder with psychotic features. Despite all efforts and despite a clear diagnosis unfortunately Ms Miller's illness reached a stage where it was classified as "treatment resistant", at least to standard therapies. During psychotic episodes her behaviour continued to deteriorate and Ms Miller was subject to regular and often mandatory periods of hospitalisation. She was last admitted to hospital for treatment for her mental health between 7 November and 17 December 2012. During this period of hospitalisation Ms Miller's treatment team commenced her on the drug clozapine, an antipsychotic medication reserved for the most serious cases of bipolar disorder, schizophrenia and similar illnesses.

The role of the Coroner

5. Before an analysis of the circumstances surrounding Ms Miller's death is commenced it is important to say something about the role of a coroner. A coroner in Tasmania has jurisdiction to investigate any death which appears to have been unexpected or unnatural. In such circumstances a coroner may if she or he considers it appropriate to hold an inquest. An inquest is a public hearing. In this case, given that Ms Miller's death was most unexpected and there was considerable uncertainty as to the reason for her death, it was considered desirable to hold an inquest.
6. When investigating any death, whether or not an inquest is held, a coroner performs a role very different to other judicial officers. The coroner's role is inquisitorial. She or he is required to thoroughly investigate a death and answer the questions (if possible) that section 28 of the *Coroners Act* 1995 (the *Act*) asks. These questions include who the deceased was, the circumstances in which she or he died, the cause of the person's death and where and when the person died. This process requires the making of various findings, but without apportioning legal or moral blame for the death.[2] A coroner is required to make findings of fact from which conclusions may be drawn by others.[3] A coroner is also able, if she or he thinks fit, to make comments about the death or, in appropriate circumstances, recommendations with a view to preventing similar deaths in the future.
7. A coroner neither punishes nor awards compensation – that is for other proceedings in other courts, if appropriate. Nor does a coroner charge people with crimes or offences arising out of death the subject of investigation. In fact, a coroner in Tasmania may not

2 See *R v Tennent; ex parte Jaeger* [2000] TASSC 64, per Cox CJ at paragraph 7.
3 See *Keown v Khan* [1998] VSC 297; [1999] 1 VR 69, Calloway JA at 75 – 76.

even say that he or she thinks someone is guilty of a crime or offence.[4] I should add that in this case there is no reason to think, at all, that anyone has committed any crime or offence in relation to Ms Miller's death.

8. As was noted above, one matter that the *Act* requires a finding to be made about is how death occurred.[5] It is well-settled that this phrase involves the application of the ordinary concepts of legal causation.[6] Any coronial inquiry necessarily involves a consideration of the particular circumstances surrounding the particular death so as to discharge the obligation imposed by section 28(1)(b) upon the coroner.
9. Finally, I note that the standard of proof in coronial inquests is the civil standard. This means that where findings of fact are made a coroner needs to be satisfied on the balance of probabilities as to the existence of those facts. However, if an enquiry reaches a stage where findings being made may reflect adversely upon an individual it is well-settled that the standard applicable is that articulated in *Briginshaw v Briginshaw*[7]. That case stands for the proposition that it is particularly important to bear in mind the seriousness of any allegation and that the task of deciding whether a serious allegation is proved should be approached with great caution.

Community Treatment Order

10. On 9 January 2013 the Mental Health Tribunal reviewed a Community Treatment Order[8] made in relation to Ms Miller on 17 December 2012 under the *Mental Health Act* 1996. After hearing, the Tribunal decided that the order should be confirmed. The order was due to expire on 16 December 2013 and required Ms Miller to take medications as prescribed, and attend appointments as directed, by her treating team, submit to blood tests and other medical investigations as required and provide her case manager reasonable access to her home for the purpose of assessment and/or the provision to her of medications. The order, in its terms, provided that should Ms Miller fail to comply with any of the conditions she may be admitted to improved hospital as an involuntary patient.
11. The effect of the order was to require Ms Miller to undertake a particular course of treatment, in this case clozapine, whether she wanted to or not, under threat of hospitalisation. The order was in force at the time of her death.

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[4] Section 28 (4) of the Act.
[5] Section 28(1)(b)
[6] See *March v E. & M.H. Stramare Pty. Limited and Another* [1990 – 1991] 171 CLR 506.
[7] (1938) 60 CLR 336 (see in particular Dixon J at page 362).
[8] Exhibit C13.

12. It is arguable that the order which compelled Ms Miller to undertake a particular course of treatment on pain of involuntary commitment to a mental hospital, meant that her death was one to which section 24(1)(b) of the *Act* applied. That section provides that a coroner must hold an inquest if a deceased person was, immediately before death, a person held in care. The term "person held in care" is defined in the *Act* in the following way:

> "b) a person detained or *liable to be detained* in an approved hospital within the meaning of the *Mental Health Act* 2013 or in a secure mental health unit or another place while in the custody of the controlling authority of a secure mental health unit, within the meaning of that Act"[9] [emphasis added].

13. However, in light of the fact that I had already determined to conduct an inquest to enquire into the circumstances surrounding Ms Miller's death, it is unnecessary to determine whether a contingent liability to detention in an approved hospital such as Ms Miller seems to have been subject to by reason of the Community Treatment Order made in January 2013 falls within the definition of "person held in care".
14. The existence of the Community Treatment Order at the time of Ms Miller's death, and which required her to take any medication prescribed for her by her treatment team, is however clearly relevant to both the cause and circumstances of her death. This is especially so given that one area which was explored as a possible cause of her death was clozapine and/or olanzapine toxicity. Ms Miller was required by the terms of the order to take both drugs.
15. It is quite clear that some type of order was necessary because Ms Miller was often quite resistant to taking medication. No doubt this fact influenced the decision to make and then confirm the Community Treatment Order.

Clozapine

16. Clozapine is an atypical antipsychotic drug. It has been in use both in Australia and overseas for over 40 years. It is reserved for treating people such as Ms Miller who are suffering from disorders such as schizophrenia which are resistant to standard treatments. Specifically, clozapine is reserved for those persons who have not responded to at least two other treatments over a two-year period or alternatively who

[9] Section 3.

have suffered adverse effects from other medication which would otherwise be suitable.[10]

17. Clozapine is very effective in the treatment of schizophrenia, schizoaffective disorders and bipolar disorders. Dr Evans, a highly experienced psychiatrist who was involved in Ms Miller's treatment at the Clozapine Clinic at the Royal Hobart Hospital, said that all studies of clozapine as an antipsychotic medication had shown that it is the most effective treatment available for psychosis. Dr Evans said, and I accept, that people treated with clozapine have lower hospitalisation and mortality rates than people treated with other antipsychotic medications. However, clozapine is also known to have very serious side-effects. Those side-effects include cardiomyopathy or myocarditis. Cardiomyopathy is a condition in which heart muscles become inflamed and enlarged. In turn, this leads to stretching and weakening of the heart and the inability of that organ to pump blood efficiently. Myocarditis is an infection of the heart muscle. Like cardiomyopathy, it weakens the heart muscle. It also may interfere with the electrical conduction system of the heart necessary to maintain a regular and healthy heartbeat. Both cardiomyopathy and myocarditis can be fatal.

18. Clozapine is, in real terms, a drug of last resort. Because of this it is only prescribed within very specific parameters. After prescription it is very carefully monitored. The drug is subject to a central national patient monitoring system. That system provides demographic and clinical information in relation to every person in this country ever prescribed clozapine. Dr Evans said that the system serves several purposes including ensuring prescribers do not prescribe for someone who has previously had adverse effects of the drug, and that the prescribers follow the strict monitoring protocols. In addition, the system provides specialist advice regarding the management of any emerging side-effects. The manufacturer of clozapine established a multidisciplinary advisory board which comprises members of the Royal Australian and New Zealand College of Psychiatrists as well as a hospital Pharmacist and a consultant haematologist. Finally, as part of the regulatory framework surrounding the prescription and use of clozapine, a national user guide was published and adopted in August 2013 (around the time of Ms Miller's death).

19. The evidence was that any patient prescribed clozapine must undertake a number of tests including an examination of white blood cells and heart functioning before use of the drug can be commenced.[11] Self-evidently (and this was the evidence at the inquest from several of the psychiatrists who gave evidence) the prescription and monitoring of clozapine is undertaken with great caution.

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[10] Dr Evans, Exhibit C20; Transcript 26 February 2018 at page 30.
[11] Dr Evans' evidence – Exhibit C20; Transcript 26 February 2008 at page 34 – 35.

20. In Tasmania in recent times, and relevantly at the time of Ms Miller's treatment in late 2012 and during 2013 in a manner consistent with national standards, clozapine is dispensed from a clinic conducted at the Royal Hobart Hospital. The evidence was, and I accept, that the clinic is staffed by a registered pharmacist, properly qualified doctors and nurses. Pharmacists require particular accreditation to prescribe and dispense clozapine. The evidence was, and I am satisfied, that this requirement was adhered to at all times Ms Miller was a patient of the clinic.
21. All patients, medical offices and healthcare professionals as well as pharmacies, pharmacists, centre coordinators and assistance - indeed anyone associated with the prescription, provision or use of clozapine - must be registered with the clozapine patient monitoring system before they can either receive or be involved in the dispensing of the drug.
22. The evidence was, and I am satisfied, that all regulatory requirements with respect to the dispensing of clozapine to Ms Miller were adhered to at all relevant times.

Olanzapine

23. Like clozapine, olanzapine is also an antipsychotic medication. It is also used to treat schizophrenia and bipolar disorder. It is also an atypical antipsychotic. Olanzapine is less effective then clozapine and whilst it has side-effects it is not ordinarily thought to be associated with increased or a significant risk of either cardiomyopathy or myalgia. A number of side-effects are associated with the drug. Those side-effects tend to be metabolic in nature such as the development of type II diabetes and weight gain. It also has a sedative effect.
24. Unlike clozapine, the prescription of olanzapine is not managed through a dedicated clinic. Instead community treatment teams are responsible for ensuring its safe prescription and use.

Ms Miller's treatment in the lead up to her death

25. During the period January to August 2013 Ms Miller's medical records indicate that she consulted with healthcare professionals on at least 31 occasions. During that time she saw psychiatrists Dr David Lang and Dr Mandy Evans. Psychiatrist Dr Rupak Dasgupta wrote at least one prescription for her during this time (for diazepam). In addition she saw her general practitioner, Dr Majchrzak, regularly, as well as two case managers and various nursing staff at the Clozapine Clinic at the Royal Hobart

Hospital. The myriad of medical consultations and interventions is not surprising given the complexity and treatment resistance of Ms Miller's illness.

26. Ms Miller was in daily contact with staff from Gavitt House, the location of the Glenorchy and Northern District adult community health service, the community mental health support service in Southern Tasmania. Dr Lang, one of the psychiatrists under whose care she was, was based at Gavitt House during this time. A crisis and assessment triage team (CATT) and a mobile intensive support team also operated from Gavitt House.

27. Ms Miller first attended the Clozapine Clinic on 20 December 2012 shortly after her discharge from hospital. Notes from the clinic describe her at that time as displaying poverty of speech, blunted affect and poor insight. This attendance coincided with her prescription of clozapine. She was initially prescribed 200mg of the drug to be taken at night. Dr Mandy Evans was the principal psychiatrist at all relevant times at the Clozapine Clinic. Ms Miller attended at the clinic at least once a month and had a total of 11 consultations with Dr Evans.[12]

28. The Clozapine Clinic prescribes and then monitors the use of that drug and that drug only. Therefore any other medication needed by a patient must be provided by some other entity. This also explains, at least in part, why Ms Miller had contact with multiple healthcare professionals.

29. By reason of the fact that Ms Miller was attending both Gavitt House and the Clozapine Clinic it was not uncommon for her to see two psychiatrists in a single week. Although the evidence was that there was a high degree of cooperation between Gavitt House and the Clozapine Clinic, it is clear that the two organisations are separate and distinct entities.

30. One consequence of the two organisations being discrete entities is that both clinics keep medical records in relation to the same patient (in this case Ms Miller). Whilst the medical records from the Clozapine Clinic at the Royal Hobart Hospital are digital and are easily and readily accessed by staff at Gavitt House the reverse is not the case. I will return to this issue later in this finding.

31. Between December 2012 and August 2013 Ms Miller's clozapine dosage was steadily increased. As noted above the dose commenced at 200mg *nocte*. On 22 February the dose was increased to 250mg. In April that increased to 275mg and then again 300mg *nocte*. In May the dosage was increased twice first to 325mg *nocte* and then to 350mg.

32. On 20 June 2013 the clozapine dosage was increased to 375mg *nocte*. On 18 July the dose was again increased to 400mg and then again increased on 1 August to 425mg

[12] Exhibit C20.

nocte. Dr Evans said in her evidence, and I accept, that the rationale for the increase in clozapine dosage was the fact that Ms Miller's symptoms continued to manifest themselves. She had at various times displayed clear signs of delusions and paranoia including feeling that she was being watched by her neighbours and that the TV was commenting on her activities. Dr Evans also said that she received information regarding Ms Miller's symptoms and functioning from her clinical manager. Dr Evans also received information from Dr Lang at Gavitt House via the Digital Medical Record system on two occasions, 26 March and 6 June 2013.

33. The evidence was that there is a wide recommended dosage range between 100 and 900mg per day.[13] Ms Miller's dosage did not ever go close to exceeding the recommended maximum prescribed dosage.

34. During the same time period Ms Miller was prescribed a daily dosage of 15mg of olanzapine.

35. Each increase in dosage followed a review of Ms Miller's symptoms at the Clozapine Clinic. As a consequence of the Community Treatment Order the taking by Ms Miller of clozapine was supervised by members of the CATT based at Gavitt House. In practical terms this involved two staff members from the team attending Ms Miller's home each night and providing her with the clozapine and olanzapine medication from a Webster pack.

36. Best practice in relation to the use of clozapine at the time Ms Miller was using it is to be found in the Australian Commission on Safety and Quality in Healthcare - National Adult Clozapine Titration Chart User Guide, Version 1.1. That document was tendered.[14] Dr Evans gave evidence, which I accept, that the requirements of those guidelines were adhered to in Ms Miller's case. A review of the evidence as a whole, and in particular the prescribing records from the Clozapine Clinic, indicate that this was so.

37. An important aspect of the controls and monitoring associated with the prescription of clozapine is pre-treatment haematological and metabolic screening and ongoing monitoring in that regard. The testing that has to be undertaken has not changed materially since Ms Miller's death. It involves regular blood tests and echocardiograms. The tests essentially focus upon bone marrow and heart function. The rationale for undertaking the monitoring, and the associated collection and recording of data obtained, is to enable early detection of any serious adverse effects particularly in relation to cardiac function. The evidence at the inquest was, and I accept, that the

[13] Exhibit C 23 – scholarly article by Nelson J, Demick P, Lublin H, Taylor D – Optimising clozapine treatment.
[14] Exhibit C 21.

pre-treatment testing and ongoing monitoring in relation to Ms Miller whilst prescribed and using clozapine was both appropriate and in accordance with best practice at the time.

38. The testing of blood serum also produces data that enables monitoring of clozapine plasma levels in blood serum. There was some difference of opinion between psychiatrists as to the appropriate reasonable target level the clozapine plasma levels. Dr Sale in a report tendered to the inquest[15] opined that clozapine blood plasma levels in the range of 250 to 350mcg/L were a reasonable target. Dr Evans gave evidence that advice in recognised international literature suggested blood serum levels of clozapine needed to be between 300 and 400mcg/L of blood so as to optimise the chance of a therapeutic response. She said it was necessary for that range to be maintained for about 12 weeks. Little turns on the difference of opinions expressed by Dr Sale and Dr Evans in my view. What is important is that clozapine plasma levels are regularly monitored as part of the safe prescription and use of the drug and that the data produced is interpreted correctly so as to optimise therapeutic outcomes. The preponderance of expert opinion seems to support Dr Evans contention that the appropriate blood serum level for clozapine is somewhere between 300 and 450mcg/L of blood. I accept that this was so. I also am quite satisfied in Ms Miller's case that the data obtained as a result of the monitoring was appropriately utilised to attempt to adjust Ms Miller's dosage of clozapine so as to optimise therapeutic outcomes for her.

39. The evidence in relation to Ms Miller's blood plasma clozapine levels was that they varied over the course of time she was prescribed and using the drug. On 7 March 2013 her level was monitored at 277mcg/L of blood. On 27 March 2013 it had dropped to 190mcg/L of blood. On 30 May 2013 her level was recorded as 231mcg/L of blood. On 20 June 2013 it had dropped again to 189mcg/L of blood. On 15 August, just before her death, Ms Miller's recorded clozapine level was 429mcg/L of blood. On every occasion her blood serum level was analysed in accordance with prescribing guidelines it was within what might be described as acceptable limits. On the last occasion an analysis was undertaken, seven days prior to her death, it was within the suggested range for therapeutic response.

Events of 21 and 22 August 2013

40. It is necessary to consider the events leading up to Ms Miller's death. On the morning of Wednesday 21 August 2013, Mr Mark Miller collected his mother and completed

[15] Exhibit C8.

some shopping at a newsagency and then a supermarket in Moonah. After this they went to a bottle shop to buy a carton of cigarettes (the evidence was that Ms Miller was a heavy smoker). Mr Miller said that his mother "seemed fine". After returning to his mother's home he had to take her out again to a bottle shop where she bought a six pack of Cascade Draught Beer stubbies. He took her home again and dropped her off. The last time he saw her alive was as she gave him a wave and went inside her home. This must have been sometime around the middle of the day.

41. At about 5.00pm two members of the Gavitt House CATT, Mr Robert Harris and Mr Graham Houghton, arrived at Ms Miller's home to dispense medication to her. She was their last patient of the day. Clozapine and Olanzapine as prescribed and at the appropriate doses were administered by Mr Harris and Mr Houghton to Ms Miller. Both men gave evidence at the inquest. Both said that the usual practice was that Ms Miller would hold her hand out and either Mr Houghton or Mr Harris (or whoever was supervising Ms Miller taking the clozapine) would break the medication from its packet into her hand. One or other of the men would get her a glass of water and watch as she took the medication. Sometimes Ms Miller would be asked if she had swallowed the medication but she was not asked that every time. When they did ask she would always confirm that she had swallowed the clozapine. Both men were confident that Ms Miller was taking the medication properly in their presence. The evidence was that the interaction with her and the supervision of the medication being consumed occupied in the order of no more than five minutes.

42. Given the passage of time, at the inquest neither man could actually remember whether Ms Miller was actually seen to swallow her tablets or whether either had asked her if she had swallowed the medication. However I am satisfied that Ms Miller took the drugs as required in accordance with her ordinary practice.

43. At 6.36pm an unanswered call was made by Ms Miller to her son Mark's mobile telephone. It seems logical to conclude Ms Miller was alive at this time. There is no evidence that she was alive after this time.

44. The next day at about 1.00pm Mark Miller went to his mother's home. Upon entering the home, he found her on the couch in her lounge room, wearing the same clothes that she had worn the day before shopping. It was obvious to him that she was dead. He said in his evidence that there was nothing suspicious about the house. Mr Miller said in his evidence that the front door was locked and nothing in the house looked to be out of place or as if it had been disturbed. He saw there were two stubbies on the coffee table in front of her. One was empty and he said he thought one had a little bit left in it. The other four stubbies (from the six pack purchased the day before) were in

the fridge. He drank a stubby himself whilst waiting for police and emergency services to arrive.

45. Police and emergency services attended relatively quickly. It was apparent to paramedics nothing more could be done for Ms Miller and that she had been dead for some time. The fact of Ms Miller's death was notified to the Coroner's Court by attending police and an investigation commenced at the scene.

46. Uniform police as well as members of the Glenorchy Criminal Investigation Branch and Forensic Services officers attended Ms Miller's home. Ms Miller's body was observed to be cold to touch, her limbs were stiff with rigor mortis and lividity was seen by officers at the edges of her fingers. Observations of police at the scene confirmed Mark Miller's evidence that there was no sign of a break-in or damage to doors or windows and nothing appeared disturbed in or around the house. There were no suspicious marks, injuries or signs of violence seen on Ms Miller's body. In short, nothing giving rise to any suspicion was identified by any of the officers who attended the scene. The physical evidence at the scene satisfies me that no other person was involved in any way in Ms Miller's unexpected death. Clearly Ms Miller was alive at 6:36pm on Wednesday, 21 August 2013 (when she called her son Mark). I am satisfied that she died sometime between that time and 1.00pm the next day. The evidence does not allow me to be more precise as to the time, and therefore date, of her death.

47. Investigators located and took possession of some drugs at Ms Miller's home subsequently identified as diazepam. In addition empty containers of that drug were found in her handbag, on the kitchen table and in a bin in the kitchen.

48. In accordance with normal coronial investigative procedure, Ms Miller's body was photographed *in situ* and then after formal identification removed from her home and transported by mortuary ambulance to the Royal Hobart Hospital. At the mortuary an autopsy was carried out upon Ms Miller's body by the State Forensic Pathologist, Dr Christopher Hamilton Lawrence (who also gave evidence at the inquest). Dr Lawrence found no sign of violence or injury. Relevantly, he found Ms Miller's heart to be enlarged and that her coronary arteries had up to 20% narrowing by reason of atherosclerosis. Dr Lawrence also found evidence of old scarring in the left ventricle of Ms Miller's heart and pill fragments in her stomach.

49. Dr Lawrence took samples at autopsy and forwarded them to the laboratory of Forensic Science Service Tasmania for toxicological analysis. Highly experienced forensic scientist, Ms Miriam Connor, gave evidence at the inquest that the toxicological analysis indicated that there were low levels of diazepam but levels of both clozapine and olanzapine in the toxic or fatal range (clozapine 2.2mg/L and

olanzapine 0.7mg/L). These ranges would indicate that the clozapine levels were around seven times the therapeutic range.

50. Ms Connor said that carboxyhaemoglobin was present in the samples at a concentration of 11% saturation. She gave evidence that such a saturation level was consistent with Ms Miller being a tobacco smoker. No alcohol was detected in any of the samples analysed. This was despite the fact that it seems quite clear that Ms Miller had drunk one stubby and part of another on 21 August 2013. The explanation for no alcohol being detected in the samples is likely to be due to it being metabolised before death.

51. Clearly the highly elevated levels of both clozapine and olanzapine required careful examination. Of potential concern is the fact that just seven days before her death Ms Miller's blood serum clozapine level was only 429mcg/L but by the time of her death had apparently increased more than fivefold. The reason for this substantial increase was the subject of detailed and comprehensive evidence at the inquest. One issue that was considered was whether Ms Miller had 'hoarded' either or both drugs and then had overdosed, perhaps deliberately. Another issue examined at inquest was whether there was some other explanation for the seemingly highly elevated levels of both drugs detected by toxicological analysis.

Hoarding and overdose?

52. The evidence I have set out earlier from Mr Houghton and Mr Harris satisfies me that there is no real possibility that Ms Miller hoarded her medication. The evidence as to the procedures followed with respect to dispensing medication by Gavitt House made it clear that the possibility of hoarding (or for that matter accidently providing Ms Miller, or any other patient, with the wrong dose of clozapine) was extremely unlikely. Viewing the evidence as a whole I am satisfied that Ms Miller did not hoard either her clozapine or olanzapine.

53. I am equally satisfied, given the stringent controls associated with the prescription and dispensing of clozapine, that the possibility of Ms Miller obtaining the drug from some other source is virtually non-existent.

54. It follows that I am positively satisfied that there was no opportunity for Ms Miller to have taken a deliberate or accidental overdose of either or both drugs, principally because she had no opportunity to order, stockpile or obtain the drugs (and in particular clozapine) from any other source. In addition, I can positively exclude the possibility that Ms Miller deliberately overdosed on either or both drugs because, aside from her inability to have kept or obtained sufficient quantity with which to overdose,

there was no history (apart from an isolated incident many years before) of any suicidal ideation or attempts on her behalf. Indeed the expert medical opinion in relation to her illness was that it manifested itself not with depression but rather with manic episodes.

Post mortem redistribution

55. The other possible explanation for the very high levels of both clozapine and olanzapine in samples analysed after autopsy was the phenomenon known as post mortem redistribution. In short, post mortem redistribution, as Ms Connor explained in her very helpful and lucid evidence, is a well-recognised but not well understood process. It is used to describe an increase, after death, in the level of a drug in a body, over and above the level it would have been immediately prior to death. Evidence in the form of a scholarly article published in the *Australian and New Zealand Journal of Psychiatry* was received.[16] The article dealt with the process of post mortem redistribution of clozapine, the evidence being that post mortem redistribution of that drug can result in increases between 3.00 to 4.89 times in central blood vessels. Broadly speaking, the concentration of levels of clozapine found in Ms Miller's post mortem blood sample are consistent with the findings referred to in the article.
56. In all the circumstances of the case, viewing the evidence as a whole, the most likely explanation, in my view, for the highly elevated blood levels of both clozapine and olanzapine is post mortem redistribution. This is especially so in light of the conclusions I have reached already with respect to the inherent improbability of Ms Miller having hoarded or stockpiled the drugs or obtained either or both from an alternative source.
57. It follows from this that I do not consider that the most probable cause of Ms Miller's death was combined drug toxicity.

Most likely cause of death

58. All the expert medical evidence received at the inquest was to the effect that schizophrenia is associated with excess early mortality. For reasons not entirely clear sufferers of the illness have significantly higher than normal rates of ischaemic heart disease, cerebrovascular disease, obstructive sleep apnoea, cardiac arrhythmia, heart failure and cardiovascular disease. As was mentioned earlier in this finding, Dr

[16] Exhibit C22 Stark, A and Scott, Jay, Australian and New Zealand Journal of Psychiatry 46 (9) 816-825.

Lawrence found clear evidence at autopsy of significant structural change to Ms Miller's heart which indicated that she had at least of pre-existing myocarditis and possibly viral myocarditis. The opinion he expressed when he gave evidence at the inquest was that the most likely explanation for her death was some type of cardiac condition, either caused by, or contributed to, by the drugs individually or collectively or alternatively a pre-existing cardiac arrhythmia. I accept this evidence. I am satisfied on the balance of probabilities that the most likely explanation for Ms Miller's sudden and unexpected death was cardiac arrhythmia caused by a combination of pre-existing myocarditis in the acute action of clozapine and/or olanzapine.

Formal findings

59. The evidence enables me to make the following findings, pursuant to section 28(1):

a) The identity of the deceased is Melinda Shirley Miller;
b) Ms Miller died in the circumstances detailed in this finding;
c) The most probable cause of Ms Miller's death was cardiac arrhythmia;
d) Ms Miller died between 21 and 22 August 2013 at 16 Alladyce Avenue, Goodwood, in Tasmania; and
e) Ms Miller was born in Hobart, Tasmania on 1 July 1955 and was aged 58 years; at the time of her death she was single and her occupation was home duties.

Recommendations and comments

60. A coroner is empowered to make recommendations or comments by sections 28 (2) and (3) of the *Act* in appropriate cases. I had considered making a recommendation with respect to the Northern Suburbs Mental Health Services processes and procedures relating to the management of records, but Counsel for the Tasmanian Health Service (the ultimately responsible body for that organisation) advised that Mental Health Services is currently introducing Digital Medical Records in all of their community clinics, which will then be available to all the Tasmanian Health Service staff, including those in the Clozapine Clinic. This development is commended. It will doubtless increase the efficient exchange of information as between outreach clinics and the Clozapine Clinic which can only enhance the treatment and management of people in receipt of the drug.
61. The elevated clozapine and olanzapine levels discovered at toxicological analysis, and ultimately explained as due to post mortem redistribution, understandably took the

investigation in a particular direction. That course would have been avoided if immediately upon Ms Miller's body being admitted to the Royal Hobart Hospital a blood sample had been taken. In the circumstances I consider it appropriate, as suggested by counsel assisting, that upon the death of a person who is administered clozapine, a blood sample be taken immediately upon the admission of the body of that person to the Royal Hobart Hospital and at multiple stages within a 48 to 72 hour period of time to more accurately determine levels of toxicity at the time of death.

62. I formally **recommend** that upon the death of a person who is administered clozapine, a blood sample be taken immediately upon the admission of the body of that person to the Royal Hobart Hospital and at multiple stages within a 48 to 72 hour period of time.

Conclusion

63. The circumstances of Ms Miller's sudden unexpected death were carefully and comprehensively examined. Viewing the evidence as a whole I am satisfied that she received appropriate treatment from all the healthcare providers. I am satisfied that the appropriate protocols associated with the use of the drug clozapine were followed. No criticism is, in the circumstances, in my view warranted of any of the healthcare professionals associated with her management.

64. I thank counsel for their assistance in dealing with the difficult and complex issues surrounding Ms Miller's death. In particular I wish to thank Ms Ansell for her assistance.

65. I conclude this finding by expressing my sincere condolences to the children Mark and Sarah on their loss.

Dated 2018 at Hobart in the State of Tasmania.

Simon Cooper
Coroner