

CHEMISTRY

The Pale Horse

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The Pale Horse

10th February 2009

Mrs Maria Barberi was found dead at
25 Thurmaston Road, Beauport
by her daughter, Brigitte

**You are part of the investigation team.
What evidence do you want to collect?**

The Pale Horse

SCIENTIFIC SKILLS

- forensic science
- chemical analysis
- physical analysis
- toxicology
- forensic pathology
- selecting analytical methods

TRANSFERABLE SKILLS

- working with others
- communication
- decision making
- analytical/critical thinking
- independent learning

What you need to do

- Consider what samples to take
- Decide suitable methods of analysis
- Identify a cause of death
- Decide what further evidence is required
- Consider who the likely suspects are

1



Initial Crime Report
Dated: 10/02/09
Beauport Police Station, Midshires Police

Case No.: 10-02-0071 Date: 10/02/09
Offence: Sudden suspicious death of Mrs Maria Barberi
DOB: 13/12/1961
Location: 25 Thurmaston Road, Beauport, front room
Means: Apparently from a blow to the head
Weapon: Unknown

Details:

I arrived at 25 Thurmaston Road at about 16:25 to find Miss Brigitte Barberi who had found her mother dead. Brigitte was in a very distressed state.

I was able to ascertain that Brigitte had left for school at 8:00 and did not return until 16:05, finding it strange that her mother had not met her in the car at the school gate. She found her mother lying in the front room and called the ambulance about 16:10.

The ambulance had arrived about the same time as me. The paramedics stated that she was dead so I called the Police Surgeon to pronounce death and advised the station that CID needed to send an officer.

I secured the scene. Awaited the arrival of the detectives. The case was turned over to Detective Mark Holme, who instructed me to interview the neighbours.

Signed:

PC Chris Rose

Dated:

10/2/01

2



Initial CID Report

Dated: 10/2/09

Case No.: 10-02-0071 Report No.: MH1
Offence: Sudden suspicious death of Mrs Maria Barberi
Location: 25 Thurmaston Road, Beauport, Front Room

Details:

At 16:45 on 10th February 2009, I went to 25 Thurmaston Road, Beauport in response to the request of PC Rose for assistance over a suspected sudden suspicious death.

The dead body, [later formally identified by Mr. Martin Barberi (her husband) as Mrs Maria Barberi], was lying in the front room. The body was lying on its front, facing north, with the top of her head-pointing west. The severe head wound was only visible upon turning the body over. She was wearing a black T-shirt, and black three-quarter-length skirt with purple flowers.

On the floor, just by her left hand were a glass and a cordless telephone. At 17:00, Dr. Steven Middleton (Police Surgeon) pronounced death. He stated that it was unlikely to be death by natural causes. Upon turning the body, a head wound was apparent to her right rear of the skull. This seemed to be from a blunt object. Blood had congealed in the hair. I then directed Annie Barnard (the SOCO) to make a full investigation and treat the area as a crime scene.

Signed:

Detective Mark Holme

Dated:

10/2/01

Identity the person who called the police, and the person who last saw her alive.

What was the approximate time of death?

Crime Scene Photos



3



Door to Door Interviews (1)
Dated: 10/02/09
Beauport Police Station, Midshires Police

Case No.: 10-02-0071 **Interview:** 1 & 2

Location: 27 Thurmaston Road, Beauport

Details:

I interviewed Mr Tim Dollar of 27 Thurmaston Road who I had cautioned the previous year for a disturbance between him and the Barberi's over the placing of a new fence. He said, "They kept much to themselves. They're OK. The damn dog was a nuisance barking in the small hours. Been worse after her marrying the toy boy. I liked Simon Shaw [Maria's ex husband] although he was away at sea a lot. Certainly kept Maria on a short leash. Knew how to discipline her, if you know what I mean."

Mrs. Helen Dollar of the above address said, "I am worried about the daughter with all the shouting that was going on in the last few weeks. Some to do about an inheritance. I am pleased things have quietened down between us. Neighbours again. A few weeks ago, my husband [Tim Dollar] gave them [the Barberi's] a couple of bottles of wine to show there were no hard feelings."

Signed:

PC Chris Rose

Dated:

10/2/01

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Door to Door Interviews (2)
Dated: 10/02/09
Beauport Police Station, Midshires Police

Case No.: 10-02-0071 **Interview:** 3

Location: 23 Thurmaston Road, Beauport

Details:

Mrs Kathy Stevens (in her late 60s) stated "Maria and her lovely daughter Brigitte are smashing. She [Maria] was still getting over the accidental death of her father a couple of years ago from Tidstall Farm. Then with the sudden death of her mother, Betty [Moore], a month or so ago. She [Maria] had visited her every Thursday until she died. Me thinks the Senior Hand ran the farm. Being the only daughter, she [Maria] would have enjoyed her trip to Australia, she had always talked about. Poor lass."

She also stated, "After going to court over the silly boundary dispute, things have been quiet between Mr Barberi and Mr Dollar thankfully. They're not top draw you know. Wasn't Maria back in court again over visiting rights from her abusive ex-husband [Simon Shaw]? Never took to him. At least Maria's accidents have not re-occurred since marrying Martin [Barberi]. That is about all good I can say of him."

Signed:

PC Chris Rose

Dated:

10/2/01

Consider whether this is a natural or suspicious death?

Consider what physical evidence you would collect?

5



**SOCO Report
Midshires Police**

Dated: 10/02/09

Case No.: 10-02-0071 **Report:** SOC01

Offence: Sudden suspicious death of Mrs Maria Barberi

Location: 25 Thurmaston Road, Beauport, Front Room

Details:

This officer was called to the above address in response to the request of Det. Mark Holme for a full crime-scene investigation. He told me that the body, Maria Barberi, was in the front room.

The body was a white female, about 40 years old, lying partly on the right side on a wooden laminated floor. Body was facing north, with the top of the head pointing west. The top of her head was 30 cm south of the north wall and 120 cm west of the east wall.

With the aid of Det. Mark Holme, I made complete measurements and made a sketch of the front room. I searched the entire scene. There was no evidence of forced entry. The following items of evidence were collected:

- 10-02-0071-B1 Glass from floor containing a straw coloured liquid.
- 10-02-0071-B2 Part full bottle of Chateau de la Gravelle 1999 (white)
- 10-02-0071-B3 Carbon monoxide detector.
- 10-02-0071-B4 White crystalline powder from the table in front room.
- 10-02-0071-B5 Medicine bottle.
- 10-02-0071-B6 Cordless telephone

Then marked the body with chalk and rope before the body was taken away to the morgue.

Then a search of the rest of the house was undertaken.

In the kitchen, the washing up certainly had not been done since the previous night but I noted that the dog bowls were clean. Under the sink was 1 litre bottle of bleach, 200 ml of oven cleaner, boot polish and brushes, 1 litre bottle of acid descaler (phosphoric acid), 500 ml bottle of washing-up liquid, white spirit, and brass cleaning fluid.

The bathroom was clean and tidy. A cabinet with a number of medicines contained within. Also suspicious dark red stain in the kitchen sink was found. A sample was taken.

10-02-0071-B7 Scraping of suspected blood sample from sink.

10-02-0071-B8 List of contents of the drug cabinet.

10-02-0071-B9 Sample from the staining on wall in front room.

Fingerprinting was undertaken.

- Front room - Polished wooden floor gave no usable prints.
- Kitchen - Some smudged prints found.
- Bathroom - No clear fingerprints developed.

Uniform officers have sealed the front room.

Signed:

Annie Barnard

Officer Annie Barnard

Dated:

10/2/09

**What do you want to examine or analyse?
Suggest the appropriate method?**

You are allowed to submit 6 requests.



Midshire Police Force

Evidence request form 1

(physical evidence)

Request submitted by Investigation Group

Evidence No.	Evidence	What are you looking for?	Method of Analysis
e.g. 10-02-0071-B9	Sample from the staining on wall in front room.	Identity of the stain?	Drift FT-IR
1.			
2.			
3.			
4.			
5.			
6.			

NOTE that the stain on the wall was not blood but paint.

Who do you suspect at the moment?

Signed: _____

Dated: _____

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**Supplementary CID
Report 1**

Dated: 11/2/09

Case No.: 10-02-0071

Report No.: MH2

Offence: Sudden suspicious death of Mrs Maria Barberi

Details:

Dr. Steven Middleton (the Police Surgeon) was uncertain of the time of death but probably within the last 5 hours but will know more after the Post Mortem.

I then accompanied the body to the morgue where I observed the pathologist, Mr. Peter Crippin, perform the post mortem procedure. He stated that he did not think the blow to the head had killed her and it may have been poisoning.

At 21:05, I returned to the crime scene to see if Mr Martin Barberi (the husband) had returned.

He had already returned home at 18:46 [according to PC Rose] to find the police in his house. Martin informed me that on the 10th February, he had left at 06:30 that morning to go fishing on the upper reaches of the River Coley and had not caught anything. Martin had sent his daughter, Brigitte, to stay with her grandparents [Mr and Mrs A.F. Barberi] for the night. She was hysterical and also rather poorly.

Signed:

Mark Holme


Detective Mark Holme


Dated:


11/2/09


NOTES


Consider the cause of death and the potential suspect(s).


	Witness Card
<p>Mr. Martin Barberi Occupation: Public Health Inspector Blood Group O Age: 30</p>	


	Witness Card
<p>Mr. Tim Dollar Occupation: Self Employed Builder Blood Group O Age: 42</p>	

	Witness Card
<p>DECEASED 5' 6" (168cm)</p> <p>Mrs. Maria Barberi Occupation: A&E Nurse at Beauport General Hospital Blood Group A Age: 39</p>	

	Witness Card
<p>Mrs. Helen Dollar Occupation: Secretary at Titan Industries PLC (pigment manufacturer) Blood Group A Age: 28</p>	

	Witness Card
<p>Miss Brigitte Barberi Occupation: Schoolgirl Blood Group AB Age: 13</p>	

	Witness Card
<p>Mrs. Kathy Stevens Occupation: Retired Science Teacher Blood Group O Age: 70</p>	

	Witness Card
<p>Mr Simon Shaw (ex-husband) Occupation: Seaman (Ex Navy) Blood Group B Age: 38</p>	

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*Midshire***POST MORTEM REPORT**
11/02/09

Case No.: 10-02-0071

Body: Mrs Maria Barberi

Gender: **Female**

Occupation: Nurse

Married: Yes

DOB: 13/12/66 **Age:** 39

Weight: 81.5 kg **Height:** 168 cm

Cause of Death: Probably poisoning awaiting toxicology.

Mechanism of Death: Renal failure and heart attack.

Manner of Death: Sudden, unexpected non-traumatic death. Minor head wound caused by head striking the floor or another surface. Accidental, suicide or homicide?

Time of Death: Before 15:00 on the 10th February 2009.

NOTES

At 18:36 on the 10th February 2009 the post mortem was carried out on Mrs Maria Barberi. The clothes were removed from the body & retained for evidence. No stains or damage to them were observed. There was no evidence of struggle or assault found. The cadaver had dyed red hair from natural brunette with blue eyes that were clear showing no severe trauma.

Death was recent (within the last 4 hours) because rigor mortis was only evident in neck and jaw, no livor mortis (greenish-red coloration to the skin) and absence of insects / maggots. Body temperature was 33°C and still warm to touch so time of death was possibly about 15:00 but as Detective Mark Holmes noted the gas fire had been left on so could have been a number of hours earlier.

Cadaver was weighed and measured. A number of healed fractures were shown in the x-rays. The blow to the head is unlikely to have killed her and was probably dead when she struck a hard object as there was

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very little blood in the hair. No other bruising was evident. The hair in places easily came away in the hand.

Acute tubular necrosis caused renal failure of the kidneys. This is usually indicative of a severe infection or chemical poisoning. There is no evidence of infection and no characteristic odours. This would suggest inorganic poisoning.

The liver showed evidence of cirrhosis by its yellowish red colour. This was caused by prolonged alcohol abuse or possibly poisoning. Caused strain upon the heart and a massive heart attack ensued. Death was almost instantaneous.

Blood, hair and urine samples were taken for Toxicology.

10-02-0071-C1 Blood sample from the body.

10-02-0071-C2 Hair samples from the body.

10-02-0071-C3 Urine samples from the body.

10-02-0071-C4 Kidney from the body.

10-02-0071-C5 Sample of liver from the body.

10-02-0071-C6 Stomach contents from the body.

I would estimate that she died around midday on the 10th February. I am awaiting the Toxicology to determine cause of death.

Signed:

Peter Crippin

Dated:

11/02/09

Peter Crippin, M.D.

**What samples do you want to send for toxicology?
Indicate appropriate analytical methods.**

You are permitted 4 requests for analysis.



Midshire Forensic Laboratory Evidence request form 2 (toxicology)

Request submitted by Pathologist

Evidence No.	Evidence	What are you looking for?	Method of Analysis
e.g. 10-02-0071-C1	Blood from the victim	Illicit and prescription drugs.	Solvent extraction then GC-MS
1.			
2.			
3.			
4.			

NOTE

The Toxicological Screen for the body showed there was only citalopram (Cipramil) present. This is unlikely to have contributed to death.

Who do you suspect at the moment?

Signed: _____

Dated: _____



Typical element levels in blood, serum, urine, kidney, liver, hair and wet tissue.

Element	Blood (µg/ml)	Serum (µg/ml)	Urine (µg/ml)	Kidney (µg/g)	Liver (µg/g)	Hair (µg/g)	Organs (general) (µg/g)
Ag	0.0023			0.05	0.05		(brain 0.03)
Al	0.005	0.005	0.005				0.5 (lung 50, bone 10)
As	0.1	0.1	0.02		0.009	1	0.2
Au	0.00006	0.00008		0.003	0.002	0.06	(brain 0.00024)
Ba		0.02					0.1
Bi	0.009	0.004	0.02				0.04
Ca		100	200				99% in the skeleton as hydroxyapatite (1kg approx.) (total of 1g in plasma)
Cd	0.002	0.0009	0.003	35	2	1	1 (lungs 0.2)
Co	0.009	0.0003	0.0004	0.093	0.061	0.3	<0.09
Cu	1.1	1.1	0.2	5		25	1
Fe	500	1	0.5		250	60	100 (spleen 200)
Hg	0.003	0.002	0.005	0.37*	0.07*	2	0.1 (brain 0.02*)
K	2000	200	2000				
Li		0.02	0.005				
Mg	50	20	50				100 (bone 1000)
Mn	0.091	0.009	0.09	80	2	1.5	0.2 (brain 20)
Mo	0.003	<0.005			0.2	0.2	0.02
Na		3200	2000				
Ni	0.0003	0.0003	0.002		0.05	0.2	0.2
Pb	0.15	<<0.009	0.05		0.55	20	1 (bone 20)
Pt	0.009		0.0003				
Sb	0.0005						
Se	0.09	0.09	0.03	0.8	0.3	1	0.2 (testis 0.3)
Si		5					
Sn		0.0005	0.002				0.2
Sr		0.05	0.15				1 (bone 50) 99% is in bone
Ti		0.09					(bone 0.5 and 10 lung)
Tl	0.005		0.003			0.095	0.09
U	0.0004			0.0006	0.0003		(lung 0.009 and bone 0.008)
V	0.0006	0.0007	0.005	0.003	0.0075		<0.09 (lung 0.002)
W	0.0004		0.0007			0.095	(lung 0.0095)
Zn	7	1	0.5		40		20 (cerebral spinal fluid 0.2)

- * Depending on number of amalgam fillings. These values for 10 amalgams.

[Thompson K.C. & Reynolds R.J. (1978) *Atomic Absorption, Fluorescence and Flame Emission Spectroscopy*, 2nd Edition, Charles Griffin & Co. Ltd., London

Iyengar G.V. & Iengar V. (1988), "Clinical Samples," In McKenzie H.A. & Smythe L.E., ed., *Quantitative Trace Analysis of Biological Materials*, Elsevier, Oxford, p409-417.

Seiler H.G., Sigel A. & Sigel H. (1994), *Handbook on Metals in Clinical and Analytical Chemistry*, Marcel Dekker, Inc., New York]

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**Supplementary CID
Report 2**
Dated: 12/2/09
Case No.: 10-02-0071
Report No.: MH3
Details:

I visited Mr Martin Barberi on the 12th February at 18:35. He was very upset and seems to have been drinking heavily. A number of empty beer cans and some bottles of wine were on the table. His hand was trembling and had obviously not sleeping well. I called the Police Surgeon because of my concerns over his health.

Meanwhile, he recounted that he had last talked to Maria the night before she died [9/2/09] over a chicken chasseur to celebrate her inheritance with a glass or two of white wine.

Martin said that his wife had been ill for some time. She [Maria Barberi] had been to the doctor on a number of occasions and the doctor had dismissed this as food poisoning. The last time, Maria had complained of alopecia. He could not understand why he had not seen how ill she was. Martin was adamant that it was medical incompetence.

The Police Surgeon called the ambulance and he was admitted to Beauport Royal Infirmary that night.

Signed:
Detective Mark Holme
Dated:

12/2/09

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**Supplementary CID
Report 3**
Dated: 12/2/09
Case No.: 10-02-0071
Report No.: MH4
Details:

This was dictated to me over the phone from Beauport Royal Infirmary.

"Mr Martin Barberi was admitted to Beauport Royal Infirmary with suspected alcohol poisoning and is currently stable. A blood sample was sent to toxicology. His airway was maintained and was given oxygen and is currently on a drip to replace fluids. He had been suffering abdominal pain, vomiting and diarrhoea with some evidence of haemorrhaging. He [Martin] was delirious and had lost consciousness. Activated carbon and a purgative to clear out his system have been administered. Undergoing further blood tests. He [Martin] stated that he had not eaten very much recently and had drunk some wine and beer."

Returning to the House, I took the following as evidence from where Mr Martin Barberi was sitting and the Kitchen.

- 10-02-0071-H1 Half-full bottle of Chilean Cabernet Sauvignon 1998 (Red) from table.
- 10-02-0071-H2 Quarter full bottle of Jacob's Creek Dry Riesling 2000 (Australian White) from table.
- 10-02-0071-H3 Part full bottle of homemade "Gooseberry Wine 1999 T.D." from the Kitchen.
- 10-02-0071-H4 Sample of beer from his glass.
- 10-02-0071-H5 Mr Barberi's part eaten plate of food.

Signed:
Detective Mark Holme
Dated:

12/2/09

Consider what caused Mr. Barberi's illness and whether he was suffering from alcohol poisoning.

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Hospital Report

Dated: 14/2/09

Case No.: 10-02-0071

Report No.: FMO-1

Details:

Brigitte was also admitted to Beauport Royal Infirmary on the 14th February with symptoms of acute heavy metal poisoning. Poison and source has yet to be determined. The following samples were taken at Beauport Royal Infirmary from both Mr Martin Barberi and his stepdaughter, Brigitte.

10-02-0071-S1 Blood sample from Mr Martin Barberi
 10-02-0071-S2 Head hair from Mr Martin Barberi.
 10-02-0071-S3 Blood sample from Miss Brigitte Barberi
 10-02-0071-S4 Head hair from Miss Brigitte Barberi.

Signed:

Mark Holme

Dated:

14/2/09

Detective Mark Holme

Consider the following: -

Were any members of the Barberi family poisoned, if so how was it administered?

**Who do you now suspect? What was the motive?
 What was the opportunity?**

**What further evidence do you need?
 Where would you find this?**

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Midshires
Forensic
Laboratory

Samples collected for case 10-02-71

To: Det. Mark Holme

List of Evidence Collected:

10-02-0071-B1 Glass from floor containing a straw coloured liquid.
 10-02-0071-B2 Part full bottle of Chateau de la Gravelle 1999 (white)
 10-02-0071-B3 Carbon monoxide detector.
 10-02-0071-B4 White crystalline powder from the table in the Front Room.
 10-02-0071-B5 Empty medicine bottle.
 10-02-0071-B6 Cordless Telephone.
 10-02-0071-B7 Scraping of suspected blood sample from sink.
 10-02-0071-B8 Contents of the drug cabinet.
 10-02-0071-B9 Sample from the staining on wall in front room.
 10-02-0071-C1 Blood sample from the body.
 10-02-0071-C2 Hair samples from the body.
 10-02-0071-C3 Urine samples from the body.
 10-02-0071-C4 Kidney from the body.
 10-02-0071-C5 Sample of liver from the body.
 10-02-0071-C6 Stomach contents from the body.
 10-02-0071-H1 Half-full bottle of Chilean Cabernet Sauvignon 1998 (Red) from table.
 10-02-0071-H2 Quarter full bottle of Jacob's Creek Dry Riesling 2000 (Australian White) from the table.
 10-02-0071-H3 Part full bottle of homemade "Gooseberry Wine 1999 T.D." from the Kitchen.
 10-02-0071-H4 Sample of beer from his glass.
 10-02-0071-H5 Mr. Barberi's part eaten plate of food.
 10-02-0071-S1 Blood sample from Mr Martin Barberi
 10-02-0071-S2 Head hair combing from Mr Martin Barberi.
 10-02-0071-S3 Blood sample from Miss Brigitte Barberi
 10-02-0071-S4 Head hair from Miss Brigitte Barberi.

Signed:

S. Gough

Dated:

18/02/09

Simon Gough, Ph.D.



Midshire Forensic Laboratory Evidence request form 3 (additional evidence)

Request submitted by Investigating Group

Evidence No.	Evidence	What are you looking for?	Method of Analysis
1.			
2.			
3.			
4.			
5.			
6.			

Who do you suspect?

Signed: _____

Dated: _____



Case Summary

You can only use the evidence that you have. Anything else should be clearly stated as suspicion or on the balance of probabilities. Criminal Law requires proof beyond reasonable doubt and there is still a considerable amount of doubt.

What was Mrs. Barberi's state of mind?	
Was the death of Mrs. Maria Barberi natural causes, accident, suicide, murder or yet to be established?	
What was the cause of death?	
Was poison used?	
If so what was it?	
How was this administered?	
Was the illness of Mr Martin Barberi linked to that of his wife?	Yes No
Was the illness of Brigitte Barberi linked to that of her mother?	Yes No
If so what did they ingest in common with Mrs. Barberi?	
What further evidence is required?	
Whom do you suspect?	
What was his / her / their motive?	
What was his / her / their opportunity?	
Could the person you suspect be cautioned on the evidence collected so far?	

NAME: _____

DATE: _____

GROUP: _____



Presentation of case 10-02-0071

The five-minute presentation and Incident Report should address at least some of the following questions.






1. What was Mrs. Barberi's state of mind?
2. Was the death of Mrs. Maria Barberi suicide, murder or yet to be established?
3. What was the cause of death?
4. Are the illnesses of Martin and Brigitte Barberi related? Could these be related to the death of Maria Barberi?
5. Who do you suspect? What was their motive? What was their opportunity?
6. Could the person you suspect be cautioned on your evidence so far analysed? What further evidence is required? Could a warrant be obtained to search for this evidence?


REMEMBER


You can only use the evidence that you have collected. Anything else should be clearly stated as suspicion or on the balance of probabilities. Criminal Law requires proof beyond reasonable doubt and there is still a considerable amount of doubt.


APPENDIX B: Initial Crime Scene Results


B1	Glass from floor with golden brown residue Fingerprints, GLC, TLC, HPLC ICP-MS, metals by ?, FT/IR	B-1 B-2
B2	Chateau de la Gravelle 1999 (white) bottle (part full) FT-IR, Fingerprints, TLC, HPLC, ICP-MS, metals by ?	B-2 B-3
B3	Carbon monoxide detector Fingerprints	B-4
B4	White crystalline powder from the table in the front room TLC, identity, FT-IR, HPLC, NMR, ICP-MS, metals by ?	B-4 B-5
B5	Empty medicine bottle Fingerprints, FT-IR, NMR, ICP-MS metals by ?	B-6 B-7
B6	Cordless telephone Fingerprints, telephone records	B-7
B7	Scraping of suspected blood sample from sink FT-IR, identity, blank card, DNA	B-8
B8	Contents of the drug cabinet List of the contents of the drug cabinet.	B-9
	Other requests NMR, MS	B-9

B1	FP	Fingerprinting request	
Evidence No.:	10-02-0071-B1 Glass from floor with golden brown residue.		
Test	Powder and fixed print then photographed.		
Prints			
			
Identity	Print from the left thumb of Mrs Barberi.	Print from left middle finger of Mrs Barberi.	Print from left index finger of Mrs Barberi.
Notes	Probably wine from the odour and colour. Suggest use UV-vis spectrometry for confirmation.		



B1	TLC	TLC of straw coloured liquid
Evidence No.:	10-02-0071-B1 Glass from floor with straw coloured liquid.	
Test	TLC then scraping off the bands to perform FT-IR of KBr Disc	
Results	Results consistent with being wine. No suspicious bands evident.	
		
Identity	Wine with no organic impurity observed.	
Notes	Only major organic impurities would be shown.	

B1	GLC	GLC-FID of straw coloured liquid
Evidence No.:	10-02-0071-B1 Glass from floor with straw coloured liquid.	
Test	GLC-FID	
Results	Results consistent with being wine. No suspicious bands evident.	
		
Identity	Wine with no organic impurity observed.	
Notes		



B1	HPLC	HPLC of straw coloured liquid
Evidence No.:	10-02-0071-B1 Glass from floor with straw coloured liquid.	
Test	HPLC-diode array	
Results	Results consistent with being wine. No suspicious bands evident.	
		
Identity	Wine with no organic impurity observed.	
Notes		

B1	ICPMS	ICP-MS of liquid in wine glass	
Evidence No.:	10-02-0071-B1 Golden liquid from wine glass in living room.		
Test	Sample diluted 1 in 10 with 0.2% nitric acid then ICP-MS		
Results		Blank	B1 Glass
	51 V 55 Mn 65 Cu 66 Zn 75 As 82 Se 111 Cd 118 Sn 202 Hg 205 Tl 208 Pb 238 U	6 ppb 32 ppb 7 ppb 27 ppb 1 ppb 4 ppb 2 ppb 0.483 ppm 29 ppb 0.3 ppb 3 ppb 0.2 ppb	20 ppb 1.06 ppm 51 ppb 1.17 ppm 20 ppb 6 ppb 3 ppb 0.446 ppm 39 ppb 0.5 ppb 60 ppb <0.1 ppb
Notes			


B1		Liquid in wine glass: metals by	
Evidence No.:	10-02-0071-B1 Golden liquid from wine glass in living room.		
Test			
Results		Blank	B1 Glass


	V Mn Cu Zn As Se Cd Sn Hg Tl Pb U	6 ppb 0.032 ppm 7 ppb 0.027 ppm 1 ppb 4 ppb 2 ppb 0.48 ppm 0.029 ppm 0.3 ppb 3 ppb 0.2 ppb	0.02 ppm 1.06 ppm 0.051 ppm 1.17 ppm 0.020 ppm 6 ppb 3 ppb 0.44 ppm 0.039 ppm 0.5 ppb 0.060 ppm <0.1 ppb
Notes			
B1/B2	FT-IR request		
Evidence No.:	Wine sample.		
Test	FT-IR		
Results	FT-IR is not a suitable method for looking at liquids with high aqueous content.		
Identity			
Notes			


B2	FP	Fingerprinting request
Evidence No.:	10-02-0071-B2 Chateau de la Gravelle 1999 (white) bottle (part full)	
Prints	Powder and fixed print then photographed.	

Prints		
	Print from Mr Barberi.	Print from unknown person
Notes	The unidentified set is probably male due to their size.	
B2 TLC	TLC of wine	
Evidence No.:	10-02-0071-B2 Part full bottle of Chateau de la Gravelle 1999 (white)	
Test	TLC then scraping off the bands to perform FT-IR of KBr Disc	
Results	Results consistent with being wine. No suspicious bands were evident.	
Identity	Wine with no organic impurity observed.	
Notes	Only major organic impurities would be shown.	


B2 HPLC	HPLC of wine
Evidence No.:	10-02-0071-B2 Part full bottle of Chateau de la Gravelle 1999 (white)
Test	HPLC-diode array
Results	Results consistent with being wine.


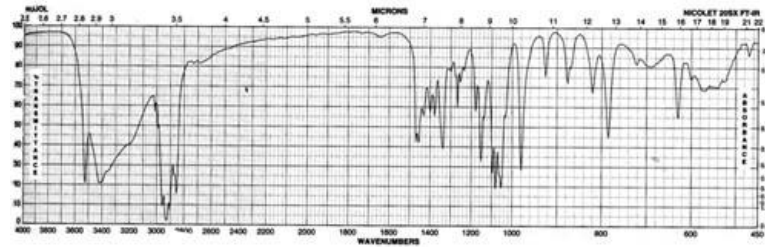
	No suspicious bands were evident.
Identity	Wine with no organic impurity observed.
Notes	


B2 ICPMS	ICP-MS of wine from living room		
Evidence No.:	10-02-0071-B2 Chateau de Gravelle 1999		
Test	Sample diluted 1 in 10 with 0.2% nitric acid then ICP-MS		
Results		Blank	B2 White Wine
	51 V 55 Mn 65 Cu 66 Zn 75 As 82 Se 111 Cd 118 Sn 202 Hg 205 Tl 208 Pb 238 U	6 ppb 32 ppb 7 ppb 27 ppb 1 ppb 4 ppb 2 ppb 0.483 ppm 29 ppb 0.3 ppb 3 ppb 0.2 ppb	20 ppb 1.01 ppm 51 ppb 1.12 ppm 20 ppb 6 ppb 4 ppb 0.421 ppm 41 ppb 0.6 ppb 65 ppb 0.1 ppb
Notes			

B2	Wine from living room: metals by		
Evidence No.:	10-02-0071-B2 Chateau de Graviile 1999		
Test			
Results		Blank	B2 White Wine
	V	6 ppb	0.020 ppm
	Mn	0.032 ppm	1.01 ppm
	Cu	7 ppb	0.051 ppm
	Zn	27 ppb	1.12 ppm
	As	1 ppb	0.020 ppm
	Se	4 ppb	6 ppb
	Cd	2 ppb	4 ppb
	Sn	0.483 ppm	0.421 ppm
	Hg	0.029 ppm	0.041 ppm
	Tl	0.3 ppb	0.6 ppb
	Pb	3 ppb	0.065 ppm
	U	0.2 ppb	0.1 ppb
Notes			

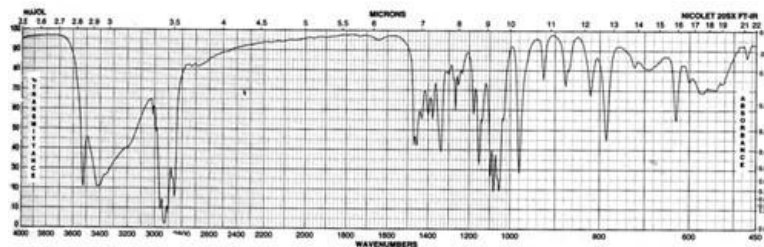

B3	FP	Fingerprinting request	
Evidence No.:	10-02-0071-B3 Carbon monoxide detector		
Prints	Latent fingerprints developed by ninhydrin		
Results			
Identity	Smudged fingerprints could not be identified.		

Notes	Did not show a brown dot in the centre so carbon monoxide levels were normal in the room.	
--------------	---	---


B4	TLC	TLC then FT-IR of white powder
Evidence No.:	10-02-0071-B4 White crystalline powder from the table in the front room.	
Test	TLC then scraping off the bands to perform FT-IR of KBr Disc	
Results		
Identity	Only one band seen. This was ID as Fructose	
Notes	Only Organic impurities would be shown.	
B4	ID	Identity of white powder
Evidence No.:	10-02-0071-B4 White crystalline powder from the table in the front room.	
Test	Charring test and melting point.	
Results	White powder melted and a sweet smell was present on charring.	
Identity	Organic compound probably pure.	


Notes	Sharp mp=119-121 °C	




Identity	Only one band seen. Over 99% Fructose
Notes	Only Organic impurities would be shown.

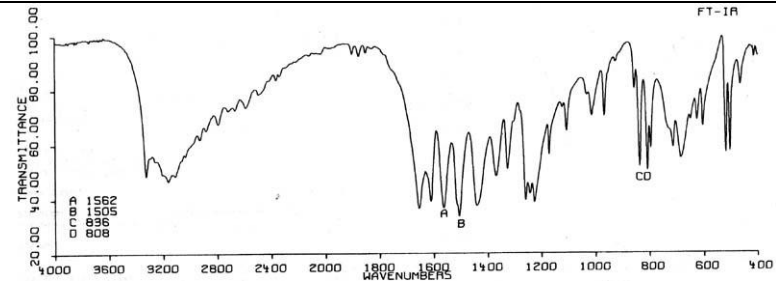
B4 IR	FT-IR of white powder	
Evidence No.:	10-02-0071-B4 White crystalline powder from the table in the front room.	
Test	FT-IR of KBr Disk of unidentified powder	
Results		
Identity	Fructose	
Notes	Organic impurities less than 5% would not be shown.	
B4 HPLC	HPLC-MS of white powder	
Evidence No.:	10-02-0071-B4 White crystalline powder from the table in the front room.	
Test	HPLC-MS	
Results		


B4 NMR	NMR of white powder	
Evidence No.:	10-02-0071-B4 White crystalline powder from the table in the front room.	
Test	NMR	
Results	NMR trace	
Identity	Fructose	
Notes	This is only suitable if the compound is known to be pure. Chromatography (TLC, HPLC or LC should be carried out before using NMR as ID test.	
B4 ICPMS	ICP-MS of white powder	
Evidence No.:	10-02-0071-B4 White Powder from table in Front Room	
Test	Microwave acid digestion with 5 ml of nitric acid to 1g of sample then ICP-MS.	
Results		Blank
		B4 White Powder


	51 V	6 ppb	73 ppb
	55 Mn	32 ppb	0.136 ppm
	65 Cu	7 ppb	91 ppb
	66 Zn	27 ppb	0.58 ppm
	75 As	1 ppb	22 ppb
	82 Se	4 ppb	21 ppb
	111 Cd	2 ppb	<2 ppb
	118 Sn	0.483 ppm	0.425 ppm
	202 Hg	29 ppb	21 ppb
	205 Tl	0.3 ppb	0.1 ppb
	208 Pb	3 ppb	5 ppb
238 U	0.2 ppb	< 0.1 ppb	
Notes			


B4	White powder: metals by		
Evidence No.:	10-02-0071-B4 White Powder from table in Front Room		
Test			
Results		Blank	B4 White Powder
	V	6 ppb	0.063 ppm
	Mn	0.032 ppm	0.101 ppm
	Cu	7 ppb	0.091 ppm
	Zn	0.027 ppm	0.034 ppm
	As	1 ppb	0.025 ppm
	Se	4 ppb	0.011 ppm
	Cd	2 ppb	5 ppb
	Sn	0.483 ppm	0.43 ppm
	Hg	0.029 ppm	0.021 ppm
	Tl	0.3 ppb	0.3 ppb
	Pb	3 ppb	6 ppb
U	0.2 ppb	< 0.1 ppb	
Notes			




B5	FP	Fingerprinting request	
Evidence No.:		10-02-0071-B5 Empty medicine bottle.	
Test		Latent fingerprints developed by ninhydrin	
Prints			
		Print from the left thumb of Mrs Barberi.	Print from right thumb of Brigitte Barberi
Notes		Label states that it is 500mg Cocodamol. Prescribed to Mr. Barberi.	
			


B5	IR	FT-IR of residue in medicine bottle	
Evidence No.:		10-02-0071-B5 Empty medicine bottle.	
Test		FT-IR of KBr Disk	
Results			
Identity		Acetoaminophen	
Notes		Commonly known as Paracetamol or Panadol. This is the major ingredient for Cocodamol. Prescribed to Mr Barberi.	


B5	NMR	NMR of residue in medicine bottle	
Evidence No.:	10-02-0071-B5 Empty medicine bottle.		
Test	NMR		
Results	NMR trace		
Identity	Possibly Paracetamol but the trace has a large number of peaks. Obviously a mixture. Tablets are not made of pure drugs and have a large proportion of filler (titanium dioxide, gelatin etc..)		
Notes	This is only suitable if the compound is known to be pure. Chromatography (TLC, HPLC or LC should be carried out before using NMR as ID test.		


B5		Contents of medicine bottle: metals by		
Evidence No.:	10-02-0071-B4 Contents of the Medicine Bottle			
Test				
Results		<i>Blank</i> ppm w/v	B5 ppm w/v	
	V	0.006	0.063	
	Mn	0.032	0.101	
	Cu	0.007	0.091	
	Zn	0.027	0.034	
	As	0.001	0.025	
	Se	0.004	0.011	
	Cd	0.002	0.005	
	Sn	0.483	0.43	
	Hg	0.029	0.021	
	Tl	0.0003	0.0003	
	Pb	0.003	0.006	
	U	0.0	0.0	
Notes	Cocodamol was prescribed to Mr Barberi			


B5	ICPMS	ICP-MS of contents of medicine bottle		
Evidence No.:	10-02-0071-B4 Contents of the Medicine Bottle			
Test	Microwave acid digestion with 5 ml of nitric acid to 1g of sample then ICP-OES.			
Results		<i>Blank</i> ppm w/v	B5 ppm w/v	
	51V	0.006	0.063	
	55Mn	0.032	0.101	
	65Cu	0.007	0.091	
	66Zn	0.027	0.034	
	75As	0.001	0.025	
	82Se	0.004	0.011	
	111Cd	0.002	0.005	
	118Sn	0.483	0.43	
	202Hg	0.029	0.021	
	205Tl	0.0003	0.0003	
	208Pb	0.003	0.006	
	238U	0.0	0.0	
Notes	Cocodamol was prescribed to Mr Barberi			


B6	FP	Fingerprinting request	
Evidence No.:	10-02-0071-B6 Cordless Telephone		
Test	Powder and fixed print then photographed.		
Prints			
Identity	Print from Mrs. Barberi's left thumb	Print from Mrs. Barberi's middle finger	
Notes	No body fluids or skin samples found on telephone. Negative to luminol test for blood.		


B6	ID	Telephone records			
Evidence No.:	10-02-0071-B6 Cordless telephone.				
Test	BT were contacted and sent the records as requested. The Past few days is shown.				
	CALL TO	NUMBER	DATE	TIME	DURATION (minutes)
	Kutnall	0236-896432	8/02/01	18:44	10:09
	Beauport	022-8305831	8/02/01	18:56	58:16
	Beauport	022-8008000	9/02/01	10:21	5:18
	Kutnall	0236-896432	9/02/01	19:01	0:05
	Kutnall	0236-896432	9/02/01	20:45	0:05
	Kutnall	0236-896432	9/02/01	21:38	12:08
	Beauport	022-8906227	10/02/01	06:21	5:10
	Atwood	0231-657801	10/02/01	09:20	10:08
	Beauport	022-8305831	10/02/01	11:23	1:43
	Beauport	999	10/02/01	16:09	2:01
	Beauport	022-8305831	10/02/01	17:56	1:25
Notes	022-8305831 Mr & Mrs A.F. Barberi 022-8906227 Beauport Angling Association 022-8008000 Coley Water Company 0231-657801 Mrs H. Petifer 0236-896432 Mr Simon Shaw (Ex Husband)				


B3	CO detector
Evidence No.:	10-02-71 CO detector
Test	Visual inspection
Results	No CO detected by this detector
Notes	


B7	IR	Identity of suspected blood stain
		10-02-0071-B Scrapping of suspected blood sample from sink.
Test		Drift FT-IR
Results		IR spectra indicative of pigment.
Identity		Paint probably from the newly painted hall. Consistent with the paint can in room.
Notes		


B7		Suspected blood sample
Evidence No.:		10-02-0071-B7 Scrapping of suspected blood sample from sink.
Test		
Results		
Identity		
Notes		


B7	ID	Suspected blood sample
Evidence No.:		10-02-0071-B7 Scrapping of suspected blood sample from sink.
Test		Luminol test. Blood is shown as fluoresces under UV light.
Results		Negative
Identity		Not blood.
Notes		Suggest FT-IR or Raman spectroscopy and comparison studies if required. 

B7	DNA	DNA testing of suspect blood sample
Evidence No.:		10-02-0071-B7 Scrapping of suspected blood sample from sink.
Test		DNA profiling.
Results		No DNA found
Identity		
Notes		It is a good idea to check whether it is blood before sending away for a very expensive test. The results would normally take about a month. 

B8	ID	List of the contents of drug cabinet
Evidence No.:	10-02-0071-B8 Contents of the drug cabinet.	
Test	N/A	
Results	N/A	
Identity	500mg Coproximol (Prescription Mr Barberi) 250mg Panadol 100mg Valium (Prescription Mrs Barberi) 20mg Cipramil (Prescription Mrs Barberi) 250mg Penicillin (Prescription B. Barberi)	
Notes	No suspect or controlled substances were present.	

	Mass spectrometry request
Evidence No.:	
Test	MS
Results	This is not a suitable method. It should be only used on pure compounds and for confirmation after suitable chromatography (TLC or LC) or as part of a hyphenated method (GC-MS, HPLC-MS, ICP-MS etc.)
Identity	
Notes	Forensic Lab would have to send out for this analysis and would take over a week to return.
	


	NMR request
Evidence No.:	
Test	NMR
Results	This is not a suitable method. It should be only used on pure compounds that are unlikely to occur during an Forensic investigation and for confirmation after suitable chromatography (TLC, HPLC or LC.)
Identity	
Notes	Forensic Lab would have to send out for this analysis and would take over a week to return.
	

Evidence No.:	
Test	
Results	
Notes	
	


APPENDIX C: Toxicology of Body Results

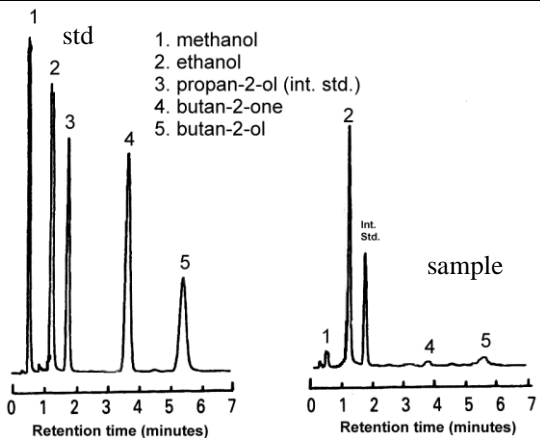

C1: Blood from the dead body	
GC-MS, headspace GC for alcohol, HPLC-MS, GF-AAS for thallium,	C-1
ICP-OES, ICP-MS, determination of ?, metals by ?	C-2
C2: Hair from the dead body	
ICP-OES, ICP-MS, XRF, SEM-XRF	C-3
SEM-EDAX, determination of ?, metals by ?	C-4
C3: Urine from the dead body	
GC-MS	C-4
HPLC-MS, GF-AAS for thallium, ICP-OES, ICP-MS	C-5
Determination of ?, metals blank	C-6
C4: Kidney from the dead body	
GC-MS, HPLC-MS	C-6
GF-AAS for thallium, ICP-OES, ICP-MS, determination of	C-7
Metals by ?	C-8
C5: Liver from the dead body	
GC-MS, HPLC-MS, GF-AAS for thallium,	C-8
ICP-OES, ICP-MS, determination of ?, metals by ?	C-9
C6: Stomach contents of the dead body	
GC-MS, HPLC-MS, GF-AAS for thallium ICP-OES,	C-10
ICP-MS, determination of ?, metals by ?	C-11
Other responses	
AAS, spectroscopy of biological samples, more specific, XRF of liquids	C-12

C1	GC-MS	GC-MS of blood
Evidence No.:	10-02-0071-C1	Blood sample from dead body
Test	GC-MS after suitable extraction method.	
Results		
Identity	No illicit drugs were found. Only citalopram (Cipramil) was found to be present.	
Notes	The levels found were consistent with normal administration of the drug.	





C1	HPLC	HPLC of blood
Evidence No.:	10-02-0071-C1	Blood sample from dead body
Test	HPLC-MS after suitable extraction method.	
Results		
Identity	No illicit drugs were found. Only citalopram (Cipramil) was found to be present.	
Notes	The levels found were consistent with normal administration of the drug.	





C1	GC	GLC for alcohol in blood
Evidence No.:	10-02-0071-C1	Blood sample from the dead body.
Test	GLC-FID by headspace vapour analysis in equilibrium with blood. 3mm (ID) x 2m glass column with 0.2% Carbowax 1500 on graphitised carbon and Oven temperature = 80C	
Results	<p>Each component has 80 mg per 100ml of blood</p> <p>Legal limit for driving is 80mg of ethanol per 100ml of blood.</p> 	<p>The dead body had consumed alcohol just prior to death.</p> <p>About twice the legal limit to drive</p> 


C1	GF	GFAAS for Tl in blood				
Evidence No.:	10-02-0071-C1	Blood sample from the dead body.				
Test	Sample microwave alkaline digestion with tetramethylammonium hydroxide then Graphite Furnace AAS					
Results	<table border="1"> <thead> <tr> <th>Element</th> <th>10-02-0071-C1</th> </tr> </thead> <tbody> <tr> <td>Tl</td> <td>71 ppb</td> </tr> </tbody> </table>	Element	10-02-0071-C1	Tl	71 ppb	
Element	10-02-0071-C1					
Tl	71 ppb					
Notes	The levels of Thallium are toxic and so contributed to the death of the dead body.					




C1	ICP	ICP-OES of blood	
Evidence No.:		10-02-0071-C1 Blood sample from the body.	
Test		Sample microwave alkaline digestion with tetramethylammonium hydroxide then ICP-OES	
Results		Element	10-02-0071-C1 (w/v)
		Al	< 5 ppb
		As	90 ppb
		Cd	< 5 ppb
		Cu	1.09 ppm
		Hg	< 5 ppb
		Mn	10 ppb
		Ni	< 5 ppb
		Pb	21 ppb
		Se	10 ppb
		Sn	< 5 ppb
		Tl	70 ppb
		U	< 5 ppb
		Zn	7.06 ppm
Notes			


C1	Blood body: Determination of		
Evidence No.:		10-02-0071-C1 Blood sample from the dead body.	
Test			
Results		Analyte	10-02-0071-C1
Notes			


C1	ICPMS	ICP-MS of the blood	
Evidence No.:		10-02-0071-C1 Blood sample from the body.	
Test		Sample microwave alkaline digestion with tetramethylammonium hydroxide then ICP-MS	
Results		Element	10-02-0071-C1 (w/v)
		Al	ND
		As*	0.505 ppm
		Cd	2 ppb
		Cu	1.1 ppm
		Hg	2 ppb
		Mn	11 ppb
		Ni	< 0.5 ppb
		Pb	20.8 ppb
		Se	9 ppb
		Sn	<0.5 ppb
		Tl	68 ppb
		U	< 0.5 ppb
		Zn	7.2 ppm
Notes		* Possible interference from ⁴⁰ Ar ³⁵ Cl ion ND = not determined	


C1	Blood: metals by		
Evidence No.:		10-02-0071-C1 Blood sample from the body.	
Test			
Results		Element	10-02-0071-C1 (w/v)
		Al	< 5 ppb
		As	90 ppb
		Cd	< 5 ppb
		Cu	1.09 ppm
		Hg	< 5 ppb
		Mn	10 ppb
		Ni	< 5 ppb
		Pb	21 ppb
		Se	10 ppb
		Sn	< 5 ppb
		Tl	70 ppb
		U	< 5 ppb
		Zn	7.06 ppm
Notes			


C2	ICP	ICP-OES of hair	
Evidence No.:	10-02-0071-C2 Hair sample from the body.		
Test	Sample microwave acid digested with 5 ml of conc. nitric acid then ICP-OES		
Results	Element	10-02-0071-C2 (w/w)	
	Al	< 5 ppb	
	As	65 ppb	
	Cd	98 ppb	
	Cu	25.0 ppm	
	Hg	2.20 ppm	
	Mn	1.50 ppm	
	Ni	0.22 ppm	
	Pb	18.9 ppm	
	Se	0.99 ppm	
	Sn	< 5 ppm	
	Tl	1.2 ppm	
	U	< 5 ppb	
	Zn	1.02 ppm	
Notes			


C2	XRF	XRF of hair	
Evidence No.:	10-02-0071-C2 Hair sample from the body.		
Test	XRF is a non-destructive method requiring short sample preparation.		
Results	Element	10-02-0071-C2 ppm (w/w)	
	As	1.2	
	Cd	1.1	
	Cu	27.5	
	Hg	1.8	
	Mn	1.2	
	Pb	19.4	
	Se	1.0	
	Tl	1.2	
	Notes	It is difficult to distinguish between environmental deposition of metals and that from ingested sources.	


C2	ICPMS	ICP-MS of hair	
Evidence No.:	10-02-0071-C2 Hair sample from the body.		
Test	Sample microwave acid digested with 5 ml of conc. nitric acid then ICP-MS		
Results	Element	10-02-0071-C2 (w/w)	
	Al	ND	
	As*	82 ppb	
	Cd	98 ppb	
	Cu	25.0 ppm	
	Hg	2.20 ppm	
	Mn	1.50 ppm	
	Ni	0.22 ppm	
	Pb	18.9 ppm	
	Se	0.99 ppm	
	Sn	< 0.5 ppb	
	Tl	1.2 ppm	
	U	< 0.5 ppb	
	Zn	1.02 ppm	
Notes	* Possible interference from $^{40}\text{Ar}^{35}\text{Cl}$ ion ND = not determined		


C2	SEM-XRF	SEM-XRF of hair	
Evidence No.:	10-02-0071-C2 Hair sample from the body.		
Test	SEM-X-Ray Fluorescence can be used to determine when the poison was ingested.		
Results	Element	10-02-0071-C2 ppm (w/w)	
	As	1.2	
	Cd	1.1	
	Cu	27.5	
	Hg	1.8	
	Mn	1.2	
	Pb	19.2	
	Se	1.0	
	Tl	1.2	
	Notes	Great deal of damage to the hair damage especially to the roots. This is unlikely to have been from the application of chemicals. All metals were evenly distributed except for Thallium that was found in or within 4cm of the root. This suggests that exposure to thallium has been for no more than a month. The root was opaque to X-rays.	


C2	EDAX	SEM-EDAX of hair
Evidence No.:	10-02-0071-C2	Hair sample from the body.
Test	Scanning Electron Microscopy-Energy Dispersive Analysis of X-rays	
Results	SEM-EDAX is not a sensitive enough method to determine trace elements.	
Identity		
Notes	The hair showed a great deal of damage especially to the roots. This is unlikely to have been caused by an externally applied chemical.	
		


C2	Hair: determination of		
Evidence No.:	10-02-0071-C2 Hair sample from the dead body.		
Test			
Results	Analyte	10-02-0071-C1	
Notes			
			


C2	Hair: metals by		
Evidence No.:	10-02-0071-C2 Hair sample from the body.		
Test			
Results	Element	10-02-0071-C2 (w/w)	
	Al	< 5 ppb	
	As	65 ppb	
	Cd	98 ppb	
	Cu	25.0 ppm	
	Hg	2.20 ppm	
	Mn	1.50 ppm	
	Ni	0.22 ppm	
	Pb	18.9 ppm	
	Se	0.99 ppm	
	Sn	< 5 ppm	
	Tl	1.2 ppm	
	U	< 5 ppb	
Zn	1.02 ppm		
Notes			


C3	GCMS	GC-MS of urine
Evidence No.:	10-02-0071-C2	Urine sample from dead body
Test	GC-MS after suitable extraction method.	
Results		
Identity	No illicit drugs were found. Only citalopram (Cipramil) was found to be present.	
Notes	The levels found were consistent with normal administration of the drug.	
		


C3	HPLC	HPLC of urine	
Evidence No.:	10-02-0071-C3 Urine sample from dead body		
Test	HPLC-MS after suitable extraction method.		
Results			
Identity	No illicit drugs were found. Only citalopram (Cipramil) was found to be present.		
Notes	The levels found were consistent with normal administration of the drug. 		


C3	ICP	ICP-OES of urine	
Evidence No.:	10-02-0071-C3 Urine samples from the body.		
Test	Sample microwave alkaline digestion with tetramethylammonium hydroxide then ICP-OES		
Results	Element	10-02-0071-C3 (w/v)	
	Al	6 ppb	
	As	80 ppb	
	Cd	< 5 ppb	
	Cu	1.89 ppm	
	Hg	6 ppb	
	Mn	10 ppb	
	Ni	< 5 ppb	
	Pb	57 ppb	
	Se	23 ppb	
	Sn	< 5 ppb	
	Tl	90 ppb	
	U	< 5 ppb	
	Zn	0.35 ppm	
Notes			


C3	GF	GFAAS for Tl in urine	
Evidence No.:	10-02-0071-C3 Urine samples from the dead body.		
Test	Sample microwave alkaline digestion with tetramethylammonium hydroxide then Graphite Furnace AAS		
Results	Element	10-02-0071-C3 (w/v)	
	Tl	97 ppb	
Notes	The levels of Thallium are toxic and so contributed to the death of the dead body. 		


C3	ICPMS	ICP-MS of the urine	
Evidence No.:	10-02-0071-C3 Urine samples from the body.		
Test	Sample microwave alkaline digestion with tetramethylammonium hydroxide then ICP-MS		
Results	Element	10-02-0071-C3 (w/v)	
	Al	ND	
	As*	0.865 ppm	
	Cd	3 ppb	
	Cu	1.89 ppm	
	Hg	6 ppb	
	Mn	9 ppb	
	Ni	<0.5 ppb	
	Pb	57 ppb	
	Se	23 ppb	
	Sn	< 0.5 ppb	
	Tl	86 ppb	
	U	<0.5 ppb	
	Zn	0.35 ppm	
Notes	* Possible interference from ⁴⁰ Ar ³⁵ Cl ion ND = not determined		


C3	Urine: Determination of		
Evidence No.:	10-02-0071-C3 Urine samples from the dead body.		
Test			
Results	Analyte	10-02-0071-C1	
Notes			


C4	GCMS	GC-MS of kidney
Evidence No.:	10-02-0071-C4 Dead body's Kidney	
Test	GC-MS after suitable extraction method.	
Results	This showed a very complex trace. None of these were identified as organic poisons, toxins or their metabolites.	
Identity		
Notes	Renal failure was the cause of death. It is unclear from analysis what caused this. The Cirrhosis of the Liver was certainly caused by long abuse of alcohol.	
		


C3	Urine: metals by		
Evidence No.:	10-02-0071-C3 Urine samples from the body.		
Test			
Results	Element	10-02-0071-C3 (w/v)	
	Al	6 ppb	
	As	80 ppb	
	Cd	< 5 ppb	
	Cu	1.89 ppm	
	Hg	6 ppb	
	Mn	10 ppb	
	Ni	< 5 ppb	
	Pb	57 ppb	
	Se	23 ppb	
	Sn	< 5 ppb	
	Tl	90 ppb	
	U	< 5 ppb	
Zn	0.35 ppm		
Notes			


C4	HPLC	HPLC of kidney
Evidence No.:	10-02-0071-C4 Dead body's Kidney	
Test	HPLC-MS after suitable extraction method.	
Results	This showed a very complex trace. None of these were identified as organic poisons, toxins or their metabolites.	
Identity		
Notes	Renal failure was the cause of death. It is unclear from analysis what caused this. The Cirrhosis of the Liver was certainly caused by long abuse of alcohol.	
		


C4	GF	GFAAS for Tl in kidney	
Evidence No.:	10-02-0071-C4 Kidney from the dead body.		
Test	Sample microwave acid digestion with 5ml of conc. nitric acid then Graphite Furnace AAS		
Results	Element	10-02-0071-C4	
		ppm (w/w)	
	Tl	0.505	
Notes	The levels of Thallium are toxic and so contributed to the death of the dead body. 		


Evidence No.:	10-02-0071-C4 Kidney from the dead body.		
Test	Sample microwave acid digestion with 5 ml of conc. nitric acid then ICP-MS		
Results	Element	10-02-0071-C4	
		(w/w)	
	Al	ND	
	As*	1.3 ppm	
	Cd	28.0 ppm	
	Cu	3.70 ppm	
	Hg	0.29 ppm	
	Mn	45.0 ppm	
	Ni	0.19 ppm	
	Pb	0.86 ppm	
	Se	0.81 ppm	
	Sn	Not determined	
	Tl	0.49 ppm	
	U	0.7 ppb	
Zn	18.9 ppm		
Notes	* Possible interference from ⁴⁰ Ar ³⁵ Cl ion ND = not determined		


C4	ICP	ICP-OES of the kidney	
Evidence No.:	10-02-0071-C4 Kidney from the dead body		
Test	Sample microwave acid digestion with 5 ml of conc. nitric acid then ICP-OES		
Results	Element	10-02-0071-C4	
		(w/w)	
	Al	0.40 ppm	
	As	< 5 ppb	
	Cd	28.0 ppm	
	Cu	3.70 ppm	
	Hg	0.29 ppm	
	Mn	45.0 ppm	
	Ni	0.19 ppm	
	Pb	0.86 ppm	
	Se	0.81 ppm	
	Sn	Not determined	
	Tl	0.49 ppm	
	U	7 ppb	
Zn	18.9 ppm		
Notes	Some elements were not quantified.		
C4	ICPMS	ICP-MS of the kidney	


C4	Kidney: Determination of		
Evidence No.:	10-02-0071-C4 Kidney from the dead body.		
Test			
Results	Analyte	10-02-0071-C1	
Notes			
C4	Kidney : metals by		
Evidence No.:	10-02-0071-C4 Kidney from the dead body		


Test			
Results	Element	10-02-0071-C4	
		(w/w)	
	Al	0.40 ppm	
	As	< 5 ppb	
	Cd	28.0 ppm	
	Cu	3.70 ppm	
	Hg	0.29 ppm	
	Mn	45.0 ppm	
	Ni	0.19 ppm	
	Pb	0.86 ppm	
	Se	0.81 ppm	
	Sn	Not determined	
Tl	0.49 ppm		
U	7 ppb		
Zn	18.9 ppm		
Notes	Some elements were not quantified.		


Test	HPLC-MS after suitable extraction method.		
Results	This showed a very complex trace. None of these were identified as organic poisons, toxins or their metabolites.		
Identity			
Notes	Renal failure was the cause of death. It is unclear from analysis what caused this. The Cirrhosis of the Liver was certainly caused by long abuse of alcohol.		


C5	GCMS	GC-MS of liver
Evidence No.:	10-02-0071-C5 Dead body's liver	
Test	GC-MS after suitable extraction method.	
Results	This showed a very complex trace. None of these were identified as organic poisons, toxins or their metabolites.	
Identity		
Notes	Renal failure was the cause of death. It is unclear from analysis what caused this. The Cirrhosis of the Liver was certainly caused by long abuse of alcohol.	
		
C5	HPLC	HPLC of liver
Evidence No.:	10-02-0071-C5 Dead body's liver	

C5	GF	GFAAS for Tl in liver	
Evidence No.:	10-02-0071-C5 Sample of liver from the dead body.		
Test	Sample microwave acid digestion with 5ml of conc. nitric acid then Graphite Furnace AAS		
Results	Element	10-02-0071-C4	10-02-0071-C5
		ppm (w/v)	ppm (w/v)
	Tl	0.505	0.296
Notes	The levels of Thallium are toxic and so contributed to the death of the dead body.		
			
C5	ICP	ICP-OES of the liver	
Evidence No.:	10-02-0071-C5 Liver from the dead body.		
Test	Sample microwave acid digestion with 5 ml of conc. nitric acid then ICP-OES		


Results	Element	10-02-0071-C5 (w/w)	
	Al	0.50	
	As	< 5 ppb	
	Cd	1.5 ppm	
	Cu	0.82 ppm	
	Hg	55 ppb	
	Mn	2.20 ppm	
	Ni	45 ppb	
	Pb	0.48 ppm	
	Se	0.25 ppm	
	Sn	Not determined	
	Tl	0.29 ppm	
	U	< 5 ppb	
Zn	34.6 ppm		
Notes	Some elements were not quantified.		


Test			
Results	Analyte	10-02-0071-C1	
Notes			


C5	ICPMS	ICP-MS of the liver
Evidence No.:	10-02-0071-C5 Liver from the dead body	
Test	Sample microwave acid digestion with 5 ml of conc. nitric acid then ICP-MS	
Results	Element	10-02-0071-C5 (w/w)
	Al	ND
	As*	1.20 ppm
	Cd	1.5 ppm
	Cu	0.80 ppm
	Hg	65 ppb
	Mn	2.20 ppm
	Ni	40 ppb
	Pb	0.48 ppm
	Se	0.25 ppm
	Sn	Not determined
	Tl	0.29 ppm
	U	< 0.5 ppb
Zn	35.6 ppm	
Notes	* Possible interference from ⁴⁰ Ar ³⁵ Cl ion ND = not determined	
C5	Liver: Determination of	
Evidence No.:	10-02-0071-C5 Sample of liver from the dead body.	


C5	Liver : metals by		
Evidence No.:	10-02-0071-C5 Liver from the dead body.		
Test			
Results	Element	10-02-0071-C5 (w/w)	
	Al	0.50	
	As	< 5 ppb	
	Cd	1.5 ppm	
	Cu	0.82 ppm	
	Hg	55 ppb	
	Mn	2.20 ppm	
	Ni	45 ppb	
	Pb	0.48 ppm	
	Se	0.25 ppm	
	Sn	Not determined	
	Tl	0.29 ppm	
	U	< 5 ppb	
Zn	34.6 ppm		
Notes	Some elements were not quantified.		

C6	GCMS	GC-MS of stomach contents
Evidence No.:	10-02-0071-C6 Stomach contents from the dead body.	

Test	GC-MS after suitable extraction method.
Results	This showed a very complex trace. None of these were identified as organic poisons.
Identity	
Notes	Maria Barberi's last meal was Chicken Chasseur and there is evidence for considerable amount of alcohol consumed. 


Test	Sample microwave alkaline digestion with tetramethylammonium hydroxide then Graphite Furnace AAS		
Results	Element	10-02-0071-C6	
		(w/w)	
	Tl	82 ppb	
Notes	Suggest that Thallium was ingested within 12 hours of death probably in food. 		


C6	HPLC	HPLC of stomach contents
Evidence No.:	10-02-0071-C6 Stomach contents from the dead body.	
Test	HPLC-MS after suitable extraction method.	
Results	This showed a very complex trace. None of these were identified as organic poisons, toxins or their metabolites.	
Identity		
Notes	The dead body's last meal was Chicken Chasseur and there is evidence for considerable amount of alcohol consumed. 	


C6	ICP	ICP-OES of stomach contents	
Evidence No.:	10-02-0071-C6 Stomach contents from the dead body.		
Test	Sample microwave acid digested with nitric acid then ICP-OES		
Results	Element	10-02-0071-C6	
		(w/w)	
	Al	< 5 ppb	
	As	Not determined	
	Cd	10 ppb	
	Cu	0.15 ppm	
	Hg	70 ppb	
	Mn	0.56 ppm	
	Ni	Not determined	
	Pb	1.2 ppm	
	Se	0.81 ppm	
	Sn	Not determined	
	Tl	8 ppb	
	U	< 5 ppb	
	Zn	15.9 ppm	
Notes	Some elements were not quantified.		


C6	GF	GFAAS for Tl in stomach contents
Evidence No.:	10-02-0071-C6 Stomach contents from the dead body.	

C6	ICPMS	ICP-MS of stomach contents
Evidence No.:	10-02-0071-C6 Stomach contents from the dead body.	


Test	Sample microwave acid digested with nitric acid then ICP-MS		
Results	Element	10-02-0071-C6 (w/w)	
	Al	Not determined	
	As	Not determined	
	Cd	11 ppb	
	Cu	0.15 ppm	
	Hg	70 ppb	
	Mn	0.56 ppm	
	Ni	Not determined	
	Pb	1.2 ppm	
	Se	0.81 ppm	
	Sn	Not determined	
	Tl	84 ppb	
	U	< 0.5 ppb	
	Zn	15.9 ppm	
Notes	Some elements were not quantified.		


Test			
Results	Element	10-02-0071-C6 (w/w)	
	Al	< 5 ppb	
	As	Not determined	
	Cd	10 ppb	
	Cu	0.15 ppm	
	Hg	70 ppb	
	Mn	0.56 ppm	
	Ni	Not determined	
	Pb	1.2 ppm	
	Se	0.81 ppm	
	Sn	Not determined	
	Tl	8 ppb	
	U	< 5 ppb	
	Zn	15.9 ppm	
Notes	Some elements were not quantified.		


C6	Stomach contents: Determination of		
Evidence No.:	10-02-0071-C6 Stomach contents from the dead body.		
Test			
Results	Analyte	10-02-0071-C1	
Notes			


Evidence No.:			
Test			
Results			
Notes			

C6	Stomach contents: metals by		
Evidence No.:	10-02-0071-C6 Stomach contents from the dead body.		

AAS	Toxicology of Tl by atomic spectroscopy
Evidence No.:	Samples from the dead body.
Test	Alkaline digestion for bodily fluids and acid digestion for solids then AAS.
Results	Results at and below the limit of detection of 1 ppm for this method.
Identity	Inconclusive as to the presence of Tl.
Notes	

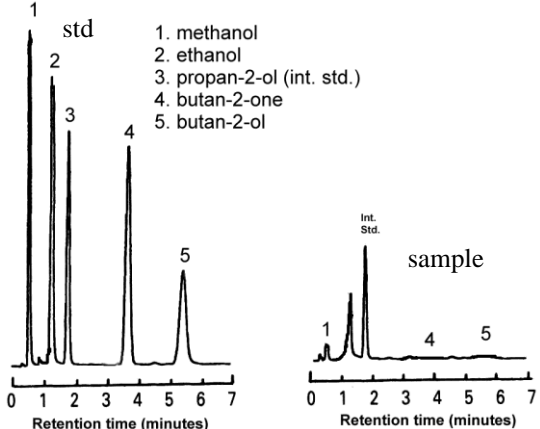

	Please be more specific.
Evidence No.:	
Test	It is unclear from your request as to what you are looking for. Please be more specific.
Results	
Notes	Inorganic compounds should be determined using primarily atomic absorption (AAS, GFAAS), atomic emission (ICP, XRF etc.) spectroscopy or electrochemical methods. 


	Spectroscopy of biological samples
Evidence No.:	Biological samples.
Test	Testing cannot be carried out if you do not specify the method. Spectroscopy is a very wide subject indeed from atomic to molecular to X-ray spectroscopy.
Results	N/A
Notes	Would suggest atomic spectroscopy (ICP, AAS or GFAAS) or X-ray fluorescence as suitable methods for heavy metal poisons. 


	XRF	Toxicology by XRF
Evidence No.:		Samples from the dead body
Test		X-ray Fluorescence is a non-destructive method requiring a short preparation time.
Results		XRF is not a suitable method for urine, blood, kidney, liver or stomach contents. A method looking at the surface elemental composition of the sample and cannot be performed on liquids.
Identity		
Notes		


APPENDIX D: Toxicology of Family Results


S1: Blood from Mr Martin Barberi	
GC for alcohol, GF-AAS for Tl, ICP-OES, ICP-MS	D-1
determination of ?, metals by ?	D-2
S2: Hair from Mr Martin Barberi	
GF-AAS for Tl, ICP-OES,	D-2
ICP-MS, XRF, SEM-XRF, determination of ?	D-3
Metals by ?	D-4
S3: Blood from Miss Brigitte Barberi	
GF-AAS for Tl, ICP-OES, ICP-MS	D-4
determination of ?, metals by ?	D-5
S4: Hair from Miss Brigitte Barberi	
GF-AAS for Tl, ICP-OES,	D-5
ICP-MS, SEM-XRF, determination of ?, metals by ?	D-6


S1	GC	GLC for alcohol in blood of Mr Barberi	
Evidence No.:		10-02-0071-S1 Blood sample from Mr Martin Barberi	
Test		GLC-FID by headspace vapour analysis in equilibrium with blood. 3mm (ID) x 2m glass column with 0.2% Carbowax 1500 on graphitised carbon and Oven temperature = 80C	
Results		<p>Each component has 80 mg per 100ml of blood</p> <p>Legal limit for driving is 80mg of ethanol per 100ml of blood.</p>  <p>Retention time (minutes)</p>	<p>A low amount of alcohol was found in his blood.</p> <p>Below the legal limit to drive</p> 


S1	ICP	ICP-OES of the blood from Mr Martin Barberi	
Evidence No.:		10-02-0071-S1 Blood sample from Mr Martin Barberi.	
Test		Sample microwave alkaline digestion with tetramethylammonium hydroxide then ICP-MS	
Results		Element	10-02-0071-C1 (w/v)
		As	<1 ppb
		Cd	8 ppb
		Cu	1.3 ppm
		Hg	< 10 ppb
		Mn	< 10 ppb
		Ni	< 5 ppb
		Pb	0.2 ppm
		Se	9 ppb
		Tl	0.21 ppm
		U	< 5 ppb
Notes			


S1	GF	GFAAS for Tl in blood from Mr Martin Barberi	
Evidence No.:		10-02-0071-S1 Blood sample from Mr Martin Barberi.	
Test		Sample microwave alkaline digestion with tetramethylammonium hydroxide then graphite furnace AAS	
Results		Element	10-02-0071-S1 ppm (w/v)
		Tl	0.302
Notes		The levels of Thallium are considered toxic probably causing illness.	
			


S1	ICPMS	ICP-MS of blood from Mr Martin Barberi	
Evidence No.:		10-02-0071-S1 Blood sample from Mr Martin Barberi.	
Test		Sample microwave alkaline digestion with tetramethylammonium hydroxide then ICP-MS	
Results		Element	10-02-0071-S1 (w/v)
		As*	2.5 ppm
		Cd	2 ppb
		Cu	1.1 ppm
		Hg	3 ppb
		Mn	11 ppb
		Ni	< 0.5 ppb
		Pb	0.2 ppm
		Se	9 ppb
		Tl	0.20 ppm
		U	<0.5 ppb
Notes		* Possible interference from ⁴⁰ Ar ³⁵ Cl ion	



S1	Blood from Martin: determination of		
Evidence No.:	10-02-0071-S1 Blood sample from Mr Martin Barberi.		
Test			
Results	Analyte	10-02-0071-S1 (w/v)	
Notes			


S2	GF	GFAAS for Tl of the hair Mr Martin Barberi	
Evidence No.:	10-02-0071-S2 Head Hair from Mr Martin Barberi.		
Test	Sample microwave acid digested with 5 ml of conc. nitric acid then ICP-MS		
Results	Element	10-02-0071-S2 ppm (w/v)	
	Tl	12 ppb	
Notes	The levels of Thallium are not considered acutely toxic.		


S1	ICP	Blood from Martin: metals by	
Evidence No.:	10-02-0071-S1 Blood sample from Mr Martin Barberi.		
Test			
Results	Element	10-02-0071-C1 (w/v)	
	As	<1 ppb	
	Cd	8 ppb	
	Cu	1.3 ppm	
	Hg	< 10 ppb	
	Mn	< 10 ppb	
	Ni	< 5 ppb	
	Pb	0.2 ppm	
	Se	9 ppb	
	Tl	0.21 ppm	
	U	< 5 ppb	
Notes			


S2	ICP	ICP-OES of the hair from Mr Martin Barberi	
Evidence No.:	10-02-0071-S2 Head Hair from Mr Martin Barberi.		
Test	Sample microwave acid digested with 5 ml of conc. nitric acid then ICP-MS		
Results	Element	10-02-0071-S2 (w/w)	
	As	1.0 ppm	
	Cd	1.5 ppm	
	Cu	17.4 ppm	
	Hg	1.5 ppm	
	Mn	3.5 ppm	
	Ni	0.4 ppm	
	Pb	35.5 ppm	
	Se	1.2 ppm	
	Tl	< 5 ppb	
	U	< 5 ppb	
Notes			


S2	ICPMS	ICP-MS of the hair from Mr Martin Barberi	
Evidence No.:		10-02-0071-S2 Head Hair from Mr Martin Barberi.	
Test		Sample microwave acid digested with 5 ml of conc. nitric acid then ICP-MS	
Results	Element	10-02-0071-S2 (w/w)	
	As	1.0 ppm	
	Cd	1.5 ppm	
	Cu	18.0 ppm	
	Hg	1.8 ppm	
	Mn	2.5 ppm	
	Ni	0.5 ppm	
	Pb	43.5 ppm	
	Se	1.2 ppm	
	Tl	4 ppb	
	U	< 0.5 ppb	
Notes		The interference from $^{40}\text{Ar}^{35}\text{Cl}$ ion is not significant, as the natural chloride levels of hair are small.	


S2	SEM-XRF	SEM-XRF of the hair of Mr Martin Barberi	
Evidence No.:		10-02-0071-S2 Head Hair from Mr Martin Barberi.	
Test		SEM-X-Ray Fluorescence can be used to determine when a poison was ingested.	
Results	Element	10-02-0071-S2 ppm (w/w)	
	As	< 1 ppb	
	Cd	0.9 ppm	
	Cu	15.0 ppm	
	Hg	2.2 ppm	
	Mn	1.5 ppm	
	Ni	0.2 ppm	
	Pb	41.9 ppm	
	Se	2.1 ppm	
	Tl	< 5 ppb	
	Notes		Hair from Brigitte and Martin Barberi showed no damage to the roots. Brigitte Barberi is probably suffering from dandruff and has taken special medication. 


S2	XRF	XRF of the hair from Mr Martin Barberi	
Evidence No.:		10-02-0071-S2 Head Hair from Mr Martin Barberi.	
Test		XRF is a non-destructive method requiring short sample preparation.	
Results	Element	10-02-0071-S2 ppm (w/w)	
	As	< 1 ppb	
	Cd	0.9 ppm	
	Cu	15.0 ppm	
	Hg	2.2 ppm	
	Mn	1.5 ppm	
	Ni	0.2 ppm	
	Pb	41.9 ppm	
	Se	2.1 ppm	
	Tl	< 5 ppb	
	U	< 5 ppb	
Notes			


S2		Hair from Martin: determination of	
Evidence No.:		10-02-0071-S2 Head Hair from Mr Martin Barberi.	
Test			
Results	Analyte	10-02-0071-S2 (w/v)	
Notes			


S2	Hair from Martin: metals by		
Evidence No.:	10-02-0071-S2 Head Hair from Mr Martin Barberi.		
Test			
Results	Element	10-02-0071-C1 (w/v)	
	As	<1 ppb	
	Cd	8 ppb	
	Cu	1.3 ppm	
	Hg	< 10 ppb	
	Mn	< 10 ppb	
	Ni	< 5 ppb	
	Pb	0.2 ppm	
	Se	9 ppb	
	Tl	0.21 ppm	
	U	< 5 ppb	
Notes			


S3	ICP	ICP-OES of blood from Miss Brigitte Barberi	
Evidence No.:	10-02-0071-S3 Blood sample from Miss Brigitte Barberi.		
Test	Sample microwave alkaline digestion with tetramethylammonium hydroxide then ICP-MS		
Results	Element	10-02-0071-S3 ppm (w/v)	
	As	< 5 ppb	
	Cd	< 5 ppb	
	Cu	1.2 ppm	
	Hg	< 10 ppb	
	Mn	< 10 ppb	
	Ni	< 5 ppb	
	Pb	57 ppb	
	Se	23 ppb	
	Tl	15 ppb	
	U	< 5 ppb	
Notes			


S3	GF	GFAAS for Tl in blood from Miss Brigitte Barberi	
Evidence No.:	10-02-0071-S3 Blood sample from Miss Brigitte Barberi.		
Test	Sample microwave alkaline digestion with tetramethylammonium hydroxide then graphite furnace AAS		
Results	Element	10-02-0071-S3 ppm (w/v)	
	Tl	0.223	
Notes	The levels of Thallium are considered toxic probably causing illness. 		


S3	ICPMS	ICP-MS of blood from Miss Brigitte Barberi	
Evidence No.:	10-02-0071-S3 Blood sample from Miss Brigitte Barberi.		
Test	Sample microwave alkaline digestion with tetramethylammonium hydroxide then ICP-MS		
Results	Element	10-02-0071-S3 ppm (w/v)	
	As	2.8 ppm	
	Cd	3 ppb	
	Cu	1.9 ppm	
	Hg	6 ppb	
	Mn	9 ppb	
	Ni	< 5 ppb	
	Pb	57 ppb	
	Se	23 ppb	
	Tl	0.18 ppm	
	U	< 0.5 ppb	
Notes	Possible interference from ⁴⁰ Ar ³⁵ Cl ion		


S3	Blood from Brigitte: determination of		
Evidence No.:	10-02-0071-S3 Blood sample from Miss Brigitte Barberi.		
Test			
Results	Analyte	10-02-0071-S3	
Notes			



S4	GF	GFAAS for Tl of hair from Miss Brigitte Barberi.	
Evidence No.:	10-02-0071-S4 Head Hair from Miss Brigitte Barberi.		
Test	Sample microwave acid digested with 5 ml of conc. nitric acid then ICP-MS		
Results	Element	10-02-0071-S4	
		ppm (w/v)	
	Tl	0.003	
Notes	The levels of Thallium are not considered acutely toxic.		


S3	Blood from Brigitte		
Evidence No.:	10-02-0071-S3 Blood sample from Miss Brigitte Barberi.		
Test			
Results	Element	10-02-0071-S3	
		ppm (w/v)	
	As	< 5 ppb	
	Cd	< 5 ppb	
	Cu	1.2 ppm	
	Hg	< 10 ppb	
	Mn	< 10 ppb	
	Ni	< 5 ppb	
	Pb	57 ppb	
	Se	23 ppb	
	Tl	15 ppb	
	U	< 5 ppb	
Notes			

S4	ICP	ICP-OES of hair from Miss Brigitte Barberi.	
Evidence No.:	10-02-0071-S4 Head Hair from Miss Brigitte Barberi.		
Test	Sample microwave acid digested with 5 ml of conc. nitric acid then ICP-MS		
Results	Element	10-02-0071-S4	
		ppm (w/w)	
	As	0.2 ppm	
	Cd	0.3 ppm	
	Cu	10.2 ppm	
	Hg	1.1 ppm	
	Mn	1.3 ppm	
	Ni	0.1 ppm	
	Pb	10.2 ppm	
	Se	21.4 ppm	
	Tl	< 5 ppb	
	U	< 5 ppb	
Notes			

S4	ICPMS	ICP-MS of hair from Miss Brigitte Barberi	
Evidence No.:		10-02-0071-S4 Head Hair from Miss Brigitte Barberi.	
Test		Sample microwave acid digested with 5 ml of conc. nitric acid then ICP-MS	
Results	Element	10-02-0071-S4 ppm (w/w)	
	As	0.2 ppm	
	Cd	0.3 ppm	
	Cu	10.2 ppm	
	Hg	1.1 ppm	
	Mn	1.3 ppm	
	Ni	0.1 ppm	
	Pb	10.2 ppm	
	Se	21.4 ppm	
	Tl	< 0.5 ppb	
	U	<0.5 ppb	
Notes		The interference from $^{40}\text{Ar}^{35}\text{Cl}$ ion is not significant, as the natural chloride levels of hair are small.	


S4		Hair from Brigitte: determination of	
Evidence No.:		10-02-0071-S4 Head Hair from Miss Brigitte Barberi.	
Test			
Results	Element	10-02-0071-S4 ppm (w/v)	
	Tl	0.003	
Notes			


S4	SEM-XRF	SEM-XRF of the hair of Miss Brigitte Barberi	
Evidence No.:		10-02-0071-S4 Head Hair from Miss Brigitte Barberi.	
Test		SEM-X-Ray Fluorescence can be used to determine when a poison was ingested.	
Results	Element	10-02-0071-S4 ppm (w/w)	
	As	<1 ppb	
	Cd	0.9 ppm	
	Cu	5.0 ppm	
	Hg	1.2 ppm	
	Mn	1.5 ppm	
	Ni	0.2 ppm	
	Pb	21.4 ppm	
	Se	21.0 ppm	
	Tl	< 5 ppb	
	Notes		Hair from Brigitte Barberi showed no damage to the roots. Brigitte Barberi is probably suffering from dandruff and has taken special medication. 


S4		Hair from Brigitte: metals by	
Evidence No.:		10-02-0071-S4 Head Hair from Miss Brigitte Barberi.	
Test			
Results	Element	10-02-0071-S4 ppm (w/w)	
	As	0.2 ppm	
	Cd	0.3 ppm	
	Cu	10.2 ppm	
	Hg	1.1 ppm	
	Mn	1.3 ppm	
	Ni	0.1 ppm	
	Pb	10.2 ppm	
	Se	21.4 ppm	
	Tl	< 5 ppb	
	U	< 5 ppb	
Notes			


APPENDIX E: Further samples from scene


H1: Chilean Cabernet Sauvignon 1998 (red wine)	
GLC, ICP-MS	E-1
Metals by?	E-2
H2: Jacob's Creek Dry Riesling 2000	
GLC, ICP-MS	E-1
Metals by?	E-2
H3: Gooseberry Wine 1999	
GLC, ICP-MS	E-1
Metals by ?, Fingerprints,	E-2
Identification of unknown print	E-3
H4: Sample of beer from the glass	
GLC, ICP-MS, metals by ?	E-3
H5: Part eaten plate of food	
GF-AAS, ICP-OES, ICP-MS, metals by ?	E-4


H1-3	GC	GLC of wine from kitchen
Evidence No.:	10-02-0071-H1 Chilean Cabernet Sauvignon 1998 10-02-0071-H2 Jacob's Creek Dry Riesling 2000 10-02-0071-H3 Gooseberry Wine 1999, T.D.	
Test	GLC-FID	
Results	Results consistent with being wine. No suspicious bands evident.	
		
Identity	Wine with no organic impurity observed.	
Notes		


H2	ICPMS	ICP-MS of white wine from kitchen	
Evidence No.:	10-02-0071-H2 Jacob's Creek Dry Riesling 2000		
Test	Sample diluted 1 in 10 with 0.2% nitric acid then ICP-MS		
Results		Blank	H2 White wine (w/v)
	51 V 55 Mn 65 Cu 66 Zn 75 As 82 Se 111 Cd 118 Sn 202 Hg 205 Tl 208 Pb 238 U	6 ppb 32 ppb 7 ppb 27 ppb 1 ppb 4 ppb 2 ppb 0.483 ppm 29 ppb 0.3 ppb 3 ppb 0.2 ppb	13 ppb 1.37 ppm 45 ppb 1.02 ppm 11 ppb 4 ppb 3 ppb 0.36 ppm 37 ppb 0.2 ppb 21 ppb < 0.5 ppb
Notes			




H1	ICPMS	ICP-MS of red wine from kitchen	
Evidence No.:	10-02-0071-H1 Chilean Cabernet Sauvignon 1998		
Test	Sample diluted 1 in 10 with 0.2% nitric acid then ICP-MS		
Results		Blank	H2 Red wine (w/v)
	51 V 55 Mn 65 Cu 66 Zn 75 As 82 Se 111 Cd 118 Sn 202 Hg 205 Tl 208 Pb 238 U	6 ppb 32 ppb 7 ppb 27 ppb 1 ppb 4 ppb 2 ppb 0.483 ppm 29 ppb 0.3 ppb 3 ppb 0.2 ppb	41 ppb 0.935 ppm 64 ppb 0.585 ppm 14 ppb 1 ppb 2 ppb 0.391 ppm 20 ppb 0.3 ppb 52 ppb 0.3 ppb
Notes			


H3	ICPMS	ICP-MS of gooseberry wine from kitchen	
Evidence No.:	10-02-0071-H3 Gooseberry Wine 1999, T.D.		
Test	Sample diluted 1 in 10 with 0.2% nitric acid then ICP-MS		
Results		Blank	H1 Gooseberry wine (w/v)
	51 V 55 Mn 65 Cu 66 Zn 75 As 82 Se 111 Cd 118 Sn 202 Hg 205 Tl 208 Pb 238 U	6 ppb 32 ppb 7 ppb 27 ppb 1 ppb 4 ppb 2 ppb 0.483 ppm 29 ppb 0.3 ppb 3 ppb 0.2 ppb	63 ppb 2.34 ppm 91 ppb 1.42 ppm 25 ppb 11 ppb 3 ppb 0.43 ppm 21 ppb 16.1 ppm 35 ppb 0.2 ppb
Notes			


H1	Red wine from kitchen: metals by		
Evidence No.:	10-02-0071-H1 Chilean Cabernet Sauvignon 1998		
Test			
Results		Blank	H2 Red wine (w/v)
	V	6 ppb	41 ppb
	Mn	32 ppb	0.935 ppm
	Cu	7 ppb	64 ppb
	Zn	27 ppb	0.585 ppm
	As	<5 ppb	14 ppb
	Se	<5 ppb	<5 ppb
	Cd	<5 ppb	<5 ppb
	Sn	ND	ND
	Hg	29 ppb	20 ppb
	Tl	<5 ppb	<5 ppb
	Pb	<5 ppb	52 ppb
	U	<5 ppb	<5 ppb
Notes	ND = Not determined		


H3	Gooseberry wine from kitchen: metals by		
Evidence No.:	10-02-0071-H3 Gooseberry Wine 1999, T.D.		
Test	Sample diluted 1 in 10 with 0.2% nitric acid then ICP-MS		
Results		Blank	H1 Gooseberry wine (w/v)
	V	6 ppb	63 ppb
	Mn	32 ppb	2.34 ppm
	Cu	7 ppb	91 ppb
	Zn	27 ppb	1.42 ppm
	As	<5 ppb	25 ppb
	Se	<5 ppb	11 ppb
	Cd	<5 ppb	<5 ppb
	Sn	ND	0.43 ppm
	Hg	29 ppb	21 ppb
	Tl	<5 ppb	16.1 ppm
	Pb	<5 ppb	35 ppb
	U	<5 ppb	<5 ppb
Notes	ND = Not determined		


H2	White wine from kitchen: metals by		
Evidence No.:	10-02-0071-H2 Jacob's Creek Dry Riesling 2000		
Test			
Results		Blank	H2 (w/v)
	V	6 ppb	13 ppb
	Mn	32 ppb	1.37 ppm
	Cu	7 ppb	45 ppb
	Zn	27 ppb	1.02 ppm
	As	<5 ppb	11 ppb
	Se	<5 ppb	<5 ppb
	Cd	<5 ppb	<5 ppb
	Sn	ND	0.36 ppm
	Hg	29 ppb	37 ppb
	Tl	<5 ppb	<5 ppb
	Pb	<5 ppb	21 ppb
	U	<5 ppb	<5 ppb
Notes	ND = Not determined		


H3	FP	Fingerprinting request	
Evidence No.:	10-02-0071-H3 Gooseberry Wine, 1999 T.D.		
Prints	Bottle was sprayed with ninhydrin which revealed three clear prints.		
Prints			
	Print from the left thumb of Mrs Barberi.	Print from left middle finger of Mrs Barberi.	Print from unknown person
Notes	The unidentified set is probably male due to their size.		

H3a	FP	Identification of unknown print	
Evidence No.:	10-02-0071-H3 Gooseberry Wine, 1999 T.D.		
Prints	The unknown fingerprint was not from the Barberi family. Upon instructions it was checked with that of Mr Tim Dollar and was found to match.		
Prints			
Notes	The unidentified set is probably male due to their size.		



H4	ICPMS	ICP-MS of beer from the glass	
Evidence No.:	10-02-0071-H4 Sample of beer from glass		
Test	Undiluted into an ICP-MS		
Results		Blank	H4 Beer (w/v)
	V	6 ppb	33 ppb
	Mn	32 ppb	55 ppb
	Cu	7 ppb	14 ppb
	Zn	27 ppb	37 ppb
	As	1 ppb	0.9 ppb
	Se	4 ppb	4 ppb
	Cd	2 ppb	2 ppb
	Sn	0.483 ppm	0.495 ppm
	Hg	29 ppb	21 ppb
	Tl	0.3 ppb	0.2 ppb
	Pb	3 ppb	4 ppb
	U	0.2 ppb	0.4 ppb
Notes	High Sn probably instrumental.		

H4	GC	GLC of beer from the glass	
Evidence No.:	10-02-0071-H4 Sample of beer from glass		
Test	GLC-FID		
Results	Results consistent with being beer. No suspicious bands evident.		
			
Identity	Wine with no organic impurity observed.		
Notes			


H4		Beer: metals by	
Evidence No.:	10-02-0071-H4 Sample of beer from glass		
Test			
Results		Blank	H4 Beer (w/v)
	V	6 ppb	33 ppb
	Mn	32 ppb	55 ppb
	Cu	7 ppb	14 ppb
	Zn	27 ppb	37 ppb
	As	<5 ppb	<5 ppb
	Se	<5 ppb	<5 ppb
	Cd	<5 ppb	<5 ppb
	Sn	ND	ND
	Hg	29 ppb	21 ppb
	Tl	<5 ppb	<5 ppb
	Pb	<5 ppb	<5 ppb
	U	<5 ppb	<5 ppb
Notes	ND = Not determined		

H5	GF	GFAAS of part eaten plate of food			
Evidence No.:		10-02-0071-H5 Part eaten plate of food.			
Test		Microwave acid digestion with 5 ml of nitric acid to 1g of sample then Graphite Furnace AAS			
Results		<i>B l a n k</i> w/v	H5a potato w/w	H5b White sauce w/w	H5c Chicken w/w
	Tl	< 5 ppb	0.6 ppm	26.7 ppm	3.4 ppm
Notes		Remnants of the Chicken Chasseur meal. GFAAS is a very sensitive quantitative method of analysis. 1000 times more sensitive than Flame AAS.			

H5	ICP	ICP-OES of part eaten plate of food			
Evidence No.:		10-02-0071-H5 Part eaten plate of food.			
Test		Microwave acid digestion with 5 ml of nitric acid to 1g of sample then ICP-OES.			
Results		<i>Bla nk</i> ppm w/v	H5a potato (w/w)	H5b White sauce (w/w)	H5c Chicken (w/w)

	V	6 ppb	8 ppb	70 ppb	90 ppb
	Mn	32 ppb	20 ppb	11.4 ppm	1.2 ppm
Cu	< 5 ppb	90 ppb	0.4 ppm	0.1 ppm	
Zn	27 ppb	40 ppb	7.2 ppm	0.8 ppm	
As	< 5 ppb	< 5 ppb	10 ppb	2 ppb	
Se	< 5 ppb	10 ppb	50 ppb	0.18 ppm	
Cd	< 5 ppb	< 5 ppb	< 0.5 ppb	20 ppb	
Sn	0.48 ppm	0.48 ppm	0.44 ppm	0.41 ppm	
Hg	29 ppb	41 ppb	72 ppb	65 ppb	
Tl	< 5 ppb	0.6 ppm	26.7 ppm	3.4 ppm	
Pb	< 5 ppb	2.1 ppm	41 ppb	1.9 ppm	
U	< 5 ppb	< 5 ppb	< 5 ppb	< 5 ppb	
Notes		Sn probably instrumental Remnants of the Chicken Chasseur meal.			
H5	ICPMS	ICP-MS of part eaten plate of food			
Evidence No.:		10-02-0071-H5 Part eaten plate of food			
Test		Microwave acid digestion with 5 ml of nitric acid to 1g of sample then ICP-MS.			
Results		<i>Bl an k</i> w/v	H5a potato w/w	H5b White sauce w/w	H5c Chicken w/w
	51 V	6 ppb	8 ppb	70 ppb	90 ppb
	55 Mn	32 ppb	19 ppb	11.4 ppb	1.2 ppm
	65 Cu	7 ppb	91 ppb	0.4 ppm	0.1 ppm
	66 Zn	27 ppb	34 ppb	7.2 ppm	0.8 ppm
	75 As	1 ppb	20.8 ppm	6.1 ppm	19.9 ppm
	82 Se	4 ppb	11 ppb	50 ppb	0.18 ppm
	111 Cd	2 ppb	5 ppb	3 ppb	21 ppb
	118 Sn	0.48 ppm	0.48 ppm	0.44 ppm	0.41 ppm
	202 Hg	29 ppb	41 ppb	72 ppb	65 ppb
	205 Tl	0.3 ppb	0.6 ppm	26.7 ppm	3.4 ppm
	208 Pb	3 ppb	2.1 ppm	41 ppb	1.9 ppm
	238 U	0.2 ppb	2 ppb	0.4 ppb	3 ppb
Notes		Remnants of the Chicken Chasseur meal.			

H5		Part eaten plate of food: metals by
Evidence No.:		10-02-0071-H5 Part eaten plate of food
Test		

Results		Bl an k w/v	H5a potato w/w	H5b White sauce w/w	H5c Chicken w/w
	V	6 ppb	8 ppb	70 ppb	90 ppb
	Mn	32 ppb	20 ppb	11.4 ppm	1.2 ppm
	Cu	< 5 ppb	90 ppb	0.4 ppm	0.1 ppm
	Zn	27 ppb	40 ppb	7.2 ppm	0.8 ppm
	As	< 5 ppb	< 5 ppb	10 ppb	2 ppb
	Se	< 5 ppb	10 ppb	50 ppb	0.18 ppm
	Cd	< 5 ppb	< 5 ppb	< 0.5 ppb	20 ppb
	Sn	ND	ND	ND	ND
	Hg	29 ppb	40 ppb	70 ppb	60 ppb
	Tl	< 5 ppb	0.6 ppm	26.7 ppm	3.4 ppm
	Pb	< 5 ppb	2.1 ppm	40 ppb	1.9 ppm
	U	< 5 ppb	< 5 ppb	< 5 ppb	< 5 ppb
Notes	ND = not determined				