

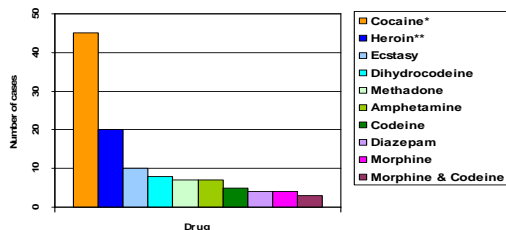
# 2008: A review of hair analysis in post-mortem cases

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## DRUGS OF ABUSE DETECTED IN HAIR:

To date in 2008 we have analysed hair samples in 72 post-mortem cases. In 56 of these cases one or more drugs were detected with cocaine being by far the most frequent seen drug.

In 25% of cases studied, drug use would not have been detected without hair analysis.

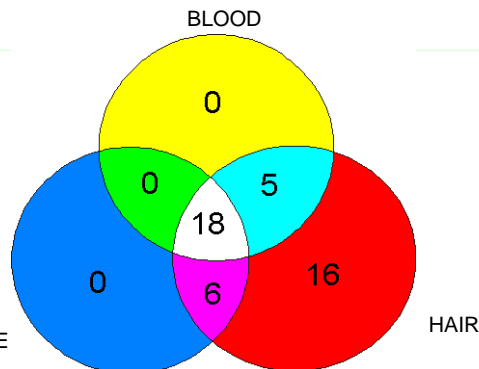


\*Cocaine metabolites were detected in 33 out of 45 cases including cocaethylene in 23 cases.  
\*\* Confirmed by detection of 6-Monoacetylmorphine and morphine to confirm ingestion of heroin.

## HAIR ANALYSIS IS NEEDED TO DEMONSTRATE CHRONIC COCAINE USE:

Cocaine use is widespread, in the cases studied the user's age varied from 18 to 64 years old. Deaths associated with its use may go undetected. Cocaine causes very few acute deaths, but chronic use may cause fatal cardiac disease and may be linked to depression leading to suicide.

## FREQUENCY OF COCAINE STATED IN HISTORY and/or DETECTED IN BLOOD and/or HAIR in 45 CASES



Cocaine use was indicated in 36% of cases using hair analysis that would not have otherwise been identified.

## EXCITED DELIRIUM:

Excited delirium is a syndrome uniquely associated with chronic stimulant abuse. The syndrome has been described as having four sequential stages occurring over 4 – 6 hours:  
1. Hyperthermia  
2. Agitated delirium  
3. Respiratory arrest  
4. Death

As one of the manifestations of the syndrome is displaying violent or aggressive behaviour, in many cases the police are called and a number of the deaths occur while the person is being restrained or in police custody.

Cocaine-associated excited delirium is not associated with high concentrations of cocaine in the blood. A study has concluded that the syndrome is caused by changes in dopamine processing induced by chronic and intense use of cocaine rather than by the acute toxic effects of the drug.

Below is an example from the cases studied:  
Police were called to a 27 year old woman behaving erratically and smashing windows. She was detained and later found dead. No cocaine was detected in the blood sample.

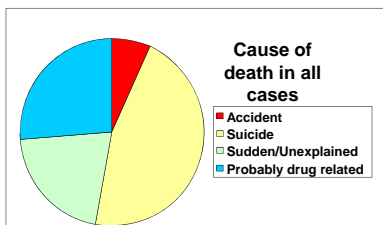
Drugs (ng/mg)	HAIR		
	Section 1 (2 cm)	Section 2 (2 cm)	Section 3 (3 cm)
Amphetamine	0.4	0.6	0.7
Cocaine	32.9	44.8	54.2
BE	7.1	9.4	8.8
EME	0.7	0.7	0.7
Cocaethylene	3.7	2.0	1.5
Morphine	9.7	15.7	19.1
6-MAM	20.5	46.1	69.0
Codeine	2.8	2.9	3.0
Papaverine	Pos	Pos	Pos
Lignocaine			Pos

The hair analysis results indicate use of amphetamine and heavy, habitual use of cocaine and street heroin by the deceased throughout 7 months prior to death. It is possible that her death was a result of excited delirium.

## OTHER DRUGS DETECTED IN HAIR SAMPLES:

ANALGESICS	Oxycodone	Tramadol	
ANTICONVULSANTS	Carbamazepine	Lamotrigine	
ANTIDEPRESSANTS	Amitriptyline	Citalopram	Fluoxetine
	Mirtazapine	Paroxetine	Trazodone
ANTIEMETICS	Cyclizine		
ANTIHISTAMINE	Diphenhydramine		
ANTIPSYCHOTICS	Clozapine	Chlorpromazine	
LOCAL ANAESTHETIC	Lidocaine		
MISCELLANEOUS	Caffeine	Nicotine	Bupropion
OTHER DRUGS OF ABUSE	Methamphetamine	Papaverine (marker for street heroin)	

## COCAINE AND SUICIDE:



• The most common cause of death was suicide by hanging.

• Out of 33 cases where suicide was the mode of death cocaine was detected in the hair for 16 cases.

Tolerance and dependence to cocaine can happen very rapidly.

As tolerance increases, the effects of the 'highs' become shorter and less intense.

This causes the user to 'binge'.

Following this bingeing withdrawal symptoms occur which are characterised by intense unpleasant feelings of lassitude and depression.

This depression can be associated with suicidal intention.

## SUDDEN UNEXPLAINED DEATH:

Cocaine causes vascular disease and in general there is little to distinguish cocaine-induced vascular disease from naturally occurring vascular disease at post mortem. Heart damage is a frequent complication of chronic cocaine use. Therefore it is vital to get a reliable drug history in order to determine the cause of death.

From the information provided with the cases shown in the table, there was no obvious cause of death. Often there was no indication of previous drug use. In all of the cases no drugs were detected in the blood sample (or there was no sample available), but cocaine was detected in hair analysis. Cocaine use could have contributed to these deaths.

Age	History of drug use	Drugs in the blood	Drugs detected in hair
20	None	NO SAMPLE	Cocaine, Morphine
28	Heroin and Cocaine	NO SAMPLE	Cocaine, Heroin, Ecstasy
29	None	ND	Cocaine, Amphetamine, Paroxetine
30	Cannabis and alcohol	ND	Cocaine, Cocaethylene
37	Cannabis and Cocaine	NO SAMPLE	Cocaine, Morphine
46	None	ND	Cocaine, Ecstasy