

Purity of Illicit Drugs submitted to Forensic Science Ireland 2015

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Executive Summary

As part of our Service Level agreement with An Garda Síochána, Forensic Science Ireland monitors the purity of the main illegal drugs in use in Ireland and provides this information to An Garda Síochána, on an intelligence basis. FSI monitors the purity of “bulk seizures” of cocaine, heroin (diamorphine) and amphetamine by analysing a sample from all seizures of these drugs in packs weighing in excess of 25 grams. FSI also monitors the purity of “street level” cocaine and heroin by analysing a representative sample of seizures of less than 25 grams.

Bulk Cocaine

158 samples were analysed and an average purity of 40% was obtained. The purities ranged from 0.03% to 91%. Levamisole was the most common adulterant detected, being present in 73% of the samples analysed. Other common adulterants were benzocaine (41%), caffeine (22%), lignocaine (18%), and phenacetin (9%).

Bulk Heroin (Diamorphine)

74 samples were analysed and an average purity of 40% was obtained. The purities ranged from 3% to 81%. The most common adulterants detected were caffeine (81%) and paracetamol (70%). Other adulterants detected included diazepam (Valium), phenacetin and benzocaine.

Bulk Amphetamine

Twenty samples were analysed. The average purity was 9.2% ranging from 0.6% to 49%. Caffeine was the main adulterant detected in amphetamine samples.

Street Level Cocaine

36 samples were analysed, 21 from Dublin and 15 from outside Dublin. (Dublin here means the Dublin Metropolitan Region of An Garda Síochána.) The average purities obtained were 28% in Dublin and 19% outside Dublin (0.1 – 78%) (overall average: 24%). Adulterants detected were levamisole, benzocaine, caffeine, phenacetin and lignocaine.

Street Level Heroin

30 samples were analysed, 17 from Dublin and 13 from outside Dublin. The average purities obtained were 33% in Dublin and 35% outside Dublin (overall average: 34%). The main adulterants detected were caffeine and paracetamol.

Purity of bulk Cocaine seizures

A total of 158 samples were analysed. The dates of the seizures involved ranged from 22/12/2013 to 27/11/2015. These are broken down by origin below. (DMR = Dublin Metropolitan Region i.e. Greater Dublin area, DOCB = Drugs and Organised Crime Bureau).

DMR	64
Non-DMR	42
DOCB	8
Customs	14
QA	1

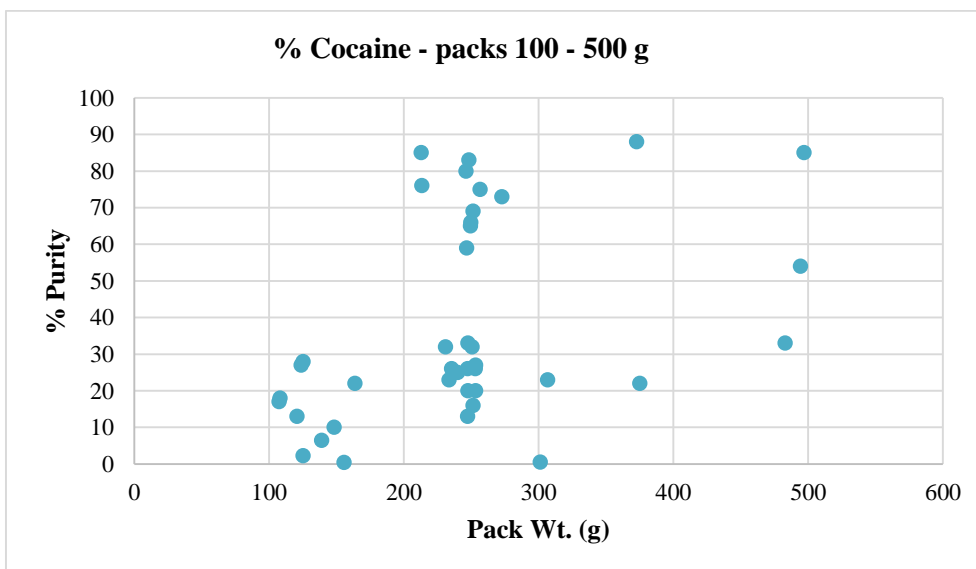
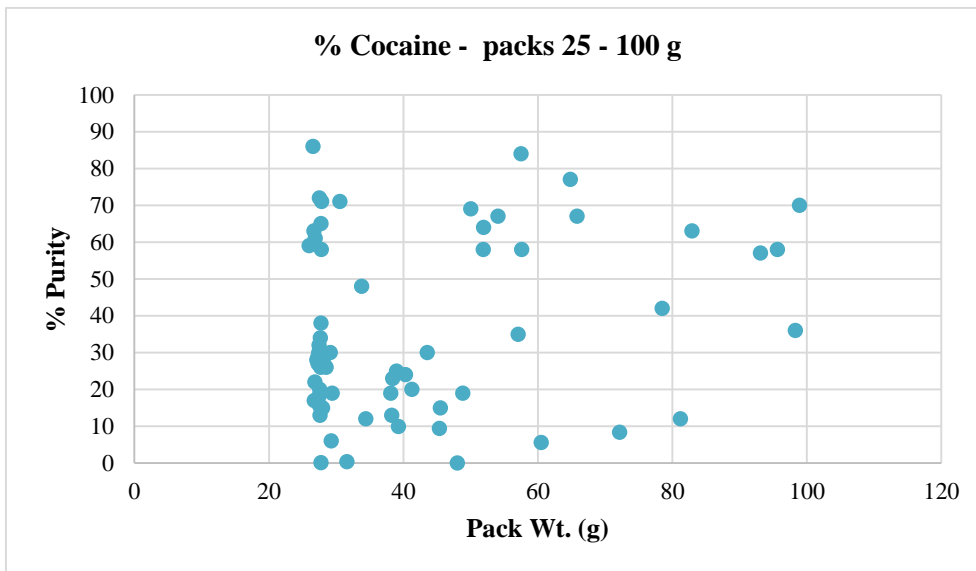
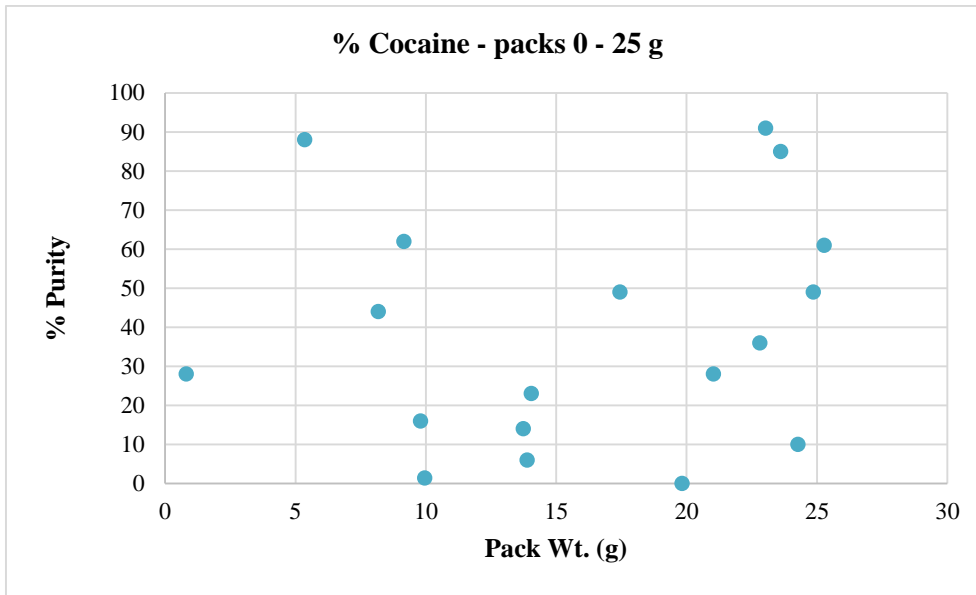
As almost three times as many samples were quantified in 2015 in comparison to 2014 (158 vs. 55), comparisons should be made with caution as variations could be due to having a more representative sample set.

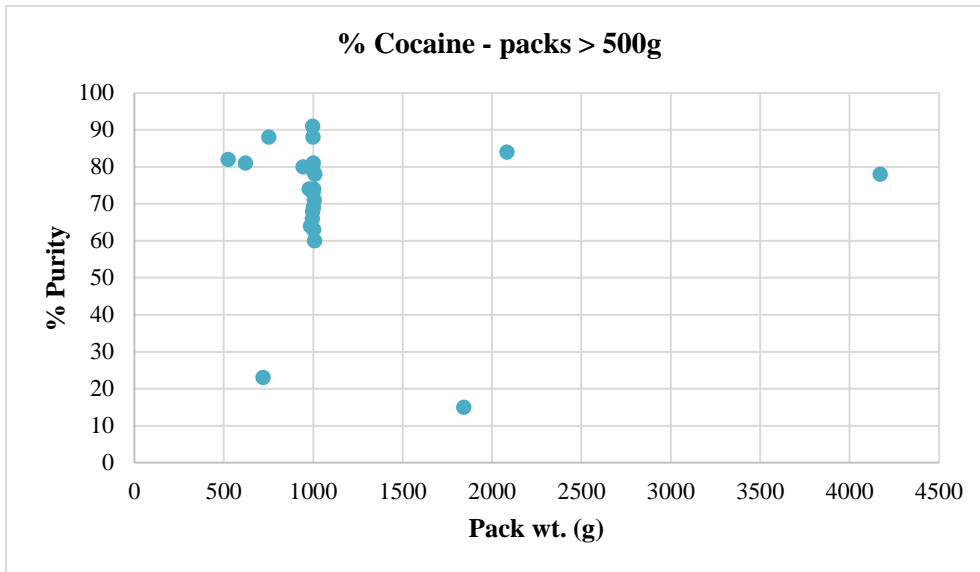
Results

Overall, pack sizes ranged from 0.807 grams to 4171.3 grams. The % cocaine purity results ranged from 0.03% to 91%, with an overall average purity of 40%.

Pack size (g)	No. determinations	Av. Pack wt. (g)	Avg. % Cocaine purity	Min %	Max %
0 – 25	18	15.943	38	0.05	91
25 – 100	70	41.452	34	0.03	34
100 - 500	40	244.462	37	0.468	37
>500	24	1150.992	71	15	71

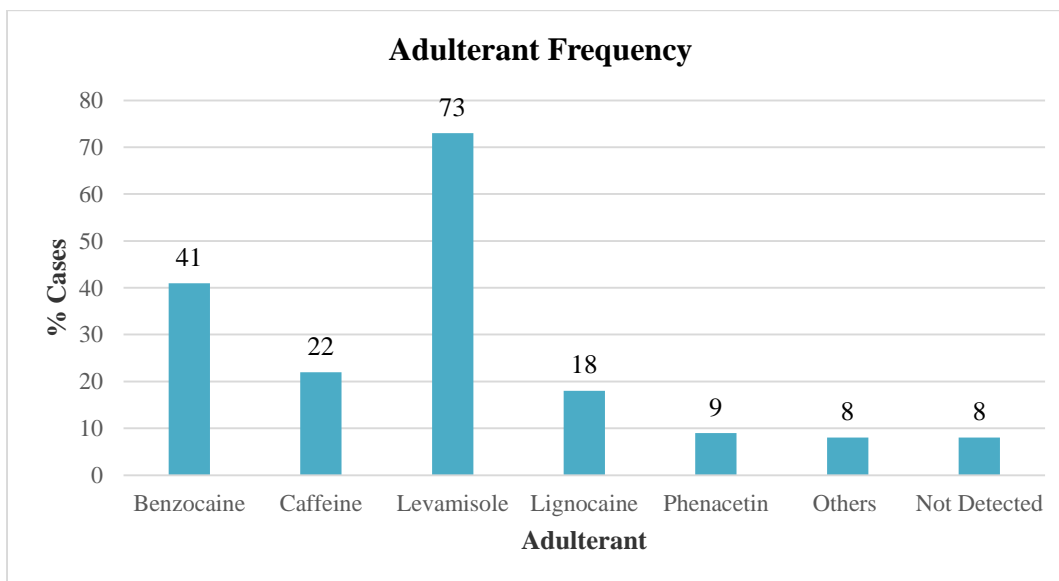
The scatter charts are included to demonstrate the variance of individual purity determinations and weights within a given weight range. They demonstrate the need for caution when using the average purity values of a certain range as a means of comparison. However, we can say that packs of 500g or more are generally of purity 60% or higher, indicating that they are intended for adulteration for dealing purposes.

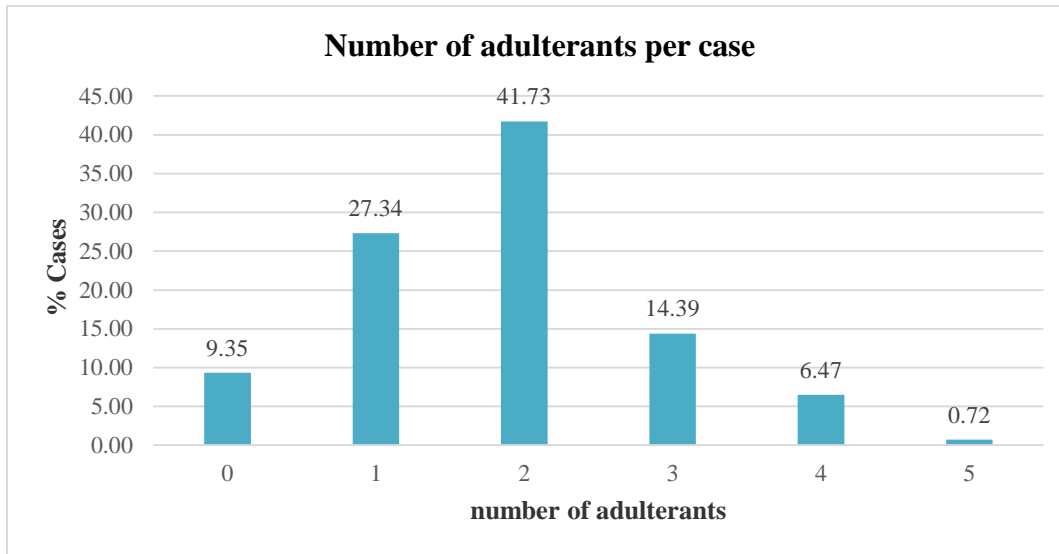




Cocaine Adulterants

Levamisole is the most frequently encountered adulterant (present in 73% of cases). Other adulterants detected were benzocaine, caffeine, lignocaine and phenacetin. It should be noted that powders may also contain adulterants such as sugars, creatine etc which may not be detected by our methods.

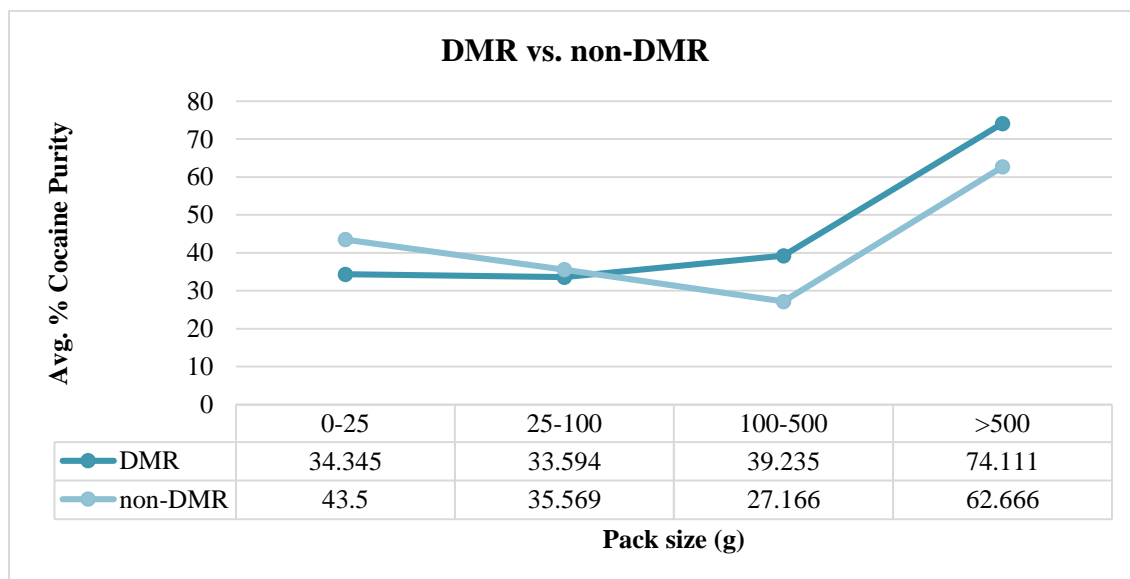




DMR vs. non-DMR

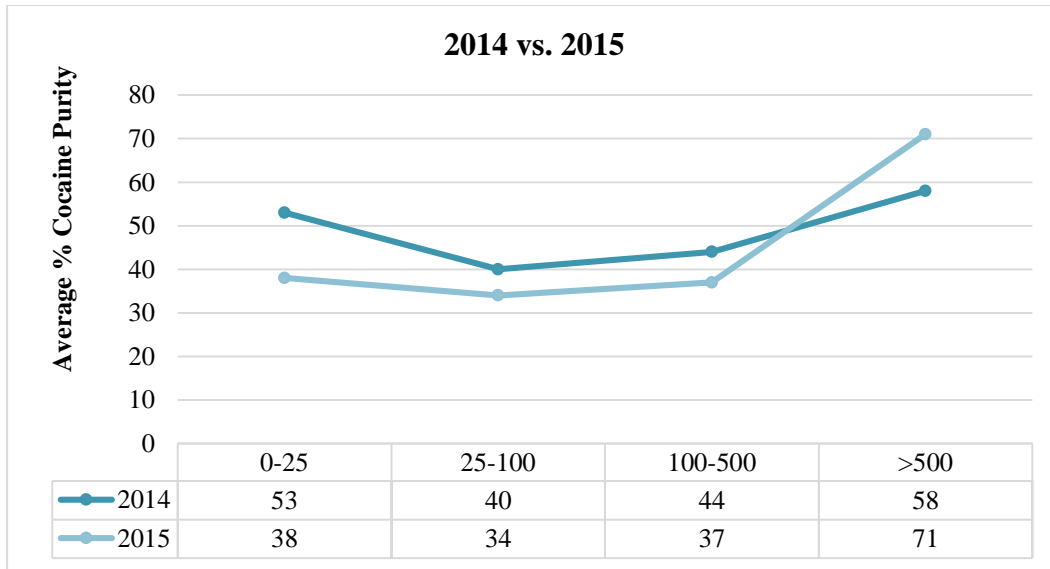
In assessing comparisons in the chart below, the differences in the number of determinations should be borne in mind.

Weight Range (g)	DMR determinations	Non- DMR determinations
0 – 25	10	8
25 – 100	48	24
100 – 500	33	9
>500	18	6



Cocaine yearly trends

This chart is included to begin to monitor trends in purities from year to year. The average purities for the weight ranges < 500 grams would all appear to be down but as we have a larger number of determinations this year and only a two year comparison, we will have to wait some years for meaningful comparisons.



Purity of bulk Diamorphine (Heroin) seizures

A total of 74 samples were quantified. The dates of the seizures ranged from 4/4/2013 to 15/12/2015. These are broken down by origin below.

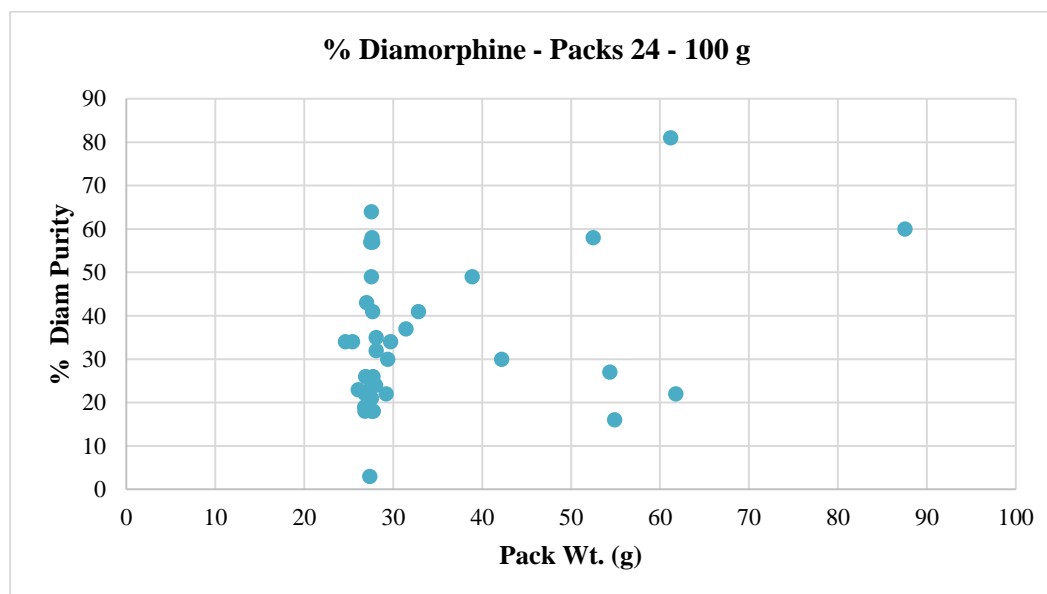
DMR	27
Non-DMR	19
Customs	8
Other	2

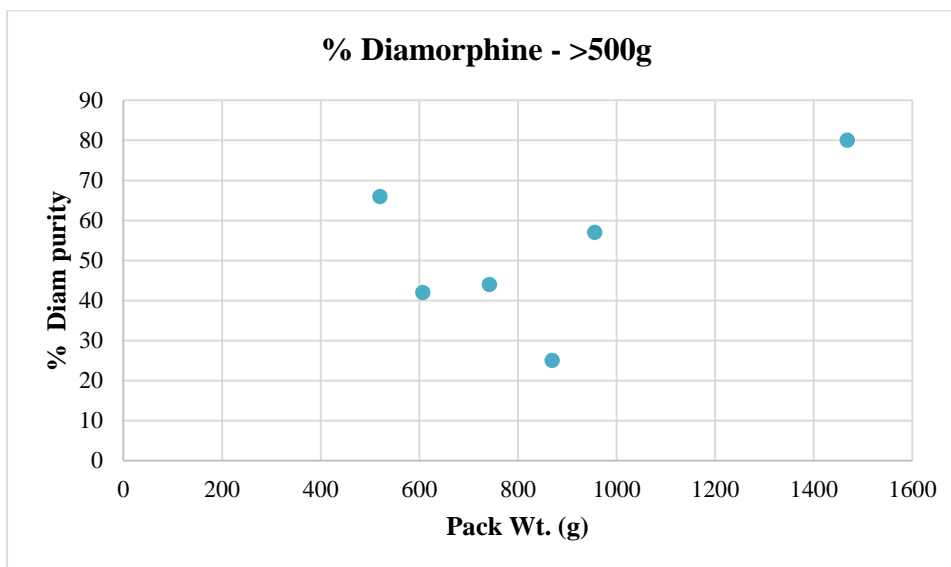
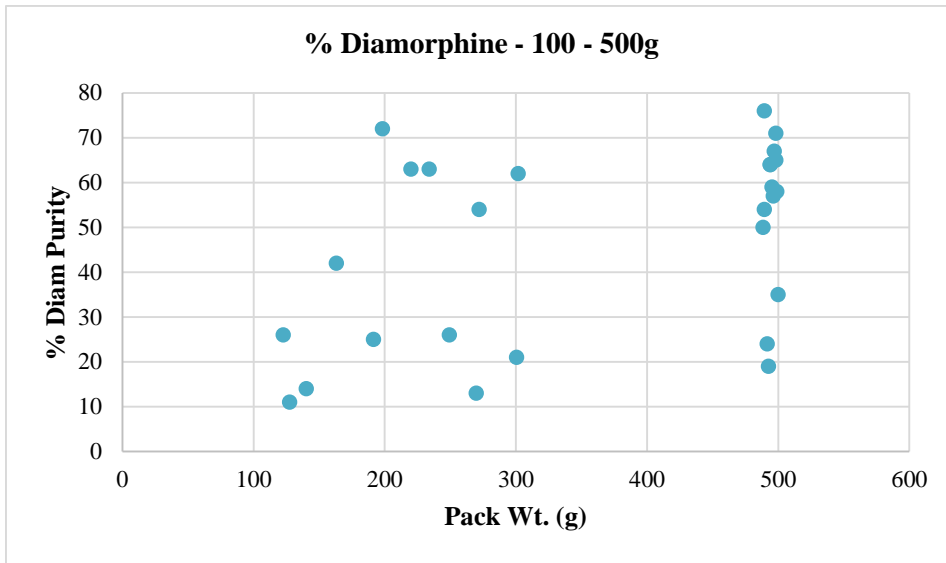
Results

Overall, pack sizes ranged from 13.893 grams to 1468.0 grams. The % Diamorphine purity ranged from 3% to 81% with an overall average purity of 40%.

Pack size (g)	No. determinations	Avg. Pack wt. (g)	Avg. % Diamorphine purity	Min %	Max %
0 – 24	1	13.893	19	n/a	n/a
24 – 100	36	34.217	34	3	81
100 – 500	28	359.689	46	11	76
>500	6	860.4	52	25	80

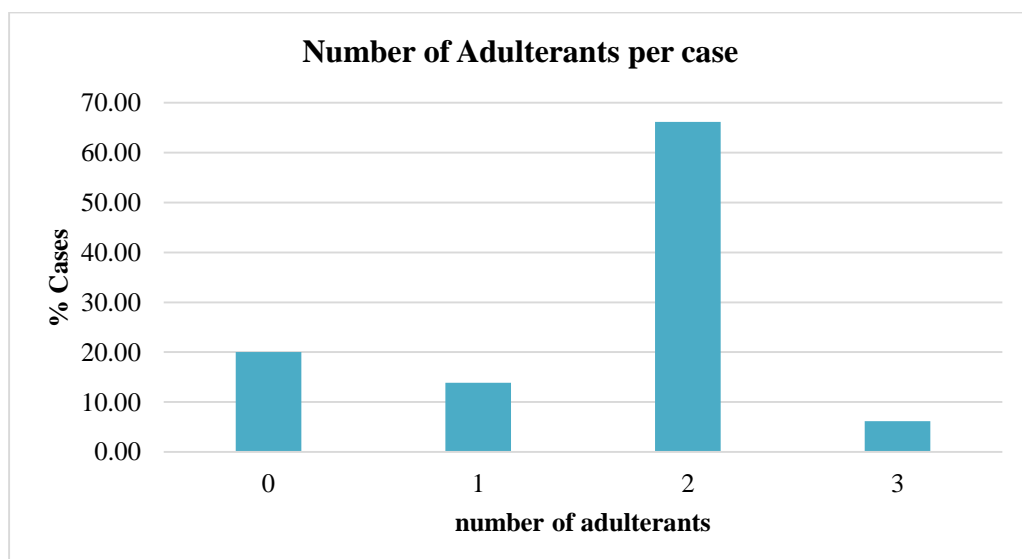
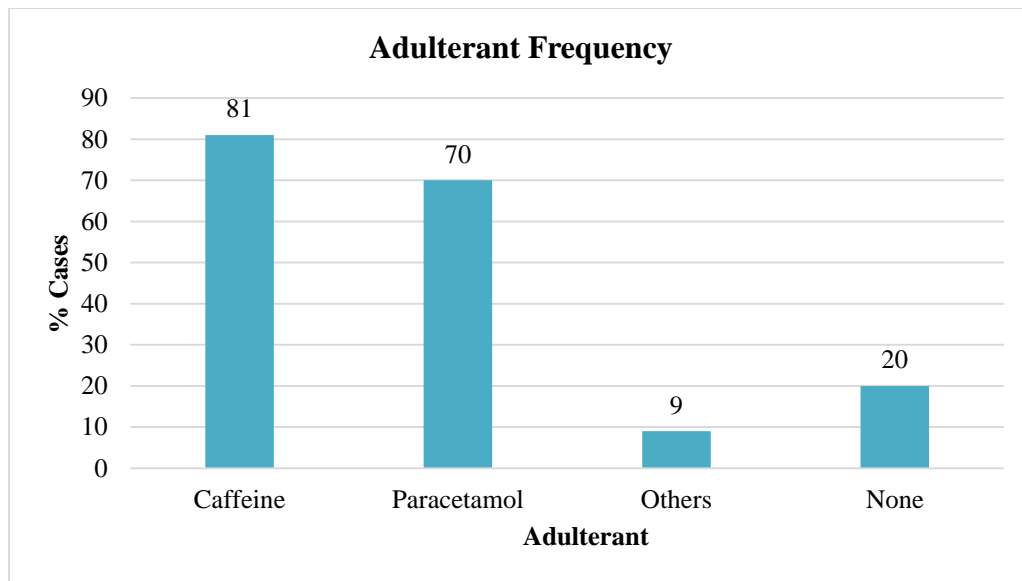
The scatter charts are included to illustrate the spread of individual determinations, including within a certain weight cluster e.g. ~ 27 grams, ~500 grams etc.





Heroin Adulterants

Caffeine remains the most common adulterant detected in samples (present in 81% of cases). It is frequently found in combination with paracetamol (present in 70% of samples submitted). The other adulterants detected included diazepam, phenacetin and benzocaine.



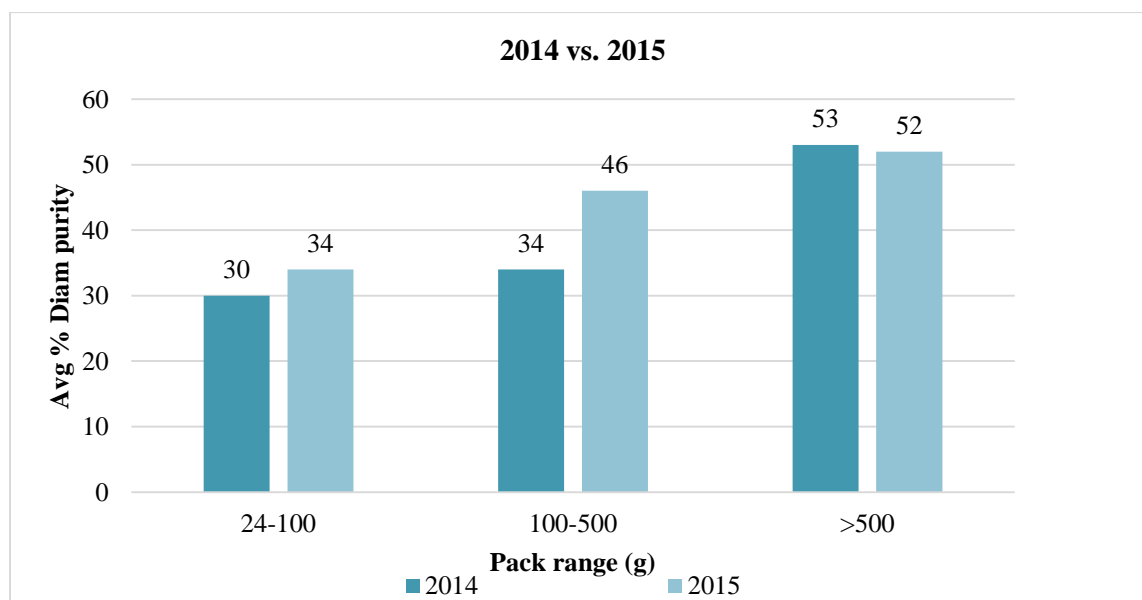
DMR vs non-DMR

The most meaningful comparison for these purposes occurs in the 24 – 100 gram weight range as all but 4 results in the 100 – 500 gram and all but 1 result in the >500 gram range are DMR submissions (including DOCB).

	Average pack wt, (g)	Average % purity
DMR	32.968	39
Non - DMR	35.779	29

Heroin yearly trends

This chart is included to begin to make some comparison in trends from year to year, (*albeit taking into account an almost two fold increase in the number of determinations carried out in 2015*). The most notable difference would appear to be in the 100 – 500 g pack range. The 0 – 24g range is omitted as it would be a comparison of two single determinations.



Purity of bulk Amphetamine seizures

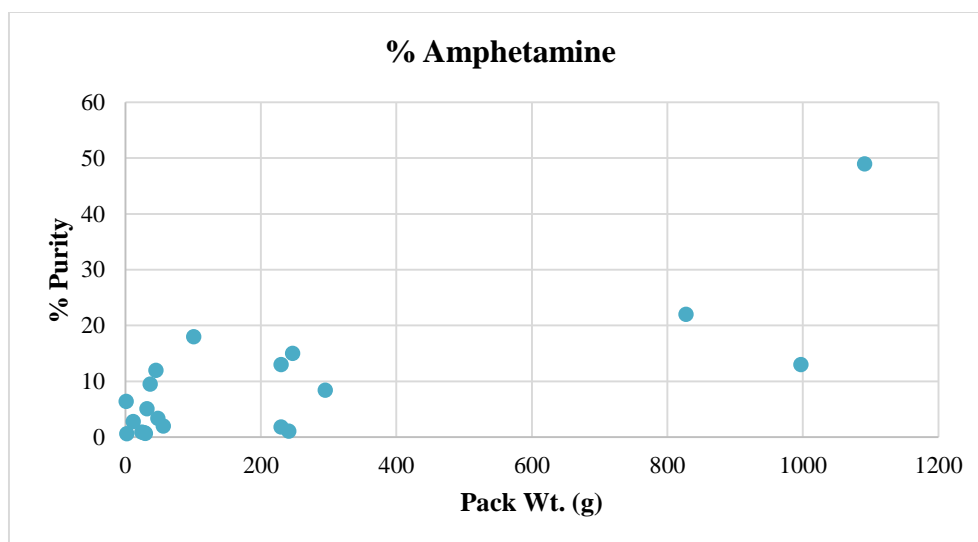
Twenty samples containing amphetamine were quantified in 2015, with the dates of the seizures involved ranging from 21/12/2012 to 22/8/2015. The origins of these samples are shown below;

DMR	7
Non-DMR	12
DOCB	1

Results

Overall, pack sizes ranged from 0.825 grams to 1090.9 grams. The % amphetamine purity results ranged from 0.6% to 49%, with an overall average purity of 9.2%.

Pack size (g)	No. Determinations	Av. Pack wt. (g)	Avg. % Amphetamine purity	Min %	Max %
0 – 25	3	4.691	3.2	0.6	6.4
25 – 100	8	37.196	4.3	0.7	12
100 – 500	6	223.771	9.5	1.1	18
>500	3	971.7	28	13	49



The scatter chart above illustrates the clustering of individual purity determination results within a given weight range and highlights the outliers e.g. omitting the outlier at 1090.9 grams (49% amphetamine) reduces the overall average purity from 9.2% to 7.1%.

Amphetamine Adulterants

Caffeine was detected in 80% of cases. In 20% of cases, no adulterants were detected. (*This does not preclude the presence of sugars or other substances which may not be detected by our methods*).

DMR / non-DMR comparison

Due to the limited number of determinations, statistical analysis on a regional basis is of limited value beyond noting that, when the outlier point was omitted, the overall average % purity for the 14 non-DMR cases was 7.2% and the overall average % purity for the 5 DMR (incl. DOCB) cases was 7.0%.

Street Deal Survey

This analysis was carried out on a representative set of street level deals (weights not available) submitted for quantification in 2015. The seizure dates ranged from 29/1/2014 to 16/10/2015.

Cocaine

Purity was determined in 36 cases involving 21 DMR cases and 15 non-DMR cases. The overall % cocaine purity was 24% (DMR: 28%, non-DMR: 19%).

The main adulterants detected were levamisole, benzocaine, caffeine, phenacetin and lignocaine, detected in 66.6%, 63.8%, 22.2%, 13.8% and 13.8% of cases respectively.

One adulterant was detected in 30.5% of cases, two adulterants in 38.9 % of cases, three adulterants in 38.9 % of cases and four adulterants in 5.6 % of cases.

Diamorphine (Heroin)

Purity was determined in 30 cases involving 17 DMR cases and 13 non-DMR cases. The overall % diamorphine purity was 34% (DMR: 33%, non-DMR: 35%).

The adulterants detected were caffeine and paracetamol, which were both present in 93% of cases.