March 2019

Estimates of the Prevalence of Opiate Use and/or Crack Cocaine Use, 2016/17: Sweep 13 report

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Keywords

Opiate use; crack cocaine use; prevalence estimation; capture-recapture methods; multiple indicator methods.

Contents

Executive summary

This report presents the findings of Sweep 13 of the estimates of the prevalence of opiate and/or crack cocaine use in England, covering 2016/17. These continue the long time series of opiate and/or crack cocaine use prevalence estimates, starting in 2004/05 and most recently reported for 2014/15.

The estimated number of people who use opiate and/or crack cocaine aged 15-64 in England in 2016/17 was 313,971 (95% CI: 309,242 to 327,196). Within this group, there are an estimated 261,294 people (95% CI: 259,018 to 271,403) that use opiates and an estimated 180,748 people (95% CI: 176,583 to 188,066) that use crack cocaine.

The estimated prevalence rates for England per thousand population in 2016/17 were 8.85 (95% CI: 8.72 to 9.23) for OCU, 7.37 (95% CI: 7.30 to 7.65) for opiate use and 5.10 (95% CI: 4.98 to 5.30) for crack cocaine use.

The estimated prevalence rates for England per thousand population in each age group in 2016/17 were 4.62 (95% CI: 3.95 to 5.41) in the 15 to 24 age group, 10.93 (95% CI: 10.49 to 12.53) in the 25 to 34 age group and 9.46 (95% CI: 8.97 to 9.96) in the 35 to 64 age group. The North East region had the highest estimated prevalence in the 25 to 34 age group, the North West region had the highest estimated prevalence in the 35 to 64 age group and London had the highest estimated prevalence in the 15 to 24 age group.

The estimated number of people in England who use opiates and/or crack cocaine increased by 4.4% when compared to 2014/15 (300,783 to 313,971). This increase over the two-year period was statistically significant. The estimated number of people who use opiates increased slightly by 1.5% (257,476 to 261,294), but this change was not statistically significant. There was a decrease of 1.1% in the number people who use crack cocaine between 2014/15 and 2016/17 (182,828 to 180,748); this change was not statistically significant.

The only region that has seen a statistically significant increase in the number people who use opiates was London, however that region has also seen a statistically significant decrease in the number of people who use crack cocaine. However, the highest prevalences for both opiate and/or crack cocaine use overall and opiate use continue to be in the north of England, with the North West, North East and Yorkshire and the Humber all having estimated prevalences rates of opiate and/or crack cocaine use above 10 per thousand population. In contrast to 2014/15, the North West now has the highest estimated prevalence of crack cocaine use in 2016/17, at 6.21 per thousand. London, the West Midlands and Yorkshire and the Humber all have estimated prevalences of crack cocaine use over 5 per thousand in 2016/17.

The estimated number of people who use opiates and/or crack cocaine in the 35 to 64 age group increased by 12% between 2014/15 and 2016/17 (178,875 to 200,186), while there was a 10% decrease in the estimated number aged 25 to 34 (91,808 to 82,680). The increase in the 35 to 64 age group was was statistically significant, and these findings follow a long-term ageing trend in the population that use opiates and/or crack cocaine. There was an increase of 3% in the estimated number of people who use opiates and/or crack cocaine aged 15 to 24 between 2014/15 and 2016/17 (30,190 to 31,105), which was not statistically significant. London was the only region to see a statistically significant increase in the number of people who use opiates and/or crack cocaine and in the number of people who use opiates in the 15 to 24 age group.

Report overview

Information about the prevalence of opiate and/or crack cocaine use (OCU) is an essential part of the evidence base used to formulate policy, inform service provision and assess the impact of interventions to reduce the use of these drugs and the associated health harms. Opiates are defined as: a group of drugs including heroin, methadone and buprenorphine that act on opioid receptors. Although it is not possible to directly count the number of people who use opiate and/or crack cocaine as they may not be identifiable through available administrative datasets, indirect techniques can provide estimates of prevalence. This research uses data sources that are available at the local and national level to estimate the prevalence of OCU.

Estimates are provided in the accompanying spreadsheet for the 151 upper tier local authority (LA) areas and the nine regions of England previously described as Government Office Regions. Two established prevalence estimation methods are used; the capture-recapture method and the multiple indicator method (Hay et al, 2010; Smit, van Laar and Wiessing, 2006). The national estimate for OCU was derived as the sum of the 151 LA area estimates.

These estimates for 2016/17 are the eleventh set of OCU estimates to be published using this methodology and the first to be published since 2014/15. There will be a time series covering 11 of the 13 years back to 2004/05 (data for 2007/08 and 2015/16 are unavailable). Therefore, this set of estimates is also referred to as 'Sweep 13' of this series of estimates.

Data sources

Four sources of data were available within which people who use opiate and/or crack cocaine could be identified. These sources of data are drug treatment, probation, police and prison data.

Persons resident in each LA area, in contact with these sources during 2016/17, known to be using heroin, methadone, other opiate drugs, or crack cocaine were included in the analysis. Only those aged 15 to 64 were included. The overlap between data sources was determined via comparison of initials, date of birth and gender within each LA area. These identifiers were anonymised in advance of carrying out analysis. Established statistical modelling techniques were used to examine this overlap and to produce prevalence estimates stratified, where this is possible, by age group, gender, and LA area of residence.

Methods

Two prevalence estimation methods have been used to estimate the size of the 'hidden' opiate and / or crack cocaine using population at the upper tier local authority (LA) area level: the capture-recapture method and the multiple indicator method. The hidden population is those people using opiates and/or crack cocaine who do not have contact with any of the drug treatment and criminal justice services that provide information to the data sources used in the the analyses. Where available a capture-recapture estimate is used for an LA; otherwise the multiple indicator method is used. The capture-recapture method examines the overlap between the available sources of data on individuals who use drugs at the local level. The multiple indicator method models the relationship between all of the available capture-recapture estimates and readily available drug indicator data. It then applies that relationship to the LAs where capture-recapture estimates are not available to provide an estimate. The LA area estimates are then summed to provide regional and national estimates.

For the 2016/17 estimates the capture-recapture method has been used to estimate the prevalence of OCU in the slight majority of LA areas in England (n=90). The multiple indicator method provided local estimates in the remaining LA areas. Further detail about the two methods can be found in the Annex at page 14.

Findings for 2016/17

England and regional estimates

Table 1 presents the national estimates and their associated 95% confidence intervals (CIs).

There were an estimated 313,971 people who use opiates and/or crack cocaine aged 15 to 64 in England (95% CI: 309,242 to 327,196). This corresponds to 8.85 per thousand of the population (95% CI: 8.72 to 9.23). Within this group, there were an estimated 261,294 people (95% CI: 259,018 to 271,403) in England who use opiates (7.37 per thousand population aged 15 to 64, 95% CI: 7.30 to 7.65). It is estimated that 180,748 people (95% CI: 176,583 to 188,066) use crack cocaine (5.10 per thousand population aged 15 to 64, 95% CI: 4.98 to 5.30).

Table 1: National estimates and prevalence per 1,000 population aged 15 to 64 with 95% confidence intervals (CIs), 2016/17.

Drug	Estimate	95% CI	Rate	95% CI
Opiate and/or crack cocaine use	313,971	309,242 – 327,196	8.85	8.72 – 9.23
Opiate use	261,294	259,018 – 271,403	7.37	7.30 – 7.65
Crack cocaine use	180,748	176,583 – 188,066	5.10	4.98 – 5.30

Total estimates and estimated prevalence rates per 1,000 population for OCU, opiate use and crack cocaine use for each region are shown in Tables 2 to 4. Table 2 shows that the North East had the largest estimated point prevalence of OCU at just over 11 per thousand population aged 15 to 64, followed closely by Yorkshire and the Humber and the North West at over 10 per thousand. The South East had the lowest prevalence at around 6 per thousand.

When comparing opiate use prevalence (Table 3), the highest prevalences were again in the North East followed by Yorkshire and the Humber; both between 9 and 10 per thousand. The South East and the East of England had the lowest prevalence at under 6 per thousand. The North West had the highest estimated prevalence of crack cocaine use at over 6 per thousand population (Table 4), with London and West Midlands and Yorkshire and the Humber close behind with a prevalence of around 6 per thousand. The prevalence was between around 3 and 5 per thousand in all other regions, with the South East, East Midlands and the North East having the lowest prevalences.

Table 2: Estimated number of people who use opiates and/or crack cocaine (O/CC) and prevalence of OCU by region, 2016/17.

Region	Number of people who use O/CC			Rate per 1,000 population		
	Estimate	95% CI:		Estimate	95% CI:	
North East	18,983	18,312	20,337	11.24	10.84	12.04
North West	49,871	46,958	53,459	10.81	10.18	11.59
Yorkshire and the Humber	37,531	35,574	40,650	10.83	10.26	11.73
East Midlands	24,828	22,651	27,281	8.25	7.53	9.07
West Midlands	35,381	32,986	38,542	9.61	8.96	10.47
East of England	27,509	24,249	32,475	7.17	6.32	8.46
London	56,299	53,915	59,908	9.31	8.91	9.90
South East	35,135	31,476	39,983	6.17	5.52	7.02
South West	28,434	27,335	31,278	8.32	8.00	9.16
ENGLAND	**313,971**	**309,242**	**327,196**	**8.85**	**8.72**	**9.23**

Table 3: Estimated number of people who use opiates and prevalence of opiate use by region, 2016/17.

Region	Number of people who use opiates			Rate per 1,000 population		
	Estimate	95% CI:		Estimate	95% CI:	
North East	16,468	16,028	17,964	9.75	9.49	10.64
North West	41,333	39,414	43,601	8.96	8.54	9.45
Yorkshire and the Humber	31,729	30,144	34,278	9.15	8.70	9.89
East Midlands	21,573	20,222	23,389	7.17	6.72	7.77
West Midlands	30,453	28,723	33,399	8.28	7.81	9.08
East of England	22,308	20,099	24,963	5.81	5.24	6.50
London	43,823	42,362	47,410	7.24	7.00	7.84
South East	29,176	26,655	32,545	5.12	4.68	5.71
South West	24,431	24,431	23,261	7.15	6.81	7.64
ENGLAND	**261,294**	**259,018**	**271,403**	**7.37**	**7.30**	**7.65**

Table 4: Estimated number of people who use crack cocaine and prevalence of crack cocaine use by region, 2016/17.

Region	Number of people who use crack cocaine			Rate per 1,000 population		
	Estimate	95% CI:		Estimate	95% CI:	
North East	6,745	5,890	8,073	3.99	3.49	4.78
North West	28,666	26,792	30,959	6.21	5.81	6.71
Yorkshire and the Humber	20,255	18,896	22,167	5.84	5.45	6.40
East Midlands	11,882	10,271	13,541	3.95	3.41	4.50
West Midlands	21,696	19,923	23,634	5.90	5.41	6.42
East of England	18,170	16,033	20,400	4.73	4.18	5.31
London	36,116	34,351	38,123	5.97	5.68	6.30
South East	21,891	19,987	24,464	3.84	3.51	4.29
South West	15,327	14,000	17,334	4.49	4.10	5.07
ENGLAND	**180,748**	**176,583**	**188,066**	**5.10**	**4.98**	**5.30**

In Table 4, the estimates of the number of people who use crack cocaine will include people who use opiates and crack cocaine. In order to obtain a crude estimate of the number of people who use crack cocaine but not opiates, the opiate use estimate can be subtracted from the opiate and/or crack cocaine estimate. Using this crude approach indicates that around 52,677 (95% CI: 42,282 to 64,018) people where using crack cocaine but not opiates in 2016/17, however, considering the approach taken to produce this figure it should be used with caution.

Age estimates

Table 5 shows the breakdown of the OCU estimates by age group and region. Table 6 shows how this breaks down by the percentage in each age group in each region, and Table 7 shows the prevalence in each age group and in each region.

Nationally, Table 6 shows that it is estimated that just under 10% of people who use opiates and/or crack cocaine in 2016/17 were aged between 15 and 24 (n=31,105, 95% CI: 26,636 to 36,470), with just over a quarter aged between 25 and 34 (n=82,680, 95% CI: 79,292 to 94,733), and almost two-thirds were aged between 35 and 64 (n=200,186, 95% CI: 189,702 to 210,769). Table 7 shows that the highest estimated prevalence was however in the 25 to 34 age group, at 10.93 per thousand population (95% CI: 10.49 to 12.53), compared to 9.46 per thousand population in the 35 to 64 age group (95% CI: 8.97 to 9.96) and 4.62 per thousand population in the 15 to 24 age group (95% CI: 3.95 to 5.41). Regional variation is shown in Table 7: notably, the North West had the highest estimated prevalence in the 35 to 64 age group than any other region at 13.19 per thousand population (95% CI: 12.19 to 14.36) and the North East had the highest estimated prevalence in the 25 to 34 age group than any other region at 18.34 per thousand population (95% CI: 16.80 to 21.44). London had a significantly higher prevalence compared to England in the 15 to 24 age group at 8.50 per thousand population (95% CI: 7.44 to 9.89).

Table 5: Estimated number of people who use opiate and/or crack cocaine by age group and region.

Region	15 to 24 years			25 to 34 years			35 to 64 years		
	Estimate	95% CI:		Estimate	95% CI:		Estimate	95% CI:	
North East	1,475	889	2,081	6,160	5,640	7,201	11,348	10,439	12,465
North West	3,758	2,418	5,005	9,787	8,523	11,600	36,326	33,577	39,552
Yorkshire and the Humber	2,966	1,807	4,131	9,359	8,387	11,168	25,206	23,258	27,636
East Midlands	2,047	828	3,302	7,589	6,273	9,973	15,192	12,538	17,403
West Midlands	3,194	1,815	4,572	10,496	9,314	12,485	21,691	19,192	24,308
East of England	2,787	1,383	4,821	8,017	6,530	11,902	16,705	12,714	20,255
London	8,786	7,693	10,225	12,874	11,202	14,886	34,639	32,393	37,637
South East	3,672	1,345	6,458	10,621	8,251	15,811	20,842	15,037	25,442
South West	2,420	1,219	3,631	7,777	6,792	10,631	18,237	15,408	20,611
ENGLAND	**31,105**	**26,636**	**36,470**	**82,680**	**79,292**	**94,733**	**200,186**	**189,702**	**210,769**

Table 6: Estimated age group proportion, people who use opiates and/or crack cocaine by region. (Row percentages).

Region	15 to 24 years			25 to 34 years			35 to 64 years		
	Estimate	95% CI:		Estimate	95% CI:		Estimate	95% CI:	
North East	7.77	4.61	10.69	32.45	29.44	37.02	59.78	54.75	63.38
North West	7.54	4.83	9.91	19.62	17.18	22.75	72.84	69.18	76.20
Yorkshire and the Humber	7.90	6.56	10.86	24.94	22.49	28.74	67.16	62.71	70.90
East Midlands	8.24	3.39	12.93	30.57	25.82	39.31	61.19	51.82	67.66
West Midlands	9.03	5.06	12.68	29.66	26.31	34.46	61.31	55.47	65.59
East of England	10.13	4.81	16.80	29.14	23.62	39.95	60.73	46.71	67.22
London	15.60	13.69	17.60	22.87	20.03	25.98	61.53	58.17	64.68
South East	10.45	3.77	17.61	30.23	23.80	43.36	59.32	43.10	67.17
South West	8.51	4.17	12.50	27.35	23.92	36.72	64.14	54.02	68.89
ENGLAND	**9.91**	**8.40**	**11.42**	**26.33**	**25.04**	**29.72**	**63.76**	**60.35**	**65.49**

Table 7: Opiate and/or crack cocaine use prevalence rates per thousand population, by age group and region with 95% confidence intervals.

Region	15 to 24 years			25 to 34 years			35 to 64 years		
	Estimate	95% CI:		Estimate	95% CI:		Estimate	95% CI:	
North East	4.37	2.64	6.17	18.34	16.80	21.44	11.18	10.28	12.28
North West	4.18	2.69	5.57	10.19	8.87	12.08	13.19	12.19	14.36
Yorkshire and the Humber	4.19	2.55	5.83	13.20	11.82	15.75	12.30	11.35	13.49
East Midlands	3.40	1.38	5.48	12.92	10.68	16.98	8.35	6.89	9.57
West Midlands	4.30	2.44	6.15	13.69	12.14	16.28	10.00	8.84	11.20
East of England	4.04	2.00	6.98	10.42	8.49	15.47	7.02	5.35	8.52
London	8.50	7.44	9.89	7.64	6.65	8.84	10.40	9.73	11.30
South East	3.42	1.25	6.02	9.69	7.53	14.43	5.91	4.26	7.21
South West	3.70	1.86	5.55	11.94	10.43	16.32	8.64	7.30	9.77
ENGLAND	**4.62**	**3.95**	**5.41**	**10.93**	**10.49**	**12.53**	**9.46**	**8.97**	**9.96**

Comparisons to previous estimates

This section presents information on the differences between the 2016/17 estimates (Sweep 13) and the last set of estimates to be published, which were for 2014/15 (Sweep 11). Simulation based confidence intervals (Gemmell, Millar and Hay, 2004) were used to derive 95% CIs and where there has been a statistically significant difference between these two time periods, this has been noted by *↓ (for a decrease) or *↑ (for an increase). It should be noted that significant differences are identified when the 95% CI for the difference does not include zero, rather than comparing the confidence intervals for each year. Estimates for years prior to 2014/15 are available here.

Changes in England and regional estimates

Table 8 shows the changes in the estimated number of people who use opiates and/or crack cocaine between 2014/15 and 2016/17 by region. The number of people who use opiates and/or crack cocaine increased by 4%, from 300,783 in 2014/15 to 313,971 in 2016/17, and this increase of 13,188 was statistically significant (95% CI: 2,451 to 25,266). There was a slight decrease in the estimate in the East Midlands, however all other regions saw increases in the estimate, none of which were statistically significant.

Table 8: Estimated number of people who use opiates and/or crack cocaine by region in 2014/15 (sweep 11) and 2016/17 (sweep 13)

Region	Sweep 11			Sweep 13			Difference			
	Estimate	95% CI:		Estimate	95% CI:		Estimate	95% CI:		
North East	17,675	17,116	19,120	18,983	18,312	20,337	1,308	-149	2,673	
North West	48,814	46,661	52,097	49,871	46,958	53,459	1,057	-3,232	5,065	
Yorkshire and the Humber	36,662	34,971	38,800	37,531	35,574	40,650	869	-2,107	4,367	
East Midlands	25,057	23,108	27,064	24,828	22,651	27,281	-229	-3,423	2,628	
West Midlands	34,822	33,090	37,580	35,381	32,986	38,542	559	-3,009	3,882	
East of England	25,910	23,146	28,708	27,509	24,249	32,475	1,599	-2,381	7,222	
London	52,487	50,955	55,550	56,299	53,915	59,908	3,812	-49	7,489	
South East	32,734	30,175	35,974	35,135	31,476	39,983	2,401	-2,318	7,949	
South West	26,622	25,586	29,474	28,434	27,335	31,278	1,812	-1,324	4,354	
ENGLAND	**300,783**	**297,986**	**311,128**	**313,971**	**309,242**	**327,196**	**13,188**	**2,451**	**25,266**	*↑

Table 9 shows the changes in the number of people using opiates between 2014/15 and 2016/17 by region. There was an increase of around 1.5% in the estimated number of people using opiates in England. This change was not statistically significant. The only statistically significant change in a region was an increase in London, with a 7% rise over this period.

Table 9: Estimated number of people who use opiates by region in 2014/15 (sweep 11) and 2016/17 (sweep 13).

Region	Sweep 11			Sweep 13			Difference		
	Estimate	95% CI:		Estimate	95% CI:		Estimate	95% CI:	
North East	15,414	14,945	16,643	16,468	16,028	17,964	1,054	-189	2,532
North West	42,647	41,029	45,239	41,333	39,414	43,601	-1,314	-4,402	1,501
Yorkshire and the Humber	32,221	30,834	34,026	31,729	30,144	34,278	-492	-2,757	2,280
East Midlands	22,163	20,635	24,262	21,573	20,222	23,389	-590	-2,904	1,681
West Midlands	30,270	28,991	32,519	30,453	28,723	33,399	183	-2,645	3,426
East of England	21,827	20,086	23,861	22,308	20,099	24,963	481	-2,557	3,552
London	40,750	39,407	42,995	43,823	42,362	47,410	3,073	767	6,592 *↑
South East	28,639	26,645	32,162	29,176	26,655	32,545	537	-3,571	4,347
South West	23,545	22,834	25,830	24,431	23,261	26,096	886	-1,682	2,360
ENGLAND	**257,476**	**255,440**	**266,643**	**261,294**	**259,018**	**271,403**	**3,818**	**-4,092**	**12,177**

Table 10 shows the changes in the number of people who use crack cocaine between 2014/15 and 2016/17 by region. Nationally, there was an decrease of 1% in the number of people who use crack cocaine over this period, and this increase was not statistically significant. There was an decrease of 8% in London, which was statistically significant. There was also an increase of 6.5% in the North East, but this change were not statistically significant.

Table 10: Estimated number of people who use crack cocaine by region in 2014/15 (sweep 11) and 2016/17 (sweep 13).

Region	Sweep 11			Sweep 13			Difference		
	Estimate	95% CI:		Estimate	95% CI:		Estimate	95% CI:	
North East	6,331	4,965	8,002	6,745	5,890	8,073	414	-1,501	2,291
North West	28,685	25,980	31,979	28,666	26,792	30,959	-19	-3,648	3,175
Yorkshire and the Humber	19,411	17,130	21,989	20,255	18,896	22,167	844	-2,065	3,866
East Midlands	12,331	10,451	14,255	11,882	10,271	13,541	-449	-2,915	2,159
West Midlands	21,930	19,184	24,835	21,696	19,923	23,634	-234	-3,581	3,148
East of England	17,408	14,005	20,606	18,170	16,033	20,400	762	-2,810	4,789
London	39,226	37,364	41,940	36,116	34,351	38,123	-3,110	-6,323	-355 *↓
South East	22,126	20,015	24,583	21,891	19,987	24,464	-235	-3,362	3,404
South West	15,380	13,116	17,255	15,327	14,000	17,334	-53	-2,336	3,125
ENGLAND	**182,828**	**176,675**	**190,782**	**180,748**	**176,583**	**188,066**	**-2,080**	**-11,240**	**8,126**

The estimates in Tables 8 and 9 can be used to derive an estimate of the change in the number of people who use crack cocaine but do not use opiates. The number of people who use crack cocaine without using opiates in 2014/15 was crudely estimated at around 43,307 (95% CI: 34,923 to 52,420) by subtracting the estimate of opiate use from that for opiate and/or crack use; this compares to a crude estimate of 52,677 for 2016/17. The difference over the two year period was a rise of 9,370 (95% CI: -4,472 to 23,953); this difference was not statistically significant indicating no change over time.

Changes in age estimates

Tables 11 to 13 show the changes in the estimated number of people who use opiates and/or crack cocaine in each age group between 2014/15 and 2016/17.

In London, there was a statistically significant increase in the number of people who use opiates and/or crack cocaine in the 15 to 24 age group between 2014/15 and 2016/17. The estimated increase was 2,697 (95% CI: 843 to 4,016). There was also an increase nationally of 3% but this was not statistically significant.

There was a statistically significant decrease of 10% nationally between 2014/15 and 2016/17 in the 25 to 34 age group, with statistically significant decrease of 19% in Yorkshire and the Humber.

In contrast to the 25 to 34 age group, there was a statistically significant increase of 12% nationally between 2014/15 and 2016/17 in the 35 to 64 age group and statistically significant increases in three of the nine regions over the two year period. This represents a continuation of a longer term trend of an ageing population of people who use opiates and/or crack cocaine.

Table 11: Estimated number of people who use opiates and/or crack cocaine aged 15 to 24 by region in 2014/15 (sweep 13) and 2016/17 (sweep 13).

Region	Sweep 11			Sweep 13			Difference			
	Estimate	95% CI:		Estimate	95% CI:		Estimate	95% CI:		
North East	1,727	1,470	2,422	1,475	889	2,081	-252	-1,193	359	
North West	3,580	2,923	4,920	3,758	2,418	5,005	178	-1,826	1,426	
Yorkshire and the Humber	3,092	2,403	4,311	2,966	1,807	4,131	-126	-1,706	1,158	
East Midlands	3,192	2,256	4,765	2,047	828	3,302	-1,145	-3,274	405	
West Midlands	2,949	2,301	3,948	3,194	1,815	4,572	245	-1,587	1,644	
East of England	2,960	2,129	3,955	2,787	1,383	4,821	-173	-1,926	2,012	
London	6,089	5,553	7,645	8,786	7,693	10,225	2,697	843	4,016	*↑
South East	4,196	3,181	5,433	3,672	1,345	6,458	-524	-3,041	2,379	
South West	2,405	2,033	3,435	2,420	1,219	3,631	15	-1,731	1,210	
ENGLAND	**30,190**	**28,906**	**34,829**	**31,105**	**26,636**	**36,470**	**915**	**-6,062**	**5,521**	

Table 12: Estimated number of people who use opiates and/or crack cocaine aged 25 to 34 by region in 2014/15 (sweep 11) and 2016/17 (sweep 13).

Region	Sweep 11			Sweep 13			Difference			
	Estimate	95% CI:		Estimate	95% CI:		Estimate	95% CI:		
North East	6,842	6,336	7,611	6,160	5,640	7,201	-682	-1,608	540	
North West	11,035	10,317	12,182	9,787	8,523	11,600	-1,248	-2,926	574	
Yorkshire and the Humber	11,570	10,639	12,441	9,359	8,387	11,168	-2,211	-3,651	-251	*↓
East Midlands	8,211	7,259	9,674	7,589	6,273	9,973	-622	-2,456	1,782	
West Midlands	12,414	11,412	13,768	10,496	9,314	12,485	-1,918	-3,516	345	
East of England	8,068	7,038	9,633	8,017	6,530	11,902	-51	-2,151	4,015	
London	14,994	14,113	16,314	12,874	11,202	14,886	-2,120	-4,206	3	
South East	10,390	9,153	12,356	10,621	8,251	15,811	231	-3005	5,620	
South West	8,284	7,678	9,619	7,777	6,792	10,631	-507	-2,277	2,731	
ENGLAND	91,808	89,650	111,795	82,680	79,292	94,733	-9,128	-15,285	2,280	

Table 13: Estimated number of people who use opiates and/or crack cocaine aged 35 to 64 by region in 2014/15 (sweep 11) and 2016/17 (sweep 13).

Region	Sweep 11			Sweep 113			Difference			
	Estimate	95% CI:		Estimate	95% CI:		Estimate	95% CI:		
North East	9,106	8,479	9,975	11,348	10,439	12,465	2,242	991	3,410	*↑
North West	34,199	32,301	36,418	36,326	33,577	39,552	2,127	-1,376	5,483	
Yorkshire and the Humber	22,000	20,413	23,649	25,206	23,258	27,636	3,206	580	6,142	*↑
East Midlands	13,654	11,951	15,092	15,192	12,538	17,403	1,538	-1,457	4,342	
West Midlands	19,459	17,724	21,581	21,691	19,192	24,308	2,232	-1,016	5,102	
East of England	14,882	13,143	16,589	16,705	12,714	20,255	1,823	-2,566	5,849	
London	31,404	29,887	33,359	34,639	32,393	37,637	3,235	217	6,678	*↑
South East	18,148	16,510	20,110	20,842	15,037	25,442	2,694	-3,532	7,630	
South West	15,933	14,983	17,607	18,237	15,408	20,611	2,304	-986	4,678	
ENGLAND	178,785	174,685	184,519	200,186	189,702	210,769	21,401	8,480	32,464	*↑

Conclusion

This series of estimates of the prevalence of opiate and/or crack cocaine use continue to provide key information that is important for policy makers, commissioners and services providers. The information they provide on the size and nature of this population, and the changes in these over time, continue to inform efforts to reduce harm. However, it is important that appropriate consideration is given to the confidence intervals and the associated uncertainly when using these estimates.

Annex – Technical notes

Overall method

This research applies two established methods, the capture-recapture method (Hay et al, 2010) and the multiple indicator method, which is also known as the multivariate indicator method or MIM, (Smit, van Laar and Wiessing, 2006) to estimate the prevalence of opiate and/or crack cocaine use in England in 2016/17. The benefits of these methods are that: they do not rely exclusively on people's self-reported use of substances; it is possible to provide estimates of prevalence stratified by key characteristics such as age and gender; they use a standard set of procedures that are tried and tested and allow for replication; they build upon existing routinely collected data. This annex provides a brief overview of the methods. More details of these methods and the implications for their use can be found in the report of the first two sweeps of this project (Hay et al, 2006; Hay et al, 2007a) and in a technical report (Hay et al, 2007b).

As with previous sweeps of the project, the first stage of the estimation process was to attempt to obtain capture-recapture (CRC) estimates for all LA areas. These CRC estimates were then used as anchor points for a multiple indicator method (MIM) model which was used to provide estimates for those areas for which it had not proved possible to obtain a CRC estimate.

The capture-recapture analysis procedure

In simple terms, the capture-recapture analysis involves testing a series of statistical formulae, or 'models', to find one that best matches, or 'fits' the pattern of overlap between data sources. A value, known as the Akaike Information Criterion (AIC) (Hook and Regal, 1997), can be useful in assessing goodness of fit. This model is then used to calculate the number of people using opiates and/or crack cocaine who do not appear in any source. This estimate is then added to the 'known' number of people who use opiates and/or crack cocaine to provide an overall estimate of prevalence.

The first stage of analysis involved testing how well a simple model that assumed all samples were independent of each other described the observed overlap pattern across the four samples. Increasingly complex models, representing dependencies between single pairs of data sources ('one-way') and then two pairs of sources ('two-way') were then tested. The model that best matched the overlap was chosen using objective statistical criteria; more complex models were only chosen if they provided a better match (on comparing AIC values) than lower-level models. All capture-recapture analyses were carried out using the GLIM4 statistical package.

In most LA areas, all four sources of data were available to estimate the prevalence of opiate and/or crack cocaine use and opiate use. Attempts were made to produce capture-recapture estimates in all areas but in the two smallest LA areas there were too few data to carry out any meaningful analyses (City of London and Rutland). In contrast with with previous years the estimates for the newer local authorities of Bedford, Central Bedfordshire, Cheshire East and also Cheshire West and Chester were derived in the same way as the other 147 LA areas; previously they were derived at the previous upper tier level (Bedfordshire and Cheshire) then disaggregated to the new upper tier level.

Within this first stage of the analysis, models were fitted in turn with a view to acquiring capture re-capture estimates for each area which, when summed, would ensure that the national confidence interval was as narrow as possible. To do this, the 22 simplest models were applied to the overlap data from each area. This was initially carried out on unstratified data, i.e. not split by gender or age group. This process was then repeated for the data stratified by age group (three strata) and by gender (two strata) giving five stratified estimates. At this stage the data were not stratified by both the age group and gender (e.g. young males, females aged 35 to 64). Such an approach to stratification would have given another six stratified estimates.

Various methods were used to explore whether the model fitted to the unstratified data was a good fit (in particular if the AIC value was less than zero) and whether the resultant estimate was valid. This included checking whether the lowest deviance value indicated a good fit (a lower deviance value signifies a better fit of the model to the observed data), checking whether the estimate derived from applying the best model was similar to a weighted estimate (calculated as a weighted mean of the available 22 estimates) and whether the unstratified estimate was similar to the sum of the stratified estimate for both the age-stratified and gender-stratified model / estimates. In addition, the credibility of each estimate was considered (i.e. not unfeasibly low or high in comparison with the known drug using population or underlying general population).

Thus to summarise, if the model fitted to the unstratified data did not offer a valid estimate, then either the summed gender-specific or age group-specific estimates were considered (with gender-specific estimates preferred if there was no discernible difference between the two approaches; again to ensure that the national confidence interval was not excessively wide). If the models fitted at this stage again did not offer a valid estimate then the approach taken was to stratify the males into three age groups but keep the female data unstratified. This was particularly important, as, across the country, there were fewer data on female opiate and/or crack cocaine users over the age of 34. If that approach did not work, then the analyses were run on the six age and gender strata and those estimates were considered. If none of those unstratified estimates were deemed appropriate then any stratified analysis where the AIC value for one stratum was less than five was considered. If none of those approaches provided a valid estimate then a multiple indicator estimate was used instead.

Once the OCU and opiate use capture-recapture estimates for each case definition were obtained, they were compared against each other at the LA area level and aligned where necessary (e.g. to ensure that the OCU estimate is the greater of the two). As with the previous sweeps, estimates stratified by age group were obtained by first estimating the proportion of drug users falling in each stratum in each LA area, then applying these estimated proportions to the total prevalence estimates for that area, whether it was obtained using capture-recapture method or the multiple indicator method.

A simplified version of the approach described above was carried out to estimate the prevalence of crack cocaine use at the LA area level. However, in this case analyses were not stratified by age group or gender and estimates by age group are not produced.

Case definitions

The case definition of the prevalence estimates depends heavily on the case definitions used by the contributing sources. Moreover, the case definitions of the resultant prevalence estimates need to reflect case definitions that are common across all data sources. The study therefore employed the following as the case definition:

● Use of opiates and/or the use of crack cocaine.

It should be noted that the case definition focuses on the 'use' of opiates and/or crack cocaine rather than the 'misuse' of these drugs or addiction to either drug. The case definition does not include the use of cocaine in a powder form or the use of any other substances such as amphetamine, ecstasy or cannabis.

The study also provides separate estimates of the prevalence of opiate use, and of the prevalence of crack cocaine use.

All data refer to the financial year from 1st April 2016 to 31st March 2017. The age range employed within the study is from 15 to 64 and where the estimates have been stratified by age group, these are 15 to 24, 25 to 34 and 35 to 64 years of age. To derive age from date of birth, the individual's age on the 1st of October 2014 (the mid-point in the financial year 2014/15) was calculated and those who were under the age of 15 or over the age of 64 were excluded. Individuals with missing data fields, such as gender, forename initial or surname initial were also excluded, as were individuals where it was not possible to assign LA area of residence (or those that were resident outside England).

Data

Data used in the capture-recapture analyses

Four main sources of data on opiate and/or crack cocaine use, which were suitable for use in the capture-recapture analyses, were available at the national level:

- The National Drug Treatment Monitoring System (NDTMS) – this collects data on both community and prison treatment, which are regarded as two separate data sources (and are routinely reported as such); a person is included if they indicated opiate and/or crack cocaine use among their problematic substances
- The National Probation Service assessments where opiate and/or crack cocaine use was indicated
- Drug users convicted under the Misuse of Drugs Act (1971) for offences involving possession (or possession with intent to supply) heroin, methadone and/or crack cocaine from the Police National Computer (PNC)

Data sources used in the multiple indicator analyses

There is a wide range of indicator data that may be correlated with drug use prevalence at the LA area level that could be useful within a multiple indicator analysis. Three main types of indicator data could be used within this type of analysis; data that are currently in the public domain (e.g. published data on crime or income support claimants), data that are not currently in the public domain but could have been provided to the study team (e.g. drug-related hospital admissions) and data that have been collected for use within the capture-recapture analyses (such as the NDTMS data).

As in the previous sweeps of the study, a decision was made not to use crime data as these data referred to the place where the crime was committed, not the place where the person responsible for the crime lived. Therefore such indicator data could artificially inflate the estimates for some places where crimes are committed by people who do not live there (e.g. Westminster). Population density was used as an indicator in sweeps one, two and three but has not been used in later sweeps. In previous sweeps, the use of data that were not in the public domain did not appear to improve the analyses. Therefore, the data used in the multiple indicator method analyses were the same as those used in the capture-recapture analyses.

Multiple indicator analyses

In this section, the specific application of the multiple indicator method within this sweep of the study is considered. All of the indicator data and the anchor point data were converted to rates per 1,000 population aged 15 to 64 prior to inclusion in the analyses.

The capture-recapture analyses derived estimates of the prevalence of different types of problem drug use (opiate and/or crack cocaine use; opiate use; crack cocaine use). From these estimates a set of anchor point LA areas were constructed for use within the multiple indicator analyses. Overall there were 89 LA areas that were used as anchor points in the final multiple indicator analyses, although other provisional multiple indicator analyses were carried out to examine the credibility of the capture-recapture estimates and their use in a multiple indicator model.

The number of LA areas that were used as multiple indicator anchor points is summarised by region in Table A1.

Table A1: Summary of the number of local authority (LA) areas used as multiple indicator anchor points by region.

Region	Number of LA Areas	OCU	Opiate	Crack cocaine
North East	12	10	8	5
North West	23	11	5	15
Yorkshire and the Humber	15	11	6	9
East Midlands	9	4	4	4
West Midlands	14	11	7	8
East of England	11	7	4	6
London	33	10	11	8
South East	19	12	9	9
South West	15	13	11	8
ENGLAND	**151**	**89**	**65**	**72**

The LA areas that were used as anchor points in the OCU multiple indicator analyses are shown as the darker shaded areas in Figure A1 (map).

Figure A1: Map showing the opiate and/or crack cocaine use (OCU) anchor point areas (darker shaded areas).
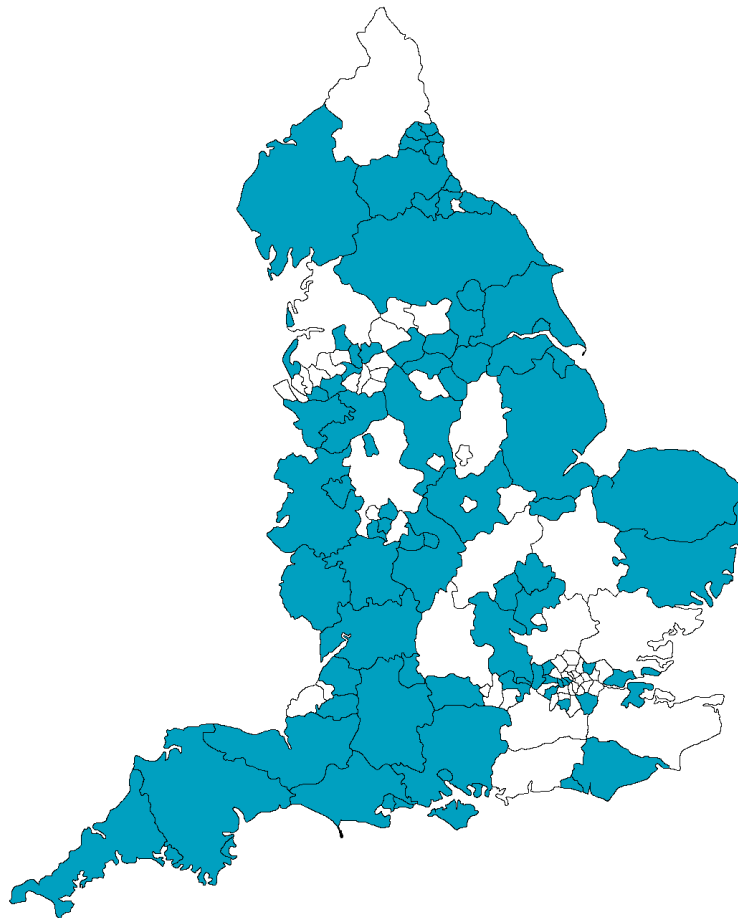
With 89 anchor points available there was no need to use a technique known as principal component analyses that multiple indicator studies often use to ensure that the number of indicators is effectively less than the number of available anchor points (a prerequisite of the regression analysis). Instead, the stepwise regression method (simple linear multiple regression with normal errors) in Minitab 18.1 was used. For each different drug definition only one multiple indicator model was constructed for the whole of England and region was not included as a categorical indicator.

The stepwise regression approach considers all available indicators and only includes a particular indicator in the final regression model if it is significantly related to the available prevalence estimates. The stepwise regression approach alternates at each step between adding significant or deleting non-significant indicators[2] and can result in models that offer a good fit to the available data with a minimal number of indicators. This is in contrast to the forward selection approach which starts with no indicators in the model and keeps including indicators until there are no more significant indicators, and the backward elimination approach which starts with all indicators in the model and removes non-significant ones until all remaining ones are significantly related to the available prevalence estimates. The stepwise regression approach resulted in the following indicators remaining in the best regression model (in order of significance starting with the most significant indicator):

- NDTMS
- Prison
- Police

This model explained 85% of the variance (i.e. provided a good fit to the available data) with the first indicator (NDTMS) explaining 82% of the variance.

Analysis: prevalence of opiate use and crack cocaine use

The general approach outlined above for opiate and/or crack cocaine use was also taken to estimate the prevalence of opiate use or crack cocaine use. The stepwise regression approach resulted in the following indicators remaining in the best regression models (in descending order of significance) for each definition;

Opiate use:

- NDTMS
- Prison
- Police

Crack cocaine use:

- NDTMS
- Prison
- Probation

For the opiate use analyses, the indicators explained 92% of the variance (83% for crack cocaine).

As described in the Sweep 2 Technical Report (Hay et al. 2007b), comparisons between the opiate use and crack cocaine use and the opiate and/or crack cocaine use estimates were made to gauge the validity of the different estimates. Capture-recapture estimates for each definition were compared with multiple indicator estimates. The impact of including capture-recapture estimates that unduly influenced the multiple indicator model was also considered. This 'consistency checking' will always have some element of subjectivity in it due to the issue of having to have consistency of estimates derived from two different methods across three case definitions.

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[2] In these analyses α to enter and α to remove were both set to 0.15

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