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# Measuring the harm from illegal drugs using the Drug Harm Index

Ziggy MacDonald  
Louise Tinsley  
James Collingwood  
Pip Jamieson  
Stephen Pudney

Home Office Online Report 24/05

The views expressed in this report are those of the authors, not necessarily those of the Home Office (nor do they reflect Government policy).

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Ziggy MacDonald  
Drugs Analysis & Research Programme, Home Office

Louise Tinsley, James Collingwood, Pip Jamieson  
Drugs Modelling & Analysis Team, Home Office

Stephen Pudney  
Institute for Social and Economic Research, University of Essex

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# Contents

<b>Acknowledgements</b>	<b>ii</b>
<b>Summary</b>	<b>v</b>
<b>1. Introduction</b>	<b>1</b>
Drug harm and Drug Strategy	1
Measuring harm: responding to SR 2004	2
<b>2. Capturing harm</b>	<b>3</b>
Approach	3
The harms	3
<b>3. Constructing the DHI</b>	<b>5</b>
DHI methodology	5
Constructing the trajectory	6
Shares of total harm	6
<b>4. Limitations of the DHI</b>	<b>7</b>
Measuring drug-related crime proportions	7
Measuring health harms	8
<b>5. Using the DHI</b>	<b>9</b>
Issues of timing	9
<b>6. Areas for further development</b>	<b>10</b>
Data timeliness	10
Unit costs for health harms	10
Additional harms	10
Drug-related crime proportions	10
<b>Appendix A</b>	<b>12</b>
<b>Appendix B</b>	<b>16</b>
<b>Appendix C</b>	<b>19</b>
<b>Appendix D</b>	<b>20</b>
<b>Appendix E</b>	<b>22</b>

## List of boxes

S.1 Key points	v
2.1 The harms included in the DHI	4

## List of figures

S.1 The Drug Harm Index and provisional trajectory	vi
1.1 Conceptual model	2
E.1 Drug-related proportions over time: full samples of respondents arrested on suspicion of acquisitive crimes	23
E.2 Drug-related proportions over time: matched samples of respondents arrested on suspicion of acquisitive crimes	24

## List of tables

3.1 Share of total harm (2003)	6
4.1 High-level assumptions	7
A.1 The harms captured in the DHI	12
C.1 Sensitivity results	19
D.1 Indicator frequencies	20
E.1 Fixed and random effects logit estimates: full sample of respondents arrested on suspicion of acquisitive crimes	23

## Summary

The 2004 Spending Review settlement sets a new Public Service Agreement (PSA) target for the Government's Action Against Illegal Drugs. This new PSA target, which comes into effect over the Spending Review Period 2005/06 to 2007/08, requires the Government to

*“reduce the harm caused by illegal drugs including substantially increasing the number of drug misusing offenders entering treatment through the criminal justice system.”*

A high-level description of how harm reduction will be measured is given in the supporting PSA Technical Note.<sup>1</sup> The purpose of this paper is to provide a more detailed description of the Drug Harm Index (DHI), which has been adopted as the overarching measure for this new PSA target. Where possible technical detail has been placed in the appendices, whilst the key points are summarised in Box S.1.

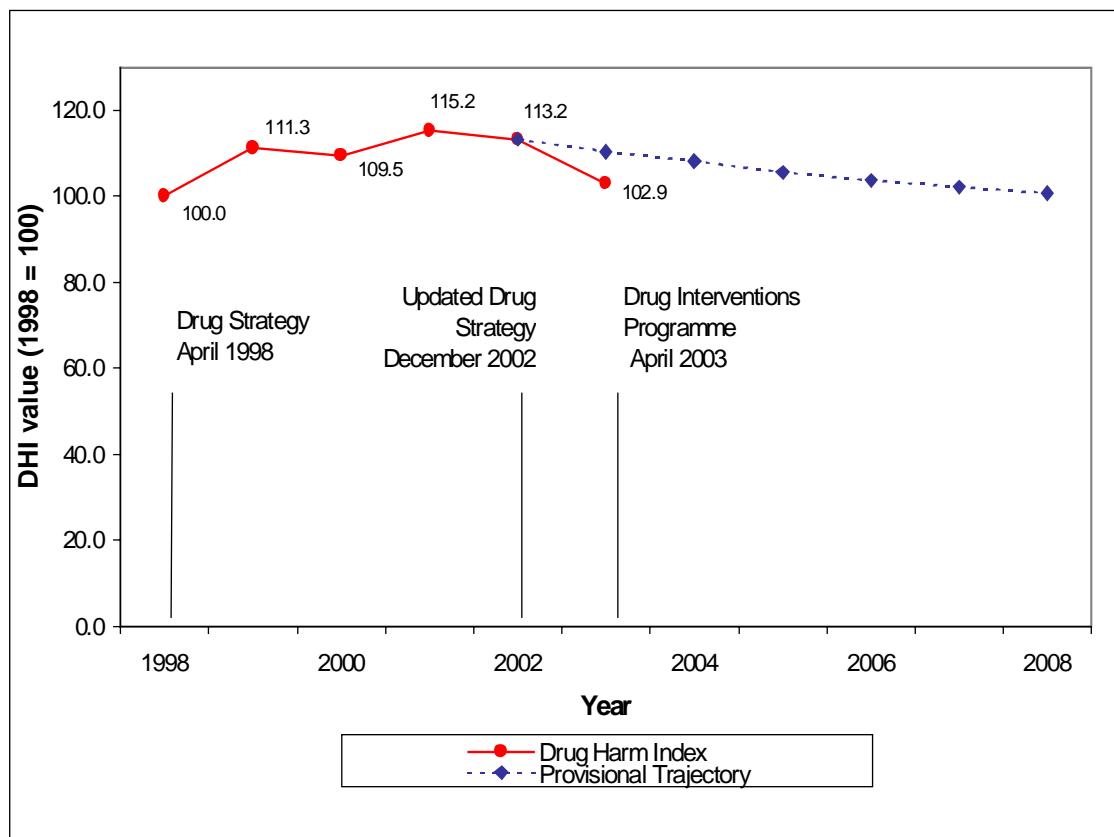
### **Box S.1: Key points**

- The Drug Harm Index captures the harms generated by the problematic use of any illegal drug by combining robust national indicators into a single-figure time-series index. The harms include drug-related crime, community perceptions of drug problems, drug nuisance, and the various health consequences that arise from drug abuse (e.g. HIV, overdoses, deaths etc.).
- The relative importance of each of the harm indicators in the DHI is captured by the economic and social costs that they generate. This follows from work to estimate the economic and social costs of class A drug use, published by the Home Office in 2002.
- From year to year, the change in the DHI will be due to the growth in the volume of harms (e.g. the number of new HIV cases or the number of drug-related burglaries) and the growth in the unit economic or social cost of the harms (e.g. the rise in the expected cost per new HIV case or the average victim cost of a domestic burglary).
- Interpreting changes in the DHI requires care, as it is a single measure that summarises much detail. Different categories of harm may evolve differently over time and no single index can fully capture this diversity. It is recommended that the DHI should be considered alongside a 'basket' of individual indicators in order to determine which particular types of harm are becoming dominant, or are being moderated.
- The DHI does not capture all the harms that illegal drugs might possibly generate, but rather a subset of harm for which robust data are available. As such, this measure is an index indicating change over time, rather than an estimate of the absolute level of harm at any one time.
- Development of the DHI will be ongoing, as more data and information become available. By the time the DHI is used to monitor the new PSA target it is likely that the drug-related crime indicators will be revised (which might have some impact), and quarterly data will be incorporated. Work to further develop the unit costs of the health indicators and public nuisance is also ongoing.

<sup>1</sup> See [http://www.homeoffice.gov.uk/docs3/HomeOffice\\_SR04\\_TNs.pdf](http://www.homeoffice.gov.uk/docs3/HomeOffice_SR04_TNs.pdf)

The latest version of the DHI and a first draft of its forward-look trajectory<sup>2</sup> are presented in Figure S.1. It is likely that the DHI will undergo further development during the Spending Review period, and this will be documented on the Home Office website alongside this paper.

**Figure S.1: The Drug Harm Index and provisional trajectory**



<sup>2</sup> More detail on how the forward-look trajectory has been constructed is given later in this paper. It should be noted that the trajectory shown in Figure S.1 is very much a first draft, and is likely to change as it is developed.

# 1. Introduction

## Drug harm and the Drug Strategy

The use of illegal drugs generates a wide range of social harms, which may vary in different ways and be affected in different ways according to the mix of policy interventions. The Government's response to the challenge of reducing the harm from illegal drugs is set out in the Updated Drug Strategy 2002.<sup>3</sup> The overarching objective of the Strategy is to 'reduce the harm that drugs cause to society, including communities, individuals and their families'. To achieve this the Strategy has four aims centred on Communities, Treatment, Young People and Availability.

The Communities aim of the Strategy is implemented through the Drug Interventions Programme (DIP), which seeks to reduce harm by channelling Problematic Drug Users (PDUs) into treatment via the criminal justice system. The Treatment aim seeks to increase the numbers in treatment (and to increase treatment effectiveness) and is in part concerned with facilitating the output generated by the communities aim – increasing the number of PDUs in treatment (although this is not the only route via which PDUs enter treatment). The associated outcome from treatment is a reduction in drug use, crime and other harmful behaviour. Interventions with Young People seek to prevent vulnerable young people from becoming (problematic) drug users and to shepherd existing young PDUs into treatment. The Availability strand complements these demand-side interventions by reducing the supply and availability of illegal drugs within communities, with the aim of reducing anti-social behaviour, encouraging people to seek treatment, and making initiation less likely.

Conceptually, the Updated Drug Strategy is consistent with the recent Beckley Foundation report<sup>4</sup>, which recommends that 'the aim of drug policy at the beginning of the twenty-first century should be to minimise the harms caused by illicit drugs, with law enforcement, treatment and prevention all continuing to be important means to this end'. The means by which the aims of the Drug Strategy interact in order to reduce the harm from drugs are depicted in Figure 1.1.

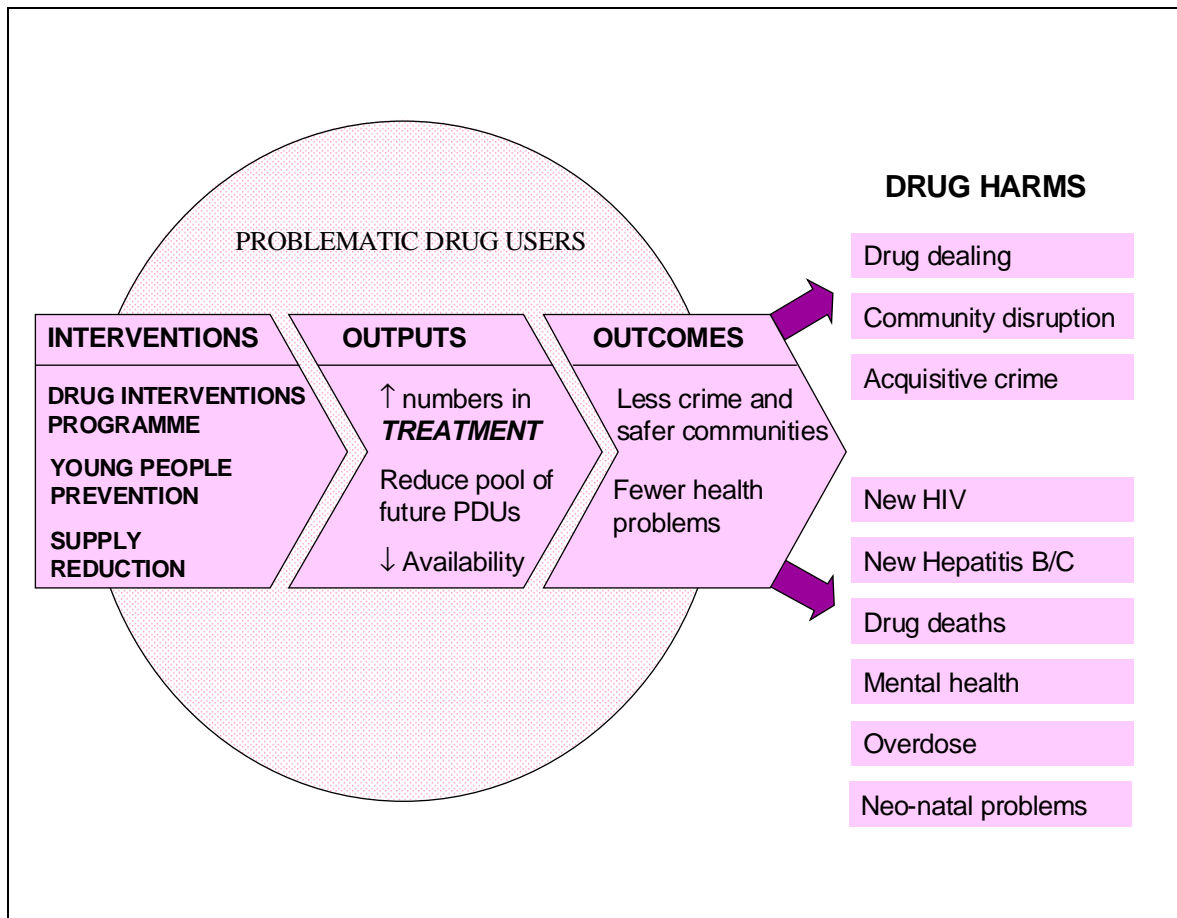
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<sup>3</sup> See <http://www.drugs.gov.uk/ReportsandPublications/NationalStrategy/1038840683>

<sup>4</sup> Trace, M., Roberts, M. and Klein, A. (2004) *Towards a review of global policies on illegal drugs*, The Beckley Foundation (available at <http://www.internationaldrugpolicy.org/report2.pdf>)



**Figure 1.1: Conceptual model**



## Measuring harm: responding to SR2004

The Government's success in delivering the aims of the Drug Strategy is measured by a set of Public Service Agreement (PSA) targets, established through the Spending Review process. The 2004 Spending Review settlement set a new PSA target for the Government's Action Against Illegal Drugs. This new PSA target, which comes into effect over the Spending Review Period 2005/6 to 2007/8, requires the Government to

*“reduce the harm caused by illegal drugs including substantially increasing the number of drug misusing offenders entering treatment through the criminal justice system.”*

The Drug Harm Index (DHI) has been developed in order to measure this new PSA target. It combines robust national indicators of the harms generated by illegal drugs into a single-figure time-series index. The harms include drug-related crime, community perceptions of drug problems, drug nuisance, and the various health consequences that arise from drug abuse (e.g. HIV, overdoses, deaths etc.). To enable a single index to be constructed the harms are measured consistently according to their relative cost to individuals and society.

The DHI is an analytical tool that can be used to monitor the success of the Drug Strategy policies in reducing harms. It should be noted, however, that whilst the DHI includes the harms arising from the abuse of all illegal drugs (i.e. not just heroin and crack cocaine) it does not capture all the harms that illegal drug use generates, but rather a subset of harms for which robust data (or information) are available. It is therefore an index indicating change over time, rather than an estimate of the absolute level of harm at any one time.

## 2. Capturing harm

### Approach

The overall approach that has been taken to capture harm follows from the influential work carried out on behalf of the Home Office by the University of York<sup>5</sup>, in which the total economic and social cost of class A drug use was estimated. This work shows that the harms from illegal drug use fall on all sectors of society, including the users themselves, their families/carers, the wider community, industry and the public sector. In constructing the DHI the broad spectrum of harms was identified through workshop consultations with front-line practitioners, academics and central government officials involved in the Drug Strategy.

### The harms

The challenge in capturing all the harms from illegal drugs is that they have to be measurable, preferably over a reasonable period of time, and, as is discussed later, they need to be expressed on a consistent basis. In essence, the scope of the DHI is constrained by the available data. The full range of harms that are currently captured in the DHI is set out in Box 2.1. This sets out 19 different harms (and the sources of the data), categorised according to whether they are health impacts (7 categories), domestic or commercial crimes (6 and 4 categories respectively), or community harms (2 categories). A more detailed account of these harms, including the precise measure and source, is given in Table A.1 in Appendix A. Table A.1 also provides details of the unit costs of these harms (see below).

There are a number of harms that are not included in Box 2.1, mostly because they cannot be measured consistently or because of conceptual ambiguities. For example, the academic literature suggests a strong association between problematic drug use and certain adverse labour market outcomes such as unemployment. Unfortunately, not only is this association directionally ambiguous (does drug use lead to unemployment or vice versa?), it is virtually impossible to isolate from official figures the proportion of unemployment that is drug-related. For similar reasons, the impact of illegal drug use on educational attainment, financial stability and homelessness have not been captured. In addition, it has not been possible to isolate the impact of illicit drug use on productivity, absenteeism, social care services, and the children of drug users. In all these cases there is clearly an association between illegal drug use and the harm, but there does not exist a consistent time-series dataset that directly captures these harms.

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<sup>5</sup> Godfrey, C. *et al.* (2002) *The economic and social cost of Class A Drug use in England and Wales*, Home Office Research Study, 249 (available at <http://www.homeoffice.gov.uk/rds/pdfs2/hors249.pdf>)

**Box 2.1: The harms included in the DHI**

**Health impacts**

- New HIV cases due to intravenous drug use (IDU), including those infected through heterosexual sex with someone who contracted the disease through IDU (Communicable Disease Surveillance Centre (CDSC))
- New Hepatitis B cases due to intravenous drug use (CDSC)
- New Hepatitis C cases due to intravenous drug use (CDSC)
- Drug-related deaths (Office for National Statistics)
- Drug-related mental health and behavioural problems (Hospital Episode Statistics)
- Drug overdoses (Hospital Episode Statistics)
- Drug-related neonatal problems (Hospital Episode Statistics)

**Community harms**

- Community perceptions of drug use/dealing [e.g. local availability] as a problem (British Crime Survey)
- Drug dealing offences (Recorded Crime Statistics)

**Domestic drug-related crime**

(All British Crime Survey, calibrated with NEW-ADAM/Arrestee Survey)

- Burglary
- Theft of vehicle
- Theft from vehicle
- Bike theft
- Other theft
- Robbery

- **Commercial drug-related crime**

(Calibrated with NEW-ADAM/Arrestee Survey and Crime Statistics (for trend))

- Shoplifting (Crime & Justice Survey & Arrestee Survey)
- Burglary (Commercial Victimization Survey)
- Theft of vehicle (Commercial Victimization Survey)
- Theft from vehicle (Commercial Victimization Survey)

# 3. Constructing the DHI

## DHI methodology

The technical details of the construction of the DHI are complex and are set out in Appendix B. However, the basic principles are simple, and centre on expressing the harms in a common currency, namely (economic) social cost. Put simply, the DHI is constructed by first determining the share of total social cost in any one year of each individual harm, then using this share to 'weight' the year-on-year growth in the volume of harms.<sup>6</sup> In other words, the trend in the DHI is constructed by cumulating over time the sequence of year-on-year growth rates. For any one year, the growth in the DHI has two components:

- the growth in the volume of harms (e.g. the number of new HIV cases or the number of drug-related domestic burglaries);
- the growth in the unit economic or social cost (e.g. the rise in the expected cost per new HIV case or the average victim cost of a domestic burglary).

Thus, the DHI might fall either because fewer drug-related incidents are occurring or because the cost of each incident is being reduced. In practice there will be movements in both elements of harm and they might be partly offsetting. It is worth noting, however, that the DHI is not the only 'measure of impact' for the Drug Strategy. Current investments include improvements to the estimates of the number of problematic drug users and the economic and social costs of class A drug use. These indicators will be considered alongside the DHI.

To calculate the volume components of the growth in the DHI, the average, across all categories of harm, of the growth in volume over the year is calculated.

The construction of the DHI allows for not all types of harm being equally costly to society. It uses weighted averages, giving greater weight to harms, which make a relatively large contribution to total social cost. The DHI weight for any particular component is calculated as its total social cost (unit cost x volume) expressed as a share of the grand total across all categories of harm. Thus a particular harm may be given a high weight either because of high volume (e.g. the large number of instances of shoplifting by drug users) or because of high unit cost (e.g. the loss to society from each drug-related death<sup>7</sup>).

In practice, unit social costs are quite stable over time, so the main driver of the DHI is the change in the volumes of incidents generating those harms. This is a good thing, since unit costs are generally the harder of the two to measure. It is also worth noting that there is a tendency for the volume indicators to follow broadly similar trends, since they are the outcomes of common underlying movements in the extent of drug abuse. This commonality means that, in practice, the DHI will usually not be very sensitive to errors in estimated unit costs, or surges in individual indicators (although additional work to address uncertainty will be undertaken). Some provisional sensitivity analysis that confirms this is presented in Annex C.

The overall methodology can be summarised as follows.

1. Determine the total costs (harm) for each year by multiplying the volume of each harm by its unit social cost and summing these.

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<sup>6</sup> The weight is actually calculated as an average of the share at the beginning and end of the reference period. This smoothes the series of weights and reduces spurious variation in the index.

<sup>7</sup> Although note that the valuation of deaths is challenging, as it is based on estimates for valuing road traffic deaths produced by the Department of the Environment, Transport and the Regions in 1999. Although these estimates are widely used in the evaluation field, they do include an element of willingness to pay to avoid risk of death. For a more detailed discussion of how drug deaths are valued (and the differences between the internal and external costs) see Godfrey *et al.* (2002).

2. For each harm in a given year, express the social cost of that harm as a percentage of the total for that year.
3. For each harm, multiply this percentage share of total cost by the year-on-year growth in the volume of that harm.
4. Sum together these weighted growths to get the overall change in the year-on-year growth of overall harm.
5. Express this as an index, making 1998 = 100.

## Constructing the trajectory

The forward-look trajectory for the DHI (see Figure S.1) is constructed by considering how the volumes and costs of each of the indicators are expected to change between now and 2008. Evidence from the National Treatment Outcomes Research Study indicates that the offending rates of problematic drug users decrease while they are in treatment, and that this is maintained for several years post-treatment. Based on this, and a number of other simplifying assumptions, a model has been created to estimate the impact that increasing the number of people in treatment will have on drug-related crime. This estimated reduction is then applied to the volumes of crimes captured in the DHI.

There is also evidence that the treatment impacts on future death rates, so a reduction in the number of drug-related deaths is also calculated from the estimated increase in treatment numbers. At the time of writing, there is not enough available evidence to model the impact of the Drug Strategy on all the other harms in the DHI, so for the purposes of this draft trajectory, the forward look is based on the average growth rates in the last three years. For simplicity, the unit costs for all the harms are estimated to increase by three per cent every year. These estimated costs and harm volumes are used to determine the future value of the DHI.

## Shares of total harm

Table 3.1 gives an indication of the typical average cost shares (i.e. the weights) for 2003. The leading contributors to the index in terms of the assigned weight are shoplifting, domestic burglary and burglary of commercial premises, and drug-related deaths. All other categories of harm, for this year, have a weight below ten per cent in the DHI, although this varies over time.

**Table 3.1: Share of total harm (2003)**

	Share of total harm		Share of total harm
<b>Health indicators</b>		<b>Domestic crime indicators</b>	
New HIV cases (inc indirect cause)	1.53%	Burglary	14.92%
New Hep B cases	1.09%	Theft of vehicle	4.36%
New Hep C cases	2.77%	Theft from vehicle	4.54%
Drug-related deaths	21.82%	Bike theft	0.44%
Mental/behavioural episodes	0.27%	Other theft	4.64%
Overdoses	0.04%	Robbery	9.34%
Neo-natal effects	0.06%		
<b>Commercial crime indicators</b>		<b>Community indicators</b>	
Shoplifting	10.42%	Community perceptions	3.46%
Burglary	17.96%	Drug dealing offences	1.04%
Theft of vehicle	1.11%		
Theft from vehicle	0.18%		

## 4. Limitations of the DHI

Before considering how to use the DHI to monitor progress in delivering the new drugs PSA, it is important to consider the limitations of this measure. At the highest level there are three important areas of uncertainty that have required certain assumptions to be made. These are highlighted in Table 4.1 alongside the proposed solutions.

**Table 4.1: High-level assumptions**

Problem	Solution
There is no time-series data on the proportion of crimes that are drug-related.	Within each relevant category of crime, for a benchmark period, estimate the proportion of offences that are committed by arrestees testing positive for opiates or cocaine. This is possible using NEW-ADAM and the Arrestee Survey. <sup>8</sup> For other years, the drug-related proportions are assumed to vary from the benchmark in proportion to the Offenders Index proxy measure of the share of drug-related crime.
There is no source comparable to the BCS to tell us the trend in the number of commercial crimes.	Within each category of commercial crime, assume that there is a constant reporting/recording rate, so that the volume of crimes with a commercial victim is proportional to recorded crime within that category.
Estimates of most unit costs are available only for a single benchmark year.	Assume unit costs are proportional to an appropriate price index (at present, GDP for the victim costs of most crimes; assumed annual rate of 3% for health, CJ and other cost elements).

### Measuring drug-related crime proportions

The biggest limitation of the DHI is the measure of 'drug-relatedness' for some of the harms. In an ideal world the extent of drug-related crime could be measured as the difference between the number of crimes committed under the *status quo* and the number that would be committed under the counter-factual of a world without drug abuse.

In the absence of an 'ideal measurement world' drug-related crime is defined as that committed by serious drug users, but there are still difficulties in defining and identifying these people and then observing their offending activity. The currently available data provide only two options: (i) to assume that a constant proportion of any category of crime is drug-related and estimate that proportion from available survey data (NEW-ADAM or the Arrestee Survey); or (ii) to use longitudinal convictions data from the Offenders Index (OI) to approximate the trend in drug-related crime from the proportion of convictions for acquisitive crime which are attributable to people with a recent drugs conviction.

The DHI uses a combination of these options. At a time of falling crime rates, it is reasonable to expect the share of drug-related crime in total crime to be rising (since drug-related crime is likely to be more persistent than other crime, as drug treatment takes time to have an effect). The OI approach does indeed give a strong upward trend in the early part of the period covered and has been used to vary the drug-related crime proportions in the DHI for those years where NEW-ADAM or the Arrestee Survey are not available. However, convictions

<sup>8</sup> Although using these proportions on the basis of information from arrestees requires further analysis to be carried out to determine how the resultant volumes compare to the prevalence of problematic drug use and self-reports of crime.

represent such a small proportion of total offences that it is important to explore other alternatives to the OI. This is discussed in more detail later where further development issues are considered.

## Measuring health harms

There are different problems that arise in measuring health harms. Table 3.1 shows how little weight the DHI currently puts on some of the health-related harms (except for drug-related deaths). This is partly a consequence of lack of measures of the intangible and indirect consequences of HIV and hepatitis infection and drug-related psychiatric disturbance. These intangible costs include the deterioration in quality of life experienced by sufferers and the distress caused to their families and dependants. In the interests of consistency, any estimates of these impacts should be based on the same measures as are used by the Department of Health. However, few intangible cost figures are yet available. Until they do become available, it should be borne in mind that the DHI might understate the importance of some of the health-related drug harms. Again, this is discussed in more detail in the final section.

## 5. Using the DHI

The DHI is a single 'portmanteau' measure that summarises a great deal of detail. Different categories of harm may evolve differently over time, at least in the short run, and no single index can ever capture this diversity. The recommendation therefore is that the DHI should be used in conjunction with plots of the trends in the component volume indicators. This will give valuable information about the extent to which particular types of harm are becoming dominant or are being moderated by successfully targeted policies.

Beyond its basic presentation, the DHI requires careful interpretation. It is purely a measure of realised outcomes, and as outlined earlier, it does not focus specifically on the impacts of any particular policy intervention, nor does it include any elements to measure the cost of policy interventions designed to reduce the harms of drug abuse.<sup>9</sup> There is also a difficult timing issue.

### Issues of timing

Some of the available indicators of harm clearly involve substantial delay. For example, it is reckoned that most cases of HIV infection go undetected for around five years before they present to the health care system and are reflected in the health statistics. Thus recorded 'new' HIV infections are in fact telling us about the new drug harms being generated five years earlier. In other areas where there are much shorter inherent lags (e.g. crime victimisation), there is nevertheless a significant delay in the data becoming available. Thus, timeliness will always be a difficult issue for the DHI.

In addition to the harms taking time to feed into the measurement system, the outcomes of policy may not become apparent in the available measures of harm until a considerable time after the implementation of the policy. Thus, while it is true that a successful programme of policy interventions should lead to a sustained downward trend in the DHI, it is unlikely that year-to-year movements in the DHI can be attributable to specific policy initiatives. Detailed programme evaluations are a better means of linking specific impacts to specific programmes.

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<sup>9</sup> Although note that the DHI *does* include criminal justice costs and costs associated with the medical treatment for HIV, hepatitis etc. These are regarded as standard 'responsive' actions, rather than policy interventions.



## 6. Areas for further development

With a complex measure like the DHI it is inevitable that further developments are possible, and even desirable, subject to the constraints of the PSA measurement process. It is proposed that these developments will be documented alongside this description of the measurement system on the Home Office website.

### Data timeliness

Currently, the DHI is produced on an annual basis. Clearly, policy requirements are such that a quarterly measure would prove much more useful. Further work is required on the frequency at which the individual data are published, and furthermore around the lag with which the data are published. The results of current investigations into more frequent updating of the DHI are presented in Annex D. The main recommendation, to include rolling annual (four-quarterly) updates, will be implemented in time for the commencement of the SR04 period.

### Unit costs for health harms

The DHI would benefit from further work on the health harms. The most pressing area of work is to ensure consistency between the health and crime unit cost estimates. 'Crime harms', for example, are a combination of fiscal, i.e. criminal justice expenditure, and social costs, i.e. the cost to the victim. 'Health harms' include NHS expenditure on treating HIV, Hep B and Hep C infections as a result of drug use as well as the cost associated with loss of life expectancy for each. The present value of lifetime cost comprises the current value of drug treatment, the cost of a death and the assumed number of years of loss of life expectancy. Where possible, this also takes into account the reduced quality of life that the patient will experience while living with the disease, but there is still some room for further improvement in the measurement of these costs.

### Additional harms

Further research is also required surrounding the inclusion, and reflective weighting, of other possible health indicators. These can be in the form of prevalence indicators on bacterial infections such as endocarditis, A & E use, and indicators that capture excessive risk, such as the proportion of intravenous drug users that share needles.

There is potential development work around the transmission of infectious diseases. A direct measurement of these has been incorporated, where HIV is transmitted from a drug user to a non-drug user through sexual intercourse. But no data on further multiplier effects of HIV or any other infectious diseases have been collected. These are important to develop, and include, in order to capture the full health harms as a result of problematic drug use. At the same time, further consideration needs to be given to how the volume of health harms are measured such that the methodology is consistent with that used to measure the volume of crime harms (although some of the differences are accounted for in the estimates of unit costs).

### Drug-related crime proportions

The final area of development work, which has the potential to have the biggest impact on the DHI, concerns the uncertainty around the proportion of crime that is drug-related. A detailed treatment of the trend in drug-related crime proportions is presented in Annex E. Whilst this provides certain reassurances about the trend (in particular that it has been relatively stable over recent years), the Arrestee Survey (AS) will eventually provide a consistent data source to replace some potentially unsatisfactory elements of this part of the DHI. The main contribution anticipated from the AS is the availability of direct estimates of the volumes of

various categories of drug-related crime, which can be tracked over time. This will replace the Offenders Index measure of the trend in the drug-related share of crime and provide an alternative to recorded figures for some commercial crimes. These changes have the potential to constitute a significant structural change in the DHI and will be fully documented on the Home Office website.

The phasing-in of AS data requires careful consideration. At the time of writing only the un-weighted AS data are available and it will take a number of years before it is possible to make a meaningful comparison of the AS trend in drug-related volumes with the OI trend and the NEW-ADAM benchmark. The technical recommendation is that the AS should be incorporated in the DHI as soon as possible, at the likely cost of some discontinuity. During the transition period, it might be necessary to produce two versions of the index in parallel, one construction using the present sources, the other incorporating direct volume measures from the AS.

## Appendix A

**Table A.1: The harms captured in the DHI**

Domestic crimes				
Indicator	Volumes	Source of volumes	Unit costs	Source of costs
Domestic burglaries	Volume of drug-related domestic burglaries. Derived by multiplying the total volume of domestic burglaries by the proportion that is drug-related. Falling from 532,095 in 1998 to 505,140 in 2003.	<b>Total volume of domestic crime categories:</b> British Crime Survey (BCS)  <b>Drug-related crime proportions:</b> NEW-ADAM  <b>Growth of drug-related crime proportions:</b> Offenders Index	Point estimate of £2,300 (=£490 Criminal Justice System (CJS) costs + £1,810 other costs) per crime for 1999.	Brand and Price (1999), <i>The economic and social cost of crime</i> , HORS 217.  In each case the cost components are assumed to vary in proportion to CJS index & GDP respectively.
Theft of domestic vehicle	Volume of drug-related theft of domestic vehicle. Derived by multiplying the total volume of theft of a domestic vehicle by the proportion that is drug-related. Rising from 67,622 in 1998 to 67,648 in 2003.		Point estimate of £4,760 (=£70 CJS + £4,690 other costs) per crime for 1999.	
Theft from domestic vehicle (& attempts)	Volume of theft from domestic vehicle. Derived by multiplying the total volume of theft from domestic vehicles by the proportion that is drug-related. Falling from 737,917 in 1998 to 700,111 in 2003.		Weighted average of theft from vehicle (£580) and attempted vehicle theft (£280). Estimate of £490 per crime in 1999.	
Other thefts	Volume of drug-related other theft. Derived by multiplying the total volume of other thefts by the proportion that is drug-related. Rising from 954,493 in 1998 to 1,053,445 in 2003.		Point estimate of £340 (=£90 CJS + £250 other costs) per crime for 1999.	
Robbery	Volume of drug-related domestic robbery. Derived by multiplying the total volume of domestic robberies by the proportion that is drug-related. Rising from 113,740 in 1998 to 154,297 in 2003.		Point estimate of £4,700 per crime for 1999.	
Bike theft	Volume of drug-related bike theft. Derived by multiplying the total volume of bike thefts by the proportion that is drug-related. Rising from 154,049 in 1998 to 177,510 in 2003.		Point estimate of £200 per crime for 1999. Costs are assumed to vary in proportion to GDP. This figure is currently under review.	
Commercial crimes				
Indicator	Volumes	Source of volumes	Unit costs	Source of costs
Shoplifting <sup>10</sup>	Volume of drug-related shoplifting. Derived by	Recorded	Point estimate of £64.24. This is	Arrestee Survey

<sup>10</sup> The volume of shoplifting offences has been developed in line with recent updates of the unit costs of crime. These will be published on the Home Office website during 2005. This approach makes use of self-report shoplifting offences from the Crime & Justice Survey and the Arrestee Survey, as the Commercial Victimization Survey tends to under-report these offences.

	<p>multiplying the total volume of shoplifting offences by the proportion that is drug-related. Rising from 8,070,749 in 1998 to 12,656,143 in 2003.</p> <p>Volume of shoplifting offences. Is the estimated volume of shoplifting offences committed by arrestees (AS) plus the total volume of shoplifting offences committed by non-arrestees (C&amp;JS), all divided by the co-offending rate (1.8).</p>	<p>crime statistics</p> <p>Arrestee Survey (AS)</p> <p>C&amp;JS</p>	<p>made up of the average costs of property stolen and damaged, from the AS, and other costs, from Brand and Price. The components are assumed to vary in proportion to CJS index &amp; GDP respectively.</p>	<p>&amp; Brand and Price (1999), <i>The economic and social cost of crime</i>, HORS 217</p>
Burglary	<p>Volume of drug-related burglaries, is the total volume of commercial burglaries multiplied by drug-related proportions. Rising from 397,840 in 1998 to 505,809 in 2003.</p> <p>Volume of burglary is recorded burglaries divided by reporting rate derived via Brand &amp; Price volume for 1999</p>	<p><b>Total volume of domestic crime categories:</b></p> <p>Recorded crime statistics</p> <p>Commercial Victimization Survey (1994) &amp; Brand and Price (1999)</p>	<p>Point estimate of £2,700 (=£490 CJS + £2,210 other costs) per crime for 1999 (Brand &amp; Price). The components are assumed to vary in proportion to CJS index &amp; GDP respectively.</p>	<p>Brand and Price (1999), <i>The economic and social cost of crime</i>, HORS 217</p>
Theft of vehicles	<p>Volume of drug-related commercial theft of a vehicle is the total volume of theft of a vehicle multiplied by drug-related proportions. Rising from 8,012 in 1998 to 8,710 in 2003.</p> <p>Volume of theft of vehicle is recorded theft of vehicles divided by reporting rate derived via Brand &amp; Price volume of 40,000 in 1999.</p>	<p><b>Drug-related crime proportions:</b> NEW-ADAM / Arrestee Survey</p> <p><b>Growth of drug-related crime proportions:</b></p>	<p>Point estimate of £9,700 from Brand &amp; Price. Assumed to vary in proportion to GDP.</p>	
Theft from vehicles	<p>Volume of drug-related theft from a vehicle is the total volume of theft from vehicles multiplied by drug-related proportions. Rising from 15,629 in 1998 to 19,984 in 2003.</p> <p>Volume of theft from vehicles is recorded theft from a vehicle divided by reporting rate derived via the Brand &amp; Price volume of 60,000 in 1999.</p>	<p>Offenders Index</p>	<p>Point estimate of £700 from Brand &amp; Price. Assumed to vary in proportion to GDP.</p>	

<b>Health indicators</b>				
<b>Indicator</b>	<b>Volumes</b>	<b>Source of Volumes</b>	<b>Unit costs</b>	<b>Source of costs</b>
New HIV cases	The number of people who have contracted HIV and are known to be injecting drug users. Also includes those infected through heterosexual sex where the partner contracted the disease through injecting drug use. Available annually: count of cases fall from 190 in 1998 to 152 in 2003	Communicable Disease Surveillance Centre which is part of the Health Protection Agency	Present value of lifetime cost assumed to be £888,753 per new case presenting in 2002. All new cases are presumed to undergo 15 years of treatment and the average loss of life is estimated to be 20 years. No information is available on any loss in quality of life. The estimated annual treatment cost in 2002 was £15,000 and the cost of a life was £714,229 (based on 20 years lost). Costs of treatment and loss of life expectancy assumed proportional to general index of medical costs and GDP, respectively.	Department of Health  Department of the Environment Transport and Regions
New HBV cases	The number of people who have contracted HBV and are known to be injecting drug users. Available annually: count of cases fall from 251 in 1998 to 124 in 2003	Communicable Disease Surveillance Centre which is part of the Health Protection Agency	Present value of lifetime cost assumed to be £590,213 per new case presenting in 2002. Only 10% of new cases are expected to require a total of 29 years of treatment but all cases are modelled as suffering from the disease for 30 years. The average loss of life is estimated to be 5 years but patients will also experience a reduced quality of life of 0.62 while alive (where 1 = full health, 0 = dead). The annual cost of treatment in 2002 was estimated to be £2,300 and the cost of a life is £178,557, while the reductions in quality of life costs £407,110 (based on 5 years lost). Costs of treatment and loss of life expectancy and quality of life assumed proportional to general index of medical costs and GDP, respectively.	Department of Health  Department of the Environment Transport and Regions
New HCV cases	The number of people who have contracted HCV and are known to be injecting drug users. Available annually: count of cases fall from 1757 in 1998 to 525 in 2003	Communicable Disease Surveillance Centre which is part of the Health Protection Agency	Present value of lifetime cost assumed to be £322,528 per new case presenting in 2002. Only 10% of new cases are expected to require a total of 9 months of treatment but all cases are modelled as suffering from the disease for 26 years. The average loss of life is estimated to be 9 years. No information is available on any loss in quality of life. The annual cost of treatment in 2002 was estimated to be £15,000 and the cost of a life is £321,403 (based on 9 years lost). Costs of treatment and loss of life expectancy assumed proportional to general index of medical costs and GDP, respectively.	Department of Health  Department of the Environment Transport and Regions
Drug deaths	The number of deaths from drug-related poisoning. Available annually: count of cases fall from 1,459 in 1998 to 1,388 in 2003	Office of National Statistics (ONS)	Lost output and human cost resulting from a fatality. Available annually: estimated costs per death rise from £975,990 in 1996 to £1,249,900 in 2002	Department of the Environment Transport and Regions
Hospital Episode Statistics (HES) mental & behavioural cases (bed days)	Number of bed days for mental and behavioural disorders due to the use of drugs. Available annually: count of bed days rises from 131,837 in 1998 to	Hospital Episode Statistics	Average cost of inpatient mental health service. Available annually: estimated costs per bed day rise from £93 in 1994 to £190 in 2003	Netten <i>et al.</i> , <i>Unit Costs of Health and Social Care</i> . Personal Social Services Research

	139,060 in 2003			Unit.
HES overdose episodes	The number of finished consultant episodes for accidental or intentional drug overdoses. Available annually: count of case numbers rises from 7,505 in 1998 to 9,035 in 2003	Hospital Episode Statistic	Average cost of a poisoning, toxic effect or overdose. Available annually: estimated costs per episode rise from £291 in 1998 to £391 in 2002	Department of Health National Statistics, NHS <i>National Schedule of Reference Costs</i> , London: Department of Health
Neonatal problems	The number of finished consultant episodes for: newborn babies, affected, or undergoing withdrawal syndrome from, the maternal use of drugs. Available annually: count of cases rises from 1,063 in 1998 to 1,301 in 2003	Hospital Episode Statistic	Average cost of a neonatal treatment with multiple major diagnoses. Available annually: estimated average costs per episode falls from £2,413 in 1998 to £3,946 in 2002.	
<b>Other indicators</b>				
<b>Indicator</b>	<b>Volumes</b>	<b>Source of volumes</b>	<b>Unit costs</b>	<b>Source of costs</b>
Drug dealing	The number of cases of trafficking in controlled drugs recorded by the police. Rising from 21,788 in 1998 to 24,510 in 2003.	Recorded crime statistics	Average cost in 2000 of a drug arrest is estimated as £3,551 this is made up of CJS expenditure. Costs are assumed to vary in proportion to CJS index.	Godfrey <i>et al.</i> (1999), <i>The economic and social cost of class A drug use</i> , HORS 249
Perception of drug problem	The percentage of people surveyed in British Crime Survey who believe that people using or dealing drugs is a 'very' or 'fairly' big problem in their area. This is then multiplied by population of England & Wales. Rising from 12.9 million in 1995 to 13.1 million in 2003.	British Crime Survey	The average yearly loss of health resulting from episodes of fearfulness is estimated as £19.50 from Dolan <i>et al.</i> This figure is currently under review.	Dolan <i>et al.</i> , <i>Estimating the economic and social costs of the fear of crime</i> , Publication pending.

# Appendix B

## Constructing the DHI – a technical description

This report is concerned with measuring changes in the aggregate social cost or harm,  $H(t)$ , attributable to problematic drug use (PDU) at time  $t$ . Let there be  $J$  categories of harm (premature death, drug-related crime, *and so on.*). Each has a volume  $X_j(t)$  (e.g. the number of drug-related deaths or drug-related crimes) and a unit social cost  $C_j(t)$  (e.g. the average cost to society of a drug-related death or crime). Thus:

$$H(t) = \sum_{j=1}^J C_j(t) X_j(t) \quad (1)$$

Now take log derivatives to express total harm in rate-of-growth form:

$$h(t) \approx \sum_{j=1}^J w_j(t) c_j(t) + \sum_{j=1}^J w_j(t) x_j(t) \quad (2)$$

where  $h(t) = d \ln H(t) / dt$  is the rate of growth of total harm and  $c_j(t)$  and  $x_j(t)$  are the analogously-defined growth rates of  $C_j(t)$  and  $X_j(t)$ . The weights  $w_j(t)$  are defined as cost shares:

$$w_j(t) = \frac{C_j(t) X_j(t)}{\sum_{k=1}^J C_k(t) X_k(t)} \quad (3)$$

The decomposition (2) expresses the growth in aggregate harm from illegal drug use into two components: the average growth rate,  $\sum w_j(t) x_j(t)$ , in harm volumes across all categories of harm; and the average growth rate,  $\sum w_j(t) c_j(t)$ , in social costs across categories of harm.

Whilst one might have information on the volume of some categories of harm  $X_j(t)$  and social costs  $C_j(t)$ , the corresponding growth series  $x_j(t)$  and  $c_j(t)$  are not observable continuously, but only for a sequence of discrete time periods  $t = 1 \dots T$ . Let  $X_{jt}$  and  $C_{jt}$  be the corresponding observed discrete measures. The simplest discrete approximations to the

instantaneous growth rates are first differences of log levels. Thus the estimate of the growth in aggregate harm from period  $t-1$  to period  $t$  is

$$\hat{h}_t = \sum_{j=1}^J w_{jt} \Delta \ln C_{jt} + \sum_{j=1}^J w_{jt} \Delta \ln X_{jt} \quad (4)$$

where the  $w_{jt}$  are weights chosen to approximate the form (3).

It is usual practice in index number construction to smooth the weights in some way to avoid excessive period-to-period fluctuation. They could be held constant within short periods and the index chained (as is done for most price indexes). We have chosen to use period-specific weights based on costs and volumes averaged over the two periods  $t-1$  and  $t$

$$w_{jt} = \frac{\bar{C}_{jt} \bar{X}_{jt}}{\sum_{k=1}^J \bar{C}_{kt} \bar{X}_{kt}} \quad (5)$$

where  $\bar{C}_{jt} = (C_{jt} + C_{jt-1})/2$ , and so on. Once a sequence of growth rates  $\hat{h}_1, \hat{h}_2 \dots \hat{h}_T$  has been constructed according to (4), the index itself is calculated as

$$\begin{aligned} \hat{H}_0 &= 100 \\ \hat{H}_t &= \exp(\hat{h}_t) \hat{H}_{t-1}, \quad t = 1 \dots T \end{aligned} \quad (6)$$

In practice, the observable indicators  $C_{jt}$  and  $X_{jt}$  may be subject to measurement or approximation error. For example, recorded numbers of Hepatitis B cases may be an error-prone measure of the number of actual drug-related cases of the disease, and the assumed cost per case necessarily involves an element of guesswork. It is useful to give some quantitative indication of the range of uncertainty that surrounds the calculated change in the index.

Most available estimates of unit cost are available only as a single benchmark figure, rather than a time series. Thus an explicit assumption of constant relative social costs is made. Constant relative social costs implies  $\Delta \ln C_{jt} = \mu_t$ , where  $\mu_t$  is the common rate of 'social cost inflation' in year  $t$ . Thus, from (4):

$$\hat{h}_t = \mu_t + \sum_{j=1}^J w_{jt} \Delta \ln X_{jt} \quad (7)$$



Note that the weights  $w_{jt}$  depend on relative rather than absolute unit costs, so a uniform tendency to over- or under-estimate costs has no impact on the index, except through the term  $\mu_t$ .

It is possible to construct a rough indicator of the reliability of the estimated rate of growth constructed using (7). Let  $\bar{C}_j$  and  $\Delta \ln \bar{X}_{jt}$  be the true unit cost and volume growth for harm category  $j$  and assume that deviations from these true values are random and mutually independent. Similarly, suppose that  $\mu_t$  is a general cost index with independent measurement error. Suppose there is corresponding *a priori* reliability measures  $s_j^2 = E(C_j - \bar{C}_j)^2$ ,  $\sigma_j^2 = E(X_{jt} - \bar{X}_{jt})^2$  and  $\omega^2 = E(\mu_t - \bar{\mu}_t)^2$ . Now expand expression (7) in a Taylor series around the point  $\bar{C}_j, \bar{X}_{jt}, \bar{\mu}_t$ :

$$\begin{aligned} \hat{h}_t - \bar{h}_t &\approx (\mu_t - \bar{\mu}_t) + \sum_{i=1}^J \left[ \sum_{j=1}^J \frac{\partial \bar{w}_{jt}}{\partial \bar{C}_i} \Delta \ln \bar{X}_{jt} \right] (C_i - \bar{C}_i) + \sum_{j=1}^J \bar{w}_{jt} (\Delta \ln X_{jt} - \Delta \ln \bar{X}_{jt}) \\ &= (\mu_t - \bar{\mu}_t) + \sum_{i=1}^J \left[ \frac{\bar{w}_j (\Delta \ln \bar{X}_{jt} - \bar{h}_t)}{\bar{C}_j} \right] (C_i - \bar{C}_i) + \sum_{j=1}^J \bar{w}_{jt} (\Delta \ln X_{jt} - \Delta \ln \bar{X}_{jt}) \end{aligned} \quad (8)$$

The corresponding approximate standard error for the estimate  $\hat{h}_t$  is:

$$se(\hat{h}_t) = \sqrt{\omega^2 + \sum_{j=1}^J w_{jt}^2 \left[ (\Delta \ln X_{jt} - \hat{h}_t)^2 \frac{s_j^2}{C_{jt}^2} + \sigma_j^2 \right]} \quad (9)$$

and this can be used to construct a precision indicator, analogous to a 90 per cent confidence interval, as  $\hat{h}_t \pm 1.645 se(\hat{h}_t)$ . Expression (9) states that the contribution of any harm category to the imprecision of the growth in the DHL over any period depends positively on four factors: its squared weight in the index  $w_{jt}^2$ ; its squared deviation from the overall rate of growth  $(\Delta \ln X_{jt} - \hat{h}_t)^2$ ; the squared imprecision of its unit cost (in coefficient of variation form  $s_{jt}^2 / C_{jt}^2$ ); and the imprecision in measured volume growth  $\sigma_j^2$ . In addition to these contributions from each constituent, there is a general level of uncertainty in the general scale of social cost  $\omega^2$ . Expression (9) implies that, if all components of the index grow at the same rate ( $\Delta \ln X_{jt} = \hat{h}_t$  for all  $j$ ), then uncertainty about the values of unit costs will not generate any imprecision in the calculated growth of the index beyond the general term  $\omega^2$ .

# Appendix C

## Sensitivity analysis

The sensitivity analysis primarily involved adjusting the volumes of the indicators by  $\pm 20\%$  for 2003 and assessing the degree of impact on the final value of the DHI in this year. The result of increasing each of the mains indicators by 20% is presented in Table C1 (decreasing each indicator by 20% would have the opposite effect). For example, increasing the volume of drug-related deaths by 20% resulted in the DHI increasing from 102.9 to 107.4, an increase of 4.3%.

**Table C1.** Sensitivity results

<i>Description</i>	<i>Change</i>	<b>DHI 2003 Value = 102.9</b>	
		<b>New Value</b>	<b>% Change</b>
Varying Drug-related proportions for all crimes	+ 20%	117.2	13.8
Volume of All Domestic Crimes	+ 20%	111.0	7.8
Volume of All Commercial crimes	+ 20%	109.2	6.0
Volume of All Health Indicators	+ 20%	108.5	5.4
Volume of Drug Deaths	+ 20%	107.4	4.3
Volume of Commercial Burglary	+ 20%	106.7	3.6
Volume of Domestic Burglary	+ 20%	106.1	3.1
Volume of Shoplifting	+ 20%	105.2	2.2
Volume of Robbery	+ 20%	104.9	1.9
Volume of Other Indicators (fear of crime and public perception of the drug problem)	+ 20%	103.8	0.9

The results shown in Table C1 are ranked by degree of sensitivity to the DHI. Unsurprisingly, those indicators with the largest weights were found to have the greatest impact on the DHI. The five most influential indicators have been presented here, as well as the main groups of indicators (domestic crime, commercial crime, health consequences, other harms to society).

The calculation of drug-related proportions of crimes is believed to be one of the most likely sources of errors, so this has also been analysed. Indeed, this was found to have the greatest impact on the Index, with a 20% increase resulting in a 14% increase in the DHI.

## Appendix D

### An investigation into more frequent updating of the DHI

The DHI currently uses annual data, and has at least a one-year time lag, primarily as a result of the time delay associated with drug death data (due to the length of the coroner's inquest process prior to the registration of a death). This annexe sets out the options for including more recent quarterly data where they are available.

The different reporting periods of the DHI indicators are given in Table D.1. The data have been given traffic-light coding according to their relative frequency. Data updated least frequently and/or with a substantial time lag are coded red<sup>11</sup>, annual and/or lagged updates in amber, and data with quarterly updates coded green. Table D.1 shows that a substantial proportion of the DHI data is updated quarterly, thus at least a partial quarterly update of the DHI is possible.

**Table D.1: Indicator frequencies**

Indicator	Source	Reporting period	Time lag	Updated
<b>Drug-related crime</b>				
Drug-related crime proportions	OI	Quarter	Three-quarters	Quarterly
Domestic crime	BCS	Annual (Rolling) <sup>a</sup>	Up to date	Quarterly
Shoplifting	AS	Annual (Rolling) <sup>a</sup>	Up to date	Quarterly
	C&JS	Annual (Financial)	Three-quarters	Annually
Commercial crime	CVS	Annual (Calendar)	Uncertain	Irregularly
	RC	Quarter	Up to date	Quarterly
<b>Drug-related health problems</b>				
HIV	CDSC	Annual (Rolling) <sup>a</sup>	Up to date	Quarterly
HBV	CDSC	Annual (Rolling) <sup>a</sup>	Up to date	Quarterly
HCV	CDSC	Annual (Rolling) <sup>a</sup>	Up to date	Quarterly
Drug-related deaths	ONS	Annual (Calendar)	Four-quarters	Annually
Mental & behavioural problems	HES	Annual (Financial) <sup>a</sup>	Three-quarters	Annually <sup>a</sup>
Overdose	HES	Annual (Financial) <sup>a</sup>	Three-quarters	Annually <sup>a</sup>
Neonatal problems	HES	Annual (Financial) <sup>a</sup>	Three-quarters	Annually <sup>a</sup>
<b>Community perceptions</b>				
Public perception of drugs	BCS	Annual (Rolling) <sup>a</sup>	Up to date	Quarterly
Drug dealing offences	Official statistics	Annual (Calendar) <sup>a</sup>	Four-quarters	Annually <sup>a</sup>

<sup>a</sup> Available, but not released, quarterly.

In order to implement a quarterly update it would be necessary to hold constant infrequently updated and lagged data. The implications of doing so are as follows.

- Holding constant the Crime & Justice Survey (C&JS) and Commercial Victimization Survey (CVS) data should have a negligible impact as the C&JS and CVS are only used to calculate the recording rate of commercial crime and not the trend itself.
- The impact of holding constant the indicators derived from Hospital Episode Statistics (HES) would be minimal, since mental and behavioural problems, overdoses and neonatal problems each have a relatively low weighting within the DHI.

<sup>11</sup> Dark grey when printed on a black and white printer, with light grey corresponding to amber.

- There would be more significant implications if the Offenders Index (OI) data were held constant because growth in drug-related crime proportions is driven by the OI, and this contributes significantly to the overall trend of the DHI. The rate of growth of the OI does vary from one year to the next, although it has become more consistent in the last couple of years. As changes in drug-related crime proportions can have a significant impact on the DHI (see Table C.1, Annex C), the OI data should not be held constant.

The DHI should therefore be updated quarterly in alignment with the most recent OI data; i.e. with a three-quarter time-lag. It should be noted that the use of the OI to derive the growth of drug-related proportions is an interim measure. Once the Arrestee Survey is available, quarterly updates of drug-related proportions will be possible, at which point the frequency of updating the DHI can be reviewed.

Reporting periods in the DHI could either be quarterly (like the Offenders Index) or rolling four-quarterly annual basis (like the BCS). Currently the majority of the indicators updated quarterly are rolling annual measures – only the OI and Recorded Crime statistics report quarterly data. Although, quarterly estimates can be determined for some indicators, there are a number of reasons why this is not done.

- Small sample size (BCS, AS, CDSC),
- Sampling variation (BCS, AS, CDSC),
- Seasonal variation (BCS, AS, HES),
- Incomplete and missing data (HES).<sup>12</sup>

As such, it is recommended that a rolling annual update be produced quarterly. This will require calendar and financial year data to be held constant. Rolling annual data would also need to be used from the Offenders Index and Recorded Crime statistics.

It is anticipated that during the first year of the SR period a rolling annual DHI will be implemented and tested, and then updated quarterly with a three-quarter time-lag. This will mean that, for example, the Quarter 4 2004 update will measure harms recorded in the year to Quarter 1 2004.

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<sup>12</sup> HES are trying to address the issue of missing data. A move towards the use of quarterly data is expected in the future.

# Appendix E

## Measuring the proportion of acquisitive crime that is drug-related: analysis of NEW-ADAM and Arrestee Survey data

### Data sources and definitions

The NEW-ADAM surveys cover 16 custody suites, eight in waves 1 (July 1999-April 2000) and 3 (May 2001-March 2002) and a different set of eight suites in wave 2 (May 2000-March 2002).

The Arrestee Survey (AS) data used for this analysis cover the period October 2003-May 2004) and relates to 60 custody suites. Six of the NEW-ADAM suites also appear in the AS: Sunderland, Newport and Southampton in waves 1+3 and Leeds, Plymouth and Nottingham in wave 2.

An acquisitive crime is defined as an arrest event where the arrestee is taken into custody on suspicion of one of the following offences:

- robbery;
- burglary;
- theft;
- handling;
- fraud;
- going equipped;
- prostitution-related offences;
- making off without paying.

A drug-related acquisitive crime involves (i) an arrest on suspicion of an acquisitive crime; and (ii) the arrestee reporting some use of heroin, cocaine or crack (HCC) within the previous 30 days (NEW-ADAM) or four weeks (AS). For any given period, the measured proportion of crime that is drug related is the number of such cases divided by the number of arrests on suspicion of acquisitive crimes within the period.

### Full-sample analysis

Here we report the results of an analysis of the merged NEW-ADAM and AS samples, largely ignoring their design differences. Figure E.1 plots the trend over time in the drug-related proportion, by computing the proportion separately for each quarter from 1999 to 2004. To give an idea of the reliability of this estimated trend, point wise 95 per cent confidence bands are also plotted. These are calculated allowing for the clustering of the sample by custody suite by assuming a simple two-stage sampling design for each survey. They almost certainly overstate the reliability of NEW-ADAM relative to AS estimates.

It is hard to see any convincing evidence of a strong trend here. If one looks at the end points only, there is a rise from around 32 per cent in 1999 to 48 per cent in early 2004 and this rise would be judged statistically significant by a conventional hypothesis test. However, such a test ignores the differences in survey methods between NEW-ADAM and the AS and it ignores the highly erratic behaviour of the trend line between these two points. Some of this variation is likely to be due to the complete change in the composition of the NEW-ADAM sample between waves 1 and 2 and waves 2 and 3, since there are known to be significant variations in case profile between suites.

**Figure E.1: Drug-related proportions over time: full samples of respondents arrested on suspicion of acquisitive crimes**

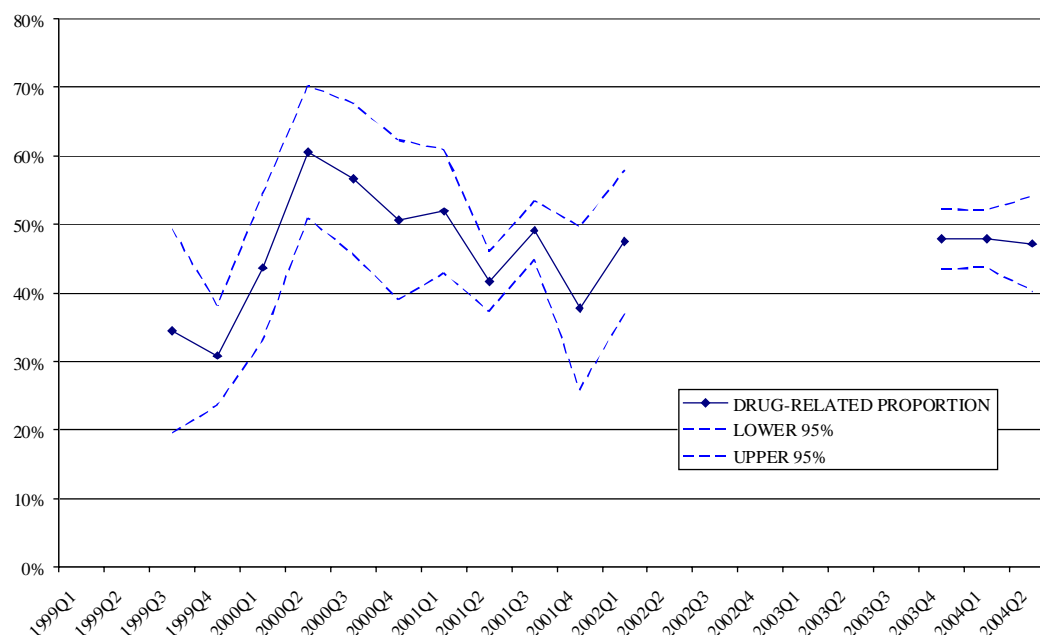


Table E.1 reports two attempts to estimate a trend parametrically, using data at the level of individual arrestees. Both use a logit model: the first allows for fixed suite-specific effects; the second allows for random effects (i.e. it assumes that suite effects are uncorrelated with the NEW-ADAM / AS design differences. In neither case is there a statistically significant trend.

**Table E.1: Fixed and random effects logit estimates: full sample of respondents arrested on suspicion of acquisitive crimes**

Variable	Coefficient	Standard error	P-value
<i>Fixed effects logit</i>			
Time	0.328	0.256	0.201
Time <sup>2</sup>	-0.057	0.046	0.216
NEW-ADAM dummy	-0.240	0.450	0.600
<i>N = 4000; LR <math>\chi^2(3) = 1.77 (P = 0.621)</math></i>			
<i>Random effects logit</i>			
Time	0.392	0.207	0.059
Time <sup>2</sup>	-0.072	0.043	0.093
NEW-ADAM dummy	-0.353	0.419	0.400
<i>N = 4001; LR <math>\chi^2(3) = 3.97 (P = 0.265)</math></i>			

Note: Time measured in years since 1.1.1999

### Matched-sample analysis

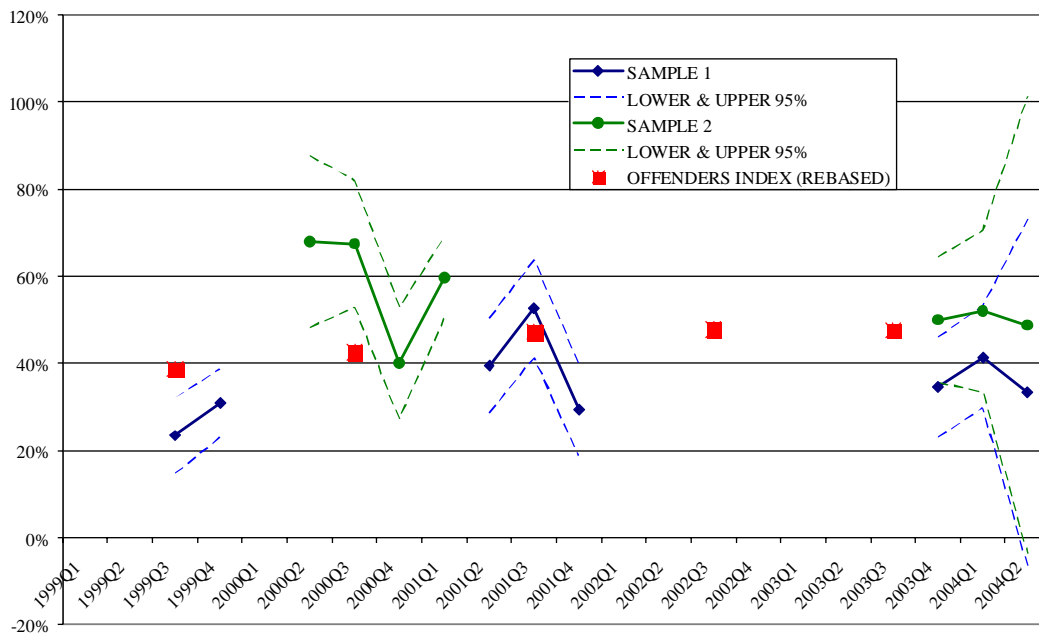
There are large between-suite differences in the extent of drug-related crime. To eliminate these from the comparison between NEW-ADAM and AS estimates, the previous analysis is now repeated on two datasets with matched NEW-ADAM and AS sampling suites:

*Sample 1:* covers only Sunderland, Newport and Southampton suites, using NEW-ADAM waves 1+3 and the AS

Sample 2: covers only Leeds, Plymouth and Nottingham suites, using NEW-ADAM wave 2 and the AS.

For these two samples, the estimated trends in drug-related crime are plotted in Figure E2, together with the Offenders Index series for 1999-2003 (rebased to have the same mean as the NEW-ADAM/AS series). The confidence bands for the survey estimates are now considerably wider and no clear trend emerges. The details are not given here, but re-estimation of the logit models for these two samples also gives no significant evidence of a trend.

**Figure E.2: Drug-related proportions over time: matched samples of respondents arrested on suspicion of acquisitive crimes**



## Conclusions

Using NEW-ADAM and Arrestee Survey data, no convincing and significant evidence of a trend over the period July 1999-May 2004 in the proportion of acquisitive crime that is drug related has been found. There is some evidence of a rise between waves 1 and 3 of NEW-ADAM, but this is subject to uncertainty. Excluding wave 1 of NEW-ADAM would suggest, if anything, a slight (and insignificant) fall in the drug-related proportion between 2000 and 2004.

This lack of a clear conclusion is partly a consequence of the small sample sizes within custody suites and the uncertain comparability of the NEW-ADAM and Arrestee Survey designs. Moreover, despite the absence of a strong upward trend, the survey evidence is still broadly consistent with the findings from Offenders Index data. The very high growth rates suggested by the Offenders Index come from the four or five years immediately prior to the start of NEW-ADAM sampling. For the years 1999-2004, there is no obvious discrepancy between the survey and Offenders Index evidence on the proportion of drug related crime.

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