Home Office

The economic and social costs of crime
Second edition

Research Report 99

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Errata

The second edition of the report clarifies the coverage of the victim services section of the report. The total and unit costs remain the same.

Executive summary

The economic and social costs of crime estimates are important in helping to develop an understanding of the wider costs and benefits associated with changes in the number of crimes. Although methods have been developed to try to capture an assessment of the societal harms of different crime types, for example the Crime Harm Index, these do not set out to estimate the monetary costs of different offences.

This report uses existing crime and cost data to update previous analysis by the Home Office to estimate the economic and social costs of different offences. It does not estimate the economic and social costs of every type of crime; it concentrates on more serious victim-based offences which are likely to have the largest economic and social costs. Costs have been estimated for crimes against individuals and, for a limited number of sectors, businesses. Those crimes which are not committed against an individual victim – so-called crimes against society – are excluded from the analysis; for example, possession of drugs.

The report considers three main cost areas:

- Costs **in anticipation of crime**, for example the cost of burglar alarms.
- Costs **as a consequence of crime**, for example the cost of property stolen or damaged.
- Costs **in response to crime**, for example costs to the police and criminal justice system.

The total costs of crime in England and Wales in the 2015/16 are estimated to be approximately £50bn for crimes against individuals and £9bn for crimes against businesses (Table E1).[1] Violent crimes make up the largest proportion of the total costs of individual crime – almost three quarters – but only one third of the number of crimes. This is mainly due to the higher physical and emotional costs to the victims of violent offences. These costs are particularly high for crimes that are more likely to result in emotional injuries, such as rape and violence with injury. The offence with the highest estimated unit cost[2] is homicide (£3.2m). Rape (£39,360) has the highest estimated unit cost of non-fatal offences.

Thefts from businesses make up almost 90% of business crime but account for approximately half of the total estimated costs of crime against businesses (£4.2bn), as each crime has a low impact on society. In contrast, robberies and burglaries against businesses – estimated to cost £2bn and £1.6bn respectively – make up over 40% of the costs of crime, but account for only 5% of all crimes against businesses.

[1] The costs to businesses are based on volumes from the CVS and therefore do not include costs to public sector organisations.

[2] The unit costs are estimated on the basis of all offences (those reported to and recorded by the police and those which are not reported).

Table E1: Unit costs of crimes by cost category

Crimes	Estimated unit costs of crime (2015/16 prices)				Estimated total costs of crime (2015/16 prices)	Estimated total number of crimes (2015/16)
	Anticipation	Consequence	Response	Total unit cost		
Individual					***£50.1bn***	
Homicide	£61,070	£2,343,730	£812,940	**£3,217,740**	**£1.8bn**	**570**
Violence with Injury	£340	£11,220	£2,500	**£14,050**	**£15.5bn**	**1,104,930**
Violence without Injury	£120	£3,750	£2,060	**£5,930**	**£5.1bn**	**852,900**
Rape	£980	£31,450	£6,940	**£39,360**	**£4.8bn**	**121,750**
Other sexual offences	£160	£5,220	£1,150	**£6,520**	**£7.4bn**	**1,137,320**
Robbery	£330	£6,310	£4,680	**£11,320**	**£2.2bn**	**193,470**
Domestic burglary	£710	£3,420	£1,800	**£5,930**	**£4.1bn**	**695,000**
Theft of Vehicle	£1,730	£4,670	£3,900	**£10,290**	**£0.7bn**	**68,000**
Theft from Vehicle	£120	£580	£180	**£870**	**£0.5bn**	**574,110**
Theft from Person	£30	£930	£430	**£1,380**	**£0.6bn**	**459,240**
Criminal damage – arson	£320	£3,110	£4,980	**£8,420**	**£0.2bn**	**22,620**
Criminal damage – other	£70	£770	£510	**£1,350**	**£1.4bn**	**1,007,160**
Fraud	£220	£840	£230	**£1,290**	**£4.7bn**	**3,616,460**
Cyber crime[3]	£290	£260	£0	**£550**	**£1.1bn**	**2,021,330**
Commercial (7 sectors only)					***£8.7bn***	
Commercial robbery	£2,300	£8,020	£4,680	**£15,000**	**£2.0bn**	**136,150**
Commercial burglary	£8,030	£4,660	£2,770	**£15,460**	**£1.6bn**	**102,570**
Commercial theft	£210	£510	£250	**£970**	**£4.2bn**	**4,312,970**
Theft of Commercial Vehicle	£5,920	£25,370	£3,900	**£35,180**	**£0.3bn**	**8,400**
Theft from Commercial Vehicle	£240	£1,460	£180	**£1,870**	**£0.1bn**	**59,890**
Commercial criminal damage – arson	£1,840	£4,110	£4,980	**£10,930**	**£0.1bn**	**6,910**

[3] The definition of cybercrime relates to computer misuse, namely computer viruses and unauthorised access to personal information (including hacking).

Crimes	Estimated unit costs of crime (2015/16 prices)				Estimated total costs of crime (2015/16 prices)	Estimated total number of crimes (2015/16)
	Anticipation	Consequence	Response	Total unit cost		
Commercial criminal damage – other	£320	£590	£510	**£1,420**	**£0.4bn**	**303,790**

Although the new estimates adopt a similar overall approach to earlier attempts to calculate the costs of crime (Brand and Price, 2000) and Dubourg *et al*, 2005), they also include a number of improvements in data quality and cost estimation. In particular, these updated figures use a more robust methodology for estimating the physical and emotional cost to victims and lost output costs, and include more complete estimates of the costs of crimes against businesses.

It is possible to estimate the change in the costs of crime over time by multiplying the estimated unit costs by the volumes between 2004/05 and 2015/16. Figure E1 below shows the total estimated costs of crime against individuals (excluding fraud and cyber crime as these data are available for 2015/16 only) have fallen from £75bn in 2004/05 to £44bn in 2015/16. These figures exclude crimes against business as the data are not collected across all sectors each year.[4]

The fall in the total estimated costs of crime is as a result of the large fall in the number of crimes between 2004/05 and 2015/16. Violence with injury made up the largest proportion of the fall in estimated costs, accounting for around 40% of the reduction, despite only accounting for around 15% of the fall in volumes.

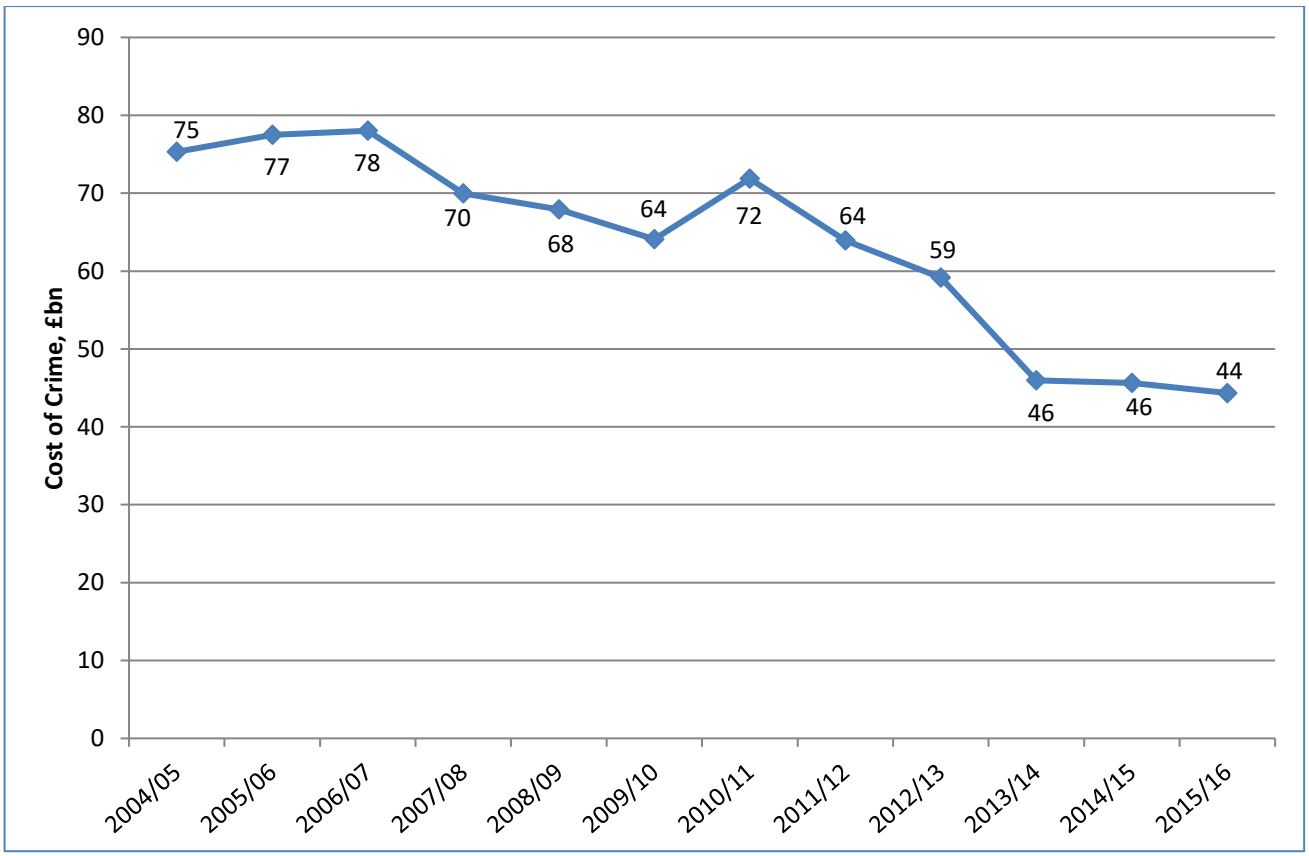

Figure E1: Total estimated costs of crimes against individuals, 2004/05 to 2015/16[5]

Although these new estimates use more robust methodologies than previous studies, there are still areas for improvement. The cyber crime estimates do not include all costs associated with cyber crime - for example, police and victim service costs - and therefore cannot be directly

[4] The number for commercial crimes is estimated using data from the CVS which does not always survey the same sectors each year. Hence a continuous time-series is not available.

[5] Figure E1 uses the unit costs of crime estimated in this report and volumes split by offence category to estimate the costs of crime. It assumes the costs of crime against children make up the same percentage in all years as in 2015/16.

compared to other ‘traditional’ costs of crime estimates. The costs to victims’ services are not comprehensive for all crime types. The analysis also does not include the costs of cyber crime and fraud against businesses due to the limited availability of data. In addition, the 2015/16 volumes data used to estimate the costs of cyber crime and fraud against individuals are based on Crime Survey for England and Wales (CSEW) experimental statistics. Finally, the costs of crime against businesses only cover 7[6] out of a possible 21[7] of all business sectors.

[6] The sectors are: (i) wholesale and retail; (ii) agriculture, forestry and fishing; (iii) construction; (iv) accommodation and food; (v) arts, entertainment and recreation; (vi) manufacturing; and (vii) transportation and storage.

[7] See list of all 21 sectors here: http://resources.companieshouse.gov.uk/sic/ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/455263/SIC_codes_V2.pdf

1. Introduction

Home Office estimates of the economic and social costs of crime were first published in 2000 (Brand and Price, 2000). This was the first comprehensive attempt to estimate the costs of crime in England and Wales. An updated Home Office study (Dubourg, Hamed and Thorns, 2005) developed the methodology further and updated the estimates. A minor update was published in 2011 based on the latest crime data (Home Office, 2011).

The analysis presented here further develops the methodology used in the 2000 and 2005 publications. It uses the 2015/16 crime data and price data where available to give a more comprehensive picture of current economic and social costs of crime. It is similar to the previous publications in terms of the cost categories it considers. These include costs incurred in **anticipation of crime**, **as a consequence of crime** and **in response to crime**. However, the 2005 update only examined the economic and social costs of crime to individuals. This update aims to provide a more comprehensive picture by estimating the costs of crime to selected business sectors.

There are five main elements to the new estimates.

1) Updating the estimates using the 2015/16 crime and cost data

Data from 2015/16 has been used to calculate the costs of crime where available. Police recorded crime (PRC), Crime Survey for England and Wales (CSEW) and Commercial Victimisation Survey (CVS) data, as well as the most recently available criminal justice system (CJS) costs estimates, have been used alongside a variety of other more recent sources which are detailed throughout the report.

2) Adding estimates for 'new' offences against individuals

Following the inclusion of experimental fraud and cyber crime[8] statistics in the CSEW in October 2015, initial estimates for fraud and cyber crime are also included. This helps to address a particular recommendation made in the Home Office Research Report 96 'Understanding the costs of Cyber Crime' (Home Office, 2018).[9] The same report also outlines the variety of challenges associated with producing accurate estimates of the costs of cyber crime, alongside the range of costs that may need to be considered in any such estimate. The methodology for estimating costs for cyber crime (and fraud) is reflective of these challenges. It is therefore sometimes different to other crime categories for some cost categories and, in some areas, is not as complete. For example, there is no data available for the police and victim services costs associated with cyber crime. Where applicable, methodological differences have been highlighted in the report. Finally, we have been unable to estimate the costs of fraud and cyber crime to businesses. They are thought to bear the majority of the

[8] The definition of cyber crime relates to computer misuse, namely computer viruses and unauthorised access to personal information (including hacking).

[9] Available from: https://www.gov.uk/government/publications/understanding-the-costs-of-cyber-crime [accessed on 23 January 2018].

fraud and cyber crime costs. The cost estimates, particularly for cyber crime, should therefore be treated as less complete.

3) Splitting some offence categories into more detailed sub categories

For the first time the costs of rape have been separated out from other sexual offences, and the costs of arson have been separated out from criminal damage. The costs of these offences are generally higher than the costs of the high-level category; therefore, more nuanced analysis can be undertaken.

4) Developing the methodology for the cost areas

Improvements have been made to the methodology, in particular to calculate the physical and emotional costs of crime using a consistent 'quality-adjusted life years' (QALY) approach across all crimes (see Section 5.2). Additionally, where previously the lost output costs of crime only included time taken off work, they now also include estimates for reduced productivity whilst at work following crime victimisation. There are other, more minor, enhancements to the methodology, discussed in the relevant sections throughout the report.

5) Adding additional cost categories

For the first time, the costs of crime against businesses estimate the lost output and victim service costs. There are costs which have not been included but are discussed in the annexes. Annex 2 discusses the costs of the wider fear of crime experienced by all members of the population rather than just victims which had not been considered previously. Annex 3 provides updated estimates for the carbon costs associated with crime which have been previously published by Skudder *et al.* (2016).

This report does not re-visit the rationale for and against including certain costs of crime. Discussion of this is included in the Brand and Price (2000) paper. This paper does, however, explain the methodology, highlighting changes and presenting the revised unit costs of crime estimates with updated multipliers[10] as well the overall costs of crime estimate. However, they are not directly comparable with previous estimates produced due to changes in methodology, assumptions, and the inclusion of new cost categories and crime types.

1.1. What is included?

The current analysis breaks down the unit and total cost estimates by offence type. As in the previous analyses, only the costs of notifiable[11] offences are included; therefore, non-notifiable offences, such as summary motoring offences, are not estimated (Home Office, 2016a). The analyses estimates the costs of crime against individuals and certain business sectors but does not consider the costs of crime against the public sector.[12]

Similar to previous analyses, the costs of crime are split into three main cost areas, each of which contains relevant cost categories.

[10] Used to convert police recorded crime to all crimes to enable volumes to be used with the unit costs. See Box 1 in this section for more details.

[11] Notifiable offences are offences that the Home Office requires details of from police forces. This includes the number of offences occurring each year within a force's territorial jurisdiction based on Home Office counting rules.

[12] It is important to understand that the victim of crime will not always bear the full cost of the crime. The costs of crimes against individuals could be borne by businesses; for example, banks often reimburse individual customers who are defrauded. The costs of crime against businesses could also be borne by individuals; for example, individuals working for a business could experience physical and emotional injuries resulting from a robbery against the business.

1) **In anticipation of crime**

a. Defensive expenditure

Defensive expenditure is defined as money individuals and businesses spend on crime detection and prevention. This encompasses expenditure such as burglar alarms, CCTV equipment and car alarms.

b. Insurance administration

The value of insurance administration costs resulting from crime is included but not the value of insurance payouts to victims of crime. In economics terms the latter does not represent a cost to society as it is a transfer of money between an individual and a business and vice versa. The costs to the victim or business are also already captured in the costs of property stolen or damaged. The insurance cost that crime creates is the cost of employees of insurance firms dealing with insurance claims (e.g. premises, salary and equipment costs) when they could be engaged in other productive activities in society. It also includes the administration costs of the Criminal Injuries Compensation Authority.[13]

2) **As a consequence of crime**

a. Property stolen or damaged

This is the cost of the value of the property stolen or damaged as a result of crime.

b. Physical and emotional harm to the victim

This is the reduction in the quality of life of the victim from the physical and emotional harm suffered as a result of the crime.

c. Lost output

Lost output estimates the lost productivity from time off work and reduced productivity whilst at work for victims of crime.

d. Health services

There are health service costs from dealing with the physical and emotional harms of crime. These include ambulance costs, medical procedure costs associated with physical harm, and counselling costs associated with the emotional harms.

e. Victim services

There are two sets of costs associated with victim services. The first is the cost of support provided to victims of crime, and the second is the opportunity cost of volunteer time in delivering victim services.

3) **In response to crime**

a. Police costs

A large part of the police's resources are spent dealing with crimes. The cost captured here is therefore the opportunity cost of police time and resources taken up by investigating a certain crime rather than engaging in other activities, such as responding to non-crime activities.

b. Other CJS costs
The CJS is a set of agencies and processes established by the Government to control crime and impose penalties on those who break the law. The costs include those for the Crown Prosecution Service (CPS), court, defence, prison and probation.

[13] They are a public body which administers the payments to victims of violent crime.

Despite the wide range of costs included in the estimates there are inevitably some costs of crime that cannot be estimated due to the lack of available evidence or data. This includes the costs relating to the fear of crime, the environmental costs of crime and costs to victims' families. Some of these areas are discussed in greater detail later in the paper (see Annex 2 and Annex 3).

In addition to the unit costs of each crime, Annex 1 includes an index showing the relative social harm created by different crimes. This allows an easy comparison on how costly one crime is relative to another.

The costs of crime presented in this report are estimates and that is how they should be treated. They demonstrate the relative magnitudes of the economic and social costs of different crimes and should not be treated as precise estimates of the cost of each crime.

The cost estimates in this report use the best available evidence and data at the time but they are inevitably sensitive to changes in crime trends, organisational developments and changes in technology. These factors should be considered when deciding whether these estimates can be used, as the multipliers and unit costs may no longer be appropriate.

1.2. How to use the costs of crime estimates

The unit costs of crime estimates are designed to help policymakers and practitioners weigh up the crime reduction benefits of policies and help assess the cost effectiveness of particular interventions. Users should therefore understand how to use the costs of crime to ensure the net benefit from crime reduction policies is calculated correctly. The unit costs of crime capture all crimes and not just crimes recorded by the police. The total costs of crime for each offence are therefore divided by all crime (both recorded crime and crime not reported to the police) to calculate the unit costs. This is an important distinction to understand when estimating the benefits of any crime reduction policy. The unit costs can therefore only be used directly with reductions in all crimes (i.e. CSEW crimes). ***The unit costs should not be used in conjunction with PRC without applying the multipliers presented in Section 3. Box 1 outlines a simple example of how the unit costs of crime and multipliers should be used with PRC.***

Box 1: Example of how to use the costs of crime for PRC reductions

- A pilot of a crime reduction policy shows evidence of a 5% reduction in police recorded crime for robbery.
- The policymaker would like to know what the estimated benefit would be from rolling this policy out to the rest of the country assuming the 5% reduction.
- Say there are 50,000 police recorded robberies in England and Wales a year. To use the unit costs of crime, the number of police recorded robberies need to be converted into an estimate for all robberies (including those not recorded by the police). This can be done using the multiplier estimates in Section 3 of this report.
- If the multiplier for robbery was 4 (implying that only 1 in 4 robberies are reported to the police), the estimate for the actual number of robberies would be 200,000.
- A 5% reduction in recorded robberies is therefore estimated to result in a 10,000 reduction in all robberies.
- The unit cost of crime for robbery can then be multiplied by the total reduction in all robberies (10,000) to calculate the benefit of this crime reduction policy.

2. Main results

The unit costs in Table 1 show the average estimated cost to society of one crime. This is the estimated total costs of crime for each crime type divided by all crimes committed (both reported and unreported) in England and Wales in the 2015/16 (Table 2).

Table 1: Unit costs of crimes by category

Crimes	Costs in anticipation of crime		Costs as a consequence of crime					Cost in response to crime		Total (1)
	Defensive expenditure	Insurance administration	Value of property stolen/ damaged	Physical and emotional harm	Lost output	Health services	Victim services	Police costs	Other CJS costs	
Individual										
Homicide	£61,060	£10	-	£2,082,430	£254,710	£1,110	£5,480	£11,960	£800,980	**£3,217,740**
Violence with Injury	£330	£10	-	£8,240	£2,060	£920	£0	£1,130	£1,370	**£14,050**
Violence without Injury	£110	£10	-	£2,810	£670	£270	£10	£810	£1,250	**£5,930**
Rape	£970	£10	-	£24,390	£5,900	£1,110	£40	£6,360	£580	**£39,360**
Other sexual offences	£150	£10	-	£3,700	£1,120	£390	£10	£570	£580	**£6,520**
Robbery	£190	£140	£1,030	£3,590	£920	£760	£10	£1,010	£3,670	**£11,320**
Domestic burglary	£320	£390	£1,400	£1,190	£440	£380	£0	£530	£1,270	**£5,930**
Theft of Vehicle	£1,010	£720	£4,140	£270	£150	£100	£0	£2,030	£1,870	**£10,290**
Theft from Vehicle	£110	£0	£350	£140	£60	£40	£0	£80	£100	**£870**
Theft from Person	£20	£0	£180	£410	£120	£210	£0	£40	£390	**£1,380**
Criminal damage – arson	£110	£220	£1,600	£980	£340	£180	£10	£1,080	£3,900	**£8,420**

Crimes	Costs in anticipation of crime		Costs as a consequence of crime					Cost in response to crime		Total (1)
	Defensive expenditure	Insurance administration	Value of property stolen/ damaged	Physical and emotional harm	Lost output	Health services	Victim services	Police costs	Other CJS costs	
Criminal damage – other	£20	£40	£330	£270	£80	£90	£0	£150	£350	**£1,350**
Fraud (2)	£170	£50	£500	£200	£60	£70	£0	£60	£170	**£1,290**
Cybercrime	£290	£0	£10	£150	£50	£50	-	-	£0	**£550**
Commercial (7 sectors only)										
Commercial robbery	£2,060	£240	£980	£4,170	£2,250	£600	£20	£1,010	£3,670	**£15,000**
Commercial burglary	£7,170	£860	£3,600	£510	£380	£160	£0	£530	£2,240	**£15,460**
Commercial theft	£210	£10	£510	£0	£0	£0	£0	£40	£200	**£970**
Theft of Commercial Vehicle	£4,040	£1,880	£24,800	£360	£190	£10	£0	£2,030	£1,870	**£35,180**
Theft from Commercial Vehicle	£220	£20	£1,280	£100	£80	£0	£0	£80	£100	**£1,870**
Commercial criminal damage – arson	£1,300	£530	£2,230	£1,010	£510	£340	£10	£1,080	£3,900	**£10,930**
Commercial criminal damage – other	£210	£110	£460	£60	£30	£40	£0	£150	£350	**£1,420**

(1) *There may be discrepancies in the total figures due to the effect of rounding*

(2) *The unit cost estimates for fraud and cyber crime are based upon experimental statistics and should be considered as partial estimates as they do not include some costs associated with each crime.*

The unit costs in Table 1 show the average costs to society of each crime. Combining these unit costs with the estimates of the total number of crimes committed in the 2015/16 in England and Wales allows the total costs of crime to be calculated. The estimates for the number of crimes committed are based on the results from the CSEW[14] and the CVS. The estimates from the surveys have been taken alongside an estimate for the number of crimes committed against individuals aged under 10 years old[15] to estimate the total number of crimes against individuals and businesses. The methodology for this is outlined in Section 3. The estimated unit costs, number of crimes and total costs are presented in Table 2.

[14] The CSEW and CVS are both surveys of a sample of the population. If the whole population was surveyed there is a chance the results would differ to the sample survey. The CSEW and CVS therefore have confidence intervals around them to convey this uncertainty (published by the Office for National Statistics (ONS)).

[15] Under 16 and over 59 for sexual offences.

Table 2: Total costs of crime in England and Wales in 2015/16[16]

Crimes	Unit costs	Number of crimes (1)	Total costs
Individual			
Homicide	£3,217,740	572	£1.8bn
Violence with Injury	£14,050	1,104,929	£15.5bn
Violence without Injury	£5,930	852,898	£5.1bn
Rape	£39,360	121,746	£4.8bn
Other sexual offences	£6,520	1,137,315	£7.4bn
Robbery	£11,320	193,469	£2.2bn
Domestic burglary	£5,930	695,000	£4.1bn
Theft of Vehicle	£10,290	68,000	£0.7bn
Theft from Vehicle	£870	574,106	£0.5bn
Theft from Person	£1,380	459,241	£0.6bn
Criminal damage – arson	£8,420	22,620	£0.2bn
Criminal damage – other	£1,350	1,007,158	£1.4bn
Fraud (2)	£1,290	3,616,460	£4.7bn
Cyber crime (2)	£550	2,021,334	£1.1bn
Total costs of crimes against individuals			**£50.1bn**
Commercial (7 sectors only)			
Commercial robbery	£15,000	136,145	£2.0bn
Commercial burglary	£15,460	102,569	£1.6bn
Commercial theft	£970	4,312,973	£4.2bn
Theft of Commercial Vehicle	£35,180	8,397	£0.3bn
Theft from Commercial Vehicle	£1,870	59,894	£0.1bn
Commercial criminal damage – arson	£10,930	6,909	£0.1bn
Commercial criminal damage – other	£1,420	303,788	£0.4bn
Total costs of commercial crimes			**£8.7bn**

(1) Estimated using the CSEW (individual) and CVS (commercial – 7 sectors only) with the exception of homicide which used PRC data. The CSEW figures are based on the main survey, 10-15 year old survey and estimates for the number of crimes for individuals aged under 10. The rape and other sexual offences figures uses data from the Interpersonal Violence self-completion module. See Section 3 of this report for more detail.

(2) The unit cost estimates for fraud and cybercrime are based upon experimental statistics. The cyber estimate should be considered as partial estimates as they do not include some costs associated with each crime.

[16] The CSEW figures use 2015/16 figures. The CVS survey has surveyed between 3 and 4 sectors per year from 2012. To improve the completeness of the estimate, the analysis takes the most recently available data for each of the sectors between 2012 and 2015. Fraud and cyber crime are not included as the CVS surveys premises rather than head offices, so is likely to severely underestimate the volume of fraud and cyber crimes for each sector.

3. Estimating the number of crimes and calculating the multipliers

This chapter outlines how the numbers of crimes were estimated and how they feed into estimating the multipliers. The estimated total number of crimes is used to calculate the unit costs for each of the cost and crime categories. The multipliers are produced to enable users of the costs of crime unit cost estimates to scale up PRC volumes to all crimes committed when required.[17]

3.1. Crimes against individuals

PRC statistics show the total number of crimes which are recorded by the police (Home Office, 2016b). However, PRC does not cover all crime; many crimes are not reported to the police. As in Brand and Price (2000) and Dubourg *et al.* (2005), CSEW is used as the basis to estimate the total number of crimes. Similarly, only the costs of notifiable offences are included, therefore the costs associated with non-notifiable offences, such as summary motoring offences, are not estimated (Home Office, 2016a).

The CSEW in 2015/16[18] surveyed 35,000 adults[19] and 3,000 children aged 10 to 15 about their experiences of crime in the previous 12 months. These individuals are given survey weights so that their experiences of crime can be extrapolated to the relevant population of England and Wales. The CSEW therefore estimates the total number of different types of crimes which occur in England and Wales against victims aged 10 and above.[20]

We also need to estimate the number of crimes against individuals aged under 10 (under 16 and over 59 for sexual offences). This is not available from the CSEW. Dubourg *et al.* (2005) assumed that victimisation rates against individuals aged under 10 would be the same as for individuals aged 16 and above. As there is large variability in victimisation rates across individuals of different ages, this assumption is unlikely to accurately reflect the number of crimes against victims aged under 10. We therefore follow an alternative approach.

To estimate the total number of crimes against individuals aged under 10, the ratio between 0 to 9 year olds and 10 to 15 year olds is calculated using Home Office Data Hub (HODH) data. This ratio is used to scale down the CSEW crime estimates for children aged 10 to 15 to estimate the equivalent for those aged under 10. For example, CSEW estimates there were roughly 330,000 violence with injury crimes against 10 to 15 year olds. HODH data suggests there is roughly 0.5 violence against a person crimes against those aged for 0 to 9 year olds for every violence against a person crime against 10 to 15 year olds. Using the described methodology results in estimates of approximately 160,000 crimes committed against 0 to 9

[17] See Section 1 for an example of how to use the costs of crime unit costs with police recorded crime.
[18] The CSEW surveys households but does not cover people resident in institutions
[19] The fraud and cyber questions are asked to adults only, and are asked to around 9,000 adults rather than 35,000 and scaled up to the population of England and Wales.
[20] The exception being estimates for sexual offences, which use the self-completion module, and only asked of individuals over 16 and less than 60.

year olds. A similar approach is taken for sexual offences to estimate the volume of crimes for under 16 year olds and those aged 60 and over.

We sum the estimate for the number of crimes committed against individuals aged under 10 (under 16 and over 60 for sexual offences) with the estimate of number of crimes committed against individuals aged over 10 years old from the CSEW. This provides an estimate of the total number of crimes committed against all individuals in the population of England and Wales for selected offence types. The only exception being homicide which comes from PRC volumes as there is assumed to be no underreporting of homicides.

The CSEW volume estimates use the main survey for all areas except for sexual offences where the self-completion module is used. The self-completion module for domestic abuse is not used in this analysis as the offence categories presented are at a broader level of violence with and without injury.[21]

3.2. Crimes against businesses

As in Brand and Price (2000), the CVS is used to calculate the total number of crimes against businesses. The CVS surveys three or four business sectors per year and has been carried out annually since 2012.[22] This provides information on crime in seven distinct sectors out of the 21 standard industrial classification sectors. Data is taken for each sector from the most recent CVS from years ending 31 March 2012 to 2015 to cover that sector. The sectors and corresponding CVS used are shown in Table 3.

Table 3: CVS data available[23]

Sector	CVS year
Wholesale and retail	2015
Agriculture, forestry and fishing	2015
Construction	2015
Accommodation and food	2014
Arts, entertainment and recreation	2013
Manufacturing	2012
Transportation and storage	2012

The prevalence of crime amongst those businesses surveyed is applied to all businesses within that sector to give an estimate of the total number of crimes against businesses from these seven sectors. These estimates are given in Table 4. These sectors only account for a third of the 21 sectors which means the costs of crime against businesses is only partially captured by this analysis. The Inter-departmental Business Register (IDBR) suggests the

[21] This may result in an underestimate for domestic abuse related crimes.
[22] The CVS previously ran between 1994 and 2002 but these results are not used due to the age of the data.
[23] The analysis does not include estimates for (i) mining and quarrying; (ii) electricity, gas, steam and air conditioning supply; (iii) water supply, sewerage, waste management and remediation action; (iv) information and communication; (v) financial and insurance activities; (vi) real estate activities; (vii) professional, scientific and technical activities; (viii) administration and support services; (ix) public administration and defence; (x) education; (xi) human health and social work activities; (xii) other service activities; (xiii) activities of households as employers; and (xiv) activities of extraterritorial organisations and bodies.

broad sectors included in the analysis account for just over 50% of the number of VAT and/or PAYE enterprises.[24]

3.3. Multipliers

The estimated unit costs of crime shown in Table 1 are the average cost of each crime regardless of whether it was reported to the police or not. This is to ensure the unit cost reflects the cost of each crime committed, rather than each crime recorded by the police. The PRC volumes need to be correctly converted to an estimate of all crimes to be used alongside the estimated unit costs. The multipliers in Table 4 allow changes in PRC to be converted into an estimate for changes in all crimes. For example, if a policy were to prevent ten violence without injury offences recorded by the police, then by using the multiplier for violence without injury in Table 4, the estimate for the actual reduction in all crimes committed would be 15 (10 $\times$ 1.5). This is the number that would need to be multiplied by the unit cost in order to calculate the savings associated with preventing all crimes.

Multipliers cannot be calculated for cyber crime and all commercial crimes. For cyber crime this is because PRC data is not available for 2015/16. For commercial crimes, the total numbers of crimes committed do not apply to all sectors, therefore they cannot be compared with PRCs to calculate multipliers.

3.4. Summary of volumes and multipliers

The estimated total number of crimes, PRCs and resultant multipliers are summarised in Table 4. The table splits out the volumes between estimates for individuals aged less than 10, CSEW estimates and CVS estimates. It then uses an estimate for total crime volumes and PRC to estimate a multiplier for converting PRC to estimated total crime.

[24] This is simply the number of enterprises and does not account for their size.

Table 4: Total number of crimes committed, PRCs and resultant multipliers[25]

Crimes	Estimate	CSEW		CVS	Estimated total crime	PRC	Estimated multiplier
	<10 year old estimates (1)	10-15 year olds (1)	16+ year olds (2)				
Individual							
Homicide (3)	-	-	-	-	570	570	1.0
Violence with injury	158,530	331,780	614,620	-	1,104,930	428,800	2.6
Violence without injury	48,030	100,520	704,340	-	852,900	554,580	1.5
Rape		54,740	67,010	-	121,750	35,690	3.4
Other sexual offences		511,340	625,980	-	1,137,320	68,980	16.5
Robbery	820	40,160	152,490	-	193,470	45,330	4.3
Domestic burglary	-	-	695,000	-	695,000	194,410	3.6
Theft of vehicle (4)	-	-	68,000	-	68,000	81,670	0.8
Theft from vehicle (5)	-	-	634,000	-	574,110	223,950	2.6
Theft from person	2,630	46,410	410,210	-	459,240	77,760	5.9
Criminal damage – arson (5)	10	1,610	27,910	-	22,620	21,880	1.0
Criminal damage – other (5)	12,920	70,930	1,227,090	-	1,007,160	512,110	2.0
Fraud (6)	-	-	3,616,460	-	3,616,460	67,480	53.6
Cyber crime (7)	-	-	2,021,330	-	2,021,330	-	-
Commercial (7 sectors only) (8)							
Commercial robbery	-	-	-	102,570	102,570	-	-
Commercial burglary	-	-	-	310,700	310,700	-	-
Commercial theft	-	-	-	8,400	8,400	-	-

[25] The CSEW volume estimates use the main survey for all areas except for sexual offences where the self-completion module is used. Repeat victimisation is taken into account in the main survey but is capped at five incidents in line with the current CSEW methodology. The ONS are planning to change this to the 98th percentile of victim incident counts. This will impact crimes, such as sexual offences and domestic abuse, where repeat victimisation is known to be prevalent.

Crimes	Estimate	CSEW		CVS	Estimated total crime	PRC	Estimated multiplier
	<10 year old estimates (1)	10-15 year olds (1)	16+ year olds (2)				
Theft of commercial vehicle	-	-	-	59,890	59,890	-	-
Theft from commercial vehicle	-	-	-	136,150	136,150	-	-
Commercial criminal damage – arson	-	-	-	4,312,970	4,312,970	-	-
Commercial criminal damage – other	-	-	-	102,570	102,570	-	-

(1) Sexual offence volumes are only estimated in the CSEW for those aged 16-59 years old. The figures in these columns include estimates for those aged <16. These are estimated using the same methodology as the estimate for <10 year olds.

(2) Sexual offence volumes are only estimated in the CSEW for those aged 16-59 years old. An estimate for sexual offences has been included for those aged 60+. These are estimated using the same methodology as the estimate for <10 year olds.

(3) We assume that all homicides come to the attention of the police, therefore the total number of homicides is assumed to be the same as the number of PRC homicides.

(4) The multiplier is less than 1 as police recorded crime covers all vehicle thefts (including those against businesses) whereas CSEW crime does not. This leads to PRC being higher than CSEW crime.

(5) PRC includes both crimes against individuals and businesses. The two figures cannot be separated. To prevent double counting we adjust the volume of individual crimes to exclude the volume of commercial crimes for the relevant crime categories using CVS commercial crime volumes for the seven available sectors. We split out arson from criminal damage using HODH data on the relative number of arson crimes to other criminal damage.

(6) The PRC figure for fraud is the number of National Fraud Intelligence Bureau (NFIB) offences within dissemination packages sent to police forces. The multiplier has been constructed on this basis and therefore should only be used to scale up from offences within dissemination packages to all fraud crime.

(7) Estimates for 10-15 year olds cannot be produced for cyber crime as they are not included in 10-15 year old module. This also means estimates for <10 year olds cannot be produced using the stated methodology. The volume of cyber crimes is therefore likely to be an underestimate.

(8) Fraud and cyber crime are not included. The CVS is a premises survey and therefore will significantly underestimate fraud and cyber crimes as they are likely to occur at head office level.

4. Costs in anticipation of crime

This chapter discusses the methodological approach and outlines the estimates of the costs in anticipation of crime. These include:

1) Defensive expenditure
2) Insurance administrations costs

4.1. Defensive expenditure

4.1.1. Approach

Defensive expenditure is the money spent by individuals and businesses on crime detection and prevention. This encompasses estimates for both security equipment, such as burglar alarms, CCTV equipment, car alarms; and private security, such as door supervision.

To establish the available evidence to inform our estimates we conducted a search of the most recent security expenditure literature available. Estimates of the size of the UK security industry range from £3bn to £4bn[26] to around €25bn.[27] In most cases the high-level estimates were not granular enough to allow an estimates by crime type to be produced. Our approach has therefore been to consider a variety of more granular figures related to specific types of security expenditure. This has allowed estimates to be split out by crime type. It has meant non-UK figures have been used alongside assumptions but these were judged to be the best available sources from our literature search. The source of the estimates, details of how they have been split out by crime type and assumptions made are explained in the remainder of this chapter.

The cost of defensive expenditure is calculated as total expenditure by individuals and businesses on the prevention of the specific crime(s) that relate to that type of expenditure. For example, total expenditure on car alarms is divided out across all **theft of** and **from vehicle offences**. In total four categories of security expenditure are estimated (separate estimates calculated for crimes against individuals and businesses):

1) General building security
2) General building security specific to burglary prevention
3) Vehicle security
4) Private security

The estimates should be viewed with caution as they take figures from a variety of sources in which the robustness of the underlying analysis is uncertain. They should also not be considered as comprehensive as they do not cost precautionary behaviour to reduce the risk

[26] https://www.perpetuityresearch.com/images/Reports/2007-02%20Introduction%20to%20Purchasing%20Security.pdf [accessed on 24 January 2018].
[27] https://www.bsia.co.uk/LatestNews/tabid/87/ctl/NewsItem/mid/431/Id/160/Default.aspx [accessed on 24 January 2018].

of being a victim of crime. For example, someone may take a taxi home to avoid the risk of being a victim of crime. They are therefore likely to be an underestimate.

4.1.2. Total costs

General building security

Total building security expenditure for England and Wales is estimated in IHS Markit's 'Physical security equipment and services report 2015' (Millar, 2015). The report looks at video surveillance, access control, intruder alarms, manned security systems and wireless infrastructure, and estimates the building security annual expenditure for the UK and Ireland to be £2.7bn. An estimate for England and Wales is split out from this based on the proportion of total UK gross domestic product (GDP) they make up (81%)[28] and is estimated to be £2.2bn per annum. This total of £2.2bn is then split out into individual (18%) and commercial (82%) expenditure based on the proportions listed in the IHS report. However, only manufacturing (6%), retail (7%) and transportation (12%) building security costs are included in the commercial costs. The remaining 57%[29] of the total costs are not covered by sectors for which we have CVS volumes data, so therefore we have excluded them from this analysis.[30]

General building security specific to burglary prevention

General security expenditure (estimated at £2.2bn) includes expenditure on intruder alarms. The IHS report estimates that intruder alarms account for 55% of security expenditure (excluding vehicles) in the UK. Intruder alarms are therefore estimated to cost approximately £1.2bn[31] of the £2.2bn per annum. In this analysis, we assume that intruder alarms are only used for the prevention of burglary and not for theft or robbery. This is justified because, of crimes involving stolen goods, theft implies that the criminal had permission to enter the property and robbery requires an individual to be present at the time of the crime.

Vehicle expenditure

Data on the total security expenditure for vehicles were not available for England and Wales, so estimates have been made by extrapolating from the USA data. The figures are estimated using the following methodology.

1) The US share of the global vehicle security market in 2015 is estimated as £1.7bn (38% of £4.4bn).[32] The total size of the market was calculated by taking the average number of vehicle security systems that are incorporated in each vehicle category (passenger car, commercial vehicle and off-highway vehicle) multiplied by vehicle production numbers. The US share of vehicle security system volumes was then based on the proportion of US vehicles in each category.[33]
2) The estimate for the US (£1.7bn) is then applied to the ratio of the number of cars in the

[28] Calculated using the proportion of UK Gross Value Added (GVA) made up by England and Wales (ONS, 2014) and the UK's proportion of the UK and Ireland's GDP (World Bank, 2016).
[29] Remaining commercial expenditure when excluding individual expenditure and the estimates for the sectors for which we have data.
[30] For commercial expenditure this only includes three sectors (manufacturing, transport and retail). The unit costs produced in Table 5 therefore only apply to these three sectors only.
[31] £2.2bn × 55%.
[32] Marketsandmarkets.com (2016a). See References section.
[33] Marketsandmarkets.com (2016a). See References section.

UK and USA (12.2%)[34] to estimate total vehicle security expenditure in the UK of approximately £200m.

3) The estimate is then scaled using the ratio of vehicles in England and Wales compared to the UK to estimate a cost of vehicle security in England and Wales of £179m.[35]

4) It is split out into individual and commercial based on the proportion of company registered cars in the UK.[36]

5) This results in an estimate of the total vehicle security expenditure for individual and commercial vehicles in England and Wales of £132m and £47m respectively. This assumes that security expenditure per vehicle is the same for commercial and non-commercial vehicles which is the best assumption we could make given the available data and evidence.

Private security expenditure

Private security expenditure relates to areas, such as guarding, cash and valuables in transit, close protection and door supervision. The total expenditure for these areas is estimated by Infologue.[37] It estimates the turnover of the top 33 companies in the sector and attempts to exclude business activities not related to private security. It extrapolates this to all businesses in the sector, which provides an expenditure estimate for private security of around £4bn. The expenditure could relate to crimes against individuals or businesses; there is no information provided by Infologue to estimate this. We have therefore assumed the same percentage split as for general building security (18% individual and 25% commercial). This results in estimates of £700m for individual expenditure and £980m for commercial expenditure.[38]

We are therefore left with eight categories of total cost:

1) General building security – individual
2) General building security specific to burglary prevention – individual
3) Vehicle security – individual
4) Private security – individual
5) General building security - commercial
6) General building security specific to burglary prevention – commercial
7) Vehicle security – commercial
8) Private security – commercial

4.1.3. Splitting out the total costs

In our methodology so far, the security expenditure estimates are not split out by crime type. The exception being general building security specific to burglary for which we assume (as explained above) all costs are related to burglary. The remaining two categories of security expenditure (general building and vehicle) need to be split out across the crimes they cover. For vehicle security this is split between two categories – theft of a vehicle and theft from a

[34] Based on 32m cars in the UK (Statista, 2017a) and 260m cars in the USA (Statista, 2017b). See References section.
[35] Number of cars in England and Wales / Number of cars in UK = 88% (Department for Transport, 2015) Global market of £4.4bn × 38% × 12.2% × 88% = £179m.
[36] Department for Transport, 2015. See References section.
[37] http://www.infologue.com/news/infologue-com-top-30-uk-companies-in-the-regulated-security-sector-2016/ [accessed on 24 January 2018].
[38] For commercial expenditure this only includes three sectors (manufacturing, transport and retail). The unit costs produced in Table 5 therefore only apply to these three sectors.

vehicle. For general building security and private security it is split between all other categories except the vehicle theft categories.[39]

The cost categories are split across relevant crime types based on the relative total value of property stolen and damaged, and physical and emotional harm, estimated in Sections 5.1 and 5.2 respectively. This is considered to be reasonable because the rationale for individuals purchasing security equipment is likely to be to prevent harm to themselves as well as their property.

For example, neither homicide nor violence with injury involve any theft or damage to property, but expenditure on general building security equipment could prevent harm to individuals. The total physical and emotional harm of homicide is estimated at £850m and the total physical and emotional harm of violence with injury at £9bn. Therefore, the total cost of security expenditure for violence with injury is assumed to be 11 times higher than for homicide (9bn / 850m = 11).

The unit costs for defensive expenditure are presented in Table 5.

4.1.4. Fraud and cyber crime

The defensive expenditure costs for fraud and cyber crime are not included in the IHS report (Millar, 2015) and are therefore calculated separately. Again, there is no estimate of the defensive expenditure on fraud in England and Wales. The defensive expenditure costs for fraud are therefore based on the estimated North American expenditure on fraud prevention and detection of $8.2bn per annum (Marketsandmarkets.com, 2016b).[40] This estimate is based on revenue of key businesses in the fraud prevention and detection market.[41] To estimate the proportion relating to England and Wales the relative total GDP ($2.6tn for England and Wales and $19.2tn for North America)[42] is used. This provides an estimate of expenditure on fraud prevention and detection in England and Wales of $1bn. This total is then divided by the number of fraud offences and converted into pounds sterling to give a unit cost (see Table 5).

Defensive expenditure costs for cyber crime are calculated as the total expenditure on cybersecurity by individuals in England and Wales divided by the number of cyber crime offences. The total expenditure by individuals on cybersecurity in the UK is estimated to be £3.3bn.[43] The proportion of this relating to England and Wales is split out by relative GDP[44] leading to an estimate for expenditure on cybersecurity in England and Wales of £2.9bn. This includes expenditure by both businesses and individuals. Individuals are estimated to account for 20%[45] of cyber security markets which results in an estimated spend of £0.6bn. This total is then divided by the number of cyber crime offences to give a unit cost (see Table 5).

[39] For private security, burglary in a dwelling is also excluded.
[40] The estimate is predominantly made up of spend by businesses and government on fraud prevention and detection. This is therefore not the spend by individuals.
[41] Assume this cost is passed onto individuals in the form of higher prices for the products/services they purchase.
[42] World Development Indicators (2017) available from https://data.worldbank.org/data-catalog/world-development-indicators [accessed 24 January 2018].
[43] Pierre Audoin Consultants (PAC) UK Ltd (2013) 'Competitive analysis of the UK cyber security sector'. Department for Business, Innovation and Skills. Retrieved from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/259500/bis-13-1231-competitive-analysis-of-the-uk-cyber-security-sector.pdf
[44] England and Wales make up 88% of UK GDP.
[45] Pierre Audoin Consultants (PAC) UK Ltd (2013) 'Competitive analysis of the UK cyber security sector'. Department for Business, Innovation and Skills. Retrieved from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/259500/bis-13-1231-competitive-analysis-of-the-uk-cyber-security-sector.pdf

4.1.5. Unit costs for defensive expenditure

Table 5: Unit costs of defensive expenditure per crime[46]

Crimes	Defensive expenditure
Individual	
Homicide	£61,060
Violence with injury	£330
Violence without injury	£110
Rape	£970
Other sexual offences	£150
Robbery	£190
Domestic burglary	£320
Theft of vehicle	£1,010
Theft from vehicle	£110
Theft from person	£20
Criminal damage – arson	£110
Criminal damage – other	£20
Fraud	£170
Cyber crime	£290
Commercial (7 sectors only)	
Commercial robbery	£2,060
Commercial burglary	£7,170
Commercial theft	£210
Theft of commercial vehicle	£4,040
Theft from commercial vehicle	£220
Commercial criminal damage – arson	£1,300
Commercial criminal damage – other	£210

4.2. Insurance administration

4.2.1. Approach

The value of insurance payouts is not included in the costs of crime as these are treated as transfers of money from one party to another and therefore do not represent an overall cost to society. Instead this cost is captured in the costs of property stolen or damaged. However, there is a social cost associated with insurance payouts arising from the administration carried

[46] In the estimation of the total costs the unit costs have been applied to all seven commercial sectors. The use of the unit costs to calculate the total costs implicitly assumes that the main and private security unit costs apply to the four other sectors not covered by the analysis (only three are covered by the analysis – retail, transportation and manufacturing).

out by insurers and public bodies that administer victim compensation. This is included as a cost to society because they spend their time and resources dealing with payouts to victims of crime where they could otherwise have employed these resources in alternative productive activities. This cost is described as the cost of insurance administration.

We have data on the cost of insurance administration for burglary and theft and on the total insurance claims for personal injury. We use this data to estimate the cost of insurance administration for all crimes involving stolen or damaged property and those involving personal injury. We also include the administrative costs associated with the Criminal Injuries Compensation Authority (CICA) for personal injury crimes.

4.2.2. Insurance administration costs for burglary

Data on the administration costs associated with insurance payouts were provided by the Association of British Insurers (ABI) for the 2015/16. The total administration cost of processing domestic property insurance claims is around £2.2bn. The proportion of this cost associated with burglary was estimated by taking the proportion of the total value of property insurance claims which was 13% for burglaries.[47] This was then multiplied by £2.2bn to give a total cost of insurance administration for burglary of around £270m. The same method was used to estimate the insurance administration cost of commercial burglaries.

4.2.3. Insurance administration costs for theft claims

Similarly, the insurance administration costs associated with vehicle-related theft were estimated using the total administration cost of motor claims multiplied by the proportion of the value of motor claims relating to theft, which is 2.8%.[48] This cost was then split into 'theft of vehicle' and 'theft from vehicle' by the value of the claims (94.5% and 5.5% respectively*).* This gave a total estimated insurance administration cost of around £50m for theft of vehicle and £3m for theft from vehicle*.*

4.2.4. Insurance administration costs for other theft/damage related crimes

Insurance data is not available for some crimes where property is either stolen or damaged and insurance administration costs are likely to be incurred. These crimes are theft from the person, arson, criminal damage and commercial theft. In order to estimate the cost of insurance administration for these crimes we use the most similar offences to them as a proxy (see Table 6). The unit cost for the relevant proxy (column 3) is adjusted by the percentage difference in the average value of the items stolen or damaged between the proxy and the actual offence. For example, the relevant proxy offence for robbery is domestic burglary. To calculate the insurance administration unit cost for robbery, the unit cost for property stolen/damaged for domestic burglary (£2,870) is divided by the unit cost of the property stolen/damaged robbery (£1,030). This is then multiplied by the insurance administration unit cost for domestic burglary (£390). As the unit cost of property stolen from a robbery is almost a third of the unit cost of property stolen from a domestic burglary, the unit cost of insurance administration is also assumed to cost around a third (£140).

[47] Association of British Insurers (2015). The implicit assumption here is that the average cost per claim is the same for a domestic burglary as for all domestic property claims. This is the most appropriate assumption we could make given the evidence and data.

[48] Association of British Insurers (2015)

Table 6 shows the unit costs estimated based on the information provided by ABI using these methodologies.

Table 6: Unit cost of insurance administration for property and motor offences[49]

Crimes	Total insurance admin cost	Proxy offence	Unit cost of property stolen/ damaged[50]	Number of offences	Unit cost
Individual					
Domestic burglary	£273m	*Not required*	£2,870	695,000	£390
Theft of vehicle	£49m	*Not required*	£4,140	68,000	£720
Theft from vehicle	£3m	*Not required*	£350	574,110	£0
Theft from person	*Proxy used*	Theft from vehicle	£180	459,240	£0
Arson	*Proxy used*	Domestic burglary	£1,600	22,620	£220
Other criminal damage	*Proxy used*	Domestic burglary	£ 330	1,007,160	£40
Robbery	*Proxy used*	Domestic burglary	£1,030	193,470	£140
Commercial					
Non-domestic burglary	£88m	*Not required*	£3,600	102,570	£860
Commercial theft	*Proxy used*	Theft from commercial vehicle	£510	4,312,970	£10
Theft of commercial vehicle	£16m	*Not required*	£24,800	8,400	£1,880
Theft from commercial vehicle	£1m	*Not required*	£1,280	59,890	£20
Commercial arson	*Proxy used*	Non-domestic burglary	£2,230	6,910	£530
Other commercial criminal damage	*Proxy used*	Non-domestic burglary	£460	303,790	£110
Commercial robbery	*Proxy used*	Non-domestic burglary	£980	136,150	£240

4.2.5. Administration costs for personal injury claims

The previous section examined the insurance administration costs associated with lost or damaged property as a result of crime. This section examines the administration costs as a result of injuries from crime which are made up of two elements. The first is the administration costs associated with the CICA scheme. The second is an estimate of the insurance administration costs associated with personal injury claims.

CICA administration costs

CICA is a public body which administers the payments to victims of violent crime. As with insurance payments by providers we are only looking to capture the costs of administering the

[49] Unit costs are rounded to the nearest £10 therefore any unit costs with a value of £5 or less will be rounded to zero.
[50] See Section 5.1 for these values.

payouts rather than the payouts themselves. The administration costs associated with CICA in 2015/16 were £12.43m.[51]

Personal injury insurance administration costs

We have data on the total value of personal injury claims, but not on the proportion of them that relate to crime. Additionally, we do not have data on the administration costs of personal injury insurance claims. The 2015 ABI data[52] show the total value of personal protection claims to be £3.6bn, which are claims relating to illness, disability and whole life insurance. The proportion of this relating to injuries and deaths caused by crime is unknown and we therefore need a method to estimate this.

We examine two approaches to estimating the proportion of injuries and deaths which are the result of crime. The first is to use the proportion of deaths in England and Wales that are as a result of homicide (0.11%).[53] This approach assumes that the proportion of all injuries which result from crime is the same as the proportion of all deaths which result from crime. An alternative approach is to use the proportion of hospital admissions which are the result of an assault. In 2015/16, 0.69% of finished admission episodes in hospitals were the result of an assault.[54]

Both approaches are unlikely to give completely accurate estimates of the proportion of injuries and deaths as a result of crime and so the average of the two is taken (0.4%). Multiplying the cost (£3.6bn) by 0.4% gives the estimated value of personal protection claims arising from crime of £14.4m.

The administration cost of these claims is then estimated using the ratio of insurance administration cost to the value of claims for property and motor claims. This calculation is necessary because the administration cost of personal protection claims was not available. For property and motor claims, the total insurance administration cost is equal to 41% of the total value of insurance claims. This 41% is multiplied by £14.4m to give the estimated administration cost of personal protection insurance relating to crime (£5.9m).

Total administration costs for personal injury claims

The total cost of personal injury administration costs of around £18m is apportioned to offence types that result in personal injuries using PRC. This assumes the same average administration costs for all types of personal injury crime and that the crimes receiving a payout are those which are also reported to the police. Therefore, the unit costs per actual crime differ because some crimes are more likely to be reported to the police than others. The unit costs for the crime types resulting in personal injuries are shown in Table 7.

Table 7: Unit costs of insurance administration for crimes involving personal injury

Crimes	Total estimated number of offences	PRC numbers	%	Unit cost
Homicide	570	570	0%	£10
Violence with injury	1,104,930	1,104,930	34%	£10

[51] CICA (2016)
[52] This data was provided directly by the Association of British Insurers.
[53] 501,424 deaths in England and Wales (ONS, 2016a) of which 572 deaths were from homicide (see Table 4).
[54] NHS Digital (2015)

Crimes	Total estimated number of offences	PRC numbers	%	Unit cost
Violence without injury	852,900	852,900	26%	£10
Rape	121,750	121,750	4%	£10
Other sexual offences	1,137,320	1,137,320	35%	£10
Robbery	193,470	45,330	1%	£0
Commercial robbery	136,150	5,430	0%	£0

4.2.6. Insurance administration costs for fraud and cyber crime

The methodology used to estimate the insurance administration cost of fraud and cyber crime is slightly different. The CSEW shows the number of fraud offences that result in a financial loss and how many of these victims receive some reimbursement. The average refund value is £262, which is also calculated using the CSEW. This is multiplied by the number of victims who receive refunds. The total estimated value of refunds in 2015/16 (according to the CSEW) is then multiplied by 41% (the ratio between the value of claims and administration costs for property and motor claims) to give the estimated cost of insurance administration associated with these refunds (£196m). This is then divided by the number of fraud offences to give a unit cost per fraud crime of around £50. The insurance administration cost for cyber crime is calculated in the same way but results in an average cost of less than £10.[55]

[55] The CSEW suggests very few victims are reimbursed for their losses as a result hence a low unit cost when dividing by the 2m incidents.

5. Costs as a consequence of crime

This chapter discusses the methodological approach and outlines the estimates of the costs as a consequence of crime. These include:

1) Property stolen/damaged costs
2) Physical and emotional harms to the victim
3) Lost output (both lost productivity and time off work)
4) Health Service costs
5) Victim services costs

5.1. Property stolen and damaged

5.1.1. Approach

The value of property stolen and damaged represents a cost to the victim of a crime. In order to calculate the unit cost of this for different crimes, information is required on the average value of property that is stolen and damaged. As in Brand and Price (2000) and Dubourg *et al.* (2005) the replacement value of property stolen and damaged is taken from the Crime Survey for England and Wales for crimes against individuals. The CVS is used for crimes against businesses. Commercial respondents in the CVS are asked the total value of the property stolen and damaged in the most recent crime they have suffered. On average this should therefore be representative of all crimes suffered by businesses within these sectors.

As these estimates are based on survey responses, it is possible that the values of property stolen and damaged are biased as respondents may have a tendency to value the property either at the price they originally paid for it or at the cost of a replacement item. Given that property loses value over time this is likely to be an overestimate of what the property is actually worth at the point at which it is stolen or damaged. Additionally, respondents in the CVS are asked only to discuss the value of property lost in the most recent crime against their business. They may instead have a tendency to discuss the most memorable crime against their business. Memorable crimes are likely to be those which have a higher value of property stolen and damaged and therefore this may also lead to an overestimate of property lost.

5.1.2. Unit costs of crimes against individuals

The average value of property stolen, recovered and damaged in crimes against individuals is taken from the CSEW in 2015/16 and is shown in Table 8.

Table 8: Average value of property stolen, recovered and damaged in crimes against individuals

Crime	Value of property stolen	+ Value of property damaged	- Value of property recovered	= Total (1)
Robbery	£1,120	£10	£90	£1,030
Domestic burglary	£1,180	£320	£90	£1,400

Crime	Value of property stolen	+ Value of property damaged	- Value of property recovered	= Total (1)
Theft from person	£200	£0	£20	£180
Theft of vehicle	£6,140	£310	£2,310	£4,140
Theft from vehicle	£280	£100	£30	£350
Arson	-	£1,600	-	£1,600
Other criminal damage	-	£330	-	£330
Fraud (2)	£505	-	-	£500
Cyber crime	£8	-	-	£10

(1) Total is calculated as the sum of value of property stolen and value of property damaged minus value of property recovered.

(2) This is the total loss from the fraud. The report estimates the cost to society from crime committed against the individual or business. As this crime was committed against the individual the costs to society are counted against them but in reality the cost might be borne by business, i.e. the banks through reimbursements.

5.1.3. Unit costs of commercial crimes

The average value of property stolen, recovered and damaged from the CVS for businesses in the years ending 31 March 2012 to 2015 is shown in Table 9. Where a sector has been surveyed multiple times during this period the most recent year has been used.

Table 9: Average value of property stolen, recovered and damaged in crimes against businesses[56]

Commercial crime	Manufacturing	Transportation and storage	Arts, entertainment and recreation	Accommodation and food	Agriculture, forestry and fishing	Construction	Wholesale and retail	All (weighted average of sectors)
Commercial robbery	£1,700	£1,700	-	£1,700	-	-	£910	£980
Non-domestic burglary	£5,340	£4,580	£2,500	£2,170	£1,820	£3,850	£4,140	£3,600
Commercial theft	£1,960	£2,130	£460	£230	£880	-	£460	£510
Theft of commercial vehicle	£24,800	£24,800	-	£24,800	-	-	£24,800	£24,800
Theft from commercial vehicle	£1,170	£1,110	-	£1,170	-	£1,570	£1,230	£1,280
Commercial arson	£1,960	£3,220	£1,800	£1,780	£3,920	£7,050	£1,690	£2,230
Other commercial criminal damage	£400	£660	£370	£360	£800	£1,450	£350	£460

[56] For some commercial crime types the sample size was too small in the last available year for each individual sector. To estimate more robust figures, the samples for each sector have been merged to produce an average across multiple sectors. This results in the same average value of property stolen across some sectors.

5.2. Physical and emotional harms to the victim

5.2.1. Approach

Some victims of crime, especially violent crime, will sometimes suffer substantial physical and emotional injuries. In order to quantify this cost we use the QALY approach first used in Dolan *et al.* (2005). This approach finds the negative percentage impact on a person's quality of life from different injuries. For example, if a person breaks their rib they are judged to suffer approximately a 15% reduction in their quality of life whilst they are recovering (Salomon *et al.,* 2015).

The cost of the injury is the likelihood of sustaining physical and emotional injuries (LIKE) multiplied by the percentage reduction in quality of life (REDUCEQL) multiplied by the duration of the injury (DUR) as a fraction of a total year. This is then combined with the value of a year of life at full health (VOLY) to give an estimate of the average cost associated with the crime. This is done for each crime type. The formula is as follows:

LIKE * REDUCEQL * DUR * VOLY = Average physical and emotional cost

This is the approach used for violent crime by Dubourg *et al.* (2005) who based their estimates on the research of Dolan *et al.* (2005). However, for non-violent crimes, Dubourg *et al.* (2005) continued with the methodology of Brand and Price (2000) where costs are calculated by asking victims to estimate the amount of money that they feel is necessary to compensate them for the inconvenience and physical and emotional harms they suffered as a result of the crime. The issue with this approach is that individuals are unlikely to be able to accurately estimate the value of the specific long-term emotional impacts they have suffered.

Therefore the QALY methodology is used in this paper for all crimes. Each of the components of the QALY approach will be discussed in more detail in this section to show how the estimates have been developed.

5.2.2. Prevalence of harms and costs of crime

The first step is to estimate the likelihood of sustaining physical and emotional injuries as a result of being a victim of crime. We estimate the prevalence of different physical and emotional harms for a given crime using the main CSEW survey for the 2015/16.[57] A question on the physical and emotional injuries is not asked in the CVS. The same question in the CSEW is therefore used with the response restricted to those who indicated the incident took place in the workplace or business they owned. However, due to a smaller sample size, results are aggregated based on the seven years of the CSEW (years ending 31 March 2009 to 2016).

The prevalence estimates may not fully capture less common injuries resulting from crime, such as burns, which may result in the estimates underestimating the prevalence of certain harms. Table AP1 and Table AP2 in Appendix 1 show the results from the CSEW for crimes against individuals and businesses respectively.

[57] The CSEW is based only on individuals aged 16+. As we apply these harm prevalences to the whole population, we implicitly assume that the harms suffered by children are the same as the harms suffered by adults. However, for certain crimes it is entirely possible that children will be more/less affected than adults and therefore this assumption is likely to create bias in our estimates. Given a lack of evidence on which to base robust estimates of the likelihood of specific harms to children as a result of crime, we continue under the assumption that the harms from crime are the same for children and adults. We recognise that this is a limitation in our estimates.

5.2.3. Quality-adjusted life loss associated with harm

To calculate the negative percentage impact to a person's quality of life (QALY loss) from the different injuries disability weights are used. The most recent disability weights come from Salomon *et al.* (2015). Table 10 shows the assumed QALY losses associated with the various physical and emotional harms of crime. Table AP3 in Appendix 1 explains in more detail the assumed harms for each CSEW physical and emotional harm category. Where the injuries in Salomon *et al.* (2015) do not exactly match the injuries suffered as a result of crime (from the CSEW) an explanation of the alternative source is provided.

5.2.4. Duration of harm

The next step was to estimate how long the average person suffers each of the harms and therefore how long should the percentage QALY loss be applied. The duration of each of the harms identified in the CSEW was therefore required. These durations largely come from Dolan *et al.* (2005). The main exception is the figure used to estimate the remaining years of life for homicides. This is calculated using the average age of an adult victim of homicide and subtracting the average life expectancy. For other harms where Dolan *et al.* (2005) did not provide the duration, other sources are used or assumptions are made. Table AP4 in Appendix 1 outlines the specific sources for each of the duration assumptions.

Depression and anxiety suffered following violent crime is likely to affect the victim for longer than depression and anxiety following non-violent crime. These durations are estimated based on academic papers looking at the depression and anxiety consequences of violent and non-violent crimes respectively.[58] Some crimes such as robbery can be either violent or non-violent. The duration of the emotional effects of these crimes therefore take the average duration of violent and non-violent crimes.

5.2.5. Costs of harms

To calculate the costs of each of the harms we multiply the QALY losses by the durations[59] and the estimated value of a statistical life year. This gives an estimate of the cost to the victim associated with suffering each of the physical and emotional harms. The value we use for a life year in this report is based on the Department of Health's value of a statistical life year of around £60,000 (2012 prices), which we uprate by the value of nominal GDP per head to 2016 prices,[60] resulting in a value of around £68,000. Table 10 shows the results.

Table 10: Estimated unit costs of physical and emotional harms

Injury	QALY loss	Duration (years)	Cost of harm (1)
Physical			
Minor bruising or black eye	2.6%	0.0288	£50
Severe bruising	5.2%	0.0575	£200
Scratches	0.2%	0.006	£0
Cuts	0.6%	0.024	£10
Puncture or stab wounds	10.3%	0.0575	£400

[58] See references in Table AP4 in Appendix 1.
[59] Tables AP3 and AP4
[60] https://www.ons.gov.uk/economy/grossdomesticproductgdp/timeseries/ihxt/pn2

Injury	QALY loss	Duration (years)	Cost of harm (1)
Broken/cracked/fractured bones	10.3%	0.115	£800
Nose bleed	0.6%	0.0027	£0
Broken nose	6.7%	0.059	£270
Broken/lost teeth	3.4%	0.0192	£40
Chipped teeth	1.7%	0.0192	£20
Dislocation of joints	6.2%	0.154	£650
Concussion or loss of consciousness	11.0%	0.0335	£250
Internal injuries	5.2%	0.0575	£200
Facial/head injuries (no mention of bruising)	0.6%	0.024	£10
Eye/facial injuries	5.4%	0.0192	£70
Other	0.8%	0.0192	£10
Emotional – violent crime (2)			
Fear	3.0%	1.25	£2,540
Depression	14.5%	1	£9,840
Anxiety/panic attacks	13.3%	3	£26,670
Emotional – non-violent crime (3)			
Fear	3.0%	1.25	£2,540
Depression	14.5%	0.167	£1,640
Anxiety/panic attacks	13.3%	0.167	£1,510
Emotional – Semi-Violent Crime (4)			
Fear	3.0%	1.25	£2,540
Depression	14.5%	0.5835	£5,740
Anxiety/panic attacks	13.3%	1.5835	£14,210
Emotional – rape specific			
Drug abuse	47.9%	5	£2,840
Alcohol abuse	37.3%	5	£2,830
Obesity/ eating disorder	22.4%	5	£3,680
Sexual dysfunction	1.7%	0.167	£150
Death			
Death	100.0%	39.8	£2,082,430

(1) Where the duration of harm is greater than 1 year, the cost of the harm is discounted in accordance with The Green Book. Central Government Guidance on Appraisal and Evaluation (2018).
(2) Violent crimes are assumed to be homicide, violence with injury and rape.
(3) Non-violent crimes are assumed to be burglary, theft, criminal damage, fraud and cyber crime.
(4) Semi-violent crimes are assumed to be other sexual offences, robbery and violence without injury.

5.2.6. Physical and emotional costs of crimes

The final step is to combine the costs of the various harms (Table 10) with the likelihood of suffering those harms (Table AP1 and Table AP2) to give unit costs for the physical and emotional harms of crime. Table 11 shows the estimated costs.

Table 11: Estimated physical and emotional costs of crime

Crime	Emotional	Physical	Total
Individual			
Homicide	-	-	£2,082,430
Violence with injury	£8,060	£180	£8,240
Violence without injury	£2,810	£0	£2,810
Rape (1)	£24,360	£30	£24,390
Other sexual offences	£3,690	£20	£3,700
Robbery	£3,450	£150	£3,590
Domestic burglary	£1,190	-	£1,190
Theft of vehicle	£270	-	£270
Theft from vehicle	£140	-	£140
Theft from person	£410	-	£410
Arson	£980	-	£980
Other criminal damage	£270	-	£270
Fraud	£200	-	£200
Cybercrime	£150	-	£150
Commercial			
Commercial robbery	£4,080	£90	£4,170
Commercial burglary	£510	-	£510
Commercial theft	£0	-	£0
Theft of commercial vehicle	£360	-	£360
Theft from commercial vehicle	£100	-	£100
Commercial arson	£1,010	-	£1,010
Other commercial criminal damage	£60	-	£60

(1) The emotional costs include the rape-specific emotional harms which are suffered with the following likelihoods: Drug abuse – 1.8%, Alcohol abuse – 2.3%, Obesity / eating disorder – 5.0%, Sexual dysfunction – 78.0% (likelihoods taken from Dolan et al., 2005).

5.3. Lost output

5.3.1. Approach

Lost output aims to estimate the cost of lost productivity as a result of individuals being victims of crimes. Victims of crime may take time off work as a result of the crime and may also be less productive at work for some time following the crime. We therefore focus on two separate causes of lost productivity as a result of crime victimisation.

1) Time taken off work as a result of the crime

   This is based on CSEW respondents who report the amount of time taken off work following victimisation.

2) Reduced productivity at work as a result of physical and emotional injuries

   Victims of crime who suffer physical and emotional injuries are assumed to be less productive at work for the duration of the injury. The QALY loss associated with the injury (discussed in Section 5.2) is used as a proxy for the extent of their reduction in productivity. The QALY losses used to estimate the physical and emotional costs are assumed not to already capture lost productivity. This is supported by Shiroiwa *et al.* (2013) who conclude that any double counting between QALYs and productivity loss is negligible. We therefore assume we are not double counting lost productivity by including an estimate for it in this section.

The analysis is only costing lost output from time off work and reduced productivity. This may therefore be a significant underestimate for crimes such as cyber crime where a large part of lost output is likely to come from damage to technology. Due to a lack of evidence on the extent of lost productivity from other causes, no attempt is made to quantify this.

Previously, Dubourg *et al.* (2005) calculated lost output by focusing solely on time taken off work. To do this, somewhat arbitrary assumptions were made about the amount of time victims take off work following various injuries. For example, it was assumed that following a broken arm, victims will be off work for 4.5 weeks. By using the Crime Survey to give an estimate of the amount of time victims of various crimes actually take off work and by including reduced productivity, it is possible to come up with a more complete estimate of the lost output cost from different crimes.

5.3.2. Time taken off work

In 2008/09, the CSEW asked respondents for the amount of time taken off work as a result of the crime they suffered. The respondents were specifically asked how many hours they were off work following the crime. The average response for each crime is then used as the estimate for the amount of time taken off work.[61] The results are presented in Table 12.

These figures do not need to be adjusted to take into account the employment rate as unemployed victims report zero hours taken off work.

[61] Note that the last time this question was included in the CSEW was in 2008/09 and so this is used to form the estimates. This will potentially cause bias as victims of crime may find it easier or harder to return to work following crime now than they did in 2008/09. This may be due, for example, to technological advances which have made it easier to work from home. Also, these figures do not cover fraud and cyber crime.

Table 12: Lost productive hours due to time taken off work by individual crime victims

Crime against individuals	Lost hours (average time taken off work) following an offence
Homicide	13,902 (1)
Violence with injury	4.9
Violence without injury	0.8
Rape	137.7
Other sexual offences	13.8
Robbery	2.7
Domestic burglary	4.0
Theft of vehicle	3.8
Theft from vehicle	0.8
Theft from person	1.1
Arson	5.5
Criminal damage	0.5
Fraud and cyber crime (2)	-

(1) Lost hours from homicide are calculated as the annual number of hours worked by the average employed person, multiplied by the discounted average life expectancy of a homicide victim before retirement, multiplied by the average employment rate for victims of violent crime.

(2) Amount of time off not available for victims of fraud and cyber crime as they were not covered in the 2008/09 CSEW.

Table 12 only covers crimes against individuals. A question on time taken off work is not asked in the CVS. The same question in the CSEW is therefore used with the response restricted to those who indicated the incident took place in the workplace or business they owned. However, due to a smaller sample size, results are aggregated based on the last eight years of CSEW where this question was asked (years ending 31 March 2002 to 2009). The results for commercial crimes are shown in Table 13.

Table 13: Lost productive hours due to time taken off work by commercial crime victims

Crimes against commercial organisations	Lost hours (time taken off work) following an offence
Commercial robbery	21.5
Non-domestic burglary	8.3
Commercial theft	0.0
Theft of commercial vehicle	1.4
Theft from commercial vehicle	1.7
Commercial arson	3.0
Other commercial criminal damage	0.4

5.3.3. Reduced productivity

The next step is to estimate reduced productivity at work as a result of the effects of the crime. This arises because victims of crime who have suffered physical and emotional harms are likely to be less productive at work as a result of the harms. For example, someone who has broken their hand may find it difficult to use a computer keyboard, and someone who is suffering from depression may be unmotivated or distracted.

Reduced productivity is estimated by first calculating the average number of hours of productive labour lost as a result of various physical and emotional harms. This figure is combined with the likelihood of a victim of crime suffering physical and emotional harms to calculate the average number of productive hours lost by victims of each of the crimes. Finally, it is multiplied by the average wage (having adjusted for the employment rate of crime victims) to give a total estimate of the average cost of reduced productivity from each crime.

Hours of productive labour lost for each harm

In order to calculate the number of hours of productive labour lost as a result of suffering from physical and emotional harms, we need to combine the following information.

- Productivity loss associated with the harm.

  This is approximated by using the QALY losses given in Section 5.2. It therefore assumes that the victim of crime's reduction in quality of life as a result of the physical and emotional injuries sustained is equivalent to the reduction in productivity when the victim of crime returns to work.
- The average number of hours worked by an individual in employment.
- The employment rate for victims of crime.
- The duration of the productivity loss.

The first step is to estimate the specific productivity loss associated with each harm. There is no available data on the reduction in productivity resulting from crime. We therefore use the values presented in Section 5.2 on the QALY losses of physical and emotional harms to attempt to capture the reduction in an individual's physical and mental state as a result of the harms they have suffered. We assume this to be a proxy for the reduction in productivity resulting from the crime.

The average number of hours worked annually by an individual in some form of employment is estimated to be 1,674 (OECD, 2015). The employment rate for victims of crime is then calculated separately for victims of violent and non-violent crime. Based on the 2015/16 CSEW, we estimate that across the population of England and Wales aged 16 and over, approximately 50% of victims of violent crime and between 55% and 68% of victims of non-violent crime are in some form of employment.[62] Finally, the durations of productivity loss as a result of the harm are taken from the estimates in Section 5.2 of the length of time physical and emotional harms are suffered for.

[62] The employment rates are calculated including those not of a working age.

Likelihood of harm being suffered

The next step is to multiply these losses by the likelihood of a person suffering each of the harms following victimisation of different crimes. These likelihoods are taken from Appendix 1 and lead to the following estimates of the number of hours of lost output as a result of reduced productivity from crimes.[63] These estimates are given in Table 14.

Table 14: Hours of lost output as a result of reduced productivity when returning to work after a crime

Crime	Lost hours (reduced productivity) after return to work
Individual	
Violence with injury	107
Violence without injury	36
Rape	184
Other sexual offences	47
Robbery	47
Domestic burglary	16
Theft of vehicle	4
Theft from vehicle	2
Theft from person	5
Arson	13
Criminal damage	4
Fraud	3
Cyber crime	2
Commercial	
Commercial robbery	53
Commercial burglary	7
Commercial theft	0
Theft of commercial vehicle	5
Theft from commercial vehicle	1
Commercial arson	14
Other commercial criminal damage	1

[63] To avoid double counting, the reduced productivity is only applied to time when the victims had returned to work following the crime.

5.3.4. Unit cost of lost output

The final step is to combine the lost hours from time off work with the lost hours from reduced productivity and then to multiply this by the average wage to calculate the lost output costs of each crime.

We assume that the average wage of employed victims of crime is the same as the national average for all employed individuals.[64] The average hourly wage is estimated to be £18, based on ONS estimates of an average hourly wage of £15[65] which is increased by 20% to include non-wage costs.[66] We have already adjusted for the lower employment rate amongst crime victims, but using the average wage might mean that the impact is an overestimate as being a victim of crime is associated with being from a deprived area where wages are likely to be lower on average.[67]

Table 15 shows the final estimates of the lost output costs of crimes against individuals and businesses.

Table 15: Average cost of lost productivity for crime victims

Crime	Hours off work	Reduced productivity hours post return to work	Total hours lost	Total lost productivity
Individual				
Homicide	-	-	13902	£254,710
Violence with injury	5	108	112	£2,060
Violence without injury	1	36	37	£670
Rape	138	184	322	£5,900
Other sexual offences	14	47	61	£1,120
Robbery	3	47	50	£920
Domestic burglary	4	20	24	£440
Theft of vehicle	4	5	8	£150
Theft from vehicle	1	2	3	£60
Theft from person	1	6	7	£120
Arson	5	13	19	£340
Criminal damage	0	4	4	£80
Fraud (1)	n/a	3	3	£60
Cyber crime (1)	n/a	3	3	£50
Commercial				
Commercial robbery	22	101	123	£2,250
Non-domestic burglary	8	13	21	£380

[64] This assumption is supported by the CSEW which shows that whilst victims of crime are less likely to be employed than the national average, the wages of those victims who are employed are representative of the average.
[65] ONS (2016c)
[66] Eurostat (2016). Non-wage costs take into account the additional costs of employing someone other than their wages, due to social contributions made by employers such as national insurance.
[67] See papers such as Tarling and Dennis (2016)

Crime	Hours off work	Reduced productivity hours post return to work	Total hours lost	Total lost productivity
Commercial theft	0	0	0	£0
Commercial theft of vehicle	1	9	10	£190
Commercial theft from vehicle	2	2	4	£80
Commercial arson	3	25	28	£510
Other commercial criminal damage	0	1	2	£30

(1) The estimates for hours off work are not available for fraud and cyber crime as they rely on the 2008/09 CSEW in which fraud and cyber crime were not included.

5.4. Health services

5.4.1. Approach

Health service costs aim to capture the costs to the NHS and other healthcare providers of responding to the physical and emotional harms of crime. If fewer people were injured through crime then the resources used to treat them could be used in alternative productive activities. Therefore, costs to the health service as a result of crime are a social cost.

The estimates of health service costs are based on assumptions about the treatment that is likely to be required for certain injuries and the prevalence of the injuries (estimated using the CSEW). Physical harms are associated with ambulance and medical procedure costs, and the emotional harms from violent crimes are associated with counselling costs. The unit costs of healthcare activities used are from Curtis and Burns (2015) and NHS Reference Costs.[68]

This methodology is very similar to that used in the previous costs of crime publications (Dubourg *et al.*, 2005 and Brand and Price, 2000). The key difference is that the proportion of victims who require medical attention was an assumption in the previous publication, whereas the figures are now based on estimates from the CSEW.

5.4.2. Medical requirements associated with injuries

The harms suffered as a result of crime are mapped to medical procedures that are assumed to be needed. For example, where a victim who suffered a broken nose required medical attention, the type of medical attention needed is assumed to be a 'Nose Procedure' (see Table 16). The proportion of people who suffer these injuries and require medical procedures are then calculated using the 2015/16 CSEW. In addition, the CSEW asks respondents whether or not an ambulance was required after suffering a particular physical harm as a result of crime. This is used to estimate the proportion of people who required an ambulance following various harms. The average number of hours of physiotherapy and counselling required are based on Dubourg *et al.* (2005).

The proportion of victims of different harms suffered who required the attendance of an ambulance and particular medical procedures, and number of hours of physiotherapy and counselling required are shown in Table 16.

[68] Department of Health (2015)

Table 16: Average number of medical requirements following an injury[69,70]

Harm suffered	Ambulance	Bone fracture	Other injury	Nose procedure	Sprain, strain or minor open wound	Lowest cost head injury	Minor dental restoration procedure	Minor dental procedure	Physiotherapy (hours)	Counselling (hours)
Broken bones	20%	85%	-	-	-	-	-	-	10	-
Severe bruising	5%	-	29%	-	-	-	-	-	-	-
Puncture/stab wound	18%	-	68%	-	-	-	-	-	-	-
Internal injury	0%	-	0%	-	-	-	-	-	-	-
Broken nose	56%	-	-	100%	-	-	-	-	-	-
Cuts	-	-	-	-	36%	-	-	-	-	-
Dislocation	0%	-	-	-	39%	-	-	-	-	-
Concussion	57%	-	-	-	-	86%	-	-	-	-
Lost teeth	0%	-	-	-	-	-	84%	-	-	-
Chipped teeth	-	-	-	-	-	-	-	100%	-	-
Scratches	-	-	-	-	-	-	-	-	-	-
Minor bruising	-	-	-	-	-	-	-	-	-	-
Facial injury	-	-	-	-	36%	-	-	-	-	-
Eye injury	-	-	-	-	-	-	-	-	-	-
Nose bleed	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	45%	-	-	-	-	-
Fear	-	-	-	-	-	-	-	-	-	2
Depression	-	-	-	-	-	-	-	-	-	20
Anxiety/panic attacks	-	-	-	-	-	-	-	-	-	25
Drug abuse	-	-	-	-	-	-	-	-	-	50
Alcohol abuse	-	-	-	-	-	-	-	-	-	50
Sexual dysfunction	-	-	-	-	-	-	-	-	-	2

[69] "-" highlights that there is assumed to be no medical requirement associated with the injury.

[70] For some harms suffered, sample sizes are small which might mean the estimated prevalence of treatment for the related injuries may not capture the medical treatment required for the more uncommon and serious injuries. This may result in an underestimate of the medical requirements following injury.

5.4.3. Costs associated with medical requirements

The next step is to estimate the costs associated with the various medical requirements. The hourly cost of counselling and the hourly cost of physiotherapy are based on Curtis and Burns (2015). These hourly costs are multiplied by the average number of hours to give average health costs associated with the harms. To estimate the health costs associated with the other harms, the unit cost of the procedure is multiplied by the proportion of victims who require that procedure (from Table 16). The results of this are shown in Table 17.

Table 17: Unit costs of health care associated with physical and emotional harms

Injury	Average cost of medical requirement
Broken bones	£2,523
Severe bruising	£356
Stabbed	£851
Internal injury	-
Broken nose	£1,257
Cuts	£315
Dislocation	£340
Concussion	£724
Lost teeth	£237
Chipped teeth	£147
Scratches	-
Minor bruising	-
Facial injury	£315
Eye injury	-
Nose bleed	-
Other	£395
Fear	£102
Depression	£1,020
Anxiety/panic attacks	£1,275
Drug abuse	£2,550
Alcohol abuse	£2,550
Sexual dysfunction	£102

The injuries are ranked in order of seriousness to avoid double counting of costs arising from respondents indicating that multiple injuries were suffered. For example, a victim may suffer a stab wound and broken bones. Both require an ambulance but the cost of the ambulance to the NHS should only be counted once.

5.4.4. Costs associated with crimes

The unit health costs are then translated into costs associated with each crime type. For each crime, the health costs of the physical and emotional harms are multiplied by the proportion of individuals who suffer those harms. The proportions of victims who suffer harms after each individual and commercial crime type are outlined in Section 5.2 'Physical and emotional harms'.

For example, the unit health cost of violence with injury is £920 (Table 18), which is the sum of the average health costs of all injuries suffered as a result of the crime. To arrive at the average health costs of the injuries associated with each crime, we first had to calculate the unit cost of each injury. For example:

i. The cost of an ambulance per episode is £231 and the proportion of crime victims who require an ambulance for a broken nose is 56%. The average cost of a nose procedure is £1,128 and the proportion of people who require a nose procedure for a broken nose is 100%.

   (£231 × 56%) + (£1,128 × 100%) = £1,257

ii. To estimate the average cost of a broken nose as a result of violence with injury, we must multiply the unit injury cost (£1,257) by the proportion of violence with injury victims that suffer a broken nose, which is 2% (Table AP1).

   £1,257 × 2% = £21

iii. The average cost of a broken nose as a result of violence with injury (£21) is then added to the average costs for all other injuries suffered as a result of violence with injury, which are calculated in the same way as the broken nose cost.

We cannot use this method to calculate the health costs for homicide. The Department for Transport health cost associated with fatal injuries is therefore used instead to estimate the health costs of homicide.[71]

Table 18: Unit costs of health care associated with each crime

Crimes	Unit costs
Individual	
Homicide	£1,110
Violence with injury	£920
Violence without injury	£270
Rape	£1,110
Other sexual offences	£390
Burglary – dwelling	£380
Robbery	£760
Theft of vehicle	£100

[71] Department for Transport (2016)

Crimes	Unit costs
Theft from vehicle	£40
Theft from person	£210
Criminal damage – arson	£180
Criminal damage – other	£90
Fraud	£70
Cyber crime	£50
Commercial	
Commercial robbery	£600
Commercial burglary	£160
Commercial theft	£0
Theft of commercial vehicle	£10
Theft from commercial vehicle	£0
Commercial criminal damage – arson	£340
Commercial criminal damage – other	£40

5.5. Victim services

5.5.1. Approach

Victim services costs are the costs of providing support to victims of crime as well as to their friends and family. Without crime, resources used for victim services could be used for other productive activities. Victim service costs therefore represent a cost to society as a result of crime.

As in Brand and Price (2000) and Dubourg *et al.* (2005), there are two types of costs associated with victim services. The first is the opportunity cost of volunteer time and the second is the total expenditure on victim services in England and Wales. The latter is based on publicly available data from Victim Support, a major independent service provider, and funding to PCCs from the MoJ for victim support services. It should only be treated as a snapshot of the full funding landscape for victim support services. Other support organisations have not been included, which is consistent with the approach in the previous costs of crime reports.[72] The total cost is then split by offence type using the proportion of time the charity Victim Support spends with victims of each crime type. This differs from previous analyses, as Brand and Price (2000) apportion the total Victim Support cost using the relative cost to the victim of each offence type.

[72] Expenditure figures are taken from Ministry of Justice (2015a) and Victim Support (2016). However, since 2015/16 the majority of support services are commissioned locally by Police and Crime Commissioners who are well placed to know the needs of victims in their area. A significant part of MoJ funding has been devolved to PCCs to allow this transition.

Victim service costs of homicide are considered separately because funding the support of families of victims of homicide is provided separate to other crimes by the Ministry of Justice (MoJ).

5.5.2. Estimated cost of volunteer time

The first type of victim service cost that is incurred as a result of crime is the cost of volunteers' time supporting victims. This can be thought of as the opportunity cost of volunteers helping victims of crime rather than spending their time on other activities. The opportunity cost of an hour of a volunteer's time is estimated to be £6.46 based on the market price of a non-working hour.[73] The total estimated number of hours volunteers spent supporting victims of crime – provided by Victim Support – is multiplied by the opportunity cost of an hour of a volunteer's time to give a cost of approximately £1.5m.

5.5.3. Direct expenditure on victim services

Victim Support spent around £42.5m on service delivery in 2015/16.[74] Of this, approximately £12m was provided by Police and Crime Commissioners (PCCs) and an additional £3m was provided to Victim Support to spend directly on homicide. A 2015 report by the MoJ[75] suggests the MoJ provided around £31.5m[76] to PCCs to fund victims' services. The difference between the amount provided to PCCs in the MoJ report (approx. £31.5m) and the amount PCCs provided to Victim Support (approx. £12m) is approximately £19.5m. This is assumed to be an estimate for the additional funding PCCs provided to other victims' services providers as not all PCC victims' services funding is provided to Victim Support. Table 19 outlines the breakdown in funding.

Table 19: Breakdown of victim services funding

Funding Stream	£ (1)
Victim Support – homicide	£3m
Victim Support – PCC	£12m
Victim Support – other	£27.5m
Total Victim Support	**£42.5m**
Estimated PCC additional	£19.5m
Total	**£62m**
(1) Rounded to the nearest £0.5m	

Total victim services costs are divided out by the estimated amount of time it spends on each crime type (excluding homicide). However, there are some instances where crime types are categorised at a higher level than is required for the costs of crime. For example, Victim Support spends 3.2% of their time on victims of theft, but this paper considers six types of

[73] Department for Transport (2016). This figure is used in transport appraisal to estimate the value of non-working travel time, including travel to and from work, by all modes of transport.
[74] Victim Support (2016)
[75] Ministry of Justice (2015a)
[76] This consists of funding for general victims services, restorative justice and funding for sexual violence/domestic abuse.

theft. When this occurs, costs are apportioned on the basis of the relative emotional harms within a broader category of crime suffered by victims of the crimes.

Finally, the expenditure on victim services for homicide is taken from the total Victim Support expenditure on homicide (£3m).

5.5.4. Unit costs for victim services

The unit costs of victim services for all of the crimes are shown in Table 20. These are estimated by dividing the estimated victim services cost for each crime type by all crimes committed (both reported and unreported) in England and Wales in 2015/16.

Table 20: Proportion of Victim Support time spent with victims of different crimes and resulting unit costs

Crimes	Proportion of time spent in contact with victims with a positive needs assessment per crime type (1) (2)	Total estimated cost (£m)	Estimated unit cost (3)
Homicide	N/A	£3.0m	£5,480
Violence with injury	7.4%	£4.5m	£0
Violence without injury	10.2%	£6.0m	£10
Rape	8.7%	£5.0m	£40
Other sexual offences	9.8%	£6.0m	£10
Robbery	7.6%	£4.5m	£10
Commercial robbery			£20
Domestic burglary	3.5%	£2.0m	£0
Non-domestic burglary			£0
Theft of vehicle	3.2%	£2.0m	£0
Theft from vehicle			£0
Theft from person			£0
Commercial theft			£0
Theft of commercial vehicle			£0
Theft from commercial vehicle			£0
Arson	0.5%	£0.5m	£10
Commercial arson			£10
Other criminal damage	5.6%	£3.5m	£0
Other commercial criminal damage			£0
Fraud	5.6%	£3.5m	£0

(1) The table does not include estimates for cyber crime as Victim Support do not record the time they spend on it separately and therefore could be included in other crime types.

(2) A positive needs assessment is when at least one need was identified for the victim. The proportion of time spent on a positive needs assessment is calculated from the time taken for phone calls and visits, including travel time. Recording of time spent on a positive needs assessment may inevitably be subject to human error. The percentages do not include other time taken by Victim Support staff on behalf of the victim, e.g. Victim Support staff speaking to employers and health services on the victims' behalf.

(3) All unit costs are rounded to the nearest £10. Some unit costs have therefore been rounded down to zero.

6. Costs in response to crime

This chapter discusses the methodological approach and outlines the estimates of the costs in response to crime. These include:

1) Police costs
2) CJS costs

6.1. Police costs

6.1.1. Approach

This section attempts to capture the cost to the police in dealing with and investigating crime. As with Dubourg *et al.* (2005), the costs associated with different crimes are based on 'activity based costing' (ABC) data. The data was provided by police forces which split out their budget into the various different activities they perform (both crime and non-crime). These activities include a breakdown of the estimated cost of dealing with different crime types and associated overheads. All non-crime police spend is excluded from this analysis.

The last year for which reliable ABC data is available is 2006/07[77] and as a result the costs require some adjustment to ensure that they are more reflective of resource the police spend dealing with and investigating crime in 2015/16. The following section outlines how this was done in more detail and presents the resulting unit cost estimates.

6.1.2. Calculating up-rated unit costs from ABC

The ABC costs data are full year estimates of cost type against activity type, based on the grossed up figures from the two-week survey data. The cost types are staff, operational support and business support. The activities were organised into a series of domains (investigating crime, providing assistance, reducing crime and promoting public safety). Within the 'investigating crime' and 'providing assistance' domains, spending on different types of crime is identified.

To arrive at an up-rated estimate of the cost per crime in 2015/16 we went through the following stages:

1) Crime categories from the original ABC classifications were identified.

2) The total direct annual cost of dealing with each crime was estimated using 2006/07 data. The total cost figures are the sum of direct costs for staff, operational support and business support.

3) In addition to the 'direct' crime costs, it is necessary to include some expenditure from the 'investigating crime' and 'providing assistance' domains which is not collected against

[77] 2006/07 was considered as the base ABC year because it is the most recent year when the ABC dataset was collected in a robust way.

individual crime and incident types. These cover costs that are 'upstream' of police attendance (call handling and control room) and those that are 'downstream' (e.g. prisoner handling and custody duties, informants, ID parades and family liaison).[78] Within each domain, the total upstream and downstream costs are allocated proportionately on the basis of the crime share of total cost. This gives an adjusted figure of total cost by specified crime type for 2006/07.

4) Overhead costs should be included in the unit costs of crime incidents, so that cost estimates are not underestimated. It is assumed that overhead costs should be added onto the incident costs proportionately to the incident costs of each activity domain. That is, if 'criminal damage' accounts for 10% of the 'investigating crime' incident costs, it is assumed that 10% of the 'investigating crime' overhead costs should be added on top. The total assumed costs associated with each incident category are shown in Table 21.

Table 21: Costs per ABC category in 2006/07

Investigating crime (i.e. crime) categories	Costs without overheads (£m)	%	Costs with overheads (£m)	%
Violence against the person – S20 & more serious	£554m	13	£653m	13
Violence against the person – S47 & less serious	£468m	11	£551m	11
Sexual offences	£294m	7	£347m	7
Burglary dwelling	£353m	9	£416m	9
Burglary – commercial & other	£181m	4	£213m	4
Robbery	£245m	6	£289m	6
Theft of or from motor vehicle	£270m	7	£319m	7
Deception/fraud	£184m	4	£216m	4
Theft other	£356m	9	£420m	9
Drugs offences	£357m	9	£421m	9
Criminal damage	£255m	6	£301m	6
Other crime	£602m	15	£710m	15
Investigating crime totals	**£4,120m**	**(100)**	**£4,857m**	**(100)**

5) To calculate the average cost per incident in 2006/07, the adjusted total costs for each crime type are divided by the respective numbers of offences, using the crime categories in use at that time.

   The categories presented in Table 21 are the most granular level for which there are cost data in the ABC data. However, between the years ending 31 March 2007 and 2016 there had been a number of changes to how crimes were recorded. Within each category are a

[78] The allocation of upstream/downstream costs across the two domains is relatively crude and represents an over-simplification of reality. Some 'providing assistance' costs (call handling and family liaison) although by definition are about 'providing assistance', some of the spend will actually relate to, and vary in accordance with individual crimes.

number of offence codes. These groupings changed between the years ending 31 March 2007 and 2016. For example, some categories have changed name and scope – 'more serious' and 'less serious' violence in 2006/07 have been recalibrated into 'violence with injury' and 'violence without injury' in 2015/16. It was therefore decided that cost estimates should try and account for these changes.

HODH timelines data[79] have been used to estimate more granular costs 2006/07. The data has been used to quantify the relative burden on forces for different crime types (to the extent that burden on the police per crime is relative elapsed time between crimes being recorded and an outcome being assigned to them).

An example of how the calculations used to estimate more granular categories using timelines data is illustrated in Appendix 2. The crimes recorded under each category in 2006/07 were identified from HO publications from the time. Changes in how each individual crime has been recorded over time were mapped.

6) Due to changes in the classification of some offences, it is necessary to recalibrate 2006/07 offence categories against their 2016 counterparts. For example, blackmail was then categorised as a 'miscellaneous other' crime, but in 2015/16 was categorised as a theft offence.

   Costs of ABC categories in 2006/07 (Table 21) were split up by estimating the proportion of the total cost that would be spent on the subcategories within it. The estimates were made by weighting the volumes of crimes in each subcategory by their relative timelines. In the example in Appendix 2, the time it took to investigate an average arson crime was 11 days, an 'other criminal damage' crime took an average of four days, and a threat to commit criminal damage offence took an average 13 days. The volume of these crime groups were weighted by the ratio of these durations, to give an estimate for the amount of the cost in the ABC category that could be expected to relate to each subcategory. These subcategory costs could then be recalibrated to match the 2015/16 category groups.

7) Once cost estimates for categories as defined in 2015/16 have been calculated in this way, it is then necessary to calculate a unit cost for each category. This involves dividing the cost estimates for each crime by the corresponding volumes (from PRC) to give a cost per incident.

8) Then, the unit costs must be up-rated in a way to reflect changes since 2006/07. To do this, two methods were considered for how to adjust the cost figures.

   i. *Adjust by inflation*

      A simple way to account for change over time would be to adjust by inflation. However, doing this assumes that the unit cost is independent of demand on the police over time, and independent of the police budget. That is, assuming that unit costs remain essentially constant might lead to, in cases where volumes have changed dramatically, a notional national police spend greater than the known police budget. It is therefore useful to reference the police budget in some way. As such, an alternative method was used.

   ii. *'Uprate' to the police budget*

[79] 2014/15 HODH data.

An alternative method is used to account for the shift in volumes over time, labelled here as 'up-rating', to calculate 2015/16 unit costs. Normally to calculate a unit cost, a cost and a volume are needed. In this instance, the costs in the 2015/16 are not known. The unit costs in 2006/07 are known, and the ratio of these unit costs is assumed to be the same in that year and 2016. Using the ratios of the unit costs, it is possible to express the total volume of crimes in terms of one single crime type. This 'volume', as it represents the volume of crimes that would cost the entire police budget, can then be the denominator to calculate a unit cost, with the numerator being the total police budget. See Figure AP2 in Appendix 2 for a worked example.

Through this method, the relative costs of each crime cost in 2006/07 are held constant, but adjusted in a way that accounts for changes in volume and police budget.

9) The final step was to validate these figures with police forces, which were asked to share any pertinent data they held that might inform this work. A data validation workshop was held with a variety of police force representatives, with two main aims:

   i. Validation of the interpretation of data shared by police forces.

   ii. Seeking professional expertise on the triangulation of up-rated ABC data with police force data.

   There was general agreement that the unit costs calculated through the up-rating methodology for crimes looked reasonable except in the case of sex offences. It was suggested that these should be changed to match costs measured by police force exercises. In order to identify any force-led surveys which might generate useful data, all forces were invited to supply data and findings from recent (within three years of 2015/16) activity-based type exercises undertaken in force. In total, 13 forces submitted data or reports in response to this request. One study was particularly useful in generating data which was broadly comparable to ABC crime data. This was used to estimate the cost to the police of sex offences.

6.1.3. Police unit costs

The full list of unit costs of dealing with and investigating crime including overheads by crime type are presented in Table 22. This is calculated by dividing the total costs to the police by crime type, divided by the estimated total number of crimes (including crimes recorded by the police and not reported to the police).[80]

Table 22: Average police costs associated with different crimes[81]

Crimes	Unit costs
Individual	
Homicide	£11,960
Violence with injury	£1,130

[80] It is therefore not a unit cost to police of each crime recorded as it uses all crimes (rather than police recorded crime) to estimate the unit cost for each crime.

[81] Commercial crimes are assumed to cost the same per crime as individual crimes. For example, a domestic burglary is assumed to cost the same as a commercial burglary.

Crimes	Unit costs
Violence without injury	£810
Rape	£6,360
Other sexual offences	£570
Robbery	£1,010
Domestic burglary	£530
Theft of vehicle	£2,030
Theft from vehicle	£80
Theft from person	£40
Arson	£1,080
Other criminal damage	£150
Fraud (1)	£60
Cyber crime (2)	-

(1) We calculate the number of fraud cases in 2015/16 using the number of fraud offences within disseminations which are handed to the police by NFIB. Fraud is reported and recorded by Action Fraud not police forces. Reports include direct reports from members of the public and businesses, and data from Cifas and Financial Fraud Action UK on behalf of their member organisations. These reports are reviewed and put into intelligence packages which are then disseminated to the police. Each dissemination may include a number of reported frauds.

(2) Costs cannot be calculated for cyber crime as it was not recorded as a category in the ABC data in 2006/07.

6.2. Criminal justice system

6.2.1. Approach

This section attempts to capture the costs to the CJS (excluding the police) as a result of crime. These costs relate to the following ten areas:

- Prosecution (CPS)
- Magistrates court
- Crown Court
- Jury service
- Legal Aid
- Non-legal aid defence
- Probation Service
- Prison Service
- National Offender Management Service (NOMS) headquarters
- Youth Justice Board

MoJ have provided data on eight of the ten areas listed above for 2013/14.[82] The exceptions are jury service and non-legal aid defence costs. The total costs by offence category in each of these eight areas were converted into unit costs using the numbers of crimes from the CSEW or CVS and then inflated to 2015/16 prices. This provided CJS unit costs for crimes for eight of the ten areas (shown in Table 23).

This is an improvement on the approach used in previous costs of crime publications which used the Home Office flows and costs model alongside prison statistics to try to estimate the costs of crime to the CJS.

Bespoke estimates have been generated for non-legal aid defence and jury service, the two areas of expenditure that MoJ were unable to provide estimates for.

6.2.2. Non-legal aid defence

Non-legal aid defence represents the cost to defendants of private legal assistance. This is calculated based on the Legal Aid costs which are scaled up based on an estimate of the ratio of private defence costs to Legal Aid whilst adjusting for self-representation.

The Legal Aid Agency (LAA) estimates that private defence costs are, on average, 4.4 times higher than legally-aided defence costs per hour.[83] Using this assumption and an estimate of the percentage of cases which do not require Legal Aid (82% for magistrates court cases and 17% for Crown Court cases), the total Legal Aid spend on magistrates and Crown Court cases (£376m and £570m respectively) are scaled up to estimate the total criminal private defence costs. The percentage of cases which do not require Legal Aid is estimated by dividing the volume of Legal Aid grants[84] by the volume of court receipts.[85] We have assumed some individuals will represent themselves. MoJ data suggests 7%[86] of defendants dealt with at the Crown Court either have no advocate representation or their representation status is unknown. We have used this as a proxy for self-representation in the Crown Court. There are no estimates for self-representation in the magistrates court, but we have assumed the proportion is likely to be higher due to less defendants having access to Legal Aid. We have assumed 14%[87] of defendants are self-represented in the magistrates court.[88] This gives total estimated non-legal aid defence costs of £6.5bn for magistrates courts and around £300m for Crown Courts.

The total non-legal aid defence costs are then divided out across the different crime types based on the total proportion of magistrates and Crown Court costs that relate to each crime. This gives a total private defence cost for each crime. This cost is inflated to 2015/16 prices and then divided by the number of crimes to give a unit cost (Table 23).

6.2.3. Jury service

To estimate the total jury costs, the number of jury days in a year is multiplied by the average daily wage of a member of the jury.

[82] This is the most recent estimates available to use.
[83] Based on Legal Aid Agency's estimate of an average hourly cost of £200 for private defence and £45 for Legal Aid.
[84] LAA (2016)
[85] MoJ (2016)
[86] MoJ (2017)
[87] No available estimates. Assumed to be double the estimates for the Crown Court.
[88] This assumes self-represented cases and Legal Aid cases are the same average length as non-legally-aided cases.

The average number of days of jury service was estimated to be 1.2m in 2013/14, which is the most recent year for which data is available.[89] Given that the number of days of jury service has not changed by more than 3% over the last nine years, it seems reasonable to assume that there was also approximately 1.2m days lost to jury service in 2015/16.

The average daily wage is calculated as the average number of hours worked in a year by someone in employment of 1,674 (OECD, 2015) multiplied by the average hourly wage (£18).[90] The average daily wage is then multiplied by the employment rate for people of eligible jury age (74.5%)[91] to give an estimate of the total annual wage of someone on the jury and divided by the average number of working days per annum to give the average daily wage. A similar approach is taken to estimate the opportunity cost of jurors that are not employed by using the market price of a non-working hour.[92]

Juries are only required in Crown Court. These total jury costs are therefore then divided out across the different crimes based on the total proportion of Crown Court costs that relate to each crime type. This gives a total jury cost for each crime type. This cost is then divided by the number of crimes to estimate a unit cost (shown in Table 23).

6.2.4. Final CJS unit costs

Estimates for the unit costs of each of the ten areas of the CJS for each crime type are in Table 23.

[89] MoJ (2015b)
[90] Average hourly wage of £15 (ONS, 2016c) increased by 20% to take into account non-wage costs (Eurostat, 2016).
[91] ONS (2016d)
[92] Department for Transport (2016). This figures is used in transport appraisal to estimate the value of non-working travel time, including travel to and from work, by all modes of transport.

Table 23: Breakdown of average costs of crimes to the CJS

Crime type	Unit costs										Total (5)
	Jury service	Non-legal aid defence	Prosecution	Magistrates court	Crown Court	Legal Aid	Probation Service	Prison Service	NOMS HQ	Youth Justice Board	
Homicide	£6,510	£206,070	£22,640	£450	£13,310	£149,260	£35,930	£318,240	£45,470	£3,090	£800,980
Violence with injury	£30	£920	£40	£10	£60	£30	£60	£190	£30	£20	£1,370
Violence without injury	£0	£630	£50	£30	£10	£170	£230	£30	£30	£60	£1,250
Sexual offences (1)	£10	£260	£30	£0	£20	£80	£20	£140	£20	£0	£580
Domestic burglary	£20	£710	£30	£10	£40	£40	£60	£290	£40	£30	£1,270
Robbery (2)	£60	£1,900	£70	£10	£120	£190	£170	£950	£140	£70	£3,670
Theft of vehicle (2)	£20	£1,070	£60	£30	£40	£70	£300	£120	£50	£90	£1,870
Theft from vehicle (2)	£0	£50	£0	£0	£0	£10	£20	£10	£0	£10	£100
Theft from person	£10	£250	£10	£0	£10	£10	£40	£30	£10	£20	£390
Arson (2)	£60	£2,050	£120	£20	£120	£180	£220	£910	£150	£80	£3,900
Other criminal damage (2)	£0	£230	£10	£10	£0	£20	£60	£0	£10	£20	£350
Fraud (3)	£0	£100	£10	£0	£10	£20	£10	£10	£0	£0	£170
Cyber crime (4)	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
Non-domestic burglary	£20	£1,130	£60	£30	£40	£170	£310	£290	£80	£110	£2,240
Commercial theft	£0	£100	£10	£10	£0	£20	£40	£10	£10	£10	£200

(1) CJS cost information is not available separately for rape and other sexual offences and so both are allocated the same cost which covers all sexual offences.

(2) CJS cost information is not available separately for this crime against individuals or businesses so costs are aggregated and the same CJS is cost is applied to both the commercial and individual versions of this crime.

(3) The definition used for CJS costs includes all fraud and not just those against individuals. It includes fraud against individuals, businesses and the Government (the latter predominantly relates to benefit fraud).

(4) The total CJS costs for Cyber crime are low per cyber crime as the total CJS costs are low and the volumes of crime are high. This suggests a very low number of cyber crimes are prosecuted.

(5) There may be discrepancies in the total figures due to the effect of rounding

7. Future developments

This costs of crime report provides a number of methodological updates as well as widening the scope to cover a greater number of crimes such cyber crime and fraud. However, there are still a number of improvements that could be made which we intend to form the basis for the next update of the report as far as possible. Potential areas for improvement are listed below.

- *Separate costs for children*

  The costs presented do not separate out the cost to adults and children. This is a reasonable approach for many of the cost categories, such as police and CJS costs. However, for other cost categories, such as physical and emotional costs of crime, producing separate estimates for adults and children would seem more appropriate. In this update, the physical and emotional costs use the CSEW which is based only on individuals aged 16+. We therefore implicitly assume that the harms suffered by children are the same as the harms suffered by adults. For certain crimes, particularly violent and sexual offences, children are likely to be substantially more affected than adults. Producing separate costs for adults and children would therefore greatly improve the estimates for certain cost categories.

- *Extend commercial crimes to cover all sectors*

  Information on the number and nature of commercial crimes is informed by the CVS. The CVS data in this report covers seven different commercial sectors. Future CVS publications may cover new sectors which may allow more to be included in the costs of crime. This will allow the costs of commercial crimes to be extended to cover more sectors of the economy.

- *Improve estimates for defensive expenditure*

  The estimates for defensive expenditure do not cover all potential costs on individuals and businesses in reducing the risk of being a victim of crime. The current estimates use readily available estimates. A more comprehensive assessment could involve approaching organisations to provide security estimates and exploring methodologies to estimate the cost of measures individuals take to reduce the risk of being a victim of crime.

- *Improved estimates for fraud and cyber crime*

  This update has included estimated costs for fraud and cyber crime offences against individuals for the first time. Estimates of the number of fraud and cyber crime offences come from a section of the CSEW survey 2015/16, introduced in October 2015, asking respondents about fraud and cyber crime victimisation. However, estimates for the costs against business for fraud and cyber crime are not captured by this analysis. They are covered by the CVS but are likely to be significantly underestimated as it is a premises survey and these crimes are likely to be recorded at head office level. Moreover, businesses may be reluctant to disclose details of fraud and cyber crime for risk of

reputational damage. As a result, a potentially large part of the costs associated with fraud and cyber crime have not been captured in this report.

In addition, police costs are based on up-rated year 2006/07 information and cyber crime was not recorded as a separate activity during that year; therefore, we have been unable to provide an estimate of the average investigative cost to police from a cyber crime offence. Moreover, estimates of the cost of lost output focus only on the reduced productivity of the victim directly from the crime, and do not consider the indirect impacts on an individual's productivity. For example, cyber crime, in particular, may well result in damage to equipment which could lead to productivity losses, but these are not captured in our estimate of the costs of lost output. Development of the estimates of police costs and lost output as a result of cyber crime should therefore be considered for future updates.

'Understanding the costs of cyber crime' (Home Office, 2018) considers in more detail the types of costs that need to be considered in relation to cyber crime specifically and also makes recommendations for how estimates could be improved in future.

- *Improve the expenditure estimates for victim support services*

  Analysis of the expenditure on victim support services is based on funding for Victim Support and Police and Crime Commissioners, but does not include other national and local service providers or commissioners. Future publications should aim to take into consideration wider victim support sector expenditure. This will allow for a more representative picture of the funding landscape.

- *Expand the costs of the fear of crime to cover the whole population*

  Given increasing academic research into the costs of the fear of crime, it may be possible to find data in the future that would allow general costs of the fear of crime felt by the full population (rather than just victims) to be estimated. Whilst quantitative estimates are not yet made in this report, a discussion of these wider costs of the fear of crime is included in Annex 2.

- *Consider including bounds or ranges*

  This update includes point estimates for the costs of each crime and cost category. The report highlights some of the uncertainties inherent in the estimates produced. Future updates could look into whether sensible bounds or ranges could be applied to highlight these uncertainties by producing upper and lower estimates.

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Annex 1: Costs of crime index

The costs of crime estimates have been used to derive an index. The index provides a weighting for the relative societal harms of different crimes. Other indices, such as the Cambridge Crime Harm Index uses the 'starting point' in the Magistrates' Court Sentencing Guidelines[93] for different crimes as a proxy for the relative social harm of the crimes (Sherman *et al.*, 2016). Similarly the ONS publish a Crime Severity Score for different crimes based on sentencing practices. The Crime Severity Scores are based on the average of actual sentences received over a five-year period, with weightings applied to custodial sentences, community orders and fines (ONS, 2016e). Both these measures therefore use sentencing practices as a proxy for the social harms of crime.

Whilst sentencing practices may be somewhat reflective of the social harms associated with crimes, they are also driven by other factors such as deterrence and rehabilitative effects. The costs of crime unit costs aim directly to capture both the economic and social costs of various crimes and can therefore be used as a more complete measure for commissioners and policy makers looking to understand the relative costs of different crimes.

By comparing the unit costs (Table 1 on page 15), the relative economic and social costs of different crimes can therefore be assessed. Table AN1 shows the relative social costs of different crimes indexed against the offence category 'theft from vehicle' (index of 1). For example, Table AN1 suggests robbery is approximately 13 times more costly to society than theft from vehicle, whereas rape is 45 times more costly to society than theft from a vehicle.[94]

Table AN1: Costs of Crime Harm Index

Crimes	Index (on theft from vehicle)
Individual	
Homicide	3699
Violence with injury	16.1
Violence without injury	6.8
Rape	45
Other sexual offences	7.5
Robbery	13.0
Domestic burglary	6.8
Theft of vehicle	11.8

[93] https://www.sentencingcouncil.org.uk/the-magistrates-court-sentencing-guidelines/

[94] To calculate the relative cost to society of two different crimes, divide one index figure in Table AN1 by another. For example, if you wanted to how much more costly rape is to society compared to robbery you would divide the rape index (44) by the robbery index (13).

Crimes	Index (on theft from vehicle)
Theft from vehicle	1.0
Theft from person	1.6
Criminal damage – arson	9.7
Criminal damage – other	1.6
Fraud	1.5
Cyber crime	0.6
Commercial	
Commercial robbery	17.2
Non-domestic burglary	17.8
Commercial theft	1.1
Theft of commercial vehicle	40
Theft from commercial vehicle	2.1
Commercial criminal damage – arson	12.6
Commercial criminal damage – other	1.6

Annex 2: The cost of the fear of crime

A number of papers have attempted to put a value on the costs of the fear of crime. This is the value of the negative impact the fear of crime has on individuals' lives, many of whom will never be victims of crime. Section 5.2 looked at the physical and emotional effects of crime and valued the cost of the additional emotional fear of crime suffered by victims of crime. However, it did not cost the fear of crime for those who are not victims but still might be concerned about crime. These individuals may experience emotional distress and worry as a result of crime which is an additional societal cost. The cost of behavioural change as a result of the fear of crime was also not considered. For example, individuals may choose to take a taxi home late at night rather than public transport, or may choose to take a longer route home to avoid an area they perceive to be dangerous. This behavioural change therefore represents a burden to individuals' lives and therefore a social cost which is caused by fear of crime.

In this section we examine the cost of the general fear of crime which is not specific to victims of crime. Whilst we do not come up with an estimate, the academic literature around this topic is discussed.

Stated preference / willingness-to-pay approach

The traditional approach used to attempt to quantify the fear of crime, was to look at stated preferences. A willingness-to-pay (WTP) study was conducted by Cohen *et al.* (2004) in the United States and asked respondents to value the benefits of a public programme designed to reduce certain types of criminal offending. The WTP values were then multiplied by the number of households across the US in order to calculate how much society collectively would be willing to pay to reduce the incidence of each crime type by 10%.

Cornaglia *et al.* (2014) use regression analysis to estimate the effect of violent and property crime on victims and non-victims' mental well-being. The authors estimate that the social cost of violent crime is about 80 times the direct impact on the victim, in terms of mental well-being alone. In contrast, property crime was found to have no impact on victims or non-victims. This difference demonstrates how the effect of the fear of crime on social well-being varies depending on the type of crime and hence the complexity involved in coming up with estimates.

Dolan and Peasgood (2007) suggest that WTP estimates are too sensitive to changes in the probability of victimisation. For example, Atkinson *et al.* (2005) suggests the difference in absolute risk of each crime type occurring creates large differences in the implied WTP to avoid each even though the WTP for a 10% reduction in the volume of certain crimes is similar. As a result, it is the absolute risk that primarily drives the differences in the final WTP estimates rather than the respondents' perceptions or fears of crime. Hammitt and Graham (1999) argue that "Stated valuations of risk reduction are not valid measures of economic preference if the valuations are insensitive to probability variation." Given these issues in using stated preferences to estimate the cost of the fear of crime, alternative methods may be better.

Quality-adjusted life year approach

The QALY approach provides an alternative method of estimating health losses associated with the fear of crime. Dolan and Peasgood (2007) used data from an omnibus survey asking how often and to what extent individuals felt fearful of becoming a victim of crime. An omnibus survey is a method of quantitative research where data on a wide variety of topics is collected during the same interview. Usually, multiple research clients will provide content for the survey.

They matched this data with a level and duration of anxiety derived from the EQ5D. The EQ5D is a standardised instrument for use as a measure of health outcomes. The authors' use of this method gave an average health loss in the year of 0.00065 QALYs due to the fear of crime.

The QALYs could then be monetised using an estimate of the value of a QALY. Dolan and Peasgood (2007) calculated an average annual per capita monetary loss of £52.65 and a total annual monetary loss of £2,098m (£52.65 multiplied by the UK population) for England and Wales using this method. This method relies on quite strong assumptions regarding individuals' self-reporting of fearfulness. For example, the authors assume a response of 'quite fearful' to mean that the individual feels moderately anxious for two hours.

Jackson and Stafford (2009) likewise discuss the use of QALY as an indicator of estimating the health losses which may be related to fear of crime. They find that there is a recursive effect, in that a greater fear of crime leads to reduced mental health and which in turn leads to a greater fear of crime. This could create an issue of reverse causality – poor mental health is the cause of the measured fear of crime rather than vice versa.

Conclusion

The studies reviewed suggest there are very substantial empirical difficulties inherent in valuing the fear of crime using any of the methodologies discussed above. The fear of crime could be estimated using the figure from Dolan and Peasgood (2007), but this estimate includes fear from victims of crime and therefore would be double counting with the estimates in Section 5.2 of this report. Therefore, no estimate is made for the wider costs of the fear of crime.

Annex 3: Estimating the carbon costs of crime

Crime, like all activities, has environmental impacts. Policing, keeping offenders in prison, caring for victims, protecting property from intrusion or replacing items that get stolen all have an impact on the environment, which includes the release of carbon emissions. As an example, thinking about an incidence of burglary, carbon emissions result from:

- preventative measures in anticipation of crime (manufacture of window and door locks and energy usage of burglar alarms or security lighting);
- clean up or consequences of the event (replacement of broken windows and stolen items, provision of victim services and insurance claim services);
- response to the event from the CJS (police response including driving to victim's households and carbon associated with police stations, probation services or courts and prison buildings).

A 'carbon footprint' typically provides a measure of all greenhouse gas emissions caused by a person, product, organisation or nation (Carbon Trust, 2015); therefore, the sum of the emissions which arise as a result of these activities amounts to the carbon footprint attributable to crime offences.

To enable a more sustainable approach to the valuation of the impacts of crime, the environmental costs need to be valued in addition to economic and social costs. As carbon emissions are the most widely used proxy for wider environmental impacts, estimates of the carbon emissions resulting from different crimes are presented in this section, along with total costs of crime-related carbon emissions. These estimates are based on a recent, peer-reviewed and published academic research paper (Skudder *et al.*, 2016) and updated to reflect the updated costs of crime in this report.

The first analysis relating to the carbon costs of crime was conducted in 2009 by Professor Ken Pease and it stated that crime is not carbon neutral and that it is difficult to imagine a high crime society being a low carbon society (Pease, 2009). It was also highlighted that climate change is such a fundamental issue that it should permeate all policy areas, including crime prevention (Pease and Farrell, 2011). Pease presented a tentative estimate of over 6 million tonnes of CO_2e (carbon dioxide equivalent) which could be attributed to crime within England and Wales (Pease, 2009).

The limitations of Pease's estimates were addressed by Skudder *et al.* (2016) and are detailed here. This research was conducted by a doctoral research student at the University of Surrey, funded by the Home Office along with Secured by Design and the Engineering and Physical Sciences Research Council (EPSRC). More recent crime figures, updated monetised costs, and more accurate and detailed carbon emissions factors were utilised in order to provide more up-to-date estimates of the emissions associated with crime. The carbon footprinting

methodology used applied multipliers derived from environmentally extended input-output analysis (EE-IOA), which designate a volume of CO_2e that arises per pound spent within the economy associated with crime. Using these multipliers, the monetised economic and social costs of crime (in pounds sterling), detailed within this report, were translated into a carbon value for different costs and different criminal offences.

The carbon multipliers used for this study were obtained from a dataset supported by the Department for Environment, Food and Rural Affairs (Defra, 2014). Detailed footprint estimates for each offence type were produced, distinguishing different types of spending associated with particular crimes and allocating the most appropriate carbon multiplier to each expenditure category. For example, the cost of the health service aspect of a single homicide is estimated at £1,110. Multiplying this by the health services sector carbon multiplier (human health services sector = 0.25 kg CO_2e/£) yields a footprint of carbon emissions associated with this spending in the health services, due to this single criminal offence, of just under 278kg CO_2e. Importantly, these estimates cover the full 'lifecycle' of the criminal act, including activities, products and services before and as a result of the offence. Emissions which may occur after the crime event (for example, years of prison sentences served by the offender) are also included in the footprint. For full datasets, limitations and results, see the published study by Skudder *et al.* (2016).

Table AN2 details the carbon footprints of different crime types using the methodology described from Skudder *et al.* (2016) updated with 2016 monetised costs of crime data. The offence with the largest carbon footprint is found to be homicide at 263 tonnes CO_2e per offence and the smallest is cyber crime at 0.14 tonnes CO_2e. It is also possible to scale the individual carbon footprint estimates to a total carbon footprint for all crime in England and Wales. This is found to be just below 8.2 million tonnes CO_2e.[95]

Use in policy appraisals

The carbon footprint of crime estimates may be used to designate a carbon footprint, per criminal offence, for use within policy appraisal to estimate the cost of environmental harm associated with the prevention of crime. For example, a policy or project designed to prevent domestic burglary can estimate the scale of emissions associated with the volume of burglaries which the policy/project aims to prevent. An estimate of the potential size of the emissions savings associated with the policy can also therefore be estimated.

The estimated savings can only be presented as **potential** savings, however, as a true saving of carbon emissions is not as straightforward to estimate as a monetary savings calculation. As discussed by Skudder *et al.* (2016), a true carbon cost saving calculation would also need to consider the activities or costs associated in the absence of crime, which may partially or wholly offset these savings. This potential offset of emissions is known as the rebound effect and is a known phenomenon which can offset emissions savings associated with policies. The carbon footprint of crime estimates, however, still present a valuable estimate of the environmental harm associated with criminal activities, and add to existing analysis which only present the economic and social costs or impacts.

Valuing energy use and greenhouse gases is vital to ensure government takes full account of climate change and energy impacts when appraising and evaluating public policies and

[95] The carbon footprint estimates per offence and total carbon footprint of crime are substantially different from that reported in the Skudder *et al.* (2016) study as the revised costs of crime figures detailed within this publication include new offence types (arson, fraud, cyber crime) as new cost categories (Youth Justice Board) and are based on crime survey figures for 2015-16.

projects. To enable the value of this environmental impact to be quantified for policy making and impact assessments, Table AN2 also details the monetised carbon cost (in £) of individual offences. This is done using the 2016 Department of Energy and Climate Change carbon valuation (DECC, 2015) of £63 per tonne CO_2e (central scenario non-traded carbon price). The total carbon cost of all crime in 2015/16 is estimated at around £520m.

Understanding the scale of the environmental costs of crime aims to ensure that the valuation of crimes includes environmental considerations and may also go some way towards reducing these potential negative impacts of crime. Although it is unrealistic to expect criminals to consider their carbon footprint, it is possible to take measures to avoid these emissions by supporting crime prevention schemes which consider all impacts (social, economic and environmental), to inform the CJS of areas where the environmental impact is large (such as policing or prison services), and highlight the areas where potential reductions of carbon emissions may be possible.

Table AN2 shows carbon footprints of different crime types (using methodology from Skudder *et al.* (2016) updated with 2016 costs of crime data) and calculated individual and total carbon costs (using DECC non-traded central estimate valuation of carbon for 2016).

Table AN2: Carbon footprints of different crime types

Offence	Carbon footprint (tonnes CO_2e)		Carbon cost (£63 per tonne)	
	Per incident	Total using YE 31 March 2016 actual crime figures	Per incident	Total using YE 31 March 2016 actual crime figures
Individual				
Homicide	263	150,417	£16,570	£9,476,290
Violence with injury	1.00	1,101,827	£60	£69,415,120
Violence without injury	0.62	529,326	£40	£33,347,540
Rape (1)	2.39	290,444	£150	£18,297,950
Other sexual offences	0.45	513,621	£30	£32,358,140
Robbery	2.09	404,288	£130	£25,470,140
Domestic burglary	1.40	969,643	£90	£61,087,480
Theft of vehicle	4.17	318,794	£260	£20,084,050
Theft from vehicle	0.25	156,603	£20	£9,866,010
Theft from person	0.26	117,622	£20	£7,410,180
Criminal Damage – arson (2)	1.95	44,117	£120	£2,779,370
Criminal Damage – other	0.25	253,025	£20	£15,940,580
Fraud (3)	0.36	453,615	£20	£28,577,760
Cybercrime (3)	0.14	140,156	£10	£8,829,830
Commercial				
Commercial robbery	2.82	383,488	£180	£24,159,720

Offence	Carbon footprint (tonnes CO_2e)		Carbon cost (£63 per tonne)	
	Per incident	Total using YE 31 March 2016 actual crime figures	Per incident	Total using YE 31 March 2016 actual crime figures
Non-domestic burglary	5.38	551,421	£340	£34,739,530
Commercial theft	0.36	1,547,798	£20	£97,511,290
Theft of commercial vehicle	18.35	154,113	£1,160	£9,709,100
Theft from commercial vehicle	0.67	40,008	£40	£2,520,500
Commercial criminal damage – arson (2)	2.49	17,184	£160	£1,082,560
Commercial criminal damage – other	0.32	98,595	£20	£6,211,490
Total		**8,236,105**		**£518,874,630**

(1) Same carbon multipliers applied as other sexual offences
(2) Same carbon multipliers applied as criminal damage
(3) Same carbon multipliers applied as theft from person offences

Appendix 1: Physical and emotional costs tables

Table AP1: Prevalence of harms against individuals for each crime[96]

Harm	Crime type – individual												
	Violence with injury	Violence without injury	Rape	Other sexual assault	Robbery	Domestic burglary	Theft of vehicle	Theft from vehicle	Theft from person	Arson	Other criminal damage	Fraud	Cyber crime
Emotional harms													
Fear	25%	21%	60%	23%	28%	28%	6%	3%	5%	31%	6%	5%	4%
Depression	15%	8%	22%	8%	10%	12%	5%	1%	5%	4%	3%	2%	1%
Anxiety/panic attacks	22%	13%	42%	18%	15%	18%	3%	2%	12%	8%	4%	4%	3%
Physical harms													
Minor bruising	59%	-	23%	2%	30%	-	-	-	-	-	-	-	-
Severe bruising	28%	-	4%	2%	19%	-	-	-	-	-	-	-	-
Scratches	21%	-	8%	2%	19%	-	-	-	-	-	-	-	-
Cuts	27%	-	18%	0%	19%	-	-	-	-	-	-	-	-
Stabbed	4%	-	0%	0%	0%	-	-	-	-	-	-	-	-
Broken bones	6%	-	0%	2%	10%	-	-	-	-	-	-	-	-
Nose bleed	7%	-	0%	0%	6%	-	-	-	-	-	-	-	-

[96] Where there is no entry in the table there are no emotional or physical harms associated with the crime types.

Harm	Crime type – individual												
	Violence with injury	Violence without injury	Rape	Other sexual assault	Robbery	Domestic burglary	Theft of vehicle	Theft from vehicle	Theft from person	Arson	Other criminal damage	Fraud	Cyber crime
Broken nose	2%	-	0%	0%	2%	-	-	-	-	-	-	-	-
Lost teeth	2%	-	0%	0%	1%	-	-	-	-	-	-	-	-
Chipped teeth	2%	-	0%	0%	0%	-	-	-	-	-	-	-	-
Dislocation	2%	-	0%	0%	0%	-	-	-	-	-	-	-	-
Concussion	2%	-	4%	0%	3%	-	-	-	-	-	-	-	-
Internal injury	1%	-	0%	0%	1%	-	-	-	-	-	-	-	-
Facial injury	1%	-	3%	0%	0%	-	-	-	-	-	-	-	-
Eye injury	0%	-	0%	0%	0%	-	-	-	-	-	-	-	-
Other	8%	-	0%	0%	3%	-	-	-	-	-	-	-	-

Table AP2: Prevalence of harms against businesses for each crime[97]

Harm	Crime type – commercial						
	Commercial robbery	Non-domestic burglary	Commercial theft	Theft of commercial vehicle	Theft from commercial vehicle	Commercial arson	Other commercial criminal damage
Emotional harms							
Fear	63%	13%	0%	14%	4%	25%	0%
Depression	13%	6%	0%	0%	0%	0%	4%
Anxiety/panic attacks	13%	6%	0%	0%	0%	25%	0%

[97] Where there is no entry in the table there are no emotional or physical harms associated with the crime types.

Harm	Crime type – commercial						
	Commercial robbery	Non-domestic burglary	Commercial theft	Theft of commercial vehicle	Theft from commercial vehicle	Commercial arson	Other commercial criminal damage
Physical harms							
Minor bruising	13%	-	-	-	-	-	-
Severe bruising	25%	-	-	-	-	-	-
Scratches	25%	-	-	-	-	-	-
Cuts	13%	-	-	-	-	-	-
Stabbed	0%	-	-	-	-	-	-
Broken bones	0%	-	-	-	-	-	-
Nose bleed	13%	-	-	-	-	-	-
Broken nose	0%	-	-	-	-	-	-
Lost teeth	13%	-	-	-	-	-	-
Chipped teeth	0%	-	-	-	-	-	-
Dislocation	0%	-	-	-	-	-	-
Concussion	13%	-	-	-	-	-	-
Internal injury	0%	-	-	-	-	-	-
Facial injury	0%	-	-	-	-	-	-
Eye injury	0%	-	-	-	-	-	-
Other	0%	-	-	-	-	-	-

Table AP3: QALY losses associated with physical and emotional harm

Injury	Corresponding Global Burden of Disease (GBD)[98] injury	QALY loss
Physical harms		
Minor bruising or black eye	0.25 of broken bones (Dolan *et al.*, 2005)	2.6%
Severe bruising	0.5 of broken bones (Dolan *et al.*, 2005)	5.2%
Scratches	0.25 of cuts (Dolan *et al.*, 2005)	0.2%
Cuts	Open wound: short term, with or without treatment	0.6%
Puncture or stab wounds	No associated injury in GBD. Broken bones used as an appropriate proxy	10.3%
Broken/cracked/fractured bones	Fracture of sternum or one or two ribs: short term, with or without treatment	10.3%
Nose bleed	Open wound: short term, with or without treatment	0.6%
Broken nose	Fracture of face bone: short or long term, with or without treatment	6.7%
Broken/lost teeth	0.5 of fracture of face bone: short or long term, with or without treatment (Dolan *et al.*, 2005)	3.4%
Chipped teeth	0.5 of broken/lost teeth (Dolan *et al.*, 2005)	1.7%
Dislocation of joints	Dislocation of shoulder: long term, with or without treatment	6.2%
Concussion or loss of consciousness	0.5 of disability weight for intracranial injury (short term) (Dolan *et al.*, 2005)	11.0%
Internal injuries	No associated injury in GBD. Severed bruising has been taken as an appropriate proxy	5.2%
Facial/head injuries (no mention of bruising)	No associated injury in GBD. Cuts has been taken as an appropriate proxy	0.6%
Eye/facial injuries	Injury to eyes: short term	5.4%
Other	Other injuries of muscle and tendon (includes sprains, strains and dislocations other than shoulder, knee or hip)	0.8%
Emotional harms		
Fear	Anxiety disorders: mild (Ohman, 2008)	3%
Depression	Major depressive disorder: mild episode	14.5%
Anxiety/panic attacks	Anxiety disorders: moderate	13.3%
Drug abuse	Moderate cocaine dependence	48%
Alcohol abuse	Moderate alcohol use disorder	37%
Obesity / eating disorder	Anorexia nervosa / bulimia nervosa	22%
Sexual dysfunction	Impotence	2%
Death		
Death	Death	100%

[98] Salomon *et al.* (2015)

Table AP4: Duration of negative consequences associated with physical and emotional harms

Injury	Duration (years)[99]	Source
Physical		
Minor bruising or black eye	0.0288	Dolan *et al.* (2005)
Severe bruising	0.0575	Dolan *et al.* (2005)
Scratches	0.0060	Dolan *et al.* (2005)
Cuts	0.0240	Dolan *et al.* (2005)
Puncture or stab wounds	0.0575	3 weeks (Advanced Tissue, 2014)
Broken/cracked/fractured bones	0.1150	Dolan *et al.* (2005)
Nose bleed	0.0027	No source available, assumed 1 day
Broken nose	0.0590	Dolan *et al.* (2005)
Broken/lost teeth	0.0192	Dolan *et al.* (2005)
Chipped teeth	0.0192	Dolan *et al.* (2005)
Dislocation of joints	0.1540	8 weeks (Drukin *et al.*, 2008)
Concussion or loss of consciousness	0.0335	Dolan *et al.* (2005)
Internal injuries	0.0575	No source available, assumed the same as severe bruising
Facial/head injuries (no mention of bruising)	0.0240	No source available, assumed the same as cuts
Eye/facial injuries	0.0192	1 week – traumatic iritis (Root, 2010)
Other	0.0192	Dolan *et al*. (2005)
Emotional – violent crime (1)		
Fear	1.2500	Norris + Kaniasty (1994) show that fear from crime is still evident after 15 months
Depression	1.0000	Dolan *et al.* (2005): Victims of violent crime who suffer short-term depression do so for 1 year.
Anxiety/panic attacks	3.0000	Dolan *et al.* (2005): Victims of violent crime who suffer anxiety/panic attacks do so for 3 years.
Emotional – non-violent crime (2)		
Fear	1.2500	Norris + Kaniasty (1994) show that emotional effects on victims of crime are still evident after 15 months
Depression	0.1670	Wasserman and Ellis (2007): "Most crime victims achieve considerable emotional recovery sometime between 1 and 3 months after the crime"
Anxiety/panic attacks	0.1670	Wasserman and Ellis (2007): "Most crime victims achieve considerable emotional recovery sometime between 1 and 3 months after the crime"

[99] Results are presented in years so that they map more easily to the total QALY value.

Injury	Duration (years)[99]	Source
Emotional – semi-violent crime (3)		
Fear	1.2500	Average of violent and non-violent crime
Depression	0.5800	Average of violent and non-violent crime
Anxiety/panic attacks	1.5800	Average of violent and non-violent crime
Emotional – rape specific		
Drug abuse	5.0000	Dolan *et al.* (2005)
Alcohol abuse	5.0000	Dolan *et al.* (2005)
Obesity / eating disorder	5.0000	Dolan *et al.* (2005)
Sexual dysfunction	0.1670	Dolan *et al.* (2005)
Death		
Death	39.800	The average age of adult victims of homicide in 2013/14 was 40 years for men and 46 years for women. Subtracting this from their life expectancy (ONS, 2016b) gives 41 years for men and 38 years for women. A weighted average of these two figures is then taken based on the numbers of domestic homicides for each

(1) Violent crimes are assumed to be homicide, violence with injury and rape.
(2) Non-violent crimes are assumed to be burglary, theft, criminal damage, fraud and cyber crime.
(3) Semi-violent crimes are assumed to be other sexual offences, robbery and violence without injury.

Appendix 2: Police cost calculations

Figure AP1: Schematic of crime mapping

In 2006/07, there were costs against the criminal damage category.

2006/07 crime category	Cost
Criminal damage	£300,913,474

The 'threat to commit criminal damage' offence was in the 'criminal damage' category in 2006/07, but in 2015/16 it is in the 'miscellaneous other crimes' category.

2006/07 category	2006/07 criminal damage	2015/16 category
Criminal damage	Arson	Criminal damage
Criminal damage	Other criminal damage	Criminal damage
Criminal damage	Threat etc. to commit criminal damage offence	Miscellaneous other crimes

It could be assumed that the costs are purely proportional to the volumes of the offence types.

	YE 31 March 2007 volumes	% of YE 31 March 2007 volumes	Estimated split-out cost (£m)
Arson	42,878	3.7%	£11m
Other criminal damage	1,120,900	95.7%	£288m
Threat etc. to commit criminal damage offence	7,818	0.7%	£2m
	1,171,596	***100.0%***	***£301m***

But estimating the proportion of the total costs that relate to each offence is also related to the individual resource needed per offence. As no direct data is available here, median investigation duration data from the HO Data Hub is used as a proxy (from the period 2014/15, which is assumed to be broadly representative of 2006/07).

Given that the median duration of an 'other criminal damage' offence is 4 days and a 'threat to commit criminal damage offence' is 13 days, crime volumes are weighted by the proportion of durations of other types of offences.

	Median investigation durations	Ratio of durations	Volumes × ration of duration	% of weighted YE 31 March 2007 volumes	Estimated split-out cost with weighted volumes (£m)
Arson	11	39.3%	16,845	9.33%	£28m
Other criminal damage	4	14.3%	160,129	88.66%	£267m
Threat etc.	13	46.4%	3,630	2.01%	£6m
	28	***100.0%***	***180,603***	***100.00%***	***£301m***

Threat to commit criminal damage can then be separated out into 'miscellaneous crimes'.

Figure AP2: Worked example of up-rating methodology

Imagine that in the 2015/16, the police budget is £900,000 and there are two crime types, arson and burglary. In 2015/16, the police dealt with 100 arsons and 120 burglaries. From 2006/07, the ABC data we have is unit costs for both arson and burglary, and the ratio of these is 2:1. In simple terms, arson is twice as expensive to investigate as burglary.

2015/16	Volume
Arson	100
Burglary	120
Total volume	220

Ratio unit costs of arson to burglary = 2:1

The total volume of crimes is 220, but it is known that a single arson costs twice that of one burglary. This information can be used to put the total volume in terms of arson. For 1 arson, the police could investigate 2 burglaries. Therefore, the 120 burglary crimes could be expressed as 60 arson crimes; which is to say the force, with the same budget, could investigate 160 arson crimes and no burglary crimes.

By dividing the total budget by this figure for total arson crimes that could be investigated, a unit cost in 2015/16 can be calculated.

$$\frac{£900,000}{160 \text{ arsons}} = £5,625$$

Equivalently, we can say that the £900,000 budget could be used instead to investigate no arson and 320 burglaries. The unit cost of burglary is found to be £2,812. It can be shown that these estimates work when plugged back into the actual volumes of arson and burglary used in this example:

Arson £5,625 × 100 = £562,500

Burglary £2,812 × 120 = £337,500

£337,500 + £562,500 = £900,000 (i.e. the total budget).

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