

## Police crime data integrity (CDI) inspection 2016 onwards – Technical methodology

The Home Office provides national standards for the recording and counting of notifiable offences by police forces in England and Wales (referred to as ‘police-recorded crime’ or PRC). These standards are known as the Home Office Counting Rules for Recorded Crime (commonly referred to as HOCR). The rules were complemented in April 2002 by the National Crime Recording Standard (NCRS) which received the full support of chief constables.

One of the main purposes of the NCRS is to improve the consistency of recording of an allegation of a crime made by a victim or his representative as well as taking a victim oriented approach to crime-recording. Once an allegation is made, forces must record the crime formally by applying the NCRS balance of probability test unless there is credible evidence to the contrary. Clearly, a force’s ability to record these details properly makes for a system that can be audited more easily, whether the system is audited by HMIC or the force.

In 2014 HMIC published the findings of the Crime Data Integrity (CDI 2014) inspection, *Crime Recording: Making the Victim Count*. The inspection looked into the accuracy of crime recording in England and Wales police forces. It found that nationally the police were under-recording crimes reported to them by 19 percent. This was a particular problem for violence against the person and sexual offences where under-recording rates were 33 percent and 26 percent respectively. Following the publication of these results, recommendations<sup>1</sup> were made to forces aimed at improving recording practices across all police forces. In order to test whether forces have improved their crime recording accuracy, another inspection and audit will take place, commencing in 2016.

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<sup>1</sup> For more details see, Crime-recording: making the victim count, available from: [www.justiceinspectorates.gov.uk/hmic/wp-content/uploads/crime-recording-making-the-victim-count.pdf](http://www.justiceinspectorates.gov.uk/hmic/wp-content/uploads/crime-recording-making-the-victim-count.pdf)

## **Aim of the audit**

The primary aim of this inspection will be to measure the rate of compliance of police-recorded crime against the national standards (HOCR) for all 43 Home Office police forces in England and Wales on a rolling program. Alongside our calculation of the forces' all crime (excluding fraud) compliance rate, the audit will also calculate the force compliance rate for violence against the person and sexual offences. This is because these offence groups were highlighted as having particularly poor recording-rates in CDI 2014.

With the force recording rates, an indication of how police forces are doing nationally will be obtained. Direct comparisons with CDI 2014 data will not be possible due to methodological differences nor will comparisons be possible between forces where records from different periods are audited.

## **Methodology**

### **Force selection**

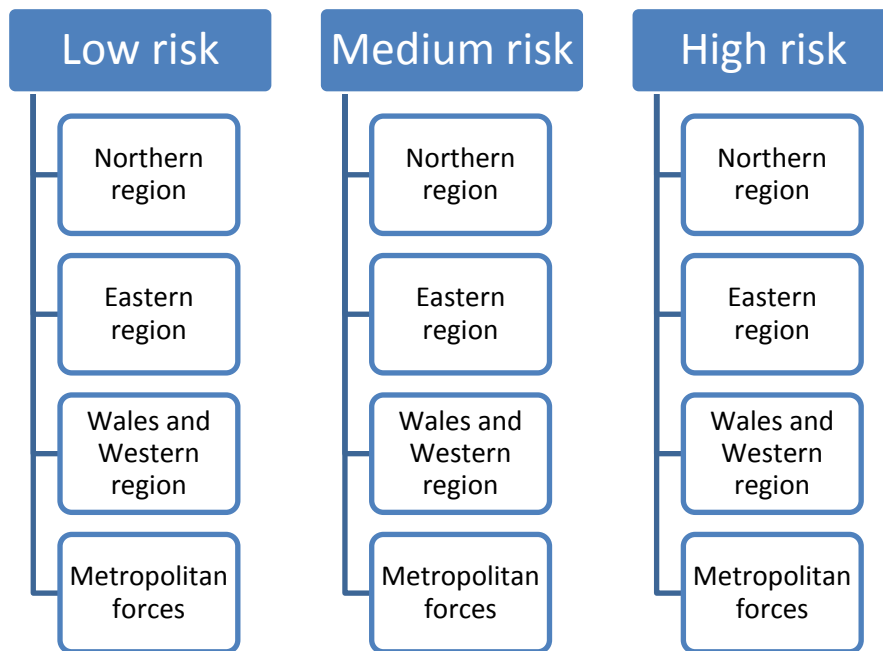
Unannounced inspections will take place in all 43 Home Office police forces in England and Wales over a number of years. The forces will be selected at random; however, true random sampling will not be used to avoid repeating full inspections in forces. In order to ensure that forces from particular regions or with similar estimated recording accuracies are not audited at once, forces will be split into 12 groups (see figure 1). Each force will be placed into a perceived 'risk' group – high, medium and low, forces will be allocated to the 'risk' group according to their estimated recording accuracy in CDI 2014<sup>2</sup> for all crime (excluding fraud) adjusted to take into account changes in their recorded crime from the 12 months ending 31 October 2013 (the CDI 2014 audit period) to the 12 months ending December 2015.

These risk groups will be further split into four groups based on the three HMIC regions - Northern, Eastern and Wales & Western, as well as a group for the larger forces (Metropolitan Police, Greater Manchester Police, West Yorkshire Police and West Midlands Police – these forces will not be in their HMIC region group). City of London Police will be included in the Eastern group. Forces will be removed from their groups once they have been inspected to avoid duplicating inspections.

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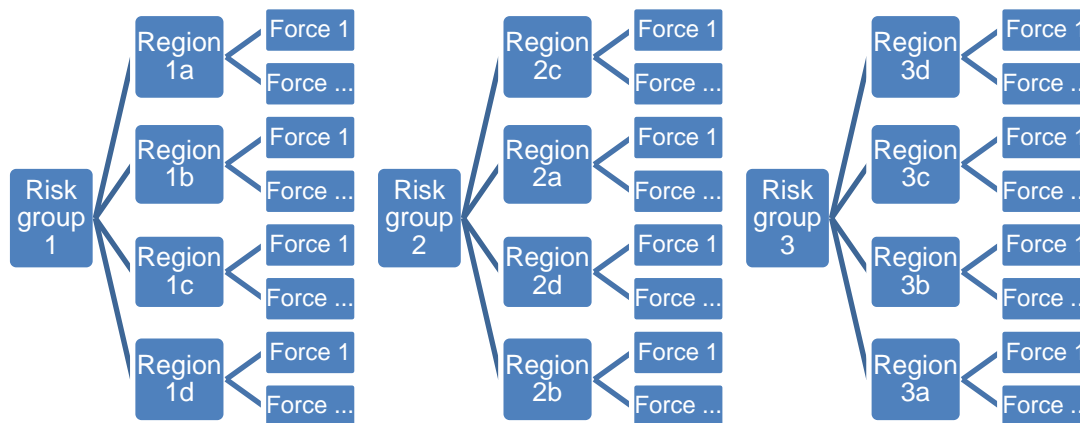
<sup>2</sup> Where a force was subject of a later crime recording audit the results of this later audit will be used for this purpose.

**Figure 1: Force selection strata**



Each of the 12 groups and each of the forces within them will be allocated a random number. The risk groups will maintain the same order throughout the force selection process but the region groups within will differ depending on the risk group. The groups and the forces within will then be selected in chronological order until all of the forces have been selected and the groups are empty. An example of how the groups could be selected is shown in figure 2. Using the diagram the first risk group is risk group 1, the second is risk group 2 and third is risk group 3. Having selected risk group 1, we would select the first region within the risk group (region 1a). From this region group we would select the force with the lowest random number and then move onto risk group 2 and select the first region (region 2c). Having also done this process with risk group 3 (region 3d and the force with the lowest number) we would return to risk group 1 and then chose the region with the next highest number (region 1b). The process would continue through all groups until there were no forces left to pick.

**Figure 2: Randomly picking the force list**



**Force selection is open to change if circumstances dictate, for example, if there is a clash with other HMIC inspection activity.**

### **Crime types**

An audit of a statistically robust sample of each Home Office police force's crime records will be used to form an estimation of the force recording accuracy.

At a force level, a statistically robust sample will be audited for three offence groups:

- violence against the person;
- sexual offences; and
- all other offences excluding fraud (everything excluding violence against the person, sexual offences and fraud).

The audit of these three offence groups will then form the force recording accuracy for all crime (excluding fraud). This will involve the use of weighting. Firstly to take account of the fact that samples and not whole populations will be audited. Secondly to take account of the fact that the proportion of the sample comprised of violence against the person and sexual offences is higher than the proportion that these offence groups make up of recorded crime.

Because of the change in methodology since CDI 2014 direct comparisons to earlier findings must not be made. The force sampling methodology is not designed to produce statistically robust national estimates.

Police forces use different IT systems and recording routes. Information will be gathered periodically from all forces about their systems and the proportion of recorded crime which comes through different routes. The main routes we intend to look at are Incidents and Directly Recorded Crime (DRC). All forces record some crime through incidents, usually recording a report as an incident initially and changing to a crime at a later point. DRC are crimes directly recorded without an

incident record by a trained operator in a control room or crime management unit; not all forces use this method. The records will be split across the recording routes according to the information about the proportion of crime reported through each route, as provided by the force.

Forces also record small proportions of reported crimes through various other routes, for example by vulnerable victim departments when holding case conferences with partner agencies. Because of the nature of 'other' recording routes, these will only be included in the main audit if they make up a high proportion of all recorded crime in the force (this will be decided on a force by force basis); otherwise a dip sample will be taken which will not be taken into account in the final crime-recording calculations. If other crime reporting routes are audited the records will be split across the recording routes according to the information about the proportions provided by the force. During the force audit the proportions from the different routes stated by the force will be checked against auditor findings.

### **Confidence level and confidence intervals**

We will apply the 95 percent confidence level as the generally accepted level of certainty used in statistical tests. Any sample may produce estimates that differ from the figures that would have been obtained if the whole population had been examined. At the 95 percent confidence level, with many repeats of an audit under the same conditions, we expect the confidence interval would contain the true population value 95 times out of 100.

The audit aims to select a random sample size necessary to yield confidence intervals of no more than +/- 3 percent for each crime type (listed above) (at the 95 percent confidence level).<sup>3</sup>

The confidence interval provides an estimated range of values that the given population being examined is likely to fall within. For example, if an audit found that 85 percent of crimes were correctly recorded with a confidence interval of +/- 3 percent, then we could be confident that between 82 percent and 88 percent of crimes were correctly recorded of the population for the period being examined for the incident and DRC routes being tested.

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<sup>3</sup> Where the recording accuracy for any category of crime being audited is found during the audit to have been over estimated, and to avoid requiring a force to prepare substantial numbers of additional audit records, an extension of the confidence interval to a maximum of +/- 3.4 percent will be applied. Additional records for audit will be requested from the force where the confidence interval achieved from the original calculation of the audit size is found to be outside +/- 3.4 percent until this confidence interval is achieved.

## Sampling of crime records

Our sampling technique is designed to provide auditors with sufficient crime records to test the recording accuracy of the crime types we are examining (listed above) as well as all crime (excluding fraud). This will provide a statistically robust measure of the recording quality in each force.

To achieve the appropriate sample size of crime records requires a prior estimate of the accuracy of force's recording for each of the three offence groups. For the violence against the person and sexual offences samples, this will be made using:

- the data gathered by the 2014 CDI programme (including revisits);
- adjustments derived from trends in recorded crime (by offence group); and
- the volume of offences recorded in the latest 12 full calendar months available prior to the individual force's inspection.

However, in order to ensure forces are not under-sampled, forces with an indexed recording accuracy of 95 percent or more will be capped at 95 percent accuracy. For forces with an estimated indexed recording accuracy figure below 95 percent, the calculated indexed accuracy will be used. HMIC is aware that the change in recorded crime during these periods cannot be solely explained by changes in recording accuracy, but this will be used as an estimate for the change as it reflects the explanation from forces that improved recording accuracy is responsible for increases in recorded crime, particularly for the categories of violence against the person and sexual offences.

Using the same method for the 'all other' offence group is not possible for a number of reasons. For example, there may have been reductions in this offence group in most police forces in England and Wales, or the varied group of offences may be less affected by recording practices than violence against the person and sexual offences.

In the absence of more up to date audit data, estimates were made based on the narrowing of the gap between similar categories (excluding violent and sexual offences) from the Crime Survey for England and Wales and Police Recorded Crime between 2012/13 and 2014/15. This is a rough adjustment, as it does not allow for regional or force differences and it will not provide a perfect like-for-like match on crime types. However, it is necessary to make an adjustment to reflect the significant changes in crime recording made nationally since the 2014 audits.

So as to minimise the risk of asking forces to prepare more samples for audit than necessary, and to remove as far as is possible a requirement for more samples to be prepared for audit by the force during the audit itself, HMIC has been cautious in the approach to the assessment of the current recording accuracy of forces. However, HMIC will monitor the recording accuracy during the auditing process, if necessary

the estimate used in the sample calculation (described above) will be adjusted, this may result in changes in the sample size, up or down.

The sample size of crimes to be audited for each offence category will be calculated using the standard equation:

$$\text{Sample size} = (Z^2)(P)(1-P)/I^2$$

Z = Z score (when confidence level is 95% this is 1.96)

P = % of sample expect - in this case we use the recording accuracy proxy's for violence against the person, sexual offences and all other offences

I = Confidence interval, we will use +/-3%

The sample size calculated will then be adjusted to take account of the number of crimes of the specific type of offence in the force in the period of interest:

$$(\text{sample size} / 1 + (\text{sample size} / \text{offence group size}))$$

Not all incidents generate a crime. Evidence from previous HMIC crime-recording audits suggests the ratio between incidents opened with the 'all crime' crime code is 1.25 incidents to each crime. For example, if there were 500 incidents opened with a crime opening code, this may yield 400 notifiable crimes. This ratio varies by the type of crime (it may be higher or lower) and risks some under- or over-sampling. To reduce this risk, a ratio of 1.25 will be applied to all crime types through the incident record reporting route and we will review the outputs during the audits adjusting the sampling fraction where necessary. An additional ten percent of incident records will also be sampled from each offence group to ensure the sample size is sufficient. The ratio will be monitored through each audit and adjusted if necessary using the new data. This will result in a change in the number of incident records reviewed and give a more accurate number of incidents to audit in order to get sufficient crime records. The new ratio would also be used in further audits. Directly recorded crimes will have an additional ten records added to the sample size for the same reason.

The sample of incidents and DRC audited will be taken from the force crime records for the previous complete six month period before the commencement of the inspection. These will be selected randomly from the list of records that each force provides to HMIC, once the sample size has been calculated. These lists will contain entries such as the unique reference ID, the date the record was raised and the crime type opening code (the code a force opens a record with). Duplicate records will be removed along with other ineligible records (e.g. fraud offences). The list of records to audit will be sorted randomly for the auditors so that particular months or offences are not over or under sampled as a result of the ongoing monitoring of the overall sample size.

The sample of incidents and DRC will use the force opening codes as they may include records which are closed incorrectly but contain crimes. Take, for example, a call from a victim of burglary which is opened on the incident system as a burglary, the incident record contains enough information to record a burglary, but is then closed incorrectly as a suspicious incident. Were we to draw our sample on closing crime codes (rather than opening incident codes), this burglary would have been missed because it was not closed as a crime. Of course, if the situation were reversed – opening incident code ‘suspicious incident’ and closing code ‘burglary’ – then the nature of the risk is similar, but we judge that the scale of the risk is less.

Auditors will examine dip samples of records from transferred or cancelled crimes (for rapes, other sexual offences, robberies and violence) and those known as N100s (reports of rape where the circumstances are insufficient to record an actual crime of rape). Transferred or cancelled crimes are those considered to have been transferred to other forces, recorded in error or where, having been recorded, additional verifiable information becomes available that determines that no crime was committed. A dip sample will also be taken from records held by vulnerable victim departments to ascertain that crimes reported within these records have been properly recorded as such.

### **Audit quality and validation**

The quality of audit decisions depends on the knowledge, experience and skills of the auditors. All auditors will be required to attend an HMIC in-house three day course which will teach auditors the Home Office Counting Rules (HOCR) and auditing techniques used in the Crime Data Integrity programme. It will be overseen by the national crime registrar who will validate the content of the course. Instruction will be provided by HMIC’s crime data specialist who is an ex-Force Crime Registrar (FCR), has managed previous HMIC crime audits and has attended the College of Policing Force Crime Registrars’ accreditation course.

To ensure consistency, the results of each audit will be subject to peer review by an independent expert. This peer reviewer will be an FCR, or deputy FCR, from another force who has also attended the College of Policing FCR accreditation course. In addition, forces will have the opportunity to review the audit decisions. We aim to resolve any issues with the force in the first instance, but if no agreement can be reached, then the matter will be passed to the CDI NCRS expert at HMIC for consideration in consultation with the national crime registrar. The ultimate decision on reconciliation of any disputed cases will rest with HMIC’s senior reporting officer (SRO) for the CDI inspection.

The audits will be monitored throughout the process to ensure that sample sizes are correct and they produce the necessary confidence intervals.