The transformation of NZ Police crime statistics: New measures and trends

February 2016

New Zealand POLICE
Nga Pirihimana O Aotearoa

Table of Contents

ADMINISTRATION

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ACKNOWLEDGEMENT

New Zealand Police is grateful to Statistics New Zealand for reviewing and validating the appropriateness of the statistical methods outlined in this report to present long-term trends across the change in the crime statistic published by New Zealand Police.

CHAPTER 1: Introduction

In 2014 New Zealand Police replaced its historic official crime statistic with a new statistic. The old and new statistics are not comparable, creating a problem for monitoring long-term crime trends across the point in time when the change occurred. This report addresses this problem by presenting two methods for observing crime trends across the transition.

Before describing these methods, key differences between the old and new statistics are described, as is the rationale for making the change.

CHAPTER 2: How and why have crime statistics changed?

2.1 History of changes to Police systems

In 1978 Police began using a computer system known as the Law Enforcement System (LES). LES captured statistical data from 'Offence Reports' recorded by Police. Police recorded an Offence Report when the report of a crime was not finalised upon initial attendance at the scene, but required subsequent investigation and/or processing an offender. LES did not collect data on crimes where Police finalised the case at their initial attendance, nor did it collect data on crime victims.

Police replaced LES with a newer system (NIA) in 2005, but continued publishing crime statistics that counted offences recorded in Offence Reports. Crime statistics published by Police up to and including the 2014 calendar year are based on the data that Police began recording in LES in 1978.

In the 1990s Police introduced a computerised dispatch management system (CARD) that does collect data on matters that Police finalise upon initial attendance at the scene, but data from LES were not integrated with data from CARD.

The NIA system that replaced LES in 2005 collects additional data not recorded in LES – most notably, details about crime victims – however, in 2005 Police did not have a nationally consistent policy for what data to record, so the data recorded in NIA varied across the country.

In 2008 Police introduced a National Recording Standard (NRS), based on Australia's National Crime Recording Standard (NCRS). Then in 2009 Police began monitoring data quality against the NRS and began work to enhance data quality to improve the value of statistical information.

The recording of data on victims improved progressively between 2009 and 2014. However, an important data item for monitoring family violence – the Relationship of Offender to Victim (ROV) – was still inconsistently recorded. So, in June 2014 Police modified NIA to ensure all required victim data (including ROV) are recorded more consistently.

In 2012 Police also commenced introducing a new data warehouse system (Police Insights Central - PIC) that could integrate data from CARD and NIA to produce crime statistics that include (a) cases that are finalised upon initial attendance at the scene, and (b) data about victims.

The above system changes combined to enable replacement of the old LES crime statistic (offences recorded on Offence Reports) with a statistic that provides a more complete and accurate picture of crime in New Zealand.

2.2 Rationale for changing the crime statistic

Statistical bias

In addition to the benefits identified above, limitations existed in the way the old crime statistic was counted. These limitations caused *Statistical Bias*[1] where figures for recent months contained a greater *under-count*[1] than figures for earlier months. (I.e. Data extracted for previously reported periods often reported significantly higher counts than data extracted at an earlier date for the same period.)

For counts of 'Offences' this under-count was mainly due to delays between a crime occurring and it being reported to Police. For counts of 'Resolved Offences' (those where Police caught the offender) the under-count bias was much greater – particularly for serious crimes that require long investigations.

To partly mitigate this problem Police produced two annual crime statistics series – one based on crimes occurring in each calendar year, and the other based on crimes occurring in each fiscal year (ending 30 June). 14 days after the end of the relevant 12-month period Police took a snapshot of data in NIA for the latest year, and published that. The published data still contained the undercount bias within the year (earlier months had less undercount than later months because more time had elapsed to report, record and resolve crimes). However, because the snapshot occurred at the same time each year, at least statistics for a given year were comparable with statistics for previous years. So, it was possible to monitor long-term crime trends.

The new crime statistic fully mitigates this under-count bias by counting based on when crimes are reported to Police and when they are resolved.

Victim focus

The old crime statistic also completely excluded historic offences (crimes reported in a given year that occurred in a previous year). Because figures for previous years were never updated, historic offences were never able to be included. This limitation became of particular concern to Police for cases of child abuse and sexual assault, which are often not reported to Police until many months or years after the crime occurs.

Current Police strategy places a strong focus on victims of crime, and working with partner agencies to deliver more effective services to victims. The exclusion of historic offences from published crime statistics, lack of data on victims, and problems of statistical bias combined to limit the value of the old crime statistic.

Timely publication

The process for publishing the old statistic took three months. Whereas this was twice as fast as Australia, Police and partner agencies recognised that more timely statistics would be more useful.

[1] See the glossary at the end of this report for definitions of abbreviations and technical terms

By changing the counting rules and using a new semi-automated back-end process in PIC it is now possible to publish statistics every month within one month of the end of the period, rather than just twice a year three months after the end of the period.

International comparability
Crime statistics from different countries are typically not directly comparable due to differences in systems, recording practices and the way crime is counted (counting-rules). This reduces the value of crime statistics because it is difficult to recognise whether the crime problems in a given country are greater than might be necessary.

New Zealand Police recognised an opportunity to produce crime statistics that are comparable with Australia, which is the country whose culture and Police agencies most closely resemble those in New Zealand. Because of the system enhancements and similar recording standard described in section 2.1 above, if New Zealand Police were to introduce the same standard as Australia for how crime is counted, resultant statistics would be reasonably comparable.

Fortunately the existing Australian national standard for counting crime also contains the victim data needed in New Zealand. This standard is called Recorded Crime Victim Statistics (RCVS). New Zealand Police was able to adopt Australia's RCVS with minimal modification.

2.3 Differences in 'counting rules'

A full description of RCVS counting rules (including differences between New Zealand and Australia) is available from the New Zealand Police internet site (http://www.police.govt.nz/about-us/publication/recorded-crime-victims-and-offenders-statistics-rcvs-and-rcos).

Key differences between RCVS and the old crime statistics include the following:

- As described in Section 2.2 above, in order to (a) eliminate under-count bias, (b) include historic offences and (c) enable timely publication, RCVS counts crime based on when crimes are reported to and resolved by Police, rather than when they occur.
- The old crime statistic counted one 'Offence' for each offence recorded in a Police Offence Report. Some offences can have more than one victim. If an offence involves more than one victim RCVS will count each victimisation distinctly.
- The old crime statistic excluded crimes where Police finalised the investigation upon initial attendance at the scene. RCVS includes these crimes.
- The old crime statistic included all offences recorded by Police on an Offence Report even if they were the same type of crime committed against the same victim. It also included offences Police later recorded for charging purposes[2]. RCVS counts '1' for each broad type of crime against a given victim included in the same report made to Police on a given day. RCVS excludes offences Police add later for charging purposes, and does not count separately multiple offences of the same type experienced by the same victim and reported to Police at the same time.

[2] This created the potential for distortions. For example, in one instance the old crime statistic counted two murders when only one victim was killed. This occurred because one offender was charged with Murder with a firearm and another was charged with Murder with a knife, which have different offence codes in the New Zealand Justice system

Because RCVS is victim-based it excludes crimes for which victims are not usually recorded, such as drugs offences and public order offences. Such offences are still included in offender statistics. Excluding these offences from RCVS also makes overall crime trends more reliable. The old crime statistic enabled a count of 'total crime', which included offences typically recorded as a result of proactive Police operations, rather than because of an increase in crime being reported to Police.

Given that the old and new statistics are so different the raw crime counts from each statistic are not directly comparable. This does not mean it is impossible to understand how crime volumes were trending across the date when the statistic changed. Two methods for doing so are described.

CHAPTER 3: Methods for deriving trends

3.1 Method 1: Indexing

A commonly used technique for comparing trends in different statistics is to index the two statistics by normalising their value to equal '1' at a specific date, then observe how the two statistics vary over time away from this date.

It is possible, for example, to index the statistics at the start date of period of time, then plot time series for each (indexed) statistic on the same chart to see if they diverge or track together. A value at a given date of greater than one indicates the statistic is a higher at that date than the start date; a value of less than one indicates lower.

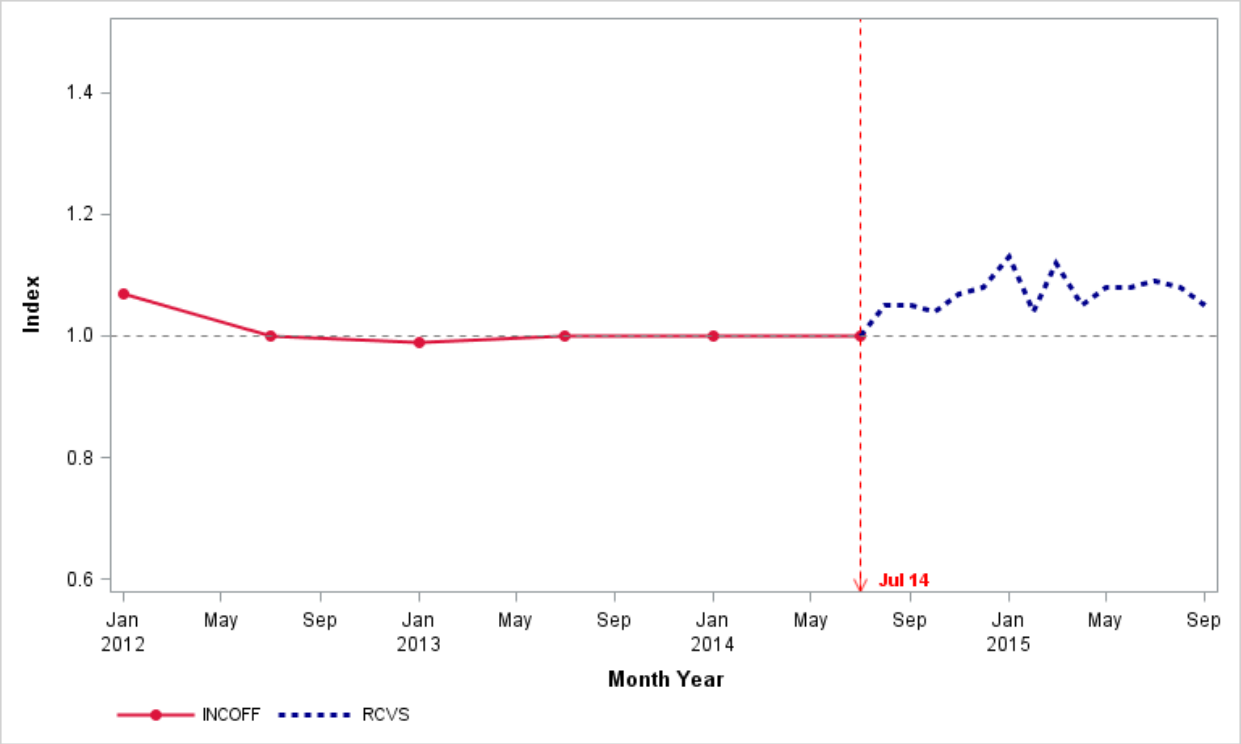
In this instance, the first month of the new RCVS statistic is July 2014, a date for which the old statistic (INCOFF[3]) is available. INCOFF data are not available for dates after 2014, and RCVS data are not available for dates prior to July 2014.

Figure 1 presents indexed statistics for the sum of all crime types included in the RCVS statistic (all of which are also included in INCOFF)[4].

[3] INCOFF is an abbreviation of INCidents and OFFences, which is the name of the Police database from which the old crime statistic was reported.

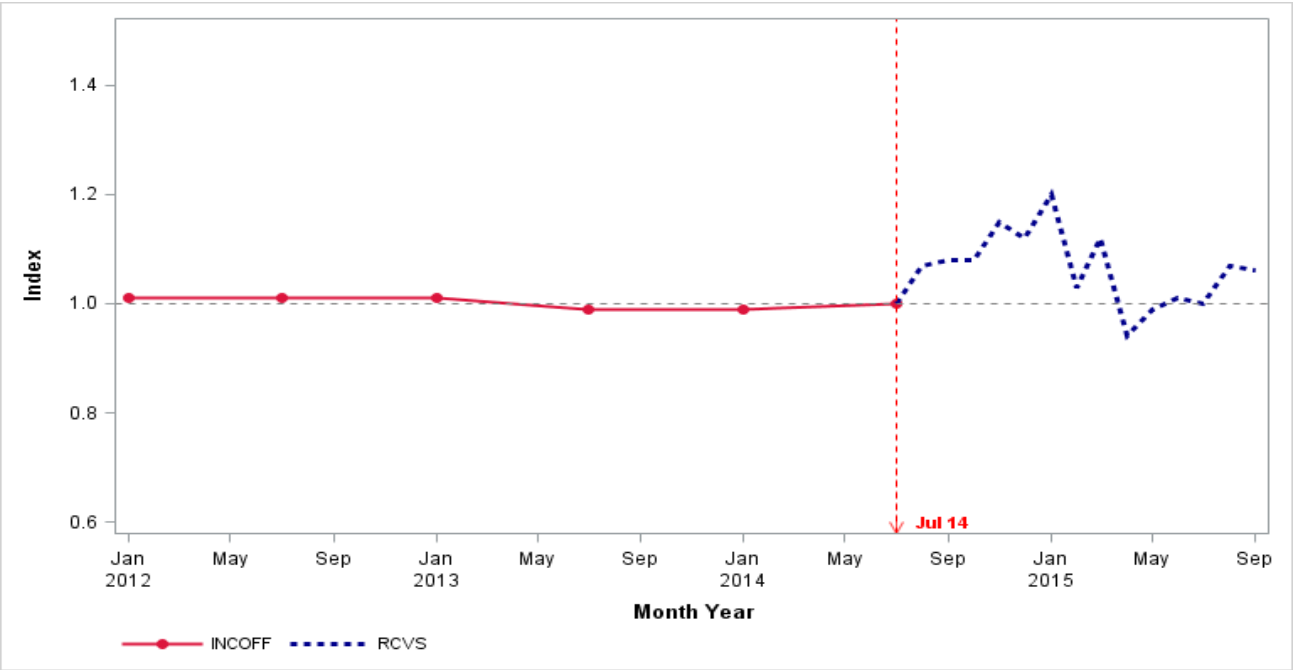
[4] Note that INCOFF data are presented at 6-monthly intervals, consistent with the twice annual publication of the old crime statistic. Presenting monthly data points would produce a distorted pattern due to the under-count bias described in Section 2.1.

Figure 1: All crime types



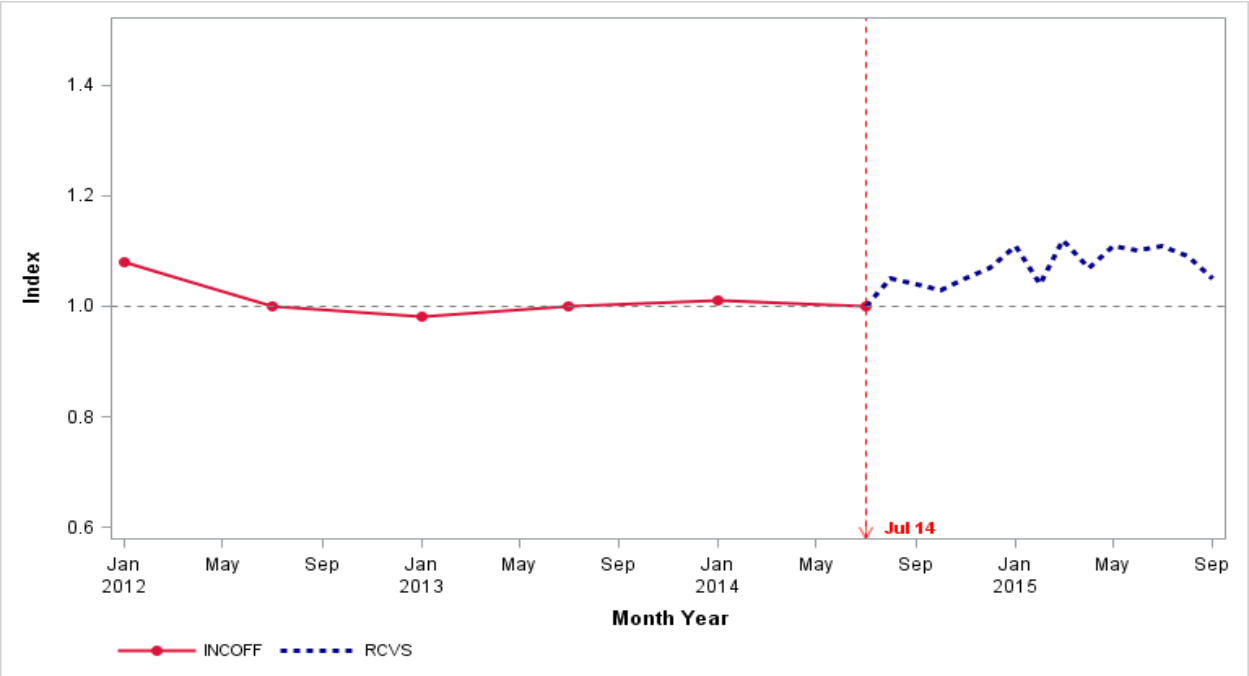
An overall trend is not particularly useful because patterns in low volume serious offences (such as violent crime) can be obscured by patterns in higher volume but less serious offences (such as theft). Therefore Figure 2 presents indexed statistics for 'crimes against the person[5]', and Figure 3 presents indexed statistics for 'crimes against property'[6].

Figure 2: Crimes against the person



[5] ANZSOC Divisions 01-06. ANZSOC is the Australian and New Zealand Standard Offence Classification.
[6] ANZSOC Divisions 07 & 08.

Figure 3: Crimes against property



We can observe that the pattern in Figure 1 is similar to the pattern in Figure 3. This suggests that the overall pattern is dominated by crimes against property, and that patterns in crimes against the person are obscured. It therefore makes sense to separate these types of crime rather than be primarily concerned with patterns in the two very different types of crime combined.

3.2 Method 2: Common statistic

Although the old and new statistics are not directly comparable, it is possible to produce a different statistic that can be reported for periods both before and after the transition.

It is not possible to produce RCVS for months earlier than July 2014 because recording of victims and ROV prior to the NIA modification in June 2014 was inconsistent and statistically biased. (Victims were less likely to be recorded further back in time.) However, it is possible to produce a reliable statistic based on RCVS but that ignores whether or not a victim was recorded. This statistic should broadly track RCVS trends, but will not contain victim demographics, nor will it contain an indication of whether there were multiple victims in a criminal incident.

This simplified RCVS statistic (let us call it 'Crime') will not be as useful as the full RCVS for understanding patterns in victimisation. However, data are available for this statistic back to January 2012. Therefore it is possible to produce a non-indexed Crime trend dating from January 2012 to the present.

Figure 4 presents the Crime trend for the sum of all crime types included in RCVS. Figures 5 and 6 present the Crime trends for crimes against the person and crimes against property respectively.

Figure 4: All crime types

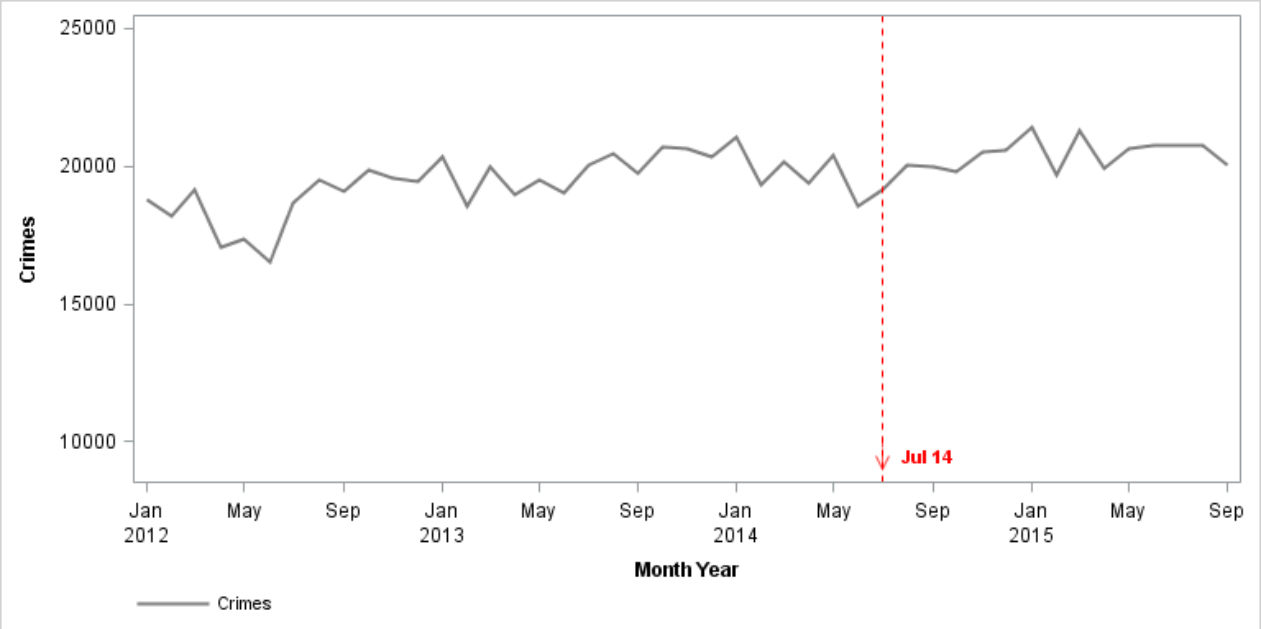


Figure 5: Crimes against the person

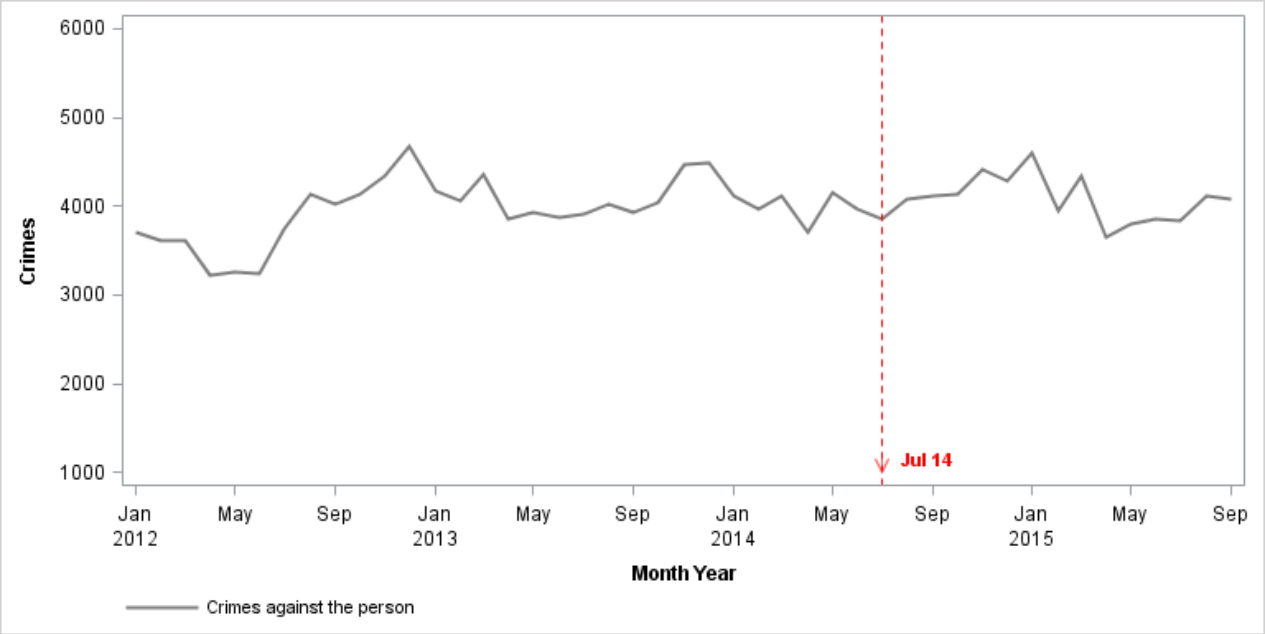
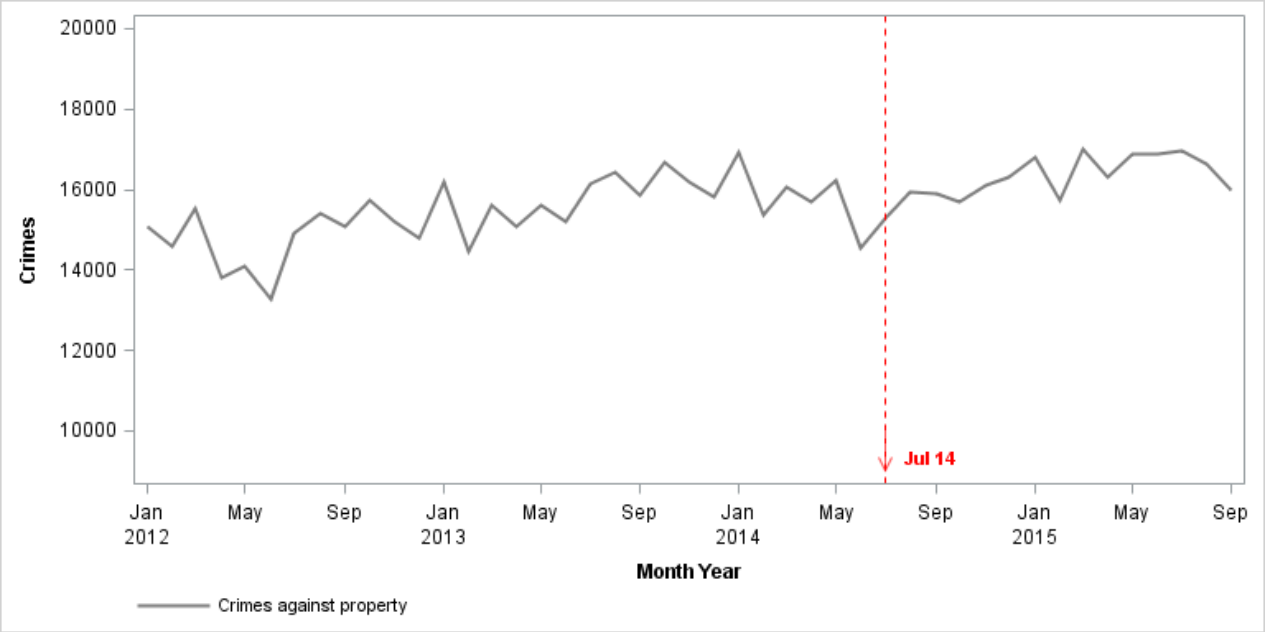


Figure 6: Crimes against property



3.3 Comparison of methods

Method 1 has the advantage that it avoids creating complexity through requiring an additional statistic less useful than RCVS purely for the purposes of observing historic crime trends.

Method 2 has the advantage that it does not require indexing. I.e. it is possible to produce a reliable monthly count of Crime for periods both preceding and following the introduction of RCVS.

Figures 7, 8 and 9 overlay the data in earlier charts to compare the trends suggested by each method. Overall we observe that trends are similar for both methods. Of particular note is that the patterns for Crime and RCVS are almost identical. This gives confidence that trends in Crime are likely to reflect trends in that would have been evident in RCVS prior to July 2014 if RCVS had been available for those dates.

Figure 7: Indexed statistics for all crime types

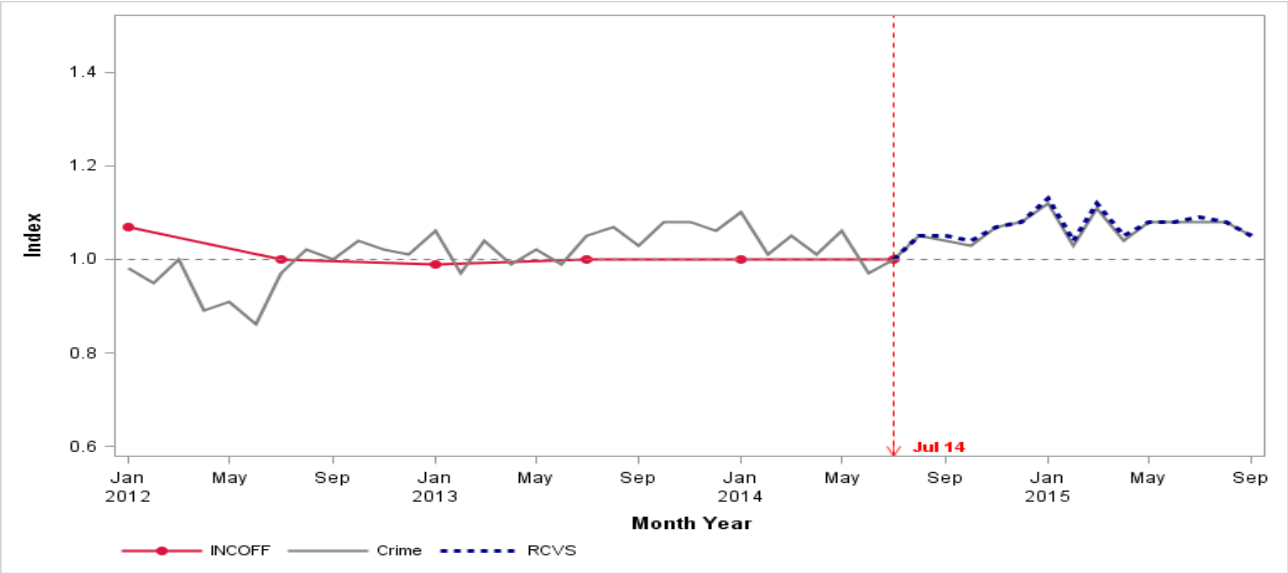


Figure 8: Indexed statistics for crimes against the person

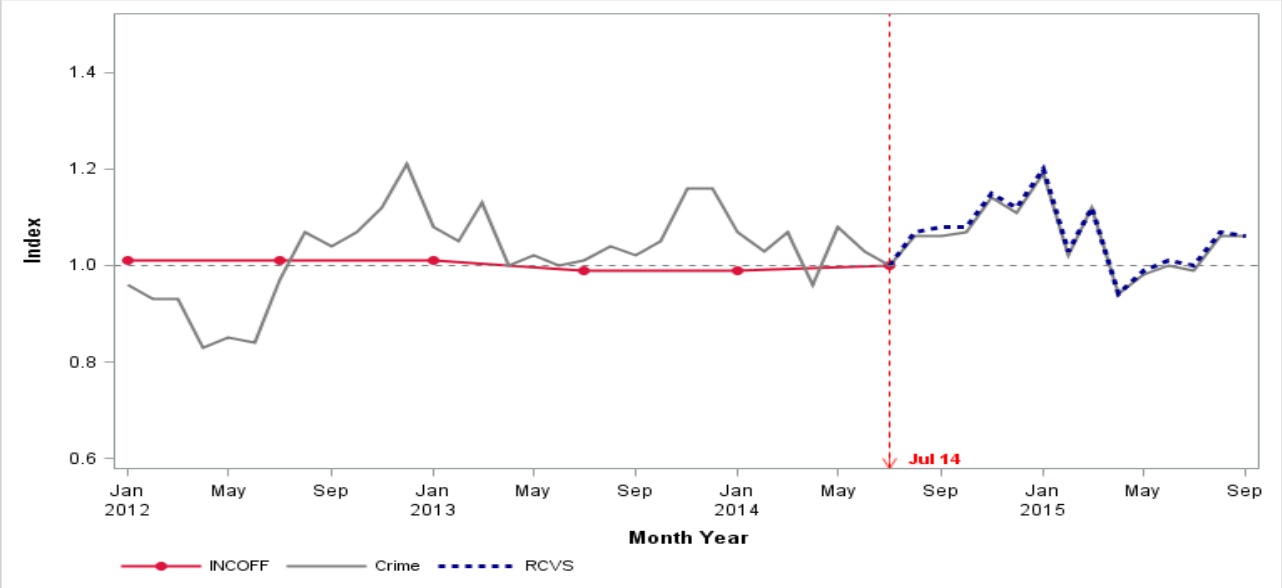
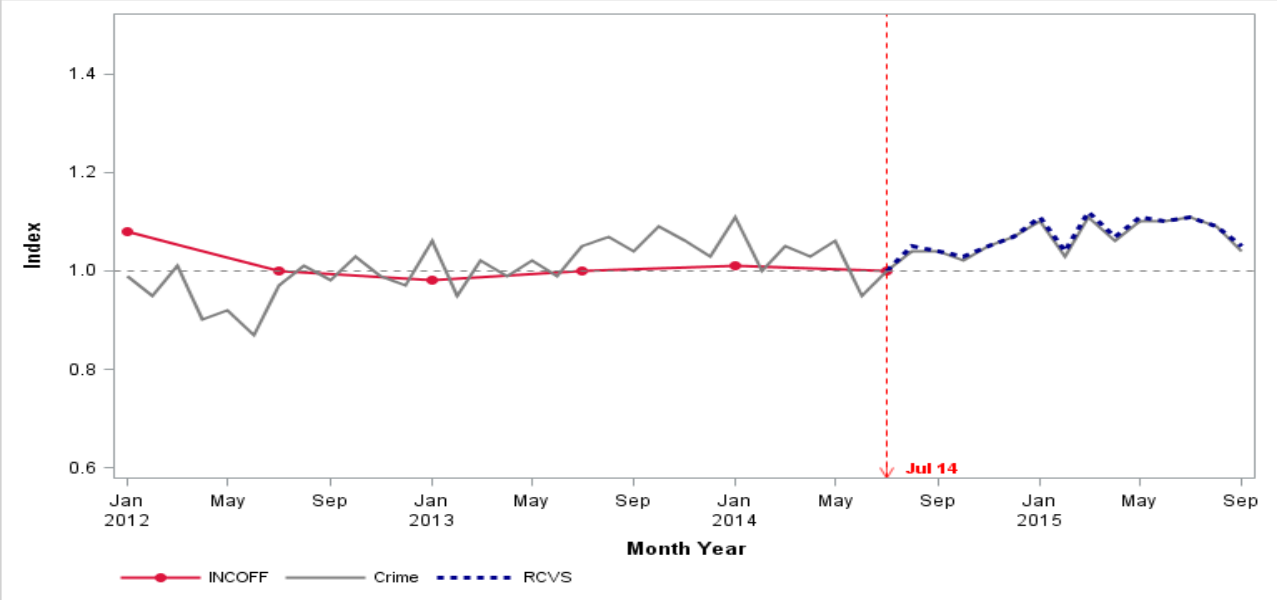


Figure 9: Indexed statistics for crimes against property



Figures 10, 11 and 12 present non-indexed data for Crime and RCVS. Although the patterns are similar RCVS reports slightly higher counts because it counts multiple victims distinctly. Furthermore, not shown in these charts, the RCVS dataset contains statistical information about the victims that Crime does not.

Figure 10: Statistics for all crime types

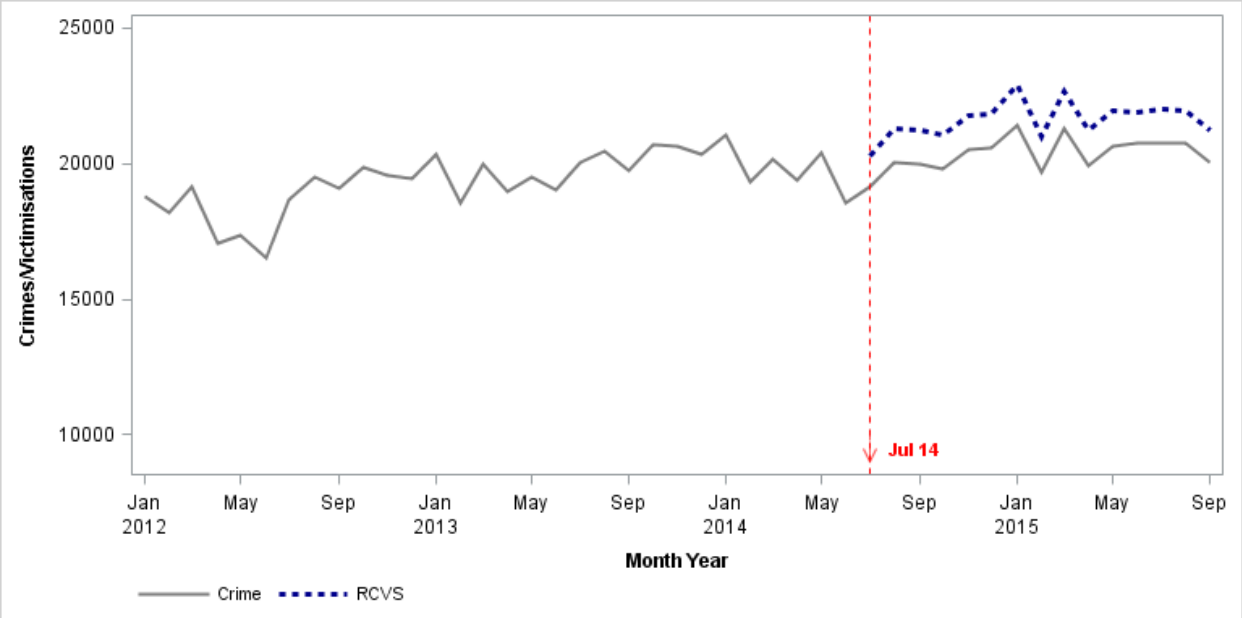


Figure 11: Statistics for crimes against the person

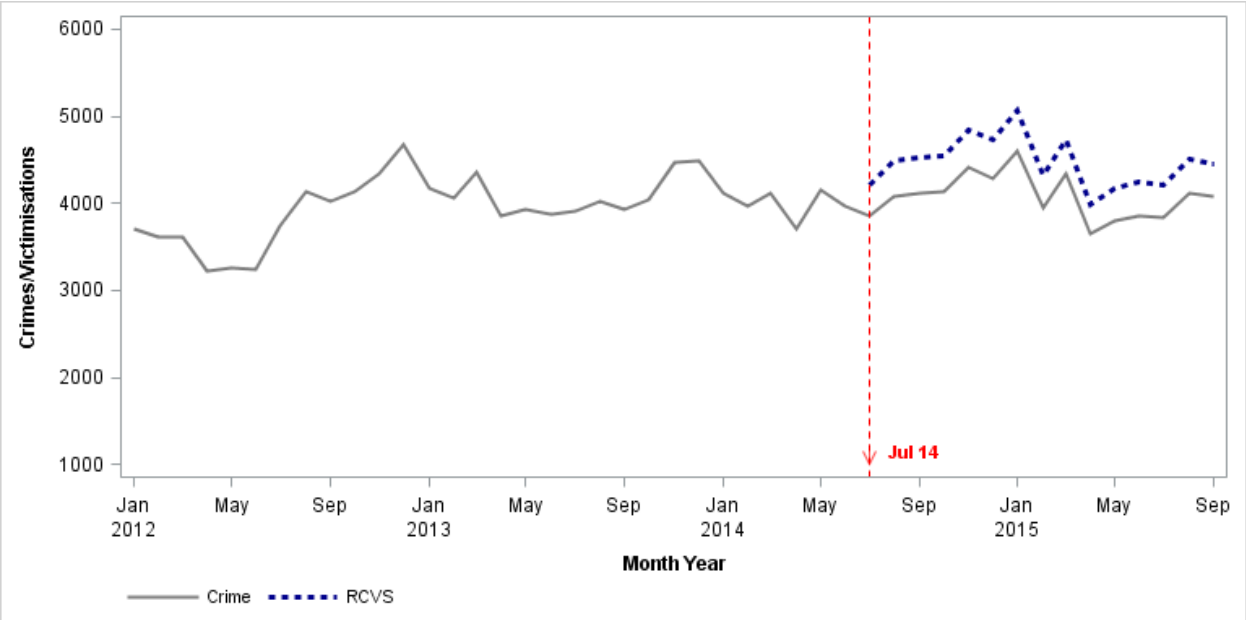


Figure 12: Statistics for crimes against property

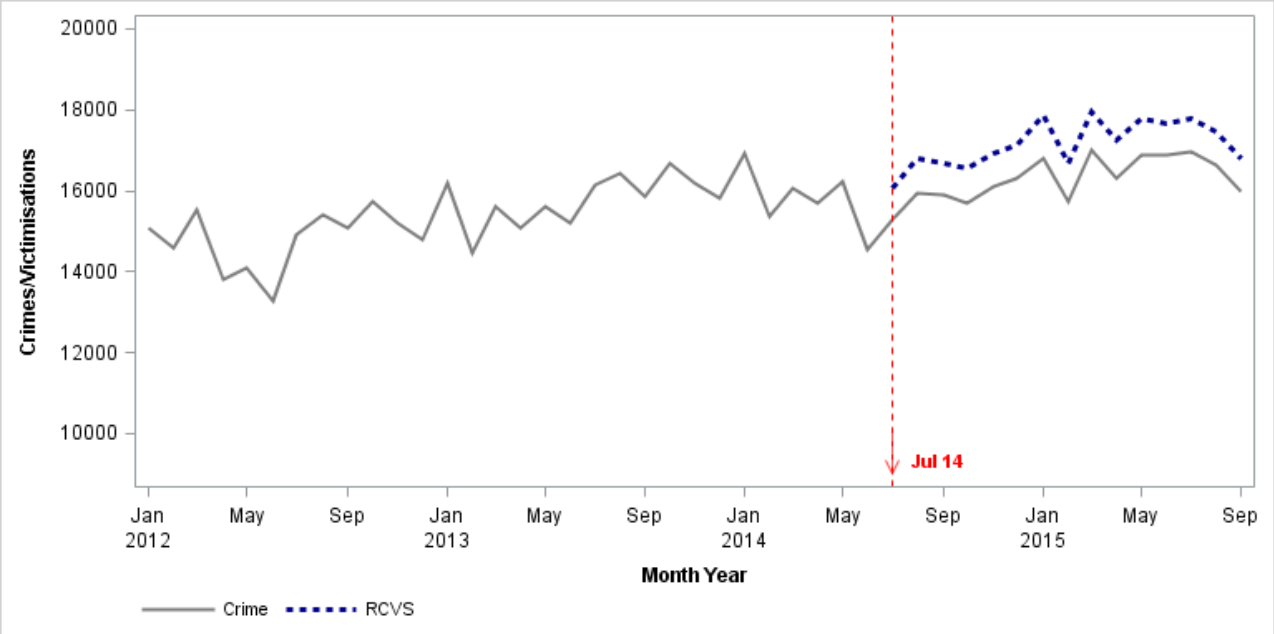


Figure 11 shows that, although there is some variation across the year, the long term trend in crimes against the person is relatively flat. Figure 12 shows a gradual long term increase in crimes against property. Growth in population over the same period has not been factored into these charts.

Because the trend in the Crime statistic reasonably reflects the trend in RCVS it has a useful short-term role to present crime trends across the transition from the old statistic to the new RCVS statistic. However, as RCVS develops a longer history over the next few years the value of the Crime statistic will reduce. Police therefore intends to make the Crime statistic available for an interim period until 2020 as a supporting statistic for RCVS.

The same approach can be used for a measure of crime resolution rate.

CHAPTER 4: Crime resolution rate

4.1 What is meant by 'crime resolution rate'?

Crime resolution rate is a measure of the proportion of crimes that Police successfully resolve. The specific way a crime resolution rate measure is defined varies around the world, and is affected by the counting-rule used for crime.

This chapter describes how NZ Police defines crime resolution rate in the old and new statistics, and uses the methods described in Chapter 3 to present trends in crime resolution rate across the transition from the old to the new statistic.

4.2 How was crime resolution rate counted in the old crime statistic?

The old crime statistic published by NZ Police counted offences recorded in Police Offence Reports. An offence was counted as 'Resolved' if Police apprehended one or more offenders by 14 days after the end of the relevant calendar or fiscal year. Crime resolution rate for a given period was reported as being the number of resolved offences divided by the number of offences that occurred during the period (and recorded within 14 days of the end of the year).

Because investigations can take many weeks or months to conclude, the old crime resolution rate contain a lot of statistical bias. Crime resolution rates for offences occurring in earlier months of the year were reported as being much higher than crime resolution rates for offences occurring in later months of the year. This distortion was a consequence of the counting-rule.

4.3 How is crime resolution rate counted in RCVS[7]?

RCVS counts victimisations, and includes the Outcome of Investigation 30 days after that matter was reported to Police.

RCVS enables crime resolution rate to be counted in different ways. In the present analysis a victimisation is counted as successfully resolved if Police apprehend one or more offenders within 30 days of the matter being reported to Police. The crime resolution rate for a given period is the number of successfully resolved victimisations divided by the total number of victimisations reported to Police in a given period.

The RCVS counting rule does not suffer from the same statistical bias that the old crime statistic had. However, some types of crime (particularly serious crime) typically involve lengthy investigations, so will often not be resolved within 30 days. To address this dynamic RCVS reports the Outcome of Investigation as at 7, 30, 90 and 180 days after the matter was reported to Police.

For simplicity, only the 30 day Outcome of Investigation measure is used in the present analysis because it best balances timeliness with completeness. Most successfully resolved investigations are resolved within 30 days, and using this measure avoids having to wait for three or six months to elapse before the measure can be reported.

4.4 Trends in crime resolution rate

Figures 13 to 15 present indexed crime resolution rate trends for the old crime statistics (INCOFF), RCVS and the interim Crime measure described in Section 3.2. Figure 13 presents the overall trend for all crime types included in RCVS.

As discussed above, trends in high volume crimes types can obscure trends in lower volume crime types. So, Figures 14 and 15 present trends in crime resolution rate for crimes against the person and crimes against property respectively.

[7] NZ Police is currently reviewing options for precise definition of crime resolution rate. As a result the figures presented in this report may change. It is not anticipated that any change would be large or affect overall trends.

Figure 13: Indexed resolution rate for all crime types

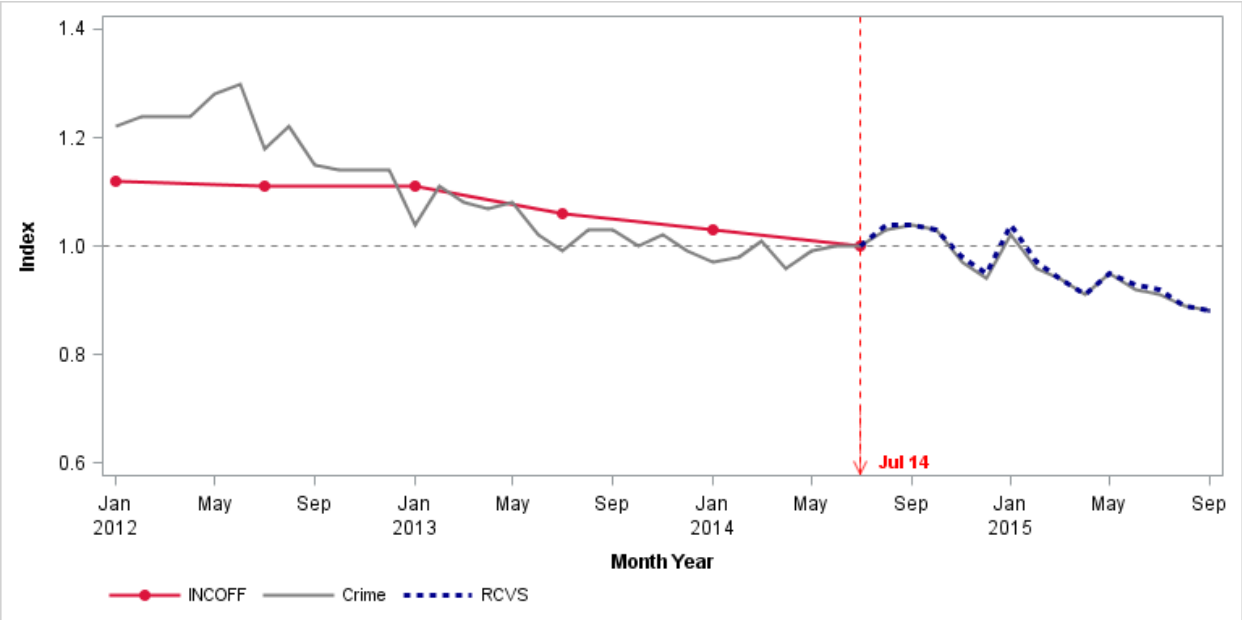


Figure 14: Indexed resolution rate for crimes against the person

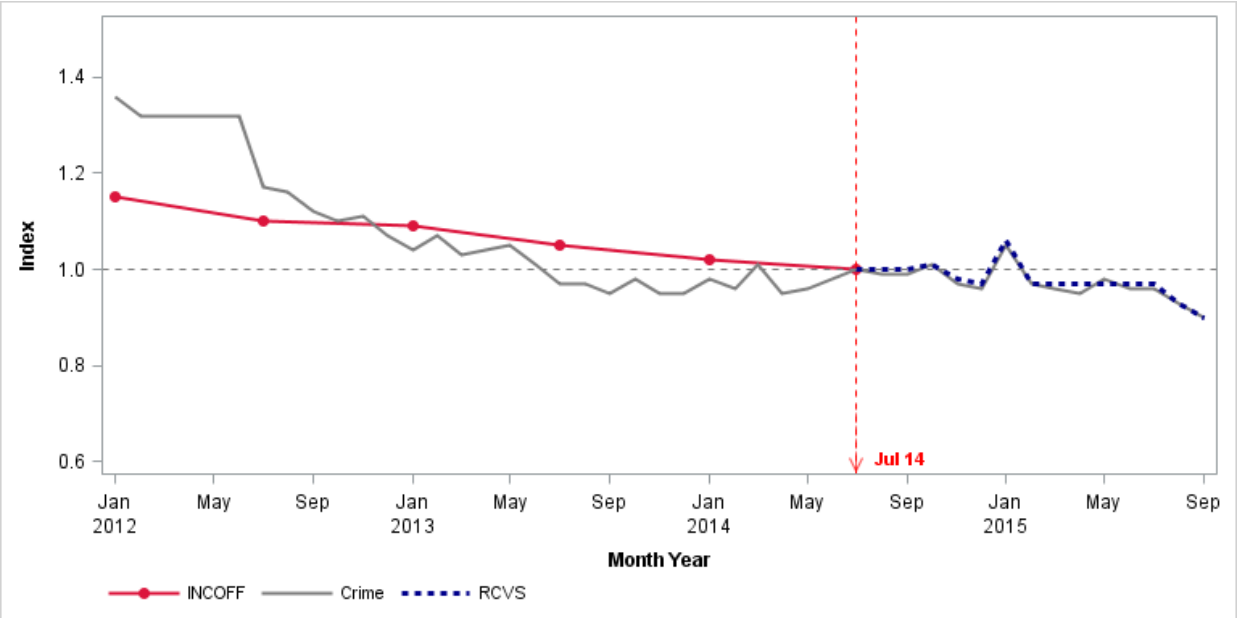
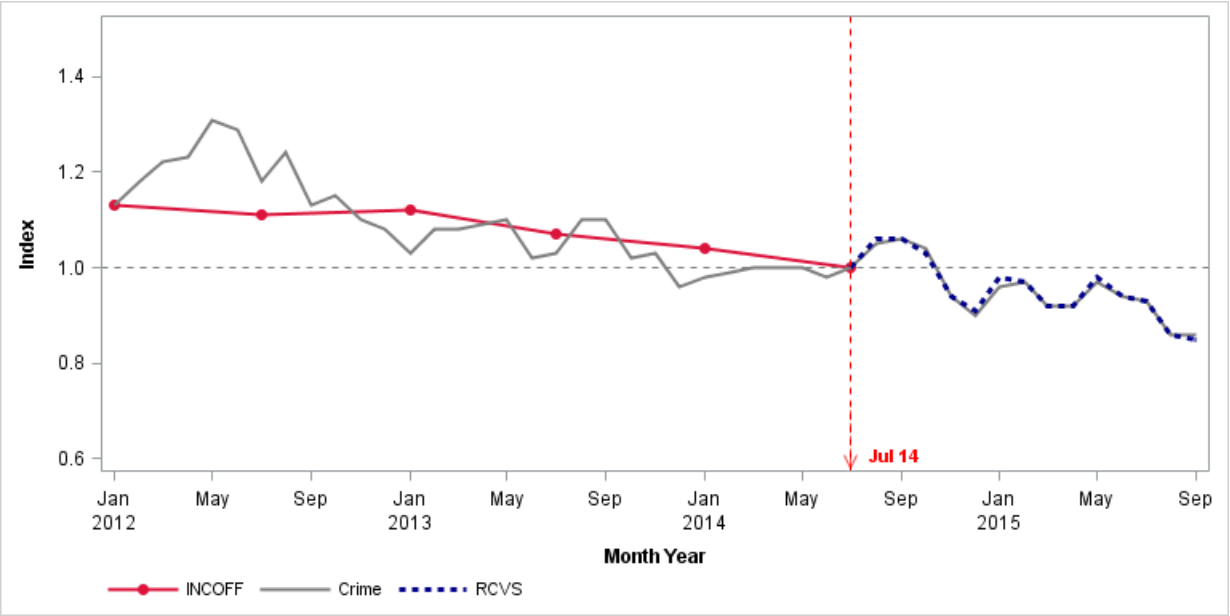


Figure 15: Indexed resolution rate for crimes against property



Crime resolution rate measures are particularly sensitive to variations in the mix of crime types because crimes against the person have much higher crime resolution rates than crimes against property. This is because the victim is always present in crimes against the person, but many crimes against property are not witnessed. An overall crime resolution rate is therefore not useful. Instead, with the introduction of RCVS New Zealand Police intends separately reporting crime resolutions rates for crimes against the person and crimes against property.

The rationale for this decision is evident in Figures 16 to 18, which present non-indexed crime resolution rates for the RCVS and the interim Crime measure. Figure 17 shows crime resolution rates for crime against the person to be more than double those of crimes against property.

Figure 16: Crime resolution rate for all crime types (at 30 days)

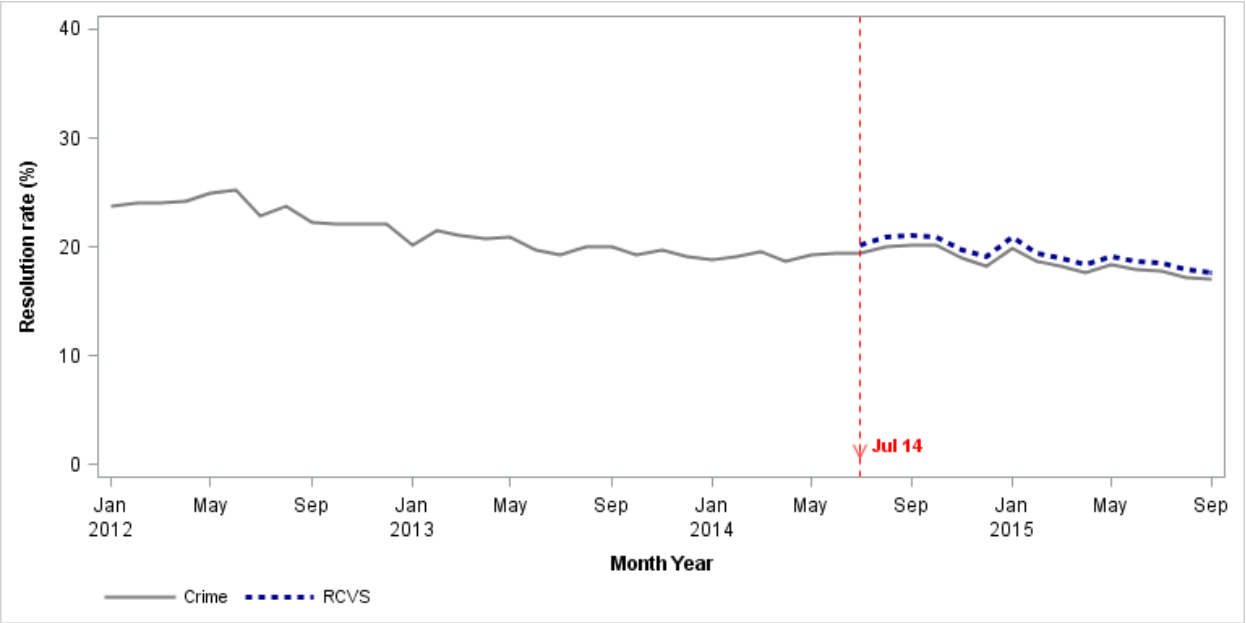


Figure 17: Crime resolution rate for crimes against the person

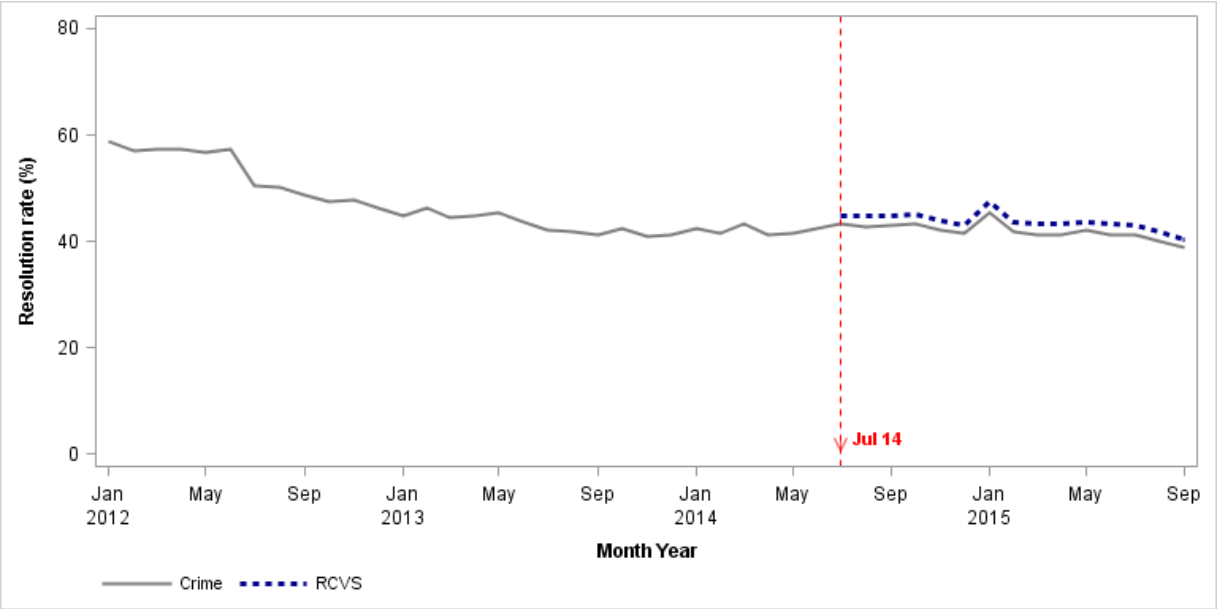
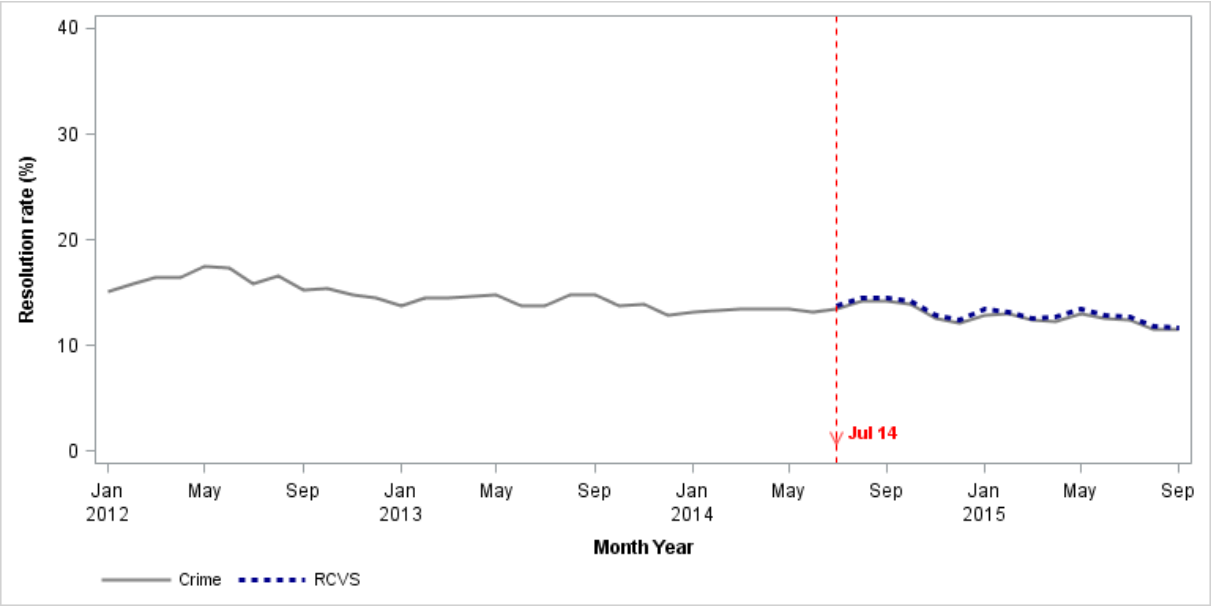


Figure 18: Crime resolution rate for crimes against property



The charts show a long term downward trend in crime resolution rates. This drop appears most evident in Figure 16. However, as illustrated in Figures 11 and 12, the volume of crimes against property is rising, but the volume of crimes against the person is not. Therefore the crime mix is changing over time to incorporate a greater proportion of crimes that typically have low resolution rates.

Figure 16 is therefore misleading. Resolution rates for more specific types of crime are not declining at the same rate as suggested by Figure 16.

Many factors (such as changes in crime reporting rates or Police priorities) can affect trends in crime and crime resolution rates. This report does not discuss causes of the observed trends.

Rather, the purpose of this report is to explain the change in crime statistics and to present methods for monitoring long term trends across the transition from the old to the new statistic.

Glossary

ANZSOC	Australian and New Zealand Standard Offence Classification – The way crimes are grouped into categories so that crimes of a similar type can be counted.
CARD	Communications And Resource Deployment – The dispatch management system used by NZ Police.
Counting rule	The mathematical criteria applied to data to report a statistical measure.
Crime	In general usage the word crime refers to breaches of criminal legislation. However, for statistical purposes the term has been used differently around the world. For example, it may refer to a specific offence such as a theft; elsewhere it may refer to a criminal incident in which one or more offences occurs at the same time and place, such as a house break-in where property is damaged and the victim is assaulted. The new interim 'Crime' measure referred to in this report is a statistical measure that uses the same counting rule used in RCVS, with the exception of the condition requiring an individual victim. The 'Crime' counting-rule is therefore to count of '1' for each unique combination of crime type (ANZSOC Division), reporting date, and Police file.
INCOFF	INCidents and OFFences – The database used to report the old crime statistic that was published by Police between 1978 and 2014.
Indexing	A method of adjusting the scale of two or more different statistics so that they can be overlaid in the same chart. In the present analysis statistics are indexed by dividing the value of the statistic for a given date by the value of that statistic for July 2014. This approach has the effect of showing how each statistic varies over time before and/or after this date.
LES	Law Enforcement System – The crime recording system used by Police until June 2005.
NCRS	National Crime Recording Standard – Australia's National policy document that governs the data recording practices in state and territory police agencies. Specifically, NCRS contains the rules used by police agencies in Australia for what data to record in Police systems for statistical purposes.
NIA	National Intelligence Application – The crime recording system that has been used by New Zealand Police since the closure of LES.
Normalising	Associated with indexing, normalising means adjusting values measured on different scales to a notionally common scale.
NRS	National Recording Standard – The policy document that governs the data recording practices within New Zealand Police.
Offence	In general usage the term offence refers to a breach of criminal legislation. However, the 'Offence' statistic produced from INCOFF excluded offences in cases that Police finalised upon initial attendance at the scene, and included 'offences' recorded for charging purposes. It also excluded historic offences –

	those occurring in prior years to the year in which they were reported to Police.
Offence Report	The written report completed by Police following attendance at a criminal incident that requires subsequent action to be taken.
PIC	Police Insights Central – The new data warehouse used by Police to produce RCVS.
RCVS	Recorded Crime Victims Statistics – The new official statistic for recorded crime published by New Zealand Police. RCVS in New Zealand was adopted from the Australian standard of the same name.
ROV	Relationship of Offender to Victim – RCVS contains many data items about crime and victims of crime. ROV is the data item containing the relationship of the offender to the victim. One use of ROV is to enable RCVS to report statistical information about family violence.
Statistical bias	Systematic over- or under-count of a statistical measure in a way that produces a misleading pattern. This report discusses statistical bias where the under-count varies for different dates in a way that produces misleading trends.
Under-count	(verb) To count a number that is lower than the true value of what is being measured. (noun) The amount by which a statistic is lower than the true value of what is being measured.
Victimisation	An instance of a victim experiencing a given type of crime. RCVS counts Victimisations. Mathematically, the RCVS counting-rule is to count of '1' for each unique combination of victim, crime type (ANZSOC Division), reporting date, and Police file.