Early Intervention to Reduce Complaints: An Australian Victoria Police Initiative
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Abstract

‘Complaints Profiling’, ‘Early Warning’ or ‘Early Intervention’ systems are currently seen as vital mechanisms for reducing police misconduct and improving police-community relations. This paper reports on the introduction of an early intervention system for police in the State of Victoria, Australia. The findings support the contention that such systems have a demonstrable utility in reducing complaints. A sample of 44 individuals profiled showed that interventions resulted in a 71.07% reduction in complaints, from an expected 121 down to 35 over a two year period. Additionally, the study showed that the financial cost-benefit effects were very positive, with reduced complaints resulting in an estimated saving of AU$3.2 million over the two years. A study of a sample of nine locations showed a 58.6% reduction in complaints, from a projected number of 60.6 down to 25 over a one year period, with an estimated saving of AU$1.4 million. The paper also describes the types of interventions used and a number of issues that arise from complaints profiling.

Background

Policing attracts large numbers of complaints. Many of these are about ‘customer service’ issues, such as alleged tardy responses or rudeness, rather than outright corruption such as bribery or fabricated evidence. Customer service issues need to be addressed in a responsive manner but complaints can also provide important information on corruption and more serious types of misconduct, such as assaults. However, complaints in themselves are generally a poor source of substantive information about police behaviour, often being in the form of uncorroborated allegations. Formal investigations are expensive and produce low substantiation rates (Prenzler 2002). In response to this problem of large numbers of complaints with limited legal standing, many police departments have been moving towards more productive and scientific applications of complaints data. By analysing complaint patterns in conjunction with other sources of information, remedial measures can be developed to address police-citizen conflict and possible misconduct (Walker 2005).

One of the earliest accounts of the use of complaints profiling is from the ‘Oakland Police Department Violence Reduction Project’ of the late-1960s and early-1970s (Toch and Grant 2005). The project was an early example of a form of problem oriented policing and action research. It was focused on the problem of physical conflict between police and citizens, but was also concerned with reducing crime and disorder problems by reducing provocation and improving public confidence in police. The Violence Reduction Unit was responsible for generating a new system for reducing conflict through an extensive consultation process and experimentation. The outcome was one of the best documented early warning and intervention systems. Officers who passed a threshold for involvement in violent incidents were required to attend a review panel in the unit. At the panel they discussed the incidents with their peers, identified patterns and factors in their behaviour and attitudes that may have
contributed to conflict, and made commitments to a changed approach to suspects. Over time the system produced marked reductions in violent encounters between police and citizens.

Projects like Oakland supported a 1981 US Commission on Civil Rights recommendation that all police departments should develop systems for identifying “problem officers” (see USCCR 2000). Subsequently, the adverse effects of neglecting complaints were dramatically illustrated in a study of excessive force issues by the 1991 Christopher Commission (which followed the Rodney King beating in Los Angeles):

Of approximately 1,800 officers against whom an allegation of excessive force or improper tactics was made from 1986 through 1990, over 1,400 officers had only one or two allegations. But 183 officers had four or more allegations, 44 had six or more, 16 had eight or more, and one had 16 allegations (Christopher, 1991: 36).

Interest in profiling and early intervention received a significant boost in 2001 when the US National Institute of Justice published a report *Early Warning Systems: Responding to the Problem Officer* (Walker, Alpert and Kenney 2001). The report was widely available via the internet on the NIJ’s ‘Research in Brief’ series. The national survey found that only 27% of a large sample of departments had an early warning system in place. However, the report also demonstrated the enormous potential for early intervention systems to reduce complaints. This was achieved through three case studies where intervention systems had a “dramatic effect” on reducing poor performance records and complaints. In summary, the following results were reported (Walker, et al, 2001: 3):

In Minneapolis, the average number of citizen complaints received by officers subject to early intervention dropped by 67 per cent one year after the intervention.

In New Orleans, that number dropped by 62 per cent one year after intervention.

In Miami-Dade, only four per cent of the early warning cohort had zero use-of-force reports prior to intervention; following intervention, 50 per cent had zero use-of force reports.

Despite the potential of early intervention systems to reduce complaints, improve conduct and reduce police-citizen conflict, the topic has attracted only limited research since the NIJ report. In the US, there have been some enlargements on the report focused primarily on guidelines for operating early warning systems (Walker 2003, 2005). One recent paper followed up on the issue of mitigating factors in complaints data. The study showed that police in high arrest areas attracted more complaints, indicating that profiling thresholds need to be adjusted according to the type of work police do (Lersch, Bazley and Mieczkowski 2006).

In Australia, a 2002 study set out general principles of early warning systems and noted anecdotal reports that the majority of Australian police departments had initiated some kind of early warning system, although details on procedures and impacts were not publicly available (Bassett and Prenzler 2002). A second study used Queensland Police data to demonstrate the potential for analysing complaints at the
level of police operational units (primarily stations) (Ede, Homel and Prenzler 2002). The study also attempted to control for the effects of different ‘task environments’ – by comparing units of similar size and similar duties – and by comparing complaint patterns in terms of concentration and prevalence. A high concentration of complaints was interpreted as indicative of a problem with small numbers of individuals attracting a large number of complaints. A high prevalence was considered indicative of a more diffuse problem that might be associated with negative aspects of the workplace culture. The analysis found units in all possible combinations of concentration and prevalence of complaints. Out of 436 units, 38 had no complaints and 79 had either a high concentration or a high prevalence. Five units had a combination of a high concentration and high prevalence. A number of implications were developed from these findings. For example, cases of high concentrations of complaints could be addressed with responses tailored to individual behavioural patterns. The issue of a possible negative culture could be addressed through reviews of management practices, with attention to issues such as supervision and staff morale.

**Complaints and Intelligence**

Good early warning systems integrate complaints data with as much information as possible in the form of ‘strategic intelligence’. Sources include data from internal compulsory reporting of incidents such as traffic accidents, high-speed vehicle pursuits, use of force, and discharge of a firearm; as well as supervisor reports, and human resource data such as sick leave and stress leave. On their own, these sources often say little of significance about an officer’s behaviour, and little of any legal standing. But put together across time they can show patterns of possible or probable misconduct, or at least a problem of excessive conflict with the public or other officers. Unsolicited complaints – primarily from the public but also internal complaints – are a key source and usually provide the backbone of any early warning system. However, the research on complaints against police presents a number of complexities and difficulties, summarised in the following points (see Lersch et al. 2006, Maguire and Corbett 1991, Bassett and Prenzler 2002).

- Police usually attract large numbers of complaints, as many as one for every two officers per year.
- Many more people are dissatisfied with their encounter with police but don’t complain.
- Most complaints lack legally admissible evidence in any criminal prosecutions or disciplinary procedures – even on the lower civil standard of proof (‘balance of probabilities’).
- Most complaints are not about classic corruption – in the form of graft, fabrication of evidence or serious assaults – but about perceived lack of response, rudeness or rough handling.
- Many complaints are generated by the nature of police work – entailing conflict, deprivation of liberty, the prospect of imprisonment and ‘heat of the moment’ decisions. These actions can be interpreted in quite different ways by participants and onlookers.
- Some complaints are vexatious.
- Most complainants appear to be sincere, even where the complaint is based on a misunderstanding.
Most complainants are not seeking retribution; rather they are interested in an explanation or apology.

Formal investigations, especially when conducted by police themselves, tend to increase complainant dissatisfaction.

Investigations, even when they involve some degree of independent oversight or supervision, typically result in substantiation rates of 10% or less.

Complaint statistics are difficult to interpret. For example, increases may result from increased misconduct, police arresting more offenders or increased public confidence in the complaints system.

Analyses of complaints consistently show that a minority of officers and units attract a disproportionately high number of complaints.

Closer investigation shows that above average numbers of complaints are often indicative of real behaviour problems.

The upshot of all this is that complaints are highly ambiguous but they do provide a barometer of sorts for police-citizen conflict and police misconduct. Police departments need to use complaints as one guide to public satisfaction and behavioural standards, and should try to reduce their incidence and severity. Early warning and intervention systems become a critical management tool viewed in this context. Tailor made interventions addressing behavioural or management issues can produce improvements evidenced in reduced complaints. This is most likely to assist public confidence and improve conduct when used in tandem with selective formal investigations and discipline, and with informal resolution through various forms of mediation and apology (see Ede and Barnes 2002).

**The Victoria Police complaints profiling and early intervention system**

The Victoria Police Ethical Standards Department (ESD) was established in 1996 and subsumed the more limited role formerly carried out by the Internal Investigations Division (IID) (Victoria Police 1997, p 16). IID was established in 1975, as the Internal Investigations Bureau (IIB). Prior to that time, the investigation of complaints was predominantly conducted within police districts. The introduction of IIB somewhat centralised this process, although investigations were still carried out in the districts. The ESD was a recommendation of Project Guardian, which was established to improve conduct in the Victoria Police following a series of internal problems, consultation with stakeholders and issues identified in Commissions of Inquiry into police corruption in other jurisdictions both in Australia and overseas (Victoria Police 1996, p.18). Within the ESD, the Research and Risk Unit (RRU) (located within the Risk Mitigation Division) holds a mission to identify corruption hazards and emerging ethical issues, and devise appropriate responses. Specifically, its mission is:

To provide and maintain the ideals of ethical standard excellence throughout Victoria Police, by providing a strategic assessment capability and conducting research into risk related behaviour, thereby ensuring the continued respect and confidence of the community and all members.

A core component of its work is to monitor all regions in Victoria to identify trends and patterns of complaints, and further analyse whether any individual member or work location is experiencing conduct problems as indicated by the type or frequency of complaints received and incidents recorded. The RRU regularly undertakes risk
assessments and profiles of individuals and locations. The ultimate purpose of RRU profiles is to provide as much information as possible to assist in developing options for management of a member or work location where a profile indicates there may be behaviour problems. The approach is based on the theory outlined in the literature review sections above.

Complaints about Victoria police can be made by members of the public and police members (sworn and unsworn). Complaints may be made in person, e-mail or phone, either directly to a local police station, the ESD or the external police “watchdog” body the Office of Police Integrity (OPI). Complaints can be made anonymously, although following up anonymous complaints is often difficult. All complaints either reported to Victoria Police or referred to them by OPI are eventually entered on the ESD computerised database ROCSID (Register of Complaints, Serious Incidents and Discipline). The database employs a classic ‘point and flag’ system to identify numbers of complaints considered above a tolerable threshold. When a member receives two or more complaints in a 12 month period, the database automatically flags these individuals. Once a member reaches the threshold an alert is sent via secure e-mail to all members of the Research and Risk Unit. A separate but linked database – the Multiple Complaints Database – is also available for Unit members to run reports to identify problem members and problem locations using specific categories.

Complaints are supplemented by additional sources in a multifaceted system. For example, profiles are also triggered by recommendations from regional Ethics and Professional Standards Officers (EPSOs). These six officers liaise between the ESD and other areas within Victoria Police. They cover each of the five police regions, with one covering all departments including crime and traffic. EPSOs provide advice to personnel on issues of ethics and professional standards. They assist managers to respond appropriately to ethical issues, including disciplinary actions, and assist in the delivery and evaluation of ethical and professional training within the districts.

In instances where complaints or management issues are identified, the RRU will liaise with the relevant EPSO and local management to jointly discuss any issues. If remedial strategies are required, the RRU and EPSO will assist local management by providing information on complaints trends to assist their decision making. The main method of communicating this information is a ‘Risk Summary’ or ‘Member Profile’, which brings together a range of indicators which have been identified over time. A typical profile takes four weeks to complete and entails a detailed analysis of the member’s complaint history and associated indicators related to their work including performance assessment information collected over their career, the member’s use of force or incidents where force has been used against the member.

Another database used to develop profiles is the Law Enforcement Assistance Program (LEAP). The LEAP database is used to identify members who have high incidents of assaults against them. This may identify members who have problems dealing with conflict situations or with specific segments of the public. It is also used to identify other patterns of offending against the member, or indicators of broader personal issues such as intervention orders.
The BART database is another source used in profiling. It contains a comprehensive record of all members who were implicated in Operation BART, which exposed a long term scam involving large numbers of police receiving kickbacks from emergency security hardware installers. Inclusion in the database might indicate vulnerability to corruption.

Databases include standard information on complaints such as the categories of complaints – including assault, ‘behaviour’ (e.g., rudeness) malfeasance and duty failure – as well as the age and gender of complainants, and the location of the alleged incidents. For profiles on individuals, personnel files are analysed and included in the profile (e.g., years of service, specialisations, any performance issues, supervisor reports and leave patterns). Personnel files also include previous disciplinary issues, breaches or orders. These data are cross-checked with the Discipline Advisory Unit database. Data are also sought from the civil litigation database, the Sheriff’s office, the Victoria Police Performance Assessment Unit and the Use of Force register.

Depending on the seriousness of possible misconduct shown in a profile, a member may be charged criminally or prosecuted by a disciplinary tribunal. In other cases, where considered appropriate, a remedial action plan will be developed. The RRU provides recommendations which accompany the profile and may form the basis for an action plan. There are also specialist support areas of Victoria Police, such as Equity and the Conflict Resolution Unit, which may provide advice in relation to components of any plans that fall into their area or recommend external consultants to assist the process.

EPSOs then supply the completed profile to Area Management, who then normally meet with the member to discuss the profile. The Professional Development Committee for the area may also become involved depending on the level of the problem. The meeting covers the dimensions of the problem behaviours and the recommendations for improving them. Options typically include training, counselling and alternate duties. A plan is drawn up in consultation with the member that is appropriate for their situation, taking into account all considerations. The plan includes periodic review and often an end date when appropriate measures should have been implemented. Throughout the duration of the plan, the appropriate managers are kept informed of the member’s progress. This can include the relevant Assistant Commissioner. After the plan has been completed successfully the member’s progress continues to be monitored through the EPSO, the member’s management and the regular performance management processes.

Profiling is also done on ‘locations’, such as police stations. Location profiles rely largely on complaints data, rather than other indicators which are more relevant in the assessment of individual members. The system does not yet use automated alerts, but relies instead on periodic reports which the RRU runs through the Multiple Complaints Database to identify locations with high incidents of complaints. Management reports are also used in a more anecdotal fashion to identify potential problems in specific locations. Location risk assessments are seen more as a tool to help management decisions, rather than to identify management shortcomings. Issues are identified which may be rectified by improved training, changing station level policies or processes, or other initiatives. The focus is on rectifying the problem identified for the location. If, as part of this process a member who has not previously
been identified as a problem is identified, then further work would be conducted on the member to identify the relevant issues to their performance.

Method

In order to assess the impact of the system of profiling and remedial intervention, a study was conducted of complaints before and after profiling. As noted, the number of complaints is the primary benchmark. Complaints cover a very wide field of possible misconduct, whereas other indicators may only be of value in relation to a specific problem (such as use of force or incomplete paperwork). Complaints mainly come from the public and are generated independently of police internal processes (such as performance evaluations or the recording of use of force incidents).

The study for individuals covers profiles conducted in the period 1997-2004, which enabled a full eight quarter data collection period after all profiles. ‘Profile’ here includes the whole process leading up to the initiation of a remedial plan. The criteria for selection limited the sample to cases that could be addressed predominantly by management intervention. Counts were taken of the number of complaint files recorded for each member profiled per annual quarter for the 16 quarters prior to the date of the profile and eight quarters after the profile. The total sample was 44. This included profiles of seven members who separated from the Victoria Police within the two year period after profiling and intervention. The separations were most likely attributable to the spotlight being on these members’ behaviour and should therefore be interpreted as positive outcomes. (Subsequently, a further 10 members separated from the after the two year period.)

In the case of individual member profiles, complaints mainly related to behavioural issues such as duty failure, minor assault, and possibly minor malfeasance. By the very nature of the location query, the range of complaints was much broader and the complaints could be highly serious. However, serious complaints were in the minority and other processes were in place to identify members with problems which required major individualised interventions.

With respect to work locations, only those complaint files received against members while serving at that particular location were counted. For the pre-profile counts, research was conducted on members stationed at the particular work location at the time of the profile. Post-profile counts were limited to four quarters. Research was conducted on members stationed at the particular location according to a daily duty roster. Due to factors such as separation and transfer, the members sampled at each location post-profile were not necessarily the same as those sampled pre-profile. The sample only included serving members for whom there had been at least nine quarters since the location’s risk assessment was disseminated. In this case, members that separated after the risk assessment were excluded from the sample because a location assessment takes into account factors which relate to the location environment, including station demographics and the service area of the station. Interventions occur at a station level and individual members would no longer be influenced by these local level changes once they have left the area. A location risk assessment may also include members who did not significantly contribute to the complaints figures and separated from the organisation or location for unrelated reasons.
The data for the location samples involved some overlap with the data for the individual profiles. Of the nine work locations, four involved members who had also had individual profiles completed in the same period. In one location it involved one member. In the other three it involved two members. Location summaries usually involve data from a large number of members, and have a varying focus. In all four cases the locations involved were substantial in size and one or two members did not represent a significant portion of the sample.

The impact of profiling was also assessed in financial terms. The operating budget of the Department in 2005/6 was used to calculate an approximate cost for each investigation, based on the average number of days it took to complete an investigation begun in 2005/6. This figure incorporates the cost involved in processing a complaint, taking into account various factors including the time to completion, the financial cost of personnel involved in processing the complaint from its initial receipt, and the costs of premises and equipment. Cases were highly diverse and include a number that are highly complex and take a long time to complete. The average cost for the period was approximately AU$40,105. This figure was used as the basis for the financial calculations.

**Findings**

**The Effect of Individual Profiles**

As a result of interventions developed from profiles on individual members the average number of complaints received per quarter decreased by 71.07%. As Figure 1 shows, for the sixteen quarters prior to being profiled, the sample of 44 members received an average of 15.125 complaints per quarter. However, for the eight quarters after the profiles were conducted, there was a significant reduction in the average number of complaints down to 4.375 per quarter ($t = 8.470$, $p < 0.05$). It was projected that the sample would have received a further 121 complaints over two years (15.125 per quarter) had they not been profiled by the RRU. Instead, they received only 35 complaints over the eight quarters following remedial interventions. Hence, it can confidently be asserted that 86 complaints were prevented.

Figure 1 about here

Figure 2 shows the average number of complaints per person for the sixteen quarters before and eight quarters after each profile was conducted. The trendlines indicate that prior to being profiled the average number of complaints received by the members was increasing, whereas after intervention the average number of complaints per member decreased. The trendline for the pre-profile complaints also demonstrates that had the RRU not conducted profiles on these individuals, the average number of complaints per member would have continued to increase. (A regression analysis showed the projected increase in the average number of complaints per member was statistically significant: $r^2 = 0.538$, $F = 16.32$, $p<0.05$).

Figure 2 about here

As noted, the ESD calculated the average cost of processing a complaint at $40,105. In monetary terms then, the prevention of 86 complaints saved an estimated
$3,449,030 over the course of two years. After deducting the wages of three RRU analysts involved in profiling ($180,000), the total net benefit to the Victoria Police in prevented complaints amounts to a projected $3,269,030 over two years.

An example of how an RRU profile and intervention operates is demonstrated by the case of a Constable dealt with in 1998. In the four years leading up to the profile the member had accumulated seven public complaints regarding alleged assault and incivility. The RRU profile identified a number of issues relating to the member’s intimidating approach towards members of the public, and several options for his future management were suggested. Regional management subsequently spoke with the member and options to modify his behaviour were discussed and acted upon. Part of the risk summary process involved the member at least partially admitting the problem. In the two years following the intervention the member did not receive any further complaints. On the basis of his record of past complaints, it was expected the Constable would have continued to receive an average of 1.75 per year had he not been profiled. The RRU profile had therefore prevented 3.5 complaints over two years.

**The Effect of Location Profiles**

Between 1998 and 2002 the RRU conducted profiles of nine work locations. Profiles were triggered by a number of factors, including management concerns and analyses of the multiple complaints database to identify possible at-risk locations. Nine locations were identified: five were ‘uniform’ and four were ‘CIB’ (detective branch). Table 2 shows the number of complaints recorded before the profile, the expected number of complaints without profiling, the real number of complaints after profiling and the percentage change. Interventions, as with member profiles, are tailored to meet the specifics of the location. They can range from re-training, addressing management issues, implementing or devising new policy or moving individual members to disperse members away from an area where problem behaviour appeared to have become ingrained.

Table 1 about here

Table 1 shows that the number of complaints decreased at every location for the four quarters after the profiles were conducted, with one exception (I) where no change was recorded. The largest decrease was experienced at F, where the number of complaints received was 100 per cent less than expected.

As a result of conducting profiles of work locations, the average number of complaints across locations decreased by just under 60 per cent. As Figure 3 shows, for the 16 quarters prior to being profiled the work locations averaged 15 complaints per quarter. However, after profiling and intervention they received an average of only six complaints per quarter. This reduction was less than for individual profiling, although it was still statistically significant ($t(173) = 2.85, p <0.05$).

Figure 3 about here

Figure 4 presents the average number of complaints per location for the 16 quarters before and four quarters after each profile was conducted. The trendlines indicate that
prior to being profiled the average number of complaints received by the locations was increasing, whereas, after profiling and intervention, the average number of complaints per location decreased. The trendline for the pre-profile complaints also demonstrates that had the RRU not conducted profiles on these locations, the average number of complaints per location would have continued to increase. The trendlines after profiling also show that the average number of complaints continued to decrease over the four quarters. (A regression analysis showed the projected increase in the average number of complaints per location to be statistically significant: $r^2 = .046$, $F(1,142) = 6.906$, $p<0.05$.)

Figure 4 about here

On the basis of the findings presented in Figure 3, it was projected that the locations would have received a further 60 complaints per year (15 per quarter) had they not been profiled by the RRU. Instead, they received only 24 complaints over the four quarters after being profiled, a prevention of 36 complaints. In monetary terms, the prevention of 36 complaints saved the Victoria Police an estimated $1,443,780 over one year. The full cost of the RRU staff had already been incorporated in the net savings of the individual member profiles, thus giving a total saving in this case. Due to the nature of location risk assessments a detailed financial breakdown of costs would be complex and difficult but would probably show an even greater net benefit.

Implications and Issues

As indicated in the method section, this study was limited to the impact of the early intervention system on the number of complaints, both public and internal, and the financial implications. However, there is a range of associated issues that require further exploration. These include issues such as police officers’ perceptions of the fairness and value of profiling, and any inhibiting effect the system might have on their willingness to do their job in a conscientious manner. Further research would also examine the outcomes of the early intervention system on complainants, some of who might have preferred a more punitive response or the opportunity for mediation.

One issue of interest concerns the lesser effect of the intervention system on complaints in the location study, as opposed to those in the individual study. It is possible that this resulted from the fact that individual interventions entail direct communication with the officers who are the subject of complaints. In the case of location interventions, individual officers with a small number of complaints will probably not be directly approached as part of the process. Consequently, the ‘treatment effect’ might be diluted. One option therefore is for location interventions to include meetings with all individuals in the location who were the subject of complaints or members who attracted the most complaints for their location.

As noted in the method section, the samples were relatively small and based largely on a trigger of two or more complaints over a 12 month period. Consequently, it might be possible to further reduce complaints by allowing profiles to be flagged at a lower threshold or applying other thresholds such as more than a certain number of complaints within any time frame. A more detailed assessment would be required to establish a normative benchmark for complaints. This could be done in part by benchmarking with other police departments and by surveying officers and members.
of the public about “reasonable” thresholds. More refined research might also reveal that some types of interventions (e.g. anger management training) are more effective than others (such as a simple meeting with a supervisor to alert the member to his problem areas).

Conclusion

Complaints represent a major challenge for police departments. They tend to occur in large numbers and are difficult to prove. Both formal investigations and informal resolution provide two quite different types of response, which may be appropriate depending on the circumstances. Complaints profiling and early intervention are also emerging as important tools for reducing complaints. This evaluation of the Victoria Police profiling system shows that interventions targeted at officers and locations that attract high numbers of complaints can be effective in reducing complaints. Apart from the benefits of reduced police-citizen conflict, and probable reduced police misconduct, there are also significant financial savings from reduced costs for processing complaints. At the same time, the current study was not able to evaluate all aspects of profiling. Further issues concern the effects of different types of interventions and the possible benefits to be achieved from lowering the complaints threshold for triggering profiles.

References


11.


Figure 1: Complaints for Sample Before and After Individual Profiles and Remedial Interventions ($N = 44$)

![Graph showing the average number of complaints per quarter before and after the profiles and remedial interventions. The graph indicates a significant reduction in complaints after the intervention.](image)

**Average Number of complaints per quarter**

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Before Profile</th>
<th>After Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15.125</td>
<td>4.375</td>
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</table>

Figure 2: Frequency of Complaints for Individuals Before and After Individual Profiles

![Graph showing the frequency of complaints per individual before and after individual profiles. The graph includes linear regression lines for both periods.](image)

**Linear Regression Lines**

- **Before Profiles**:
  - Equation: $y = 0.0233x + 0.146$
  - $R^2 = 0.5383$

- **After Profiles**:
  - Equation: $y = -0.0225x + 0.5598$
  - $R^2 = 0.7085$

13.
Table 1: Work Location Complaints Before and After Profiling and Intervention

<table>
<thead>
<tr>
<th>Location</th>
<th>Complaints before profile (16 quarters)</th>
<th>Expected complaints without profile (4 quarters)</th>
<th>Complaints after profile (4 quarters)</th>
<th>Per cent change</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>60</td>
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<tr>
<td>B</td>
<td>43</td>
<td>10.75</td>
<td>8</td>
<td>-25.6</td>
</tr>
<tr>
<td>C</td>
<td>32</td>
<td>8</td>
<td>4</td>
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</tr>
<tr>
<td>D</td>
<td>32</td>
<td>8</td>
<td>4</td>
<td>-50.0</td>
</tr>
<tr>
<td>E</td>
<td>20</td>
<td>5</td>
<td>2</td>
<td>-60.0</td>
</tr>
<tr>
<td>F</td>
<td>16</td>
<td>4</td>
<td>0</td>
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</tr>
<tr>
<td>G</td>
<td>16</td>
<td>4</td>
<td>2</td>
<td>-50.0</td>
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<tr>
<td>H</td>
<td>15</td>
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</tr>
<tr>
<td>I</td>
<td>8</td>
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</tr>
<tr>
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<td>25</td>
<td>-58.6</td>
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</tbody>
</table>

Figure 3: Average Number of Complaints per Quarter Before and After Location Profiles
Figure 4: Frequency of Complaints Before and After Location Profiles

![Graph showing frequency of complaints](image)

Legend:
- Blue line: Average No. Complaints Before Profile
- Red line: Average No. Complaints After Profile
- Black line with dots: Linear (Average No. Complaints Before Profile)
- Black line with triangles: Linear (Average No. Complaints After Profile)