



Better Policing Toolkit

Technical Appendix

John S. Hollywood, Kenneth N. McKay, Dulani Woods,
Andrew Lauland, Yingzi Zhang

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Preface

This research tool is a pilot project intended to address a series of explicitly stated needs among law enforcement agencies that stem from existing materials being too hard to find and too hard to use. This project has two broad objectives. The first is to synthesize and disseminate information on policing strategies (including summaries, key process steps, important things to do and to avoid doing, and specific examples) in a form that will be readily accessible to practitioners and decisionmakers. The second objective is to provide agencies with general assistance on implementing novel strategies. This objective stems from specific needs for law enforcement to develop adaptive leaders and support change management. It also reflects researchers' findings that programs with major implementation problems are associated with insignificant changes in crime levels. Because it is a pilot, the tool is expected to develop over time with improvements to the research core, content, and presentation and functionality.

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Overview of the Toolkit

This project has two broad objectives. The first is to synthesize and disseminate information on policing strategies—both from the RAND Corporation’s own data analyses and from prior efforts—in a form that will be readily accessible to practitioners and decisionmakers. This first objective is intended to address a series of explicitly stated needs (notably from the RAND Corporation’s Priority Criminal Justice Needs Initiative and the Justice Innovation Center) based on existing materials being too hard to find (including many articles blocked by paywalls) and too hard to use. Thus, this online tool and the articles it links to are intended to make key information on strategies (including summaries, key process steps, key things to do and to avoid, and specific examples) readily available. Inspirations include providing the equivalent of recipe cards for policing interventions, as well as the *For Dummies* or *Complete Idiot’s Guide* series of instructional books.

A key part of this first objective is to go beyond the typical presentation offered in prior meta-analyses of policing strategies. These presentations tend to focus their reporting on whether a broad class of interventions *works*, or is considered effective, which typically means whether the interventions reviewed in the meta-analysis, as a whole, were associated with statistically significant crime reductions. These presentations typically are similar to those used in reporting whether new drugs are effective in clinical testing. We have attempted to present not just what works but also tips on what factors make interventions within a given class more (or less) likely to work.

These tips come from two types of sources. The first type consists of secondary results in the meta-analyses, as well as findings in other articles and guides on what worked. The second type consists of new examinations of the studies in the meta-analyses, extracting features that made individual interventions more or less likely to work (i.e., be associated with improvements in a core metric, such as crime reduction). To do this, we performed a combination of content analysis and machine-learning to identify factors and drivers associated with better-performing interventions. We also identified illustrative examples for these factors and drivers.

The second objective of this project is to provide agencies with general assistance on implementing novel strategies. This objective stems both from law enforcement’s specific need to develop adaptive leaders and support change management and, more broadly, from business process improvements. It also reflects our findings that articles reporting major implementation problems tended to report insignificant changes in crime levels.

As with virtually any small-scale pilot research project, the amount of work we were able to do was constrained by funding and time. Key limitations include the following:

- We did not do a comprehensive literature search and screening. Instead, we relied on past meta-analyses for selecting the individual studies. These meta-analyses were based on research-quality criteria for selecting studies to include in the meta-analysis, most notably requiring some form of controlled experimental design. This method has the twin results of (1) limiting the studies reviewed to those that met specific screening criteria and (2) omitting experiments on strategies that have been newly implemented in the past few years because these would have been too new to be picked up by even fairly recent meta-analyses. It is our intent that future additions to this tool will incorporate more, and more recent, study results.
- We performed content analysis and machine-learning analyses on studies for two strategies—focused deterrence and problem-oriented policing (POP) for hot spots.
 - For other strategies, our approach was to synthesize actionable findings in prior key literature about them, providing details for each strategy.
 - For one key area—investigating homicides and other serious crimes—this tool points only to a detailed best practices guide that the Bureau of Justice Assistance already funded.
- Given the limited scope of the pilot project, the amount of resources spent on content analysis and resulting feature extraction were limited, covering fewer than a dozen attributes.

We see this research and the tool as a pilot. We plan on seeking additional funding to improve the research core, content, and presentation and functionality over time. On the research side, one task would be to explore interventions for improving community relations and legitimacy in more detail. A longer-term task would be to examine more data on law enforcement experiments through a combination of our own searches and additional meta-analyses; for the latter, we recently received a data call for the next update to the Campbell Collaboration’s hot spots study (Braga, 2017).

The rest of this technical appendix describes the research methods employed in the *Better Policing Toolkit* (Hollywood et al., 2018). Here, we discuss the general approaches taken in identifying the studies that were reviewed and in identifying and refining the policing strategies covered. This appendix also includes more-detailed discussions of the study processing, coding, and analysis methods.

Identifying Studies and Resources

We began the study identification processes with major meta-analyses of policing strategies and the studies listed by those analyses. These were all funded by the Campbell Collaboration, with involvement from the Center for Evidence-Based Crime Policy (CEBCP) at George Mason University in Virginia. Key meta-analyses were as follows:

- Braga, Papachristos, and Hureau (2012) for hot spots policing
- Weisburd et al. (2010) for POP
- Gill et al. (2014) for community-oriented policing
- Braga and Weisburd (2012) for focused deterrence
- Mazerolle et al. (2013) for procedural justice and legitimacy.

We entered the studies used in the meta-analyses into datasets (captured in Microsoft Excel). The descriptions of the fields for each study are on the codebook sheets of the workbooks provided. It was common for the same studies to be used by multiple meta-analyses; we deconflicted these so that there was a single record per study.

We drew additional results (and a few additional studies for our qualitative analysis) from other resources. The Office of Justice Programs has funded a range of educational materials that provide definitions and discussions of different types of interventions, along with key steps involved in setting them up and executing them. These include the CrimeSolutions.gov portal (National Institute of Justice, undated), the Community Oriented Policing Services office's core brochure defining community-oriented policing and key subsidiary activities (2014), and instructional materials on the Center for Problem-Oriented Policing's website (undated). Of special note is the Bureau of Justice Assistance–funded *Homicide Process Mapping* (Carter, 2013), a guide reflecting practices from law enforcement agencies with homicide clearance rates of more than 80 percent. These practices are very detailed and include ideal organizational structures for homicide (and other serious crime) investigation units, as well as detailed task lists to be carried out within the first 24, 48, and 72 hours of a homicide. Given that *Homicide Process Mapping* already provides a detailed how-to guide for practitioners, we decided to point to this guide and avoid redundant work during our pilot project.

The CEBCP's website provides additional guidance and results on the strategies and evaluation articles, especially their "What Works in Policing?" webpage (undated).

Intended to expand on the general findings about hot spots policing in Braga, Papachristos, and Hureau (2012), Groff et al. (2015) compares three such interventions in Philadelphia. The three experiments were designed to meet the research standards (controlled experimental

design, etc.) needed to be part of the Campbell Collaboration meta-analyses. Results from each of the three interventions were added to the dataset.

Braga, Welsh, and Schnell (2015) provides recent meta-analysis on both “community and problem-solving interventions designed to change social and physical disorder conditions at particular places” (including what we categorized as *POP for hot spots*) and “aggressive order maintenance strategies” (what we characterized as *zero tolerance and aggressive policing*). The tool notes this study’s top-level finding that the zero tolerance and aggressive policing efforts were not effective (in terms of being associated with significant reductions in crime). This article was incorporated into our study fairly late, via internet searches into zero tolerance and aggressive policing strategies. In scanning the component studies, we further noted that of the nine “aggressive order maintenance” strategies, only one was associated with significant crime reduction. This one study appears to have been a focused deterrence intervention, as it was described as a crackdown on known violent gang members.

Identifying Strategies

Identifying policing strategies for this project was an iterative process. The objective was to identify a set of logical categorizations for policing interventions that (1) followed existing strategy names and categories as closely as possible while (2) using clear, plain-language definitions and strongly differentiated logical groupings of strategies.

Our team began with the strategy names from the meta-analyses already described, with the addition of *zero tolerance and aggressive policing*, a vernacular term that meets our criteria and represents a commonly used strategy in a logical grouping. We made several changes from this initial taxonomy after reviewing the meta-analyses and individual articles.

First, we noticed most POP (or “problem-solving”) studies concerned interventions for areas seeing elevated risk of crime—i.e., hot spots. Thus, we created one combined strategy we named *POP for hot spots*.

Second, there appeared to be a clear difference between interventions that simply increased staffing in hot spots, usually for random or “high-visibility” foot or vehicle patrols, as opposed to problem-solving interventions. That led to having *POP for hot spots* and *presence patrol* strategies. Braga, Papachristos, and Hureau (2012) noted a distinction between POP and increased presence interventions for hot spots; we felt it would be useful to call the two approaches out separately in the tool. It should be noted, however, that our analysis of POP for hot spots did include presence patrol interventions, as will be described.

Third, a few studies included in the meta-analyses referenced cases of officers systematically guarding small areas (roughly within a single officer’s line of sight) for up to 24 hours per day. This grouping appeared to be fundamentally different from other strategies working to cover much larger areas (e.g., neighborhoods). That led to having a *saturation policing* strategy.

Fourth, given the major differentiation between working with people and working in geographic areas, *focused deterrence* interventions were always treated as one strategy.

We treat the practices to investigate serious crimes, laid out in *Homicide Process Mapping* (Carter, 2013), as a separate strategy.

Zero tolerance and aggressive policing is also treated as a separate strategy. Here, our working definition of this strategy (as opposed to problem-oriented strategies, including order maintenance) is the following:

stopping, questioning, and frisking pedestrians or drivers in an area when an officer believes a subject is acting suspiciously and subsequently arresting the subject for offenses when possible; typically, arrests [when they occur] are made for low-level offenses, such as possessing marijuana. A defining difference between zero tolerance interventions and other strategies is that zero tolerance strategies are not discerning; the focus is on making stops and arrests to crack down on all types of disorder, generically defined.

Finally, the *standard model* of policing is included as a baseline; here, the term refers to a strategy emphasizing unguided or random patrol, attempting to achieve minimum-time responses to calls for service, and carrying out enforcement and arrests as opportunities arise. (Kelling and Moore, 1988; see also CEBCP’s description of the standard model of policing, on the “What Works in Policing?” webpage, undated).

We also found two common law enforcement strategies for which the real-world definitions appeared to be too broad and indeterminate to be treated as discrete strategies. These terms have become catch-alls that might be used to refer to a range of strategies that are significantly different or even conflicting. The first of these is *broken windows* policing, which can nominally include any intervention that seeks to reduce visible indicators of disorder—and, as a result, can be used to refer to interventions that range from POP (and more specifically, crime prevention through environmental design interventions) to zero tolerance policing. The second such term is *community-oriented* policing, which can nominally include any intervention with a community partnership, with the term *community* broadly defined (e.g., Community Oriented Policing Services, 2014; Gill et al., 2014).

For each strategy, we attempted to provide a short title describing what the strategy does, followed by the previously specified policing jargon for it (if applicable).

Content and Machine-Learning Analyses of Studies

This chapter applies strictly to our reviews of POP for hot spots and focused deterrence interventions.

Generally speaking, given the limited and pilot nature of this study, our attribute codings came strictly from the text of the study articles, article abstracts, and meta-analysis descriptions. We did not attempt to contact the study authors or others familiar with the strategies to determine whether additional codes were warranted. This does mean that the codes reflect what the study authors chose to note in their write-ups of the experiment, which means that attributes that were, in fact, present might be missing from our codes (or might have been captured incorrectly). That said, we do believe that coding what the authors (typically research partners and/or evaluators) captured as worth documenting should still produce findings of interest.

Attributes were manually and iteratively inferred from the intervention descriptions. We looked for attributes that appeared to describe substantial, defining characteristics and that applied to more than one, but not to all, studies.

Coding was done primarily by one researcher with at least one other researcher doing separate coding and reviewing the original coding. Coding was done directly in Microsoft Excel, with tags being implemented as columns, where “1” indicated the factor was unambiguously present and “0” indicated it was not. Any major ambiguities were also coded as “0;” examples of ambiguities include unclear descriptions or cases where an intervention was designed to carry out a specific tactic but there were reports the tactic was carried out only sparsely, if at all.

Our project team initially experimented with some “0.5” ratings for ambiguities, but this approach resulted in the clustering algorithm producing ambiguous clusters of studies that did not appear to have any clear explanation (in large part because non-Boolean factor attribute labels complicate clustering and the resulting interpretation of clusters). The coding process included pulling out relevant quotes from the articles or the meta-analysis descriptions (depending on which was clearer and more concise). We held two teleconferences to resolve any coding disagreements.

Segmenting the studies into similarity groups was done using the machine-learning algorithm hierarchical clustering; for more on this algorithm, see Manning, Raghavan, and Schütze (2008). In brief, the algorithm iteratively merges the two data sets (that initially are individual records, and then are groups of records) that have the most field values in common, as measured by a mathematical function. The result looks like a tree, with records on the same “limbs” and “branches” being mathematically closer together than other records; the tree can be displayed using a chart called a *dendrogram* (we include examples for each study). The algorithm was implemented using the Wessa web interface to R (Wessa, 2017); the merging

method used was Ward’s method (1963), which is the Wessa default and produces “spherical” clusters, consistent with different clusters of records representing overarching types or classes.

We now consider the analyses for each type of strategy separately.

Analysis of Focused Deterrence Strategies

Braga and Weisburd’s meta-analysis of focused deterrence strategies (2012) included ten eligible studies, with nine showing a significant decline in at least some type of crime. Braga and Weisburd did note that all ten of the studies used nonrandomized quasi-experimental designs versus a randomized design, which was a concern, noting that randomized studies tend to produce less-significant results than quasi-experimental studies.

We reviewed the article descriptions and articles, focusing on those passages describing the intervention itself. From reading the ten descriptions, we iteratively inferred four attributes derived by comparing programs that appeared to describe substantial characteristics of groups of studies. These four attributes were the following:

1. whether the intervention studied was intended to deter persons from engaging in violence directly or to deter persons from engaging in narcotics or other criminal activity (With the latter, articles sometimes described a theory of practice that by deterring narcotics activity, violence would be reduced as a secondary effect.)
2. whether the intervention studied included formal intervention meetings at which persons were told they were facing the risk of enhanced targeting, why, the impact their criminal activity was having on the community, and what they could do in response
3. whether descriptions noted that the leaders of the intervention attempted to copy Boston’s Operation Ceasefire intervention—commonly described as an archetypal focused deterrence strategy (e.g., Braga et al., 2001)—as faithfully as possible. (Virtually all focused deterrence interventions have been intended to “copy” Boston’s Operation Ceasefire in some form. The distinction here is whether the write-up described an attempt to copy all aspects of Boston’s Operation Ceasefire as completely as possible, or whether the write-up described an intervention roughly inspired by Boston’s Operation Ceasefire and missing major pieces.)
4. whether the intervention included having some part of the community provide ongoing monitoring and support of the subjects in addition to just law enforcement efforts.

We tagged which evaluated site had which attribute and used hierarchical clustering to identify groups of studied interventions that had similar attributes. We used the largest four branches of the resulting hierarchical clustering dendrogram, which correspond to the four clusters with the largest collective differences between them. Table 4.1 shows the common attributes for each group, with the percentage for studies in each cluster having that attribute in common. In Figure 4.1, each of the four major branches reflects one cluster, with the numbers on the vertical axis reflecting record identifications. The width of the branch lines on the horizontal axis reflects the distances between groups of records. We have labeled the branches with the cluster they represent.

Table 4.1 shows how much violent crime was reduced, on average, for sites within each group, noting that the average reduction is for “adjusted” rates. This is because the studies

Table 4.1
Common Attributes Among Groups, by Percentage

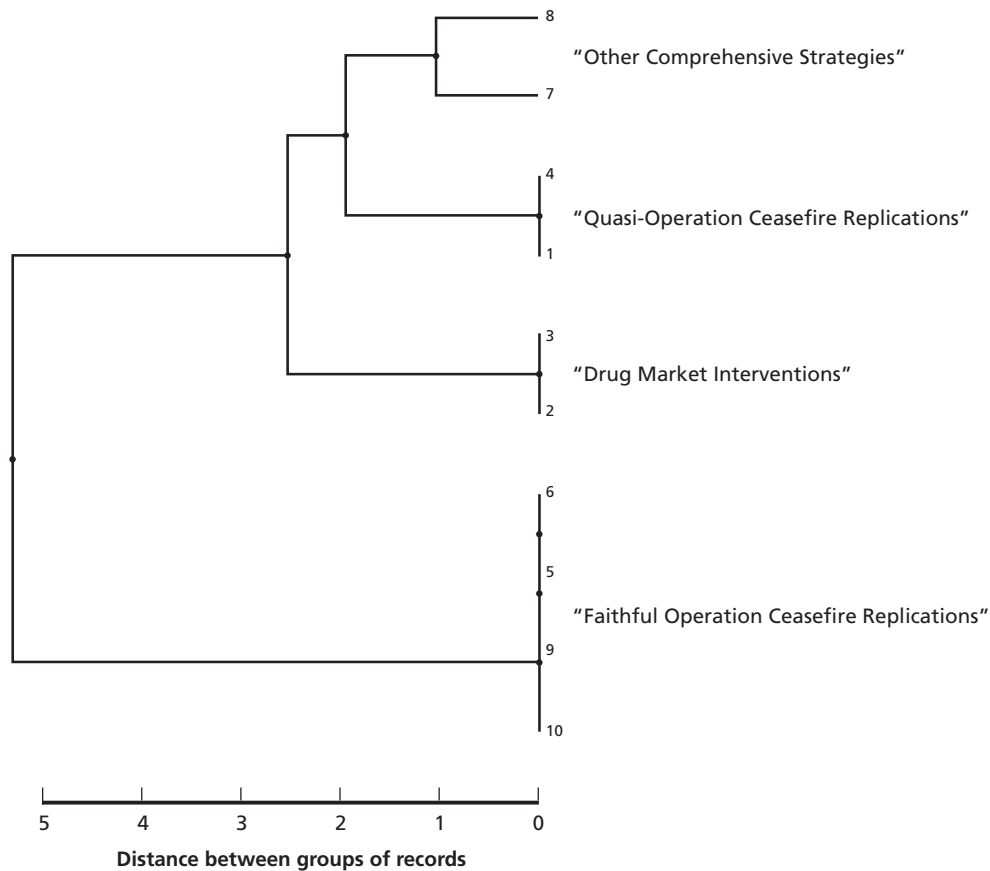
Group Description	Deters Violence (not drug trafficking)	Has Formal Intervention Meetings	Copied Boston's Operation Ceasefire	Has Ongoing Community Support	Average Reduction in Violent Crime (adjusted)
"Faithful Operation Ceasefire Replications" (4 sites) Committed efforts to copy Boston's Operation Ceasefire (extremely high fidelity), with some tailoring	100	100	100	100	32
"Other Comprehensive Strategies" (2 sites) Committed focused deterrence efforts not directly copying Boston's Operation Ceasefire	100	100	0	50	30
"Quasi-Operation Ceasefire Replications" (2 sites) Efforts with less commitment and/or fewer intervention elements than Boston's Operation Ceasefire	100	0	0	0	7
"Drug Market interventions" (2 sites) Efforts that focused on deterring subjects from narcotics trafficking	0	100	0	0	0

reported two types of crime reductions. The first was reduced crime within high-crime areas or with high-risk populations. The second was reduced crime for an entire region. To make the two roughly comparable, reported reductions for only high-crime areas and high-risk populations were reduced by 50 percent. This rule reflects a rough approximation that 50 percent of crime occurs in reasonably actionable hot spots and/or among high-risk populations.¹ Changes in crime rates that were not statistically significant were adjusted to 0 percent. Note that all reductions reported were in relation to control groups, not absolute (i.e., a difference-in-differences method was used).

As shown, sites that adapted Boston's Operation Ceasefire or an alternate comprehensive strategy, explicitly deterred violence (not drug trafficking), had formal intervention meetings, and leveraged ongoing community support for subjects outside of police presence did better, on average, than those that did not. The differences in the average crime reductions across groups are statistically significant; a one-way Analysis of Variance (ANOVA) test rejected the null hypothesis that the average reductions were the same with $Pr(>F) = 0.005$. Wessa.net was again used to run the ANOVA test (Wessa, 2017).

¹ In practice, the amount of crime in labeled hot spots can vary greatly, depending heavily on the hot spot identification methods used, the real-world distributions of crimes in specific jurisdictions, and (probably most importantly) how many resources agencies can devote to their hot spots. That said, 50 percent of crime in a jurisdiction being in hot spots is a typical approximation (see, for example, Lee and Gorr, 2017; Weisburd et al., 2004; Weisburd et al., 2010; Braga, 2007). Braga (2007) opens with the following: "In recent years, crime scholars and practitioners have pointed to the potential benefits of focusing crime prevention efforts on crime places. A number of studies suggest that crime is not spread evenly across city landscapes. Rather, there is significant clustering of a crime in small places, or 'hot spots,' that generate half of all criminal events." Fifty percent (0.5) is also a reasonable estimate for a heavily uncertain value between 0 and 1 (here, "reasonable" is based on maximum entropy arguments).

Figure 4.1
Dendrogram of Largest Collective Differences



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Analysis of Problem-Oriented Policing for Hot Spots Studies

This analysis covers both the POP for hot spots and presence patrol for hot spots strategies.

We identified and reviewed a total of 34 experimental evaluations, drawn from three meta-analyses: hot spots interventions (Braga, Papachristos, and Hureau, 2012; Braga, Papachristos, and Hureau, 2014), problem-oriented policing (Weisburd et al., 2010), and community-oriented policing (Gill et al., 2014). For community-oriented policing, we incorporated six of the experiments from Gill et al. because the others did not appear to include problem-oriented policing directed toward elevated crime areas as a component (or included it only as a very small component), instead describing more-generic measures, such as having a community relations liaison officer. We also included three experiments from a recent study comparing various types of interventions in Philadelphia (Groff et al., 2015).

After reviewing the descriptions of the interventions, we inferred nine characteristics of the types of problem-solving strategies used (including visible patrols) and more-general implementation issues. While they are not coded explicitly, we also identified example implementation problems and tips for success that we used to write the POP process checklist.

An additional complication for studies of POP for hot spots was that some studies included reduction results for multiple types of crime and disorder. The rule to select one result per study was to use the most serious type of crime reported. In practice, this meant using results for Part 1 crimes, such as counts of homicides, robberies, thefts, and motor vehicle thefts, over all calls for service and over counts of drug and disorder offenses. We did record some studies that saw significant reductions in drug and disorder counts but not Part 1 crime; these were all cases of interventions directly targeting drugs and/or disorder rather than Part 1 crimes.

We experimented with trying to cluster the studies based on all nine attributes at once. The resulting clusters did not lend themselves to ready interpretation as to why the studies were grouped together. It was hard to see how sets of attributes' presence (or absence) were strongly related to being in a specified cluster; this result is not that surprising when one considers the mathematical and interpretive complexities that can result when working with nine different factors simultaneously. In response (and in contrast to the focused deterrence studies), we examined the nine factors individually.

Table 4.2 shows the impacts of the different attributes on how much crime, on average, was reduced during the experiments. As with the focused deterrence studies, percentage-point crime reductions are for complete jurisdictional areas, such as entire districts; for evaluations reporting crime drops only within targeted hot spots, reductions were cut by 50 percent, reflecting a rough approximation that about 50 percent of crime will be in readily actionable hot spots. Similarly, changes in crime rates that were not statistically significant were adjusted to 0 percent. Again, all reported reductions are in relation to control groups. Statistical significance was assessed using a two-sided *T*-test in Microsoft Excel that assumed heterogeneous variance between the groups with and without the attribute. Results significant at the 0.05 level are marked with a star, and results significant at the 0.01 level are marked with two stars.

Clustering on just the three statistically significant attributes yielded the three clusters in Table 4.3.

Table 4.2
Impact on Crime, by Attribute

Attribute	Average Crime Reduction with Attribute (%)	Average Crime Reduction Without Attribute (%)	Statistical Significance (P-value)
One or more forms of aggressive order maintenance	20	8	0.256
Visible patrols to deter crime (vehicle or foot patrol)	7	12	0.287
Targets open-air drug selling	7	12	0.315
Targets some form of disorderly conduct	11	9	0.595
Arranges environmental changes	10	10	0.975
Works with private property owners to improve site security	10	10	0.934
Arranges getting services to the community	19	8	0.015*
Involves collecting and acting on tips from the community	22	6	0.001**
Substantial fidelity problem reported	3	13	0.024*

* Results significant at the 0.05 level.

** Results significant at the 0.01 level.

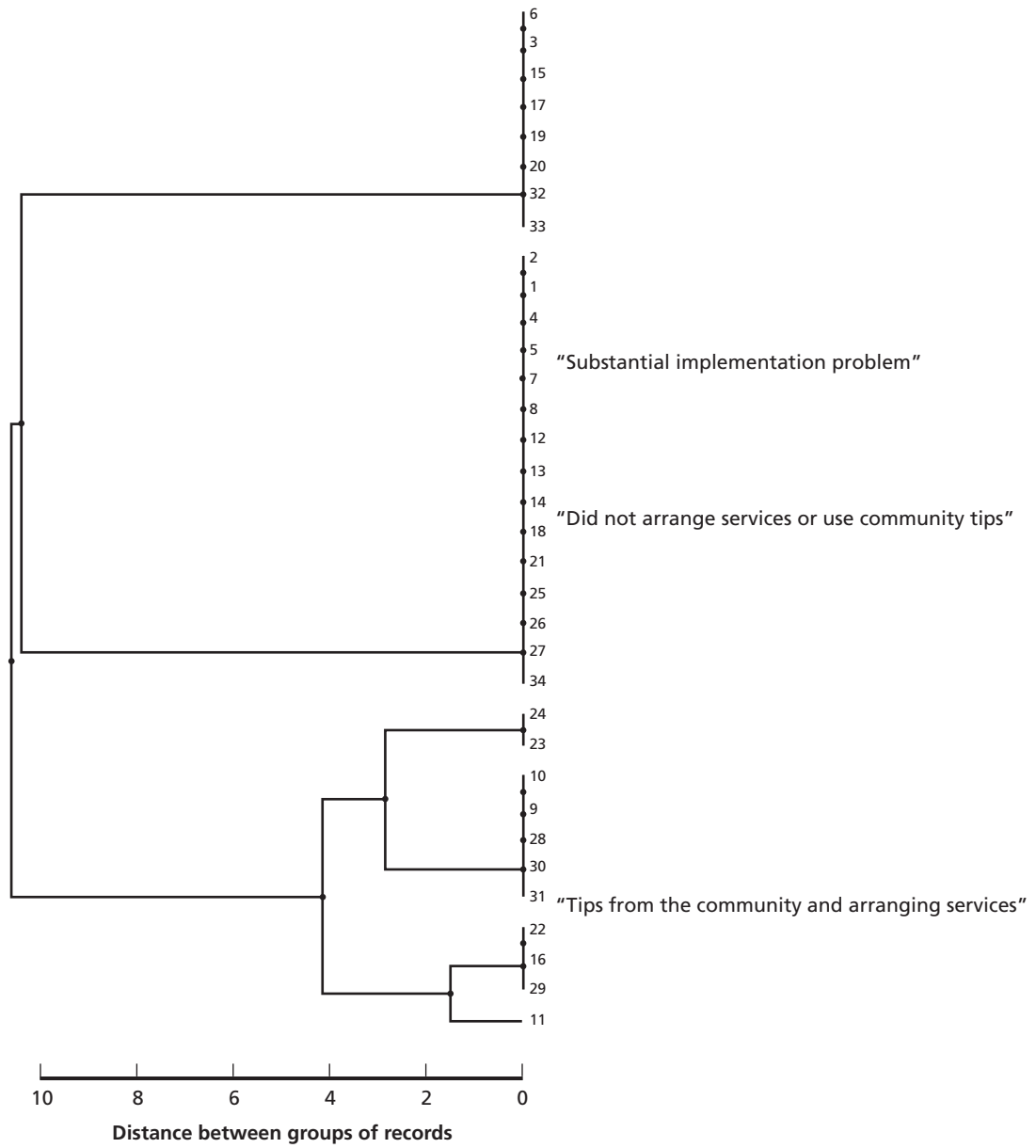
Table 4.3
Clustering on Three Significant Attributes

Group Description	Arranges Services for Community (%)	Gets and Acts on Tips from Community (%)	Substantial Implementation Problem (%)	Average Reduction in Crime (%)
Initiatives with major fidelity problems reported	0	0	100	1
Initiatives include both getting tips from the community and arranging services	64	82	9	22
Other—including neither community services nor collecting and acting on tips	0	0	0	6

In Figure 4.2, which depicts the dendrogram producing these clusters, the three large branches correspond to the three clusters.

As shown, POP initiatives that included getting and acting on tips from the community and arranging services, and that also (mostly) avoid major implementation problems, tended to see greater crime reductions. The divisions between the clusters collectively are statistically significant with a P -value of 0.0004, using a one-way ANOVA test (Lowry, undated; the Wessa portal was not working at the time the analysis was done). Comparing individual groups, we see that the group including community tips and services has significantly greater crime reductions than either of the others, with P -values of less than 0.01 for each. The difference in crime reduction between the other two groups was not statistically significant.

Figure 4.2
Dendrogram of Three Significant Clusters



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Syntheses of Prior Findings and Documenting the Results for the Tool

In summary, findings (definitions, how-tos, tips on what to do and what to avoid) that are documented for each strategy come from the following sources:

- previous educational material (mostly funded by the Department of Justice) describing the concepts of the strategies
- findings (beyond assessments of “works” or “does not work”) contained in meta-analyses
- key results from studies pointed to by both those sources, the CrimeSolutions.gov and CEBCP websites, and light internet searches (As mentioned, the limited scope of the project precluded a full literature search.)
- illustrative examples from specific studies named in the meta-analyses
- content and machine-learning analyses (focused deterrence, POP for hot spots, and presence patrolling only).

The tool was developed as a mind map (in Xmind 8), which can be thought of as a visual outline that can be expanded or contracted dynamically depending on a given reader’s interest. Different “branches” of the mind map for each strategy provide a definition (what it is), steps in a process (how to do it), and both tips and illustrative examples (what to do and what to avoid).

Individual white papers are meant to provide a bit more background and detail and to serve as a reference that can be used offline. These were inspired by recipe cards and the *For Dummies* or *Complete Idiot’s Guide* series of instructional books. The white paper on POP for hot spots also includes material on general problem-solving processes because that strategy requires custom tailoring solutions to crime problems. The research for this material was conducted in a manner similar to that for the change management guide.

Preparing the Change Management Guide

We found few examples of applications of contemporary strategic management and change management practices related to law enforcement. Thus, the change management guide is intended to import what are considered generally reasonable and widespread strategy and change management practices into law enforcement. (This is also the case for the problem-solving process material in the guide for POP for hot spots.) Material reflects a combination of our research team's decades of experience with strategy development, operations management, and implementation, as well as key references in these areas. The change management guide identifies a dozen barriers to effective change implementation that are common and widely known, and that we found applied to many of the interventions described in the studies. For each barrier, the white paper suggests tips to address it. The problem-solving process material is similar but is structured around a well-known process from the operations management field that is intended to integrate both operational experience and formal analysis and planning (Shiba and Walden, 2002).

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