



# Impact evaluation of the national plan for community policing in quadrants

Fundación **Ideas para la paz**

# **Impact evaluation of the national plan for community policing in quadrants**

**Metropolitan areas of Bogotá, Medellín, Cali, Barranquilla,  
Cúcuta, Bucaramanga, Pereira and Cartagena**

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## Introduction

The monitoring and evaluation of the National Plan for Community Policing in Quadrants (PNVCC) by the Ideas for Peace Foundation (FIP) responded to the National Police's interest in involving an independent institution in the observation of the strategy's progress and the identification of ways to improve the plan. Similarly, the Police requested an objective evaluation of the strategy's impact on crime and misdemeanor rates, and on citizen perceptions of security in the eight metropolitan areas in which the first phase of the PNVCC was implemented: Bogotá, Cali, Barranquilla, Medellín, Cúcuta, Cartagena, Bucaramanga and Pereira.

The purpose of this document is to delineate this process and present the results of the monitoring and impact evaluation of the PNVCC in the eight metropolitan police departments that initiated implementation of the strategy in the period from July 2011 to July 2012.

The National Police provided crime and misdemeanor information for 25 crimes and 25 misdemeanors over the period 2007 to 2012. The information related to perception and victimization was provided by the Bogotá Chamber of Commerce, which was involved in the evaluation in its entirety, in particular with respect to the evaluation of the city of Bogotá.

The framework in which the evaluation was developed is presented in the first section of this report, taking into account the objectives and goals of the PNVCC as illustrated in institutional documents and revisions. The evaluation examines the adoption of the PNVCC in the technical, operational, and organizational conditions established by the police, and whether or not this implementation impacts crime and misdemeanor rates.

Secondly, this report describes the evaluation methodology used to analyze the implementation, impact, and results of the PNVCC. As will be demonstrated, the Police is adopting the PNVCC gradually, as was stipulated in the implementation methodology, resulting in improvements in organizational and criminal indicators during the first year of execution.

Finally, the document presents conclusions about the implementation and the impact of the PNVCC, put forth by FIP after the application of the evaluation methodology. It is worth noting that this document does not constitute a definitive evaluation of the police strategy, given that the methodology has not been applied to the full extent planned and should therefore be considered only as a progress update in the development of the methodology and its application.



Process of defining quadrants and geo-referencing

## Executive summary

The National Police contracted the Ideas for Peace Foundation –a think tank founded by members of the private sector that works on topics related to security and defense– to conduct the first broad evaluation of the National Plan for Community Policing in Quadrants (PNVCC). Their principal interest is that an independent organization evaluates and monitors this community policing service model, which has been applied since July 2010, with the goal of ensuring its effective implementation.

The PNVCC is a managerial reform requiring that the patrol police and their commanders, as well as other entities responsible for urban security, be able to construct a shared mental model regarding the way in which security and insecurity functions. In the previous policing model, reactive policing was given priority with respect to *in flagrante* crimes, but the PNVCC requires and motivates planning and prevention.

Bogotá, Medellín, Cali, Barranquilla, Cúcuta, Bucaramanga, Pereira and Cartagena are the first cities to be evaluated that are currently implementing the PNVCC. The eight cities comprise the first phase of the police model that aims to optimize community policing services and that has been gradually replicated in other cities.

To achieve this optimization, the cities have been divided into quadrants –zones that can be larger or smaller than a neighborhood– so that the citizens can communicate directly with the assigned patrol police. These police are required to remain in the area for two years in order to generate trust in the community and understand it in detail.

The quadrants require the responsibility of the patrols, and that responsibility is controlled by the citizenry. The residents of the neighborhood assist in monitoring the quadrant police. In addition, the smaller size of the quadrant facilitates the police's in-depth understanding of the criminal and other behavior there.

The overarching objective of the PNVCC is to increase the coverage of the police service with the quadrants in order to ultimately impact criminal activity and the perception of security held by the citizenry.

To measure this impact in the eight cities, FIP monitored the advancements in the quadrants and verified whether the modifications to traditional policing (patrolling and reactive strategies) actually evolved. In other words, it compared the information registered by police for 25 crimes and misdemeanors in each city, with the ability of the authorities to confront them before and after the police were trained in the implementation of the new service model. In the case of

Bogotá, citizen perceptions of security were also evaluated based on information from the Chamber of Commerce.

For this study, FIP conducted more than 17,000 surveys, interviews, focus groups, workshops, field visits to stations and quadrants, and interviews with local authorities and community organizations.

In its first assessment, Ideas for Peace found that during the first year, the level of implementation of the PNVCC in the eight cities reached 70%, which demonstrates the police units' willingness to change. It was also found that 79% of the police who applied the PNVCC have direct contact with the citizenry resident in the quadrant, which includes a range of activities, from door-to-door visits to collaborative planning.

The same was not found with respect to the work that should be implemented in concert with other entities like mayoral offices and national government. The evaluation showed that despite the fact that 67% of the police units recognize the importance of inter-institutional collaboration, only 49% showed evidence of this type of work. The greatest limitation on this is the lack of coordination between entities.

The results of the impact evaluation conducted by FIP show that the PNVCC has caused a reduction in the rates of certain crimes per 100,000 people. These results are trustworthy in that they compare the crime rates of the stations that received training with those that did not. In both groups, the rates decreased, however there is an effect that can be attributed with assurance to the PNVCC.

Following this evaluation method it can be affirmed that the 18% drop in homicide rates in the eight principal cities can be accredited to the PNVCC. In every ten homicides that stopped occurring, almost two are the result of the new policing service strategy. In addition, 11% of the decrease in personal assault and 22% of the drop in vehicle robbery can be attributed to the PNVCC. These results confirm the supposition that if personnel are trained, the work in the quadrant improves, and crime and misdemeanors therefore decrease. It should be noted that at the end, all of the police stations received training.

This reduction in crime in the quadrants owes itself to the use of new management tools on the part of the Police. In the PNVCC, security improves when police resources are more efficiently distributed. Quadrant police and their commanders now identify crimes and misdemeanors in their jurisdiction, and subsequently investigate their causes in order to effectively confront them. Police work no longer involves only reacting to problems, but also requires the ability to anticipate them. In some cases, the



causes of the infractions are strictly police-related, such as the absence of patrol, while in others it is necessary for the police to manage the collaboration of the community and local businesses.

Planning is fundamental. It is no longer enough to go out on patrol and wait for something to happen before attending to it. With the implementation of the PNVCC, it is necessary that critical quadrants receive resources that can be transformed into personnel and means of transport. Greater resources can therefore be concentrated in the more problematic quadrants. This also requires a new police mentality, a police force able to take more initiative in forming working relationships with the community.

FIP therefore concluded that the implementation of a well-planned problem-solving program with efficient diagnostics and supervision, evaluated and developed with shared responsibility between community and local authorities, can positively impact security and coexistence, which provokes a reduction in crime. This is reflected in the following statistics: the homicide rate was 9.7% less in units in which training led to a higher level of implementation of the strategy; the residential robbery rate was 40% less; that of motorcycle theft was 60% less; that of vehicle theft was 50% less; and that of personal robbery was 24% less.

The impact on two crime rates in particular should be highlighted. The vehicle robbery was the most affected by the application of the PNVCC, and in May of 2012, for example, in the eight cities this rate dropped by 5 robberies per 100 thousand people. In the case of homicide, the rate dropped from 42 to 39 homicides per 100 thousand people in the same month.

Barranquilla is the city in which the PNVCC has had the greatest impact. The crime rates that decreased were homicide, residential robbery, motorcycle theft and vehicle theft. Although the effect on personal robbery was not greater than that exhibited at the national level, Barranquilla registered a significant reduction in this rate as well.

In the case of Bogotá, where data from the Chamber of Commerce was also included, it was possible to calculate the impact of the PNVCC on some variables of perception of security. For example, it was found that the strategy generated a 6.32% reduction in the perception of insecurity and that 12.8% more people reported having seen police in the quadrant. This demonstrates that the new model of policing allows citizens effective access to the police. It was also reported that service improved by 9.2% after the arrival of the police to the quadrant and that 8.1% more people think that security conditions improved thanks to the implementation of the PNVCC. The main conclusion is that residents

of Bogotá think that the PNVCC generates better security conditions when it is correctly implemented.

In Cali there was a reduction, though less than the average, in residential robbery, motorcycle theft, vehicle theft, and personal robbery. According to press reports, the arrests *in flagrante* have been the great success of the PNVCC in that city, given that they rose by 28% compared to 2011.

In Bucaramanga the crime rates that were most reduced were residential robbery and personal robbery. In Pereira there are positive results in residential robbery, and motorcycle and vehicle theft. There, no impact was found on robberies targeting local businesses. Medellín stayed within the average of the metropolitan areas. In Cúcuta there was a positive effect on residential robbery, and motorcycle and vehicle theft. In Cartagena, residential robbery demonstrated a greater impact than that of the national level, but robbery targeting commercial entities and personal robbery both increased. Apart from Cartagena, which has demonstrated the least progress, FIP considers the effect of the PNVCC in all metropolitan areas to have been positive.

There are findings at the national level that deserve to be taken into account because of their distinct characteristics. With relation to personal robbery, which demonstrated little decrease, a positive impact did develop after the implementation of the PNVCC in the industrial zone. In other words, in districts in which the primary land use is industrial, there was a decrease in the number of registered personal robberies as a result of the implementation of the PNVCC.

In the case of the reduction in homicide rates, the PNVCC had a greater effect in residential areas than in commercial areas. The decrease in motorcycle and vehicle theft was measured to be greater in service districts and industrial zones, and the reduction in personal assault was greater in residential areas. The smallest effects were seen in motorcycle theft in the residential sector and vehicle theft in the commercial sector.

These results demonstrate that the PNVCC is sensitive to the conditions of its environment. For example, when it involves a highly organized civil society sector which is willing to cooperate with the quadrant patrols, the probability of success of the PNVCC is greater. On the other hand, where there exists indifference it is very difficult for the PNVCC to reach its potential. This occurs because the majority of crimes tend to decrease when there is a high degree of cooperation between police, civil society, and other state entities.

FIP also found that the PNVCC had its strongest effect in the middle social strata (in the case of homicide) and lower social strata (in the case of motorcycle theft and personal

assault). It is therefore possible to deduce that the PNVCC is having a positive effect in areas that experience higher levels of conflict.

FIP deems that the PNVCC is changing the work practices of the police, which in turn explains, at least in part, the reduction in crime. As was mentioned previously, the strategy has introduced results-based managerial practices that utilize diagnosis, service planning, and an orientation to problem solving. In addition, all of the police stations now have CIEPS rooms –centers of strategic police information– that compile geo-referenced information from each quadrant and conduct detailed analysis, which facilitates strategic decision making by commanders.

The principle weakness of the plan's implementation is related to the development of new knowledge, abilities, and competencies that allow police personnel to conduct their work more systematically. This weakness is also explained by the entrenched culture of reactive, not preventive, policing. The transformation of these work habits is one of the most important challenges of the PNVCC. A great number of crimes have been occurring in a systematic way in a few quadrants for a few years. The PNVCC therefore requires that police efforts be more focused in collaboration with the responsible state entities and the community in order to fight against the factors that increase the probability that these crimes and misdemeanors will occur. This methodology requires tireless work by the police, given that some causes of crime demand months or even years of work to resolve.

### Findings by city

In the eight cities in which the PNVCC is being implemented, FIP analyzed the relationship between crime and misdemeanors in each metropolitan area, and the implementation of the PNVCC from January 2010 to July 2012.

In Cali, Ideas for Peace found that the crimes most frequently committed before the implementation of the PNVCC were personal robbery (20.2%), personal injury (14.6%), and motorcycle theft (9.4%). After the implementation of the strategy, the crime composition did not change in a significant way (motorcycle theft and personal robbery reduced by 1.5%), but a decrease in the crimes committed in the police station areas that implemented the plan best was observed.

For example, residential robbery decreased by 67.5%. The same was observed in the case of motorcycle theft, which decreased by 86.6%, vehicle theft by 71.8%, personal robbery by 60.4%, robberies targeting commercial entities by 7.3% and homicide by 9.8%.

One case to highlight is that of quadrant 10 in the station of El Guabal, which was characterized by being one of the most affected by homicide before the implementation of the PNVCC. While between January and July of 2011, fourteen cases were registered, while during the same period of 2012 the number of cases was reduced by half.

In Barranquilla, FIP found that the most frequent crimes before the implementation of the PNVCC were personal robbery (29%), personal injury (10%), and motorcycle theft (8%). Homicide comprised 3% of crime. As happened in Cali, after the implementation of the strategy there were no great changes in the overall composition of crimes, but there were changes in the police stations in which the PNVCC was best executed.

Homicide decreased by 18.1%. In the case of personal injury a 5.1% decrease was registered, in residential robbery a 64% decrease was registered, and in personal assault a 39% decrease was registered. Quadrant 7 of the Ciudadela Station (in 7 de Abril and Santa Maria neighborhoods), one of the most affected by homicide, the rate of this crime dropped by 5 cases between January and June of this year.

In Bogotá it was found that the most common crimes before the implementation of the PNVCC were personal robbery (25.5%), personal injury (15.8%), and residential robbery (9.4%); homicide represented 2.4% of crimes. The post-implementation findings demonstrate that in the police stations in which the strategy was best implemented, homicide decreased by 9.7%. The same was observed in the case of personal injury, where there is a decrease of 11%, in robberies of commercial entities by 65.3%, and in personal robbery by 59.3%.

It should be noted that quadrant 1 of the Santa Fe police station (San Bernardo and San Victorino neighborhoods), the sector most affected by homicide in the capital, managed to reduce this crime significantly, given that between January and June of 2012 there were no homicides.

In Medellín, the findings demonstrate that the most frequently occurring crimes before the implementation of the PNVCC were motorcycle theft (7.64%), personal robbery (7.45%) and homicide (5.9%). In general, after the implementation of the strategy it was found that although crimes such as motorcycle theft and personal robbery were reduced by 1%, there was a significant decrease in these crimes in the police stations in which the PNVCC was best applied: residential robbery decreased by 42.3%, motorcycle theft decreased by 45.9%, vehicle theft decreased by 50.8% and personal robbery by 24%.

In the capital of Antioquia, quadrant 11 of the Candelaria station should be highlighted (Colón, La Candelaria, and

Guayaquil neighborhoods), as it was the most affected by personal injury, and registered a reduction of 10 cases from January to July of this year. At the same time, in quadrant 2 of the San Javier station, homicide has been reduced by 4 cases compared to the same period last year.

In Pereira, FIP found that the most frequent crimes before the implementation of the PNVCC were personal robbery (12.8%), personal injury (11.69%), residential robbery (8%); homicide comprised 3.31% of crime. In this city, even though personal robbery increased to 17.2% of crimes after the implementation of the PNVCC, homicide and residential robbery decreased.

Other successes have been registered in the stations in which the PNVCC was well applied: homicide dropped by 9.7%, personal injury dropped by 8.61%, residential robbery dropped by 75%, motorcycle theft by 74.4%, vehicle theft by 22.9% and personal robbery by 22.9%.

In Bucaramanga, the most common crimes before the arrival of the PNVCC were personal robbery (18.9%), personal injury (14.64%) and residential robbery (4.93%); homicide represented 1.36% of crime. After the implementation of the PNVCC, the composition of crime changed, and homicide, personal robbery, and residential robbery were reduced by between 0.5% and 4%. In addition, it was observed that in the stations that best implemented the PNVCC, homicide decreased by 9.7%, motorcycle theft by 56.1%, vehicle theft by 45.9% and personal robbery by 38.4%.

In Cartagena, the most common crimes before the PNVCC were personal robbery (13.77%), personal injury (6.9%), and residential robbery (4.05%); homicide comprised 2.1% of crimes. With the PNVCC, the composition of crimes did not change a lot, but in the stations in which it was implemented best, homicide decreased by 10%, residential robbery by 71%, vehicle robbery by 44.2%, motorcycle robbery by 61% and personal robbery by 11%.

Finally, in Cúcuta, the crimes with the highest percentages before the PNVCC were homicide (5.51%), personal injury (3.69%), and personal robbery (4.51%). Afterwards, the composition of the crimes did not exhibit changes overall, but homicide decreased, while personal injury dropped to 5.24%. In the stations that received training, personal robbery dropped by 2%, residential robbery dropped by 70%, vehicle theft by 74.2% and motorcycle theft by 84.1%.

## 1. Project framework

In February 2010, the General Director of the Colombia National Police launched the PNVCC to be implemented starting in July of the same year in the eight departments of the Metropolitan Police.<sup>1</sup> The strategy is a strategic and operational police response aiming to transform police services, taking into account the improvement of management, contact with the community, collaboration with civil authorities and public and private organisms, through a coordinated, planned and organized program.

The PNVCC draws on previous experiences of the police related to community policing, and other international experiences which involve problem-oriented police work. These experiences were integrated in a management model that aims to respond to the expectations and realities of Colombian cities.

The objective of the PNVCC is to optimize police service through the territorial delimitation of the cities, in small jurisdictions called quadrants.

Each quadrant is assigned three shifts of patrols, and more personnel can be assigned according to the specific circumstances of the quadrant. The patrols are assigned to that quadrant for a minimum of two years and they are responsible for the quadrant, which facilitates the construction of trust, building relationships with the community, and the allocation of specific responsibilities to individuals, for the improvement of the quadrant.

In the development of their activities, the quadrant personnel works with the community to identify problems and coordinate solutions with other public entities that have citizen security responsibilities, such as mayoral offices and national organisms. It aims to facilitate social control over all of its actions.

The evaluation by FIP therefore monitored the advance of the planning processes, monitoring and evaluation in the quadrants, and the adoption of the tools that support them (local diagnostics, work plans, action tables adjusted to the problems). It also verified whether the modifications to traditional policing (patrolling and reaction policing) were transformed into a service based on the initial diagnostic, the planning and monitoring, and the problem-solving abilities in the quadrant and the conditions that have facilitated or challenged the resolution of those problems.<sup>2</sup>

Although this strategy was launched in 2010, it was officially declared to be part of a thematic focus on “*police control and presence*” of the National Citizen Security and Coexistence Policy issued by the national government in 2011. That policy established the need to strengthen the PNVCC in the municipalities prioritized by the police, and the focus of police action on areas of high criminality and in prioritized zones. The modernization and consolidation of communications and information systems was also prioritized.

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<sup>1</sup> Bogotá, Cali, Barranquilla, Medellín, Cúcuta, Cartagena, Bucaramanga and Pereira.

<sup>2</sup> For more information, please see the National Police document ISBN 978-958-98278-0-2, “Institutional Strategy for Citizen Security: National Plan for Community Policing in Quadrants.”



Implementing team feedback in a police station

## 2. Evaluation dimensions

In the context already mentioned, FIP designed a two dimensional methodology. It first analyzed the implementation of the PNVCC, and then the impact that the strategy has had on crime reduction.

### 2.1 PNVCC Implementation Progress

FIP monitored the implementation with the objective of determining whether the strategy is being developed according to the original methodology, increasing the level of teamwork with other entities to solve problems that generate insecurity in the quadrant and the level of involvement with the quadrant community.

The monitoring was conducted through the application of various tools, whose objective was to determine how the quadrant works and the level of willingness of the police personnel with regard to the PNVCC. The main tools utilized were questionnaires (more than 17,000), interviews and focus groups with police and commanders, workshops with national and local implementers, field visits to stations and quadrants, interviews with local authorities and community organizations, and investigation of documentation in the eight cities.

The principle results of the monitoring were the following:

- **Strategy Development.** During the study it was found that in the first year of the PNVCC, the eight metropolitan areas reached a 70% level of implementation and of willingness to adjust work practices to the PNVCC. This means that approximately 70% of the police units are already correctly executing the strategy, a result that corresponds to the planned goal for the first year, taking into account that the implementation was strengthened by a training program in July of 2012.
- **Involvement with the community.** One of the principal objectives of the PNVCC is to create a concept of police that maintains them close to the community, working with it and responding to its expectations. During the study a similar pattern was found to that previously mentioned. In terms of willingness, approximately 73% of the police demonstrate that they are willing to work with the community, and value that relationship. In addition, it was established that almost 79% of the quadrant police has direct contact with the citizens residing in the quadrant. This contact takes different forms, from door to door visits to the development of collaborative plans.
- **Teamwork with other entities.** Many security issues confronted by the quadrants do not depend exclusively on

police action, and require intervention by other entities at the national and municipal levels. The study found that this is one of the factors that necessitate greater attention by the mayoral offices and national government. Despite the fact that 67% of the police units recognize the importance of working in teams with other entities, only 49% of those demonstrated evidence of this type of coordinated work.

### 2.2 General impact of the PNVCC on crime reduction

First, the general results of the impact evaluation of the PNVCC are presented, based on data from January 2007 to June 2012. Next, the changes related to police work practices are explored, and analyzed in terms of their effects and supporting evidence. Finally, the way in which the effect of the PNVCC differs between metropolitan areas is examined, as well as the context in which evidence of positive effects of the PNVCC on crime is found.

#### 2.2.1 General impact of the PNVCC on crime reduction

The PNVCC causes a reduction in certain crime rates. For the following three crimes, a statistically significant reduction was shown:

- i) In the case of homicide, this reduction was 18%.
- ii) In the case of personal injury, this reduction was 11%.
- iii) In the case of vehicle robbery, this reduction was 22%.

These are the most recent results of the PNVCC.

The percentages are obtained by means of the Difference in Differences methodology, which measures the effect that the PNVCC training had on police stations, in comparison with those stations in which such training was not conducted.

To evaluate the impact of the PNVCC on criminal conduct, the following steps were taken:

- i) Two groups of police stations were formed: those that would be control stations, and others that would be treatment stations. The treatment in this case is the PNVCC training. The expectation is that those stations that receive the training will have a better performance than those that do not.
- ii) The crime rates associated with the jurisdiction of each police station were measured. This rate is measured per 100,000 inhabitants. For this, three crimes were selected: homicides, personal assault, and vehicle theft. The effect of the PNVCC was measured by the following equation:

$$\text{Crime rate of the police station} = \beta_0 + \beta_1 \text{ Training} + \beta_2 \text{ Time} + \varepsilon$$

ii) The coefficient  $\beta_1$  that accompanies the training variable is the one that measures the effect of the training. If the station was trained, the variable takes the value of 1, and if it has not received training, it takes the value of 0. This procedure measures whether the training variable is statistically significant. This variable is subsequently named PNVC Effect. A variable is statistically significant when it can be stated with a high level of confidence<sup>3</sup> that the corresponding coefficient is different from 0. In this case, the expectation is that the coefficient  $\beta_1$  will be negative because the crime rate in that station will have decreased. The variable  $\beta_2$  measures the effect that the passing of time has on the progress of the stations. In processes of evaluation of public policy, where there is an initial moment in time and a final moment in time, as in the application of the PNVC, it is usual to introduce a variable of time. The term  $\varepsilon$  represents the error of the equation, which is the part of the crime rate that cannot be explained by training or by time.

In table 1 the effect of the PNVC on the treatment units can be observed and compared to that of the control units. The results show that the treated units presented lower rates –in the percentage indicated for each crime– which indicates favorable results.

VARIABLES	Homicides	Personal Injury	Vehicle Theft
PNVCEffect	-0.183*** (0.0432)	-0.108** (0.0493)	-0.217*** (0.0462)
Post	0.0417 (0.0502)	-0.0162 (0.0628)	-0.262*** (0.0893)
Constant	3.528*** (0.0390)	4.379*** (0.0466)	3.334*** (0.0677)
Observations	7,920	7,920	7,920

Standard Errors in Parenthesis  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

It should be clarified that a logarithmic transformation was applied to the crime rate. This application had the objective of interpreting the regression coefficients as the percentage difference between the performance of the treatment stations with that of the control stations. For example, the coefficient associated with the PNVC effect in homicides is -0.183; this value is multiplied by 100 to obtain the percentage value. The negative sign demonstrates that there was a decrease. This is a standardized procedure in

statistical analysis, used to facilitate the interpretation of the results, which are the base of the following equation. Only the coefficients with a high level of confidence are used in the equations, and time is only relevant in the case of vehicle theft:

*Station homicide rate*

$$=3.528-0.183 \text{ PNVC Effect}$$

*Station injury rate*

$$=4.379-0.108 \text{ PNVC Effect}$$

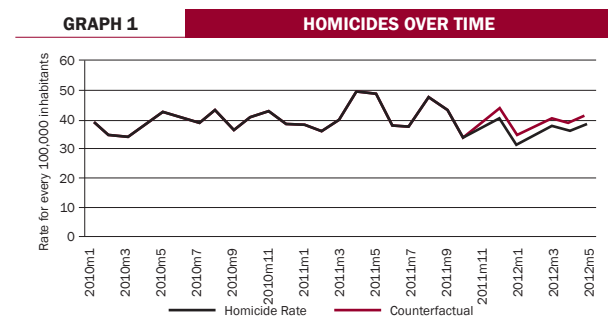
*Station vehicle theft rate*

$$=3.334-0.217 \text{ PNVC Effect } -0.262 \text{ Time}$$

The results of the equation are used to project the rate of each of these crimes. This projection is useful because it allows the comparison of the actual rate with the rate that would have been demonstrated had the PNVC not been implemented. The result is what is known as a 'counterfactual'. This rate is calculated based on the historical behavior of the rate of each crime, the seasonality of each crime, and the corresponding city.

### Homicides

With respect to homicides, it can be observed that without the implementation of the PNVC, these would have an elevated rate. This can be observed in Graph 1, where the counterfactual rate is found to be above the real rate from the moment in which the first cohort's training was conducted in July 2011.



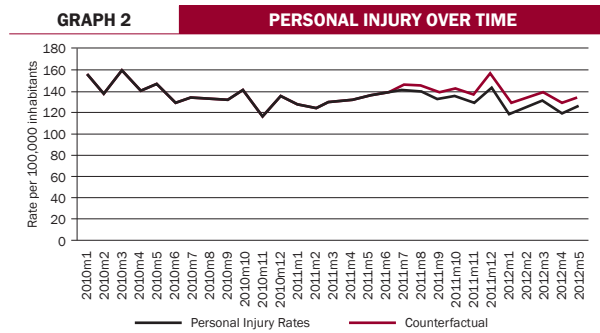
Source: DIJIN-PONAL, calculations FIP.

In May, for example, the counterfactual rate is 42 homicides per 100,000 inhabitants on average across the eight metropolitan areas, while the observed rate was 39. The reduction due to the PNVC was three homicides for every 100,000 inhabitants that month.

<sup>3</sup> A level of confidence is considered to be over 90%. These levels of confidence are indicated by the use of asterisks. \* = 90%, \*\* = 95%, and, \*\*\* = 99%. A higher level of confidence is always desirable.

## Personal Injury

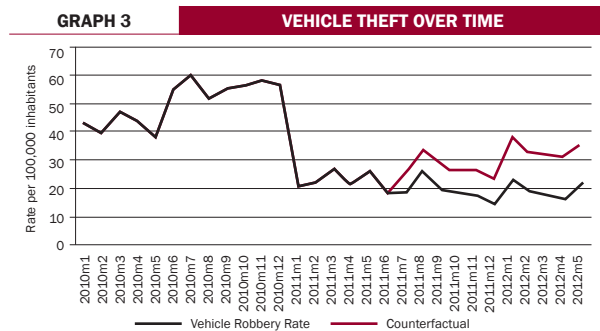
For the case of personal injury a positive effect of the PNVC can also be observed. It is clear that this effect increases over time with the number of cohorts being trained. The effect of the strategy is greater when the gap between the actual rate and the counterfactual rate grows. This can be observed in Graph 2.



Source: DIJIN-PONAL, calculations FIP.

## Vehicle Theft

In the case of vehicle theft (Graph 3) there exists a greater decrease in crime rate than for other crimes, taking into account that there was a pre-existing tendency to decrease. If the PNVC had not been implemented, the actual rate would be greater. For example, with respect to the month of May of the previous year, a reduction of 5 points can be observed in this rate. This reduction, which is due to the PNVC, is important because given the behavior of the series, the expectation was that there would be an increase in the vehicle theft rate.



Source: DIJIN-PONAL, calculations FIP.

## 2.2.2 Transmission mechanisms

The process for selecting the training as the element that differentiates the controls from the treatments in the

evaluation rests on the belief that the training will be an element that characterizes the implementation of the PNVC. In other words, the training was assumed to directly affect the advancement of the implementation of the strategy, and this impacts the progress in crime reduction. After three measurements of the implementation of the PNVC (management indicators) it is possible to relate the work processes of the PNVC with the crime results and identify which of the work processes generate the most impact on crime reduction. The purpose of this section is to explore the following relationship in the implementation of the PNVC:



An econometric procedure of instrumental variables was used, consisting of finding the part of **process (1)** that generates **process (2)**. The estimate is conducted in two stages: first the effect of the training on the improvement in work practices in the quadrant (management indicators) is estimated. This reveals the effect on the PNVC implementation and estimates the effect that the improvement in implementation generates on crimes and misdemeanors.<sup>4</sup>

This process is presented in three parts: (i) an exploration of which components of the implementation can be affected by the treatment (training), (ii) the unification of the relevant indicators to be just one, (iii) the explanation of the results. General conclusions are presented at the end.

### 2.2.2.1 Components of the implementation that are affected by the training

The first component explores the effect of the training on the level of implementation of the PNVC, which is identified through the management indicators. These result in a questionnaire conducted in three separate instances with police personnel from the quadrants in the eight metropolitan areas. For the estimates in this stage to have the same monthly periodicity that the impact evaluation has, the value of each measurement was assigned to a period of time. It was assumed that the indicator remains constant

<sup>4</sup> In formal terms the estimate consists of estimating as the first stage:  $Management_{it} = f(training)$  and as the second stage:  $S_{it} = f(Management_{it})$ .



for some months before and some months after the questionnaire. In particular, it was assumed that the value of the indicators of the first management questionnaire applies for the six months previous to and the four months after the questionnaire was conducted. In the second management questionnaire it applies until four months after the questionnaire was conducted. In the third, it applies until the most recent data collection (July 2012).

Based on this data structure, estimates of the first stage were made for each of the management indicators. The following equation was used for each case:

$$Indicator_{it} = \beta_0 + \beta_1 Training_{it} + \beta_2 Time_t + \gamma_i + \varepsilon_{it} \quad (1)$$

This means that the behavior of station  $i$  in moment  $t$  is estimated based on whether it received training ( $Training_{it}$ ) and the effect of time ( $Time_t$ ). This estimation was conducted with fixed station effects ( $\gamma_i$ ), which absorb the effect of the variables which remain constant in time, like geography.

The results of this estimate are presented in Table 2, in which the effect of the training on management indicators is calculated. Analyzing the results, it becomes clear that for the majority of indicators, the estimated effect is positive, and that the indicator of endogenous complementarity is conclusive.

In Table 2 it can be observed that the training had no effect on the length of stay of the personnel in the quadrants, or on the levels of teamwork between police departments (length of assignment and complementarity between departments). The low levels of permanence of personnel in the quadrants are a result of the dynamics of personnel management and decisions that are made far from the quadrant or the police station. However, the teamwork between departments does relate to the operational strategies within the responsibility of station commanders and quadrant leaders, who, despite the training, seem not to

have adjusted their work processes or have not received the institutional support necessary for the departments to offer the tools that the units require.

These results suggest that there is a positive relationship between the majority of management indicators and the training chosen as treatment. The indicators that presented positive behavior are more related to the station's field of action, which corresponds to their effective development.

### 2.2.2.2 Unification of relevant indicators

The second component creates a unified management indicator that can have an effect on criminal behavior. The following indicators positively react to training: monitoring and evaluation, endogenous complementarity, shared responsibility, and orientation to problems.

Principle Component Analysis (PCA) was used to calculate the additional indicator. This procedure guarantees that the resulting indicator has a greater variation that permits the calculation of changes in crime.

To find out whether the indicator that compiles management indicators is affected by the training, the following equation was used:

$$Indicator_{PCA_{it}} = \beta_0 + \beta_1 Training_{it} + \beta_2 Time_t + \gamma_i + \varepsilon_{it} \quad (2)$$

This estimates the effect of the capacitation ( $Training_{it}$ ) and the time ( $Time_t$ ) on the added management indicator found through the PCA ( $PCAIndicator_{it}$ ). Similar to Equation 1 in the previous section, the estimate included fixed effects by station ( $\gamma_i$ ).

Table 3 presents the results of the estimate of equation 2, where a positive and significant effect on the indicator of PCA that summarizes the management is identified in 95% of the training. This means that the training positively affected the implementation of the PNCC, which again con-

**TABLE 2** EFFECT OF THE TRAINING ON MANAGEMENT INDICATORS

Indicator	(1) Monitoring and Evaluation	(2) Endogenous Complementarity	(3) Exogenous Complementarity	(4) PONAL Complementarity	(5) Shared Responsibility	(6) Length of Assignment	(7) Problem Orientation
Training	0.00238 (0.0164)	0.0354*** (0.0131)	0.00664 (0.0109)	-0.0452*** (0.0145)	0.0196 (0.0147)	-0.00388 (0.0132)	0.0123 (0.0129)
Time	0.272*** (0.0121)	-0.0193** (0.00976)	-0.00322 (0.00811)	0.108*** (0.0107)	0.188*** (0.0109)	0.0512*** (0.00980)	0.0113 (0.00960)
Constant	0.387*** (0.00618)	0.702*** (0.00497)	0.187*** (0.00413)	0.589*** (0.00546)	0.589*** (0.00555)	0.301*** (0.00499)	0.446*** (0.00489)
Observations	2.700	2.700	2.683	2.682	2.700	2.700	2.700
R-squared	0.260	0.003	0	0.046	0.185	0.017	0.003
Number of Stations	109	109	109	109	109	109	109

Standard errors in parenthesis  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

firms the first part of the initial hypothesis. In addition, the effect of time on the indicator can be identified as positive and significant at 99%, with which it is possible to conclude that there was an overall increase in implementation during the period of the study.

**TABLE 3 EFFECT OF THE TRAINING ON THE PCA INDICATOR**

VARIABLES	(1) PCA
Training	0.134** (0.0657)
Time	0.745*** (0.0488)
Constant	-0.377*** (0.0248)
Observations	2,683
R-squared	0.163
Number of stations	109
Standard errors in parenthesis *** p<0.01, ** p<0.05, * p<0.1	

The previous analyses allow us to establish that the training carried out by the Director of Citizen Security and the National Director of Schools (DISEC-DINAE) did improve work practices, in particular service planning processes, the adoption of new tools (diagnostics, service sheet and TAMIR), problem solving, teamwork between quadrants, and the shared responsibility with the community and state agencies.

**2.2.2.3 Estimation by squared minimums in the quadrants**

After having found that the training had a positive effect on police personnel work practices (management indicators), the effects of the PNVC on crime were also investigated.

Based on the results of the estimate of equation 2, the effect of the PNVC's implementation on crime and misdemeanor rates was also estimated. The instrumental variable methodology was then used to explore whether the change in crime is due to the change in work practices when the training has taken place. This allows the integrated testing of the hypothesis.

In formal terms, the variable instrumental procedure for this case consists in estimating the following equation:

$$Crimes_{it} = \alpha_0 + \alpha_1 (\widehat{Indicator\ PCA}_{it}) + v_i + \eta_t + \varepsilon_{it} \quad (3)$$

FIP estimated the behavior of crime rates ( $Crimes_{it}$ ) based on the behavior of the estimated PCA indicator ( $\widehat{Indicator\ PCA}_{it}$ ), which reflects only the behavior of the indicator generated by the training.

Table 4 contains the results of the estimate of equation 3. In the odd columns, the reduced version of the estimate is shown (relationship between training and crime), while in the even columns, the result of the variable instrument exercise is shown (the relationship between training, management and crime). This allows conclusions to be drawn about whether the training has an effect on the work practices in the quadrant (PNVC implementation) and whether this affects criminal behavior.

Upon analyzing the results in Table 3, most of the crimes analyzed (all except personal injury) demonstrate a relationship between training, management or work practices, and crime reduction. This means, on the one hand, that the training does generate an effect on crime rates, and that this effect is a reduction. On the other hand, the effect of the training on work practices (management indicators) is

**TABLE 4 RESULTS OF INSTRUMENTAL VARIABLES**

VARIABLES	(1)	(2)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	Homicide		Injury		Residential Robbery		Motorcycle Theft		Vehicle Theft		Commercial Robbery		Personal Assault	
Training	-0.0640** (0.0325)		-0.0354 (0.0277)		0.0270 (0.0376)		0.144*** (0.0500)		0.0376 (0.0475)		0.0336 (0.0352)		-0.0513 (0.0387)	
Time	-0.0473** (0.0239)		0.0273 (0.0203)		-0.367*** (0.0276)		-0.588*** (0.0367)		-0.443*** (0.0349)		-0.0790*** (0.0258)		-0.172*** (0.0284)	
Ind. PCA		-0.0977*** (0.0217)		0.0101 (0.0182)		-0.423*** (0.0296)		-0.613*** (0.0412)		-0.508*** (0.0379)		-0.0733*** (0.0233)		-0.240*** (0.0271)
Constant	3.975*** (0.0322)		4.827*** (0.0274)		4.091*** (0.0373)		3.957*** (0.0495)		3.506*** (0.0470)		3.723*** (0.0348)		4.853*** (0.0383)	
Observations	2.683	2.683	2.683	2.683	2.683	2.683	2.683	2.683	2.683	2.683	2.683	2.683	2.683	2.683
R-squared	0.024	-0.009	0.008	0.005	0.112	-0.281	0.145	-0.350	0.122	-0.299	0.010	-0.014	0.075	-0.053
Number of stations	109	109	109	109	109	109	109	109	109	109	109	109	109	109
Method	Reduced Form	IV	Reduced Form	IV	Reduced Form	IV	Reduced Form	IV	Reduced Form	IV	Reduced Form	IV	Reduced Form	IV
Statistic F		260.2		260.2		260.2		260.2		260.2		260.2		260.2
Standard errors in parenthesis *** p<0.01. ** p<0.05. * p<0.1														

much stronger than the effect of unrelated training transferred to the quadrants (i.e. not related to management).

The trained units, in which the training positively affected the level of implementation of the PNVCC, demonstrated a homicide rate 9.7% lower than the rest, a residential robbery rate of 42.3% lower than the rest, a motorcycle theft rate 61.6% lower than the rest, a vehicle theft rate of 50% lower than the rest, a commercial robbery rate 7.3% lower than the rest, and a personal robbery rate 24% lower than the rest.

It can therefore be shown that:

1. The correct implementation of the PNVCC can reduce crimes that affect citizen security. In other words, the development of a well-planned project with good diagnostics, oriented to problem-solving, which is supervised, evaluated, and developed with shared responsibility with the community and the local authorities, generates reductions in crime and therefore impacts citizen security and coexistence.
2. The training put into practice by DISEC-DINAE can change work practices in the quadrants, and therefore should be replicated in other units. The principles, processes, and analysis methodologies of the PNVCC should be incorporated into academic programs in the schools.

### 2.2.3 Results by metropolitan area

In order to interpret the impact of the PNVCC in the eight metropolitan areas, the effects in each city were compared, with the average result calculated for each of the metropolitan areas studied. The methodology of instrumental variables was used to guarantee that the effect was due to an improved implementation of the PNVCC.

The average effect in the eight metropolitan areas is presented below, as well as whether the city exhibited a greater, equal or lesser effect than average in the reduction of each crime. In the case of personal injury, whose average effect was not significant, only the effect of the city is shown.

#### 2.2.3.1 Metropolitan area of Barranquilla

Barranquilla is the metropolitan area in which the PNVCC had the greatest impact. This city exhibited the most positive behavior with respect to the average effect of the PNVCC in all eight metropolitan areas. In this case,

the crimes that decreased the most due to the better implementation of the PNVCC are residential robbery, motorcycle theft, and vehicle theft. Barranquilla is one of the few cities in which there were reductions in personal injuries, attributable to the PNVCC.

**TABLE 5 RESULTS IN BARRANQUILLA**

Crime	Average Effect	BARRANQUILLA
Homicide	-0.0977***	Improved
Personal Injuries	0	Improved
Residential Robbery	-0.423***	Improved
Motorcycle Theft	-0.613***	Improved
Vehicle Theft	-0.508***	Improved
Robbery of Commercial Entities	-0.0733***	Improved
Personal Robbery	-0.240***	Improved

#### 2.2.3.2 Metropolitan Area of Bogotá

This metropolitan area also exhibited better performance than the overall effect found for the group in general, except in the case of homicide, where there was no variation. This confirms the fact that the 1 point increase in the management indicators would be accompanied by a 9.7% reduction in homicide rate. Similar to the case of Barranquilla, when the data is restricted to Bogotá, a reduction in personal injury can be found, which it was not possible to identify in the aggregated data of the eight metropolitan areas.

In addition, with the participation of the Chamber of Commerce of Bogotá (CCB) who became involved in the evaluation and the training in that city, it was possible to calculate the impact of the PNVCC on variables of perception. The CCB has conducted a questionnaire on perceptions of victimization in Bogotá, which was adjusted to capture the effect of the PNVCC on perceptions of security in the city.<sup>5</sup>

**TABLE 6 RESULTS IN BOGOTÁ**

Crime	Total Effect	BOGOTÁ
Homicide	-0.0977***	Equal
Personal Injury	0	Improved
Residential Robbery	-0.423***	Improved
Motorcycle Theft	-0.613***	Improved
Vehicle Theft	-0.508***	Improved
Robbery of Commercial Entities	-0.0733***	Improved
Personal Robbery	-0.240***	Improved

<sup>5</sup> For the estimate of the effect of the PNVCC on perceptions, an impact evaluation methodology was adopted to measure the effect of the PNVCC on crimes and misdemeanors. The trained cohorts (and the treatment cohorts) were used to generate a source of variability on the implementation of the PNVCC. The results are based on the surveys of perception and victimization conducted by the Chamber of Commerce of Bogotá in December of 2010 and 2011.

Upon calculating the effect of the PNVCC on perception, evidence was found that the cohorts that had had the training demonstrated better indicators than those that had not been trained, as is demonstrated in the following points:

#### **Perception of insecurity**

To make sure that information was geographically correct, the percentage of people who participated in the questionnaire and reported that their neighborhood was unsafe was used as the variable. The PNVCC generates a 6.32% reduction on perceptions of insecurity. This result is not significant with relation to traditional standards, but it suggests that there is a stronger reduction in perceptions of insecurity in the 'treatment' stations.

#### **Access to the quadrant police**

The treatment stations registered 12.8% more people who affirm that they have seen the police in their quadrant. This result is significant at 95% and it demonstrates that the PNVCC allows citizens better and more effective access to police.

#### **Value of police services in the quadrant**

With the objective of estimating the effect of the treatment on the value given to the service, the participants were asked to indicate the means by which the police were present and provided services. This variable is given values from 1 to 5, 1 being service of poor quality, and 5 being service of excellent quality. With this point range, an additional variable was generated that represented the percentage of questionnaires that demonstrated positive service quality (4 good and 5 excellent).

Analyzing the percentage of positive service quality, it was found that on average 6.9% of the people questioned indicated that their stations had good or excellent service, demonstrating that the correct implementation of the PNVCC improves the perception of the quadrant police as service-providing personnel.

In addition, the questionnaire asked whether police services had improved with the arrival of the police to the quadrant. In the treated stations the participants reported that service improved by 9.2%.

#### **Direct association between the perception of security and the presence of the quadrant police**

In this case, the participants were asked if the security conditions had improved with the arrival of the police in the quadrant. In the treated stations, 8.1% more of the participants responded that the conditions improved, which

demonstrates that in the eyes of the citizenry, the PNVCC positively impacts security when it is implemented correctly.

#### **2.2.3.3 Metropolitan area of Cali**

The capital of the Valle del Cauca also demonstrated a reduction in crime as a result of the application of the PNVCC. The residential robberies, motorcycle theft, vehicle theft, and personal robbery all had a reduction equal to the average. Homicide and robbery of commercial entities also had a reduction equal to the average. Finally, there was no effect on personal injury, which sustains the overall conclusion that the strategy does not affect this crime.

TABLE 7	RESULTS IN CALI	
Crime	Total Effect	CALI
Homicide	-0.0977***	Equal
Personal Injury	0.0	Equal
Residential Robbery	-0.423***	Improved
Motorcycle Theft	-0.613***	Improved
VehicleTheft	-0.508***	Improved
Robbery of Commercial Entities	-0.0733***	Equal
Personal Robbery	-0.240***	Improved

#### **2.2.3.4. Metropolitan area of Bucaramanga**

This metropolitan area demonstrates a similar performance to the average results in the eight metropolitan areas. As can be observed in table 8, the reductions in homicide, motorcycle theft, and vehicle theft are equal to those of the other metropolitan areas. Better than average results were also obtained in the crimes of residential robbery and personal robbery. On the other hand, the MEBUC presented lower results in robbery of commercial entities than in the other metropolitan areas. Personal injuries did not demonstrate any effect.

TABLE 8	RESULTS IN BUCARAMANGA	
Crime	Total Effect	BUCARAMANGA
Homicide	-0.0977***	Equal
Personal Injury	0.0	Equal
Residential Robbery	-0.423***	Improved
Motorcycle Theft	-0.613***	Equal
Vehicle Theft	-0.508***	Equal
Robbery of commercial entities	-0.0733***	Less
Personal robbery	-0.240***	Improved

#### **2.2.3.5 Metropolitan Area of Pereira**

Pereira presents positive, above-average results in personal injuries, residential robbery, motorcycle theft, and vehicle theft. In terms of homicide and personal robbery, it

is within the average. However, the PNCC did not impact robbery of commercial entities.

TABLE 9 RESULTS IN PEREIRA		
Crime	Total Effect	PEREIRA
Homicide	-0.0977***	Equal
Personal Injury	0,0101	Improved
Residential Robbery	-0.423***	Improved
Motorcycle Theft	-0.613***	Improved
Vehicle Theft	-0.508***	Improved
Robbery of commercial entities	-0.0733***	Less
Personal Robbery	-0.240***	Equal

### 2.2.3.6 Valle de Aburrá Metropolitan Area (Medellín)

In the case of Medellín, the reduction in the majority of the crimes is equal to the average, except homicides, where the PNCC did not achieve a differential effect. Personal injuries also did not exhibit a statistically significant reduction.

TABLE 10 RESULTS IN MEDELLÍN		
Crime	Total Effect	MEDELLÍN
Homicide	-0.0977***	Less
Personal Injury	0	Equal
Residential Robbery	-0.423***	Equal
Motorcycle Theft	-0.613***	Equal
Vehicle Theft	-0.508***	Equal
Robbery of commercial entities	-0.0733***	Equal
Personal Robbery	-0.240***	Equal

### 2.2.3.7 Metropolitan Area of Cúcuta

In Cúcuta a greater than average effect was seen on residential robbery, motorcycle robbery, and vehicle robbery. However, the PNCC did not seem to have an effect on homicide, robbery of commercial entities, and personal robbery. As happened in the other metropolitan areas, personal injuries were not reduced by means of the strategy.

TABLE 11 RESULTS IN CÚCUTA		
Crime	Total Effect	CÚCUTA
Homicide	-0.0977***	Less
Personal Injury	0	Equal
Residential Robbery	-0.423***	Improved
Motorcycle Theft	-0.613***	Improved
Vehicle Theft	-0.508***	Improved
Robbery of Commercial entities	-0.0733***	Less
Personal Robbery	-0.240***	Less

### 2.2.3.8 Metropolitan Area of Cartagena

In Cartagena it was found that the implementation of the PNCC had positive results in reduction of residential robbery,

which had a greater effect than at the national level. Homicide, motorcycle theft, personal robbery, and vehicle theft presented effects equal to the average. Finally, robbery of commercial entities and personal robbery did not improve, but rather increased in frequency. The results demonstrate that this is the metropolitan area that presented the fewest advances, given that it was lower than the others.

TABLE 12 RESULTS IN CARTAGENA		
Crime	Total Effect	CARTAGENA
Homicide	-0.0977***	Equal
Personal Injury	0	Equal
Residential Robbery	-0.423***	Improved
Motorcycle Theft	-0.613***	Equal
Vehicle Theft	-0.508***	Equal
Robbery of commercial entities	-0.0733***	Less
Personal Robbery	-0.240***	Less

### 2.2.4 The effect of the PNCC with relation to the context

With the objective of identifying the contexts in which the PNCC has the greatest effects, FIP conducted referred regressions for each of them. Two criteria were selected to describe the contexts in which the strategy was implemented: one is whether or not the area is mostly residential or commercial or industrial, and the other is the socioeconomic strata divided in low, middle and high.

#### By area

Crimes and the type of zone in which the strategy had results for reducing those crimes are shown in Table 13. 1 is the context in which the PNCC saw the best results, and 4 is the context in which it had the least effect. In the cases in which no statistically significant effect was found, the qualification 'NO' was assigned.

TABLE 13 EFFECT OF THE PNCC BY ZONE					
Crime	Total Effect	Residential	Industry	Commercial	Services
Homicide	-0.0977***	1	2	4	3
Personal Injury	0	NO	1	NO	NO
Residential Robbery	-0.423***	4	2	3	1
Motorcycle Theft	-0.613***	4	2	3	1
Vehicle Theft	-0.508***	3	2	4	1
Robbery of Commercial Entities	-0.0733***	NO	2	3	1
Personal Robbery	-0.240***	1	3	4	2

In the case of personal injury it can be observed that the only zone in which a difference can be noted is in the industrial zone, where the PNCC reduced this crime. In other zones, effects were not found.

The effect of the PNVC on homicides is much stronger in mostly residential zones than in zones in which there is economic activity. This can be explained by the fact that the indicator of problem orientation, as well as shared responsibility, is greater in places with more residential buildings: the first is 4 points greater and the second, 6 points greater, with more presence of residential buildings in the last management questionnaire. The shared responsibility can be greater in places in which the residents are constant, and this could be helping to make better diagnostics and identify the causes of complex phenomena like homicide.

For residential robbery it was found that in the less residential sectors, the PNVC has greater effect, due to the fact that it is easier to control this crime given the low concentration of residences. In addition, it is less likely that this crime occurs in such areas, so policing should be increased there.

In motorcycle theft and vehicle theft, the best results are found in zones with a high concentration of services, followed by industrial sectors, while the lesser effects were registered in the residential sector for the case of motorcycles and vehicles in the commercial sector. This case could be similar to the previous one given that the majority of vehicle thefts and motorcycle thefts occur in residential or commercial zones, therefore resulting in lesser effects.

In the case of robbery of commercial entities, no results are seen in areas with a high concentration of residences, as was expected, given that this crime does not occur in these zones. There were effects in zones where there is economic activity, principally in service zones followed by industrial and commercial zones, which combine three different types of zone: commercial, industrial, and services.

Finally, for the case of personal robbery, it was found that the PNVC had better results in residential areas, possibly for reasons similar to those explained in the case of homicides. In commercial areas an effect was identified, but this is found to be small and could be better.

**By strata**

As was already mentioned, socioeconomic strata were categorized for each crime such that 1 is the strata in which the strategy had the most effect, and 3 is the strata where it had least effect. Table 14 shows crimes and strata. In the cases in which statistically significant effects were not found, the strata was not included and the assignation 'NO' was given.

The strongest effect is found in the middle and low strata. The homicide rate in these strata is usually considerably higher than that in the high strata. This result is positive

**TABLE 14** EFFECT OF THE PNVC BY STRATA

Crime	Total Effect	Low strata	Middle strata	High strata
Homicide	-0.0977***	2	1	3
Personal injuries	0	NO	NO	NO
Residential robbery	-0.423***	2	3	1
Motorcycle theft	-0.613***	1	3	2
Vehicle theft	-0.508***	2	3	1
Robbery of commercial entities	-0.0733***	NO	2	1
Personal Robbery	-0.240***	1	3	2

and clearly demonstrates that the PNVC is affecting the sectors that experience the highest levels of conflict. In addition, it shows that the strategy is progressive in that it benefits the most vulnerable communities.

For the crime of personal injuries, no effect was found in either the overall results or the breakdown by strata.

In relation to residential robbery, the strata in which the PNVC works best is the high strata. This could be due in part to the fact that it has the best access to private security, which helps the PNVC to be more effective, as there is more possibility to create shared responsibility with private security. The strategy functions least in the middle strata, where robbery is concentrated because there are more valuable objects to steal than in the low strata, but less access to private security.

In motorcycle and vehicle theft, the first and second places in terms of effectiveness were found in the extremes –the low and high strata. The reason is likely to be that in the low strata there are fewer potential victims (motorcycles and vehicles), and the high strata because there are fewer robberies because they have the best access to security systems for vehicles and motorcycles. In the middle strata it is more difficult to achieve effectiveness because there are more potential victims but less access to security systems or the policing is less effective.

For the case of robbery of commercial entities, there is no effect in the low strata given that there is a lower concentration of commerce. The middle and high strata present the best results.

Finally, personal robbery presents its best results in the low strata. Upon analyzing the results of the third management questionnaire, it was found that the quadrants that prioritized personal robbery reported community activities as being the principal way to combat this type of theft. This type of activity can have an effect on sporadic theft and unstructured theft, but does not have an effect on theft associated with complex criminal structures.



Survey application in the FIP monitoring evaluation process

## Conclusions

The impact evaluation of the PNVCC allows us to establish that the strategy represents a qualitative advance for the National Police, and one that deserves consolidation and replication.

The PNVCC is changing the work practices of the police, and this explains in part the reduction in crime. The strategy has introduced management practices founded in diagnostic processes, service planning, and orientation to problem-solving which are resulting in reduction in crime.

All police stations now have CIEPS rooms where information is compiled, georeferenced, analyzed, and used to prioritize work in such a way that supports the decision-making processes of the commanders.

Despite the effort and the good results of the training, the principal weakness of the strategy in the eight metropolitan areas is related to the competencies of personnel, the threat of inertia, and the resistance to change, even taking into account the need for more systematic, analytical, and detailed work.

The replica of the PNVCC in the prioritized municipalities imposes an even greater challenge to evaluation because although the cities are smaller, they confront more severe problems that are rarely studied, with institutional problems that directly affect police work practices.

The evaluation developed by FIP establishes that the National Plan for Community Policing in Quadrants (PNVCC) does have an effect on the reduction of crime in the eight metropolitan areas. Upon estimating the effect on the total period analyzed, applying the methodology of Differences in Differences, the following effects were found:

- The treatment stations (those that received training) present homicide rates 18% lower than the control stations.
- The treatment stations present personal injury rates 10% lower than the control stations.
- The treatment stations present vehicle theft rates 21% lower than the control stations.

It was established that the training as a transmission and motivation mechanism increased levels of implementation of the PNVCC and with that, it has changed the work practices of personnel, which generated reductions in crime.

In this analysis it was possible to identify that the indicators of monitoring and evaluation, endogenous complementarity, exogenous complementarity, shared responsibility

and problem orientation increase in frequency after the training has had its effect in the stations.

Once the indicators mentioned have been analyzed, an increase in the levels of implementation generated by the training was noted. The effect of an improved implementation of the methodology demonstrates impact in the improved crime rates. The stations that increased their level of implementation as a result of the training presented:

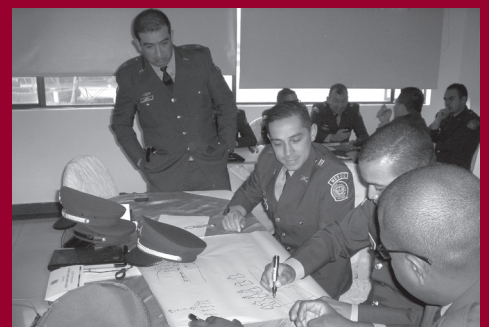
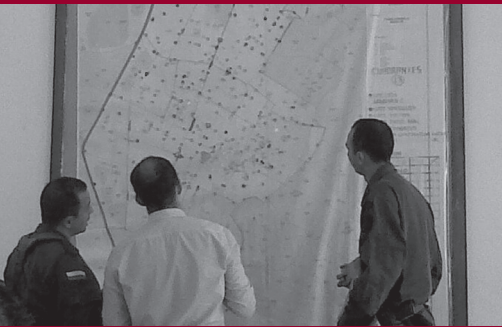
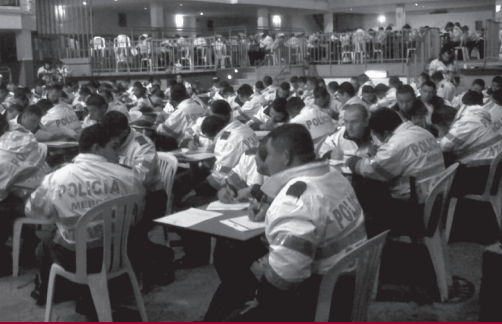
- Homicide rates 9.7% lower than the rest.
- Residential robbery rates 40% lower than the rest.
- Motorcycle theft rates 60% lower than the rest.
- Vehicle theft rates 50% lower than the rest.
- Personal robbery rates 24% lower than the rest.

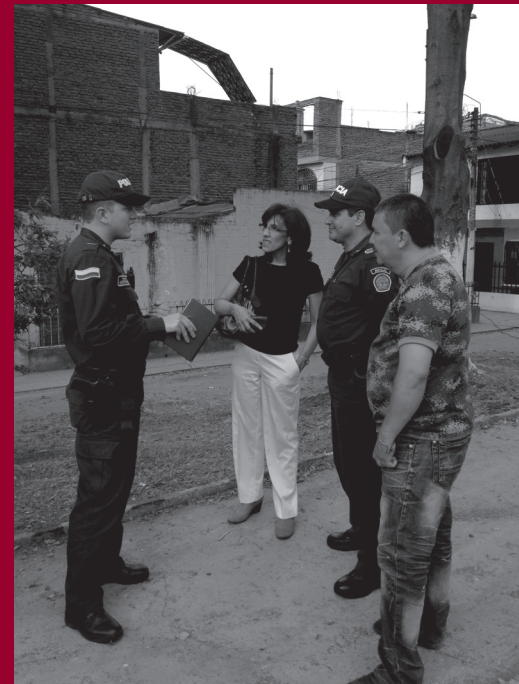
On analyzing the effect of the PNVCC generated by a higher level of implementation, it was found that all metropolitan areas except Cartagena had higher or equal effects for the majority of crimes.

It was also found that the PNVCC has different effects according to the context. The stations with a larger proportion of residences demonstrated stronger effects in homicide and personal robbery. In the stations with the larger proportion of economic activity, it was found that those with more industrial activity had a greater effect on personal injury, and that those that had more commerce did not present as many effects. Finally, those that had a higher proportion of services demonstrated greater effects on all robberies.

With respect to the effects by socioeconomic strata, in the lower strata there is a greater effect in the motorcycle theft and personal robbery; in the middle strata the greatest effects were in homicide; and in the high strata the greatest effects were detected in residential robbery, vehicle theft, and robbery of commercial entities.













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