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Planning & Management Consulting Corporation

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SUMMARY REPORT
PHASE TWO
CRIME INCIDENCE AND DISPLACEMENT

MODEL - Summary Report, Phase 2

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Submitted to:

CRIMINAL JUSTICE COORDINATING COUNCIL OF
GREATER CLEVELAND
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FOREWORD

The report which follows is a result of the foresight of the Criminal Justice Coordinating Council (CJCC) of Greater Cleveland Director, Mr. Michael V. Schaffer, in recognizing the potential for crime displacement that exists in any area where selected high intensity crime control programs, such as the IMPACT Cities Program, are implemented.

This study could not have been undertaken without the cooperation of the following agencies:

- Criminal Justice Coordinating Council of Greater Cleveland (CJCC), through its Director,
- Cleveland IMPACT Cities Program, through its Director,
- Administration of Justice Division (AJD) of the State of Ohio, through its Director,
- The Law Enforcement Assistance Administration (LEAA) Region V, through its Regional Administrator, and
- Cuyahoga County Association of Chiefs of Police, through its President.

The study proceeded with the full cooperation of each of these agencies, and in particular, the Cuyahoga County Association of Chiefs of Police whose participation in the effort made available the data upon which a major portion of the results are based.

SECTION I
INTRODUCTION AND SUMMARY

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1.1 INTRODUCTION

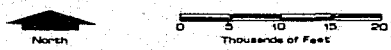
This document presents the results of Phase Two of a study of crime incidence and crime displacement within Cuyahoga County, Ohio, undertaken by the Planning & Management Consulting Corporation (PMCC) on behalf of the Criminal Justice Coordinating Council (CJCC) of Greater Cleveland. The CJCC has the responsibility for criminal justice regional planning. The Region is made up of the City of Cleveland and its adjacent and outlying suburbs located within Cuyahoga County.

There are 60 reporting municipalities in Cuyahoga County which are divided into five Mobile Radio Districts (MRDs). Figure 1-1 outlines the City of Cleveland and the other four Mobile Radio Districts which are the jurisdictions of interest for this phase of the study. Each of the Districts represents an aggregation of 12 to 20 suburban municipalities; together, the four MRDs and the City of Cleveland MRD account for all municipalities in the County.*

Before presenting a brief summary of the Phase Two accomplishments, it is important to recall the overall purposes of the Crime Displacement Study: To determine if displacement is occurring as a result of the IMPACT Program and

*The Mobile Radio District concept is explained in detail in "A Plan to Improve the Effectiveness of Law Enforcement Communications and Information Systems in Cuyahoga County," Phase One Report, Fall, 1971. The Cuyahoga County Police Chiefs Association (CCPCA), through the Board of County Commissioners, has been the proponent of this multi-year project. The project beneficiaries are the police departments of all the suburban municipalities in Cuyahoga County. Briefly stated, the Phase One report presented a frequency allocation plan which provided for the upgrading of mobile digital communications in police vehicles and information processing throughout the suburban municipalities in the county.

CRIMINAL JUSTICE COORDINATING COUNCIL
OF GREATER CLEVELAND



Cuyahoga County—Ohio

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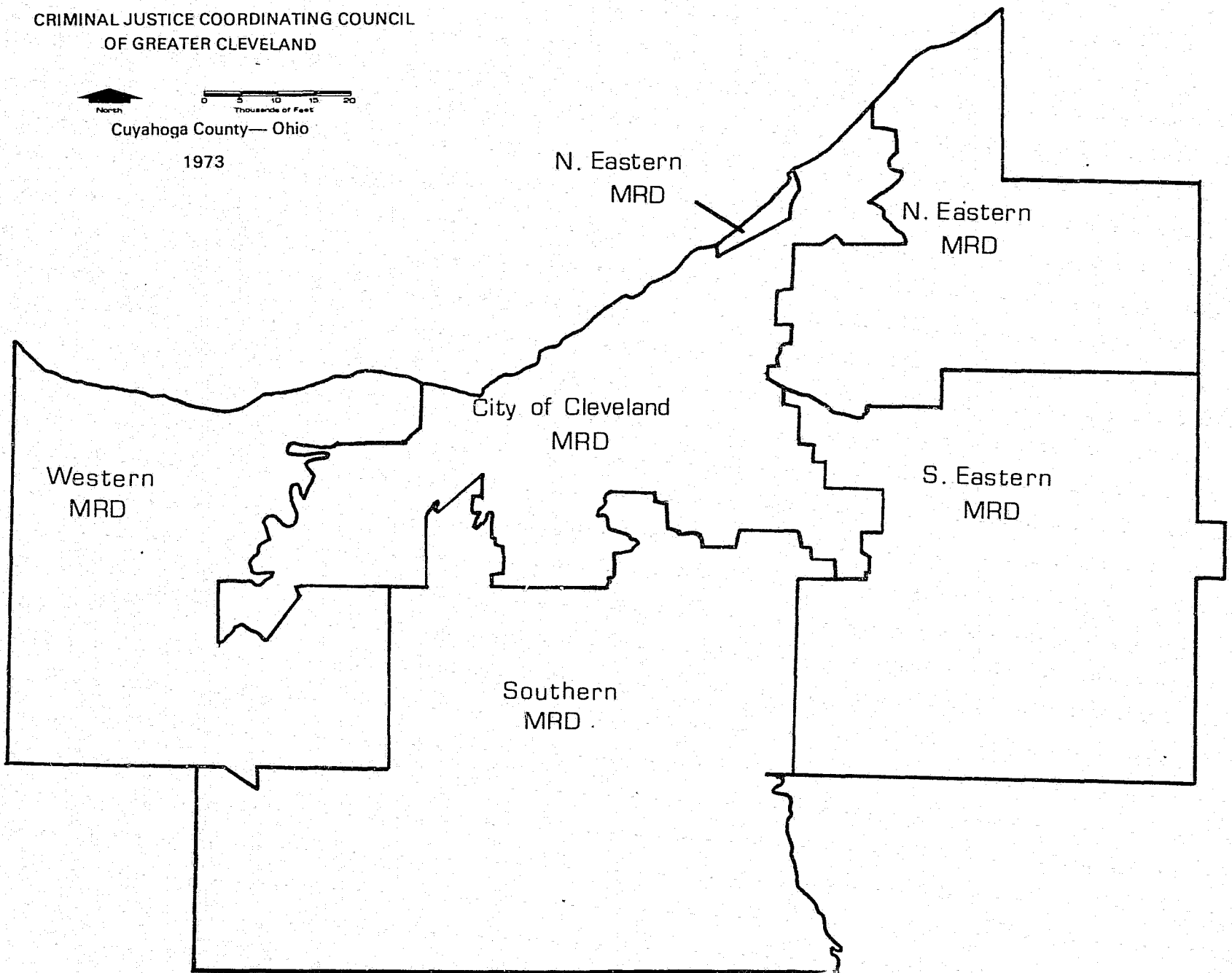


FIGURE 1-1

CITY OF CLEVELAND AND FOUR MOBILE RADIO DISTRICTS

in what form the displacement is taking place in terms of the types of crime, the amount of crime, and the jurisdictional locations of displaced crime. The initial research, Phase One of the study, developed a preliminary design, inclusive of an explicit mathematical model, and represented an effort to incorporate consideration of all pertinent aspects of crime displacement into a unified conceptual approach. This initial effort also outlined in detail the data elements necessary to drive the model and presented a data collection plan for the data capture.

The Phase Two effort implemented the data collection plan developed in Phase One and described the empirical results emerging from the analysis of the effects of the IMPACT Program and the price variables on crime incidence. However, due to the financial constraints, the number of alternative statistical models that could be utilized was limited and the analysis was confined to a high level of aggregation represented by the five Mobile Radio Districts as the basic jurisdiction unit. This aggregation scheme is of value presently to CJCC planners and evaluators for judging the effectiveness of anti-crime efforts and measuring the incidence of crime at the MRD level. However, it should be kept in mind that subsequent phases would develop schemes for breaking down the MRD level aggregation into greater detail so that crime incidence and displacement can be measured on a jurisdiction-by-jurisdiction basis by crime type -- thereby rendering the crime incidence and displacement model to be of even greater utility in the planning and evaluation processes, especially with respect to law enforcement projects.

1.2 SUMMARY OF FINDINGS

As stated in the preceding text, Phase One consisted of the construction of alternative statistical models to isolate the causal factors and the effects of the Cleveland IMPACT Cities Program, as well as the development of the data collection plan necessary for the empirical implementation of these models. Phase Two consisted of the acquisition of the monthly data delineated by the Phase One effort and, in addition, statistical analyses with those data in the context of the models also developed in Phase One.

The analyses were confined to the following:

1. Only two aggregate types of crime. All burglaries and robberies (both IMPACT crimes) are treated as a single aggregate crime type, while all larcenies and auto thefts (both non-IMPACT crimes) are treated as the second aggregate crime type.
2. Only five aggregate jurisdictions. Cuyahoga County consists of five Mobile Radio Districts (MRDs). They are the City of Cleveland, plus four suburban MRDs, each consisting of 12-20 individual municipalities.
3. Monthly data for the period January 1970, through June 1974, or in certain cases, to a subset of that sample period.

The two variables to be explained by the statistical models in the Phase Two effort were the monthly number of burglaries/robberies per capita in each of the five MRDs and the monthly number of larcenies/auto thefts per capita in each of the five MRDs. The causal variables used to explain the levels of the two per capita crime types fall into three general categories:

1. Variables to represent the absence or presence of the Cleveland IMPACT Program. There are two such variables. The first represents IMPACT planning (March 1972-February 1973), while the second represents IMPACT implementation (March 1973-June 1974).

2. Price variables for each of the two crime types in each of the five MRDs for each month in the sample period. The price of a crime is defined as the number of years an offender could expect to spend in a correctional institution. It consists of the conviction rate on offenses of the particular crime type in the particular jurisdiction in that month times the mean statutory sentence length for a conviction for that crime.
3. A set of 10-15 variables to represent the socio-economic-demographic status of each of the five MRDs in each month of the sample period. Examples of these variables are: unemployment rate, incidence of aid to dependent children, non-white proportion of the population, and average family size. These variables were included as causal factors, not for their own sake, but to act as control variables that would permit the isolation of the effects on crime incidence of the IMPACT Program and the price variables just described.

The empirical results emerging from the analyses of the effects of the IMPACT Program and the price variables on crime incidence are unusually promising; the conclusions regarding the IMPACT Program that are supported by the empirical work performed in Phase Two are as follows:

- The Cleveland IMPACT Cities Program was a dramatic deterrent to the incidence of burglaries/robberies within the City of Cleveland. In the analyses which did not include the price variables, but after allowing for the effects of the socio-economic-demographic variables, both the planning and implementation phases of the IMPACT Program reduced burglaries/robberies below what they would have been otherwise. The announcement and planning phase of IMPACT appears to have reduced these crimes from three to slightly over four such crimes per month per 10,000 of Cleveland's population, while the implementation phase of IMPACT resulted in an additional reduction of three to four and one-half such crimes per month per 10,000 of Cleveland's population. These results on the effects of IMPACT are statistically significant at the 99% significance level,* while the equations in which they are included are themselves significant relationships at the 99.9% level.**

*This means that there is only one chance in 100 that these results on the effect of the planning and implementation IMPACT variables would have been obtained from a "true" underlying relationship in which IMPACT in fact had no effect on crime incidence.

**This means that there is only one chance in 1,000 that these results on the effects of all the variables in the model (IMPACT variables and socio-economic-demographic variables) would have been obtained from a "true" underlying relationship in which none of the variables had an effect on crime incidence.

- Even when the effects of the price variables on crime incidence are allowed for, there is still a significant effect of the IMPACT Program on burglaries/robberies in the City of Cleveland. That is, IMPACT appears to have reduced burglaries/robberies over and above the extent to which IMPACT resulted in an increase in the expected punishment for such crimes. The exact nature of this "bonus" effect is unclear, but its presence is statistically significant in excess of the 95% level.
- The IMPACT Program had a much weaker effect on larcenies/auto thefts, which are non-IMPACT crimes, in the City of Cleveland. All of the relevant results suggest that IMPACT in both of its phases tended to bring about a sympathetic reduction in larcenies/auto thefts within Cleveland, but only a few of these were statistically significant above the 95% level. This weak sympathetic relationship between "cracking down" on one type of crime and the diminished incidence of the other type of crime prevails throughout the analyses, even when the price variables are introduced into the equations. But only in isolated instances is there statistically significant evidence at the 95% level that such sympathetic responses occur.
- For burglaries/robberies, no statistically significant evidence of crime displacement by the IMPACT Program from Cleveland to the four suburban MRDs has been revealed by the results obtained to date. In the large number of cases investigated, the effects of those IMPACT variables that would reveal displacement were typically insignificant at even the 80% level, although there was a small number of exceptions to this. The reason for the apparent absence of displacement probably lies in the aggregation scheme (along MRD lines) used in the analysis. Each suburban MRD contains some municipalities contiguous to Cleveland and some distant municipalities. Although there might well have been displacement into the adjacent jurisdictions, the increased crimes there were probably masked by what was happening in the distant municipalities within the same MRD. However, an aggregation scheme different from the MRD approach used would be required to test the displacement phenomenon into municipalities adjacent to Cleveland. Such an aggregation scheme would involve, at a minimum, dividing Cuyahoga County into concentric circles, with Cleveland at the center, adjacent municipalities as a first ring, and the remaining municipalities as an outer ring. Even this might be too high a level of aggregation for uncovering crime displacement out of Cleveland if such displacement tends to be concentrated in only a few areas within the adjacent ring.
- However, for larcenies/auto thefts, strong statistical evidence of crime displacement by the IMPACT Program from Cleveland to the four suburban MRDs has been revealed by the results obtained to date. This result was especially dramatic during the implementation phase of the IMPACT Program; the same result was true for the planning phase of IMPACT but to a lesser extent. In other words, the IMPACT

Program by "cracking down" on burglaries/robberies in the City of Cleveland resulted in a combination of both geographical and statutory displacement of larcenies/auto thefts to the suburbs.

Figure 1-2 displays the direct and indirect effects of the IMPACT Program by type of crime for the City of Cleveland and the four suburban MRDs taken together.

The empirical work performed in Phase Two also supports the following conclusions regarding the effects of prices (expected punishment) on crime incidence and displacement.

- The Attorney General of the United States has recently asserted that punishment is the best deterrent to crime. Every single equation in which the price variables were included support the Attorney General's assertion. The price variables, it is important to recall, represent the expected punishment associated with an offense. In every case, the price of burglaries/robberies in an MRD displayed a statistically significant negative effect on the incidence of burglaries/robberies in that MRD at the 99% level or above. The same was true for the effect of the price of larcenies/auto thefts on the incidence of larcenies/auto thefts. In particular:
 - For burglaries/robberies, for each of the five MRDs, the statistical results indicate that adding one year of incarceration to the expected punishment for that crime type in an MRD would reduce the monthly incidence of burglaries/robberies by between 1.1 and 1.5 such crimes per 10,000 of the MRD's population. (For purposes of comparison, the mean value of burglaries/robberies per 10,000 of population in the Cleveland MRD over the relevant sample period was 18.7 per month.)
 - For larcenies/auto thefts, for each of the five MRDs, the empirical estimates imply that adding one year of incarceration to the expected punishment for that crime in an MRD would reduce the monthly number of larcenies/auto thefts by between 10 and 15 such crimes per 10,000 of the MRD's population. (Again, for purposes of comparison, the mean value of larcenies/auto thefts per 10,000 of population in the Cleveland MRD over the relevant sample period was 35.4 per month.)
- Statutory displacement within an MRD due to price variations was not a statistically significant phenomenon. That is, there was no evidence to suspect that increasing the expected punishment attached

CRIME TYPE \ GEOGRAPHICAL AREA	CLEVELAND MRD	SUBURBAN MRDs
BURGLARIES/ ROBBERIES	<u>Direct Effect</u> Reduced such crimes.	<u>Indirect Effect</u> No statistically significant evidence of geographical displacement, positive or negative.
LARCENIES/ AUTO THEFTS	<u>Indirect Effect</u> No statistically significant evidence of statutory displacement, positive or negative.	<u>Indirect Effect</u> Statistically significant evidence of positive geographical/statutory displacement, especially during implementation phase of IMPACT.

FIGURE 1-2
SUMMARY OF THE ESTIMATED EFFECTS OF THE IMPACT PROGRAM,
BY GEOGRAPHICAL AREA AND BY TYPE OF CRIMES

to burglaries/robberies increases or decreases the incidence of larcenies/auto thefts, and vice-versa. All of the estimates suggested a weak sympathetic relationship -- higher punishment for one crime reduces the incidence of the other crime -- but little statistical significance can be attached to this phenomenon.

- Geographical displacement from Cleveland to suburban MRDs, due to price variations in Cleveland, was revealed by the analyses in two cases:

- A rise in the price of burglaries/robberies in Cleveland did appear with statistical reliability to displace such crimes to the Northeastern MRD.

- A rise in the price of larcenies/auto thefts in Cleveland acted to reduce the incidence of such crimes in the Western MRD.

No other statistically significant instances of geographical displacement (positive or negative) from Cleveland to the suburbs was apparent in the empirical analyses.

These results regarding the direct and indirect effects of the price variables are summarized in Figure 1-3.

In essence then, the tested, validated, and highly aggregated crime incidence and displacement model developed in Phase Two should be considered as a new strategic evaluation planning model to be used by the CJCC staff in developing new strategies in the planning for the evaluation of crime reduction programs at the MRD level. These strategies would be based upon more accurate analyses of crime by offense category and frequency of incidence and would reflect the socio-economic-demographic characteristics of the community under analysis.

In order to continue to develop useful information to improve the decision-making at less aggregated levels of analysis, and to assess and, perhaps, optimize the impact of CJCC resources on the prevention and reduction of crime and

PRICE EFFECT CRIME TYPE	Effect of the Price of Burglary/Robbery within any particular MRD	Effect of the Price of Larceny/Auto Theft within any particular MRD	Effect of the Price of Burglary/Robbery in Cleveland on suburban MRDS	Effect of the Price of Larceny/Auto Theft in Cleveland on Suburban MRDS
BURGLARY/ ROBBERY	<u>Direct Effect</u> Reduced such crimes.	<u>Indirect Effect</u> No statistically significant evidence of statutory displacement.	<u>Indirect Effect</u> Increased such crimes in NE MRD. Otherwise, no statistically significant evidence of geographical displacement to the remaining MRDs.	<u>Indirect Effect</u> Not investigated.
LARCENY/ AUTO THEFT	<u>Indirect Effect</u> No statistically significant evidence of statutory displacement	<u>Direct Effect</u> Reduced such crimes.	<u>Indirect Effect</u> Not investigated.	<u>Indirect Effect</u> Reduced such crimes in W MRD. Otherwise, no statistically significant evidence of geographical displacement to the remaining MRDs.

FIGURE 1-3
SUMMARY OF THE EFFECTS OF CRIME PRICES,
BY TYPE OF PRICE EFFECT AND BY TYPE OF CRIME

delinquency, it would be desirable to initiate work on the areas of future research suggested below:

- Estimate three concentric circles as described in the Phase One Report -- see Phase One Report Crime Displacement Study (May 1974);
- To the extent possible, estimate with existing data a nine equation model which divides each suburban MRD into an inner segment and an outer segment of concentric rings;
- Refine the socio-economic-demographic variables for both the MRDs and the three concentric rings utilizing existing data;
- Reduce the set of socio-economic-demographic variables until a significant set of coefficients is obtained; and
- Collect additional sentence length data to reflect actual sentence lengths by crime type.

And once the above work is conducted, subsequent efforts could be directed at (1) determining which jurisdictions had the highest activity, (2) isolating one to three jurisdictions and performing a detailed analysis on the extent of crime incidence and displacement, and (3) disaggregating the crime incidence and displacement model for those jurisdictions (probably 10-15 jurisdictions) exhibiting the highest activity and again performing a detailed analysis on the extent of crime incidence and displacement.

As in any research effort it is necessary to provide a description of the data; Section II presents a description of the data collected, tabulated, and processed during Phase Two of the crime incidence and displacement study. Sections III and IV present a summary of the results of over 130 regression equations insofar as they pertain to the effects of the IMPACT Program and the price variables, respectively, on crime incidence and displacement. Section V discusses in detail the recommended areas of future research necessary to develop further the crime incidence and displacement model. Finally, the

Technical Appendix provides the rationale for the various sets of regression runs performed in the study and indicates some of the statistical aspects of the techniques utilized. All of the regression equations estimated in this study are presented in a separately bound volume.

END