Examining Burglary and Robbery Case Clearance Rates for the Knoxville (TN) Police Department

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EXECUTIVE SUMMARY

This report summarizes the details of an examination conducted by the *International Association of Chiefs of Police/University of Cincinnati (IACP/UC) Center for Police Research and Policy* (the "Center") on crime clearance rates for the Knoxville, TN Police Department (KPD). The KPD identified crime clearance as a primary area of interest for research. Members of the KPD command staff observed that despite significant advances in investigation procedures, case clearance rates – that is, the percentage of reported cases cleared by arrest – remained largely stable. To better understand KPD clearance rates, this research examines trends in residential burglaries and robberies of individuals to identify case and neighborhood characteristics associated with cases cleared by arrest. The goals of this research are four-fold: (1) describe trends in reported residential burglary/individual robbery incidents over time, (2) describe case characteristics in reported residential burglary/individual robbery incidents, (3) identify case-level characteristics of residential burglary/individual robbery incidents that predict case clearance rates, and (4) identify neighborhood-level characteristics that predict case clearance.

This study documents a multi-faceted examination of incidents of residential burglary and individual robbery reported to the KPD from 2013 to 2017, including descriptive statistics and multivariate analyses. Specifically, logistic regression models are estimated to calculate the difference in the effect of case characteristics while accounting, or "controlling" for, the influence of other variables. Additionally, multilevel modeling (hierarchical linear modeling – HLM) is used to estimate the unique and combined effects of case-level and neighborhood-level factors on KPD case clearance by arrest rates. The main findings of this examination are summarized below.

Residential Burglary, 2013-2017

1. During the study time period, residential burglaries reported to the KPD declined by 34%, and the percentage of cases cleared by arrest varied over time with 10% of cases cleared by arrest in 2013 compared to 7.6% of cases in 2017. When the percentage of residential burglary cases cleared by arrest *or* exceptional means from 2013 to 2017 is considered, we find that trends in residential burglary case clearance by the KPD are largely consistent with national trends for case clearance of burglary **(**see https://ucr.fbi.gov/crime-in-the-u.s for access to yearly estimates).

2. Examining the duration of investigations revealed that reported yearly averages dramatically decreased in the length of time investigations of residential burglary remained open from 2013-2017, with an average of over 570 days in 2013 to under 30 days in 2017. However, median values for the number of days that residential burglary cases remain open suggest that outlier cases skew these averages, where median scores ranged from 23 days in 2013 to 11 days in 2017.

3. The strongest case-level predictor of burglary clearance is identification of a suspect description or name, followed by the involvement of a weapon during the crime and the

value of the stolen property. These findings are consistent with prior research, where these factors have a positive association with the likelihood of clearance. However, a fourth significant, albeit weaker predictor was victim race. Specifically, in burglaries where a victim was White, it was more likely that the case was cleared by an arrest, compared to cases involving Black victims.

4. When considering neighborhood-level factors, the statistical models show that residential burglaries are less likely to be cleared by an arrest if the burglary occurred in a neighborhood characterized by higher levels of concentrated disadvantage (measured as a combined score of the following Census variables: % female headed household, % public assistance, % Black, % below poverty, % unemployed, and % less than high school education).

5. When considering models with both case-level and neighborhood-level predictors, this study found that, although disadvantaged neighborhoods are less likely to have cases of residential burglaries cleared by an arrest, residential burglary cases occurring in disadvantaged communities where a suspect name or description is known to police were more likely to be cleared by an arrest. That is, enhanced police intelligence (i.e., knowing the name/description of suspect) for cases of residential burglary within disadvantaged communities was more beneficial in clearing burglaries than in other communities. This finding highlights the importance of strong police-community relationships, which can lead to obtainable and usable information sharing to inform police of offenders within the area.

Robbery of Individuals, 2013-2017

1. During the study time period, robberies of individuals reported to the KPD declined by 24.7%, and the percentage of cases cleared by arrest varied over time with 12.2% of cases cleared by arrest in 2013 compared to 18.3% of cases cleared by arrest in 2018. When the percentage of individual robbery cases cleared by arrest *or* exceptional means from 2013 to 2017 is considered, we find that KPD's case clearance for individual robbery is higher than national trends for robbery case clearance by arrest or exceptional means (see https://ucr.fbi.gov/crime-in-the-u.s for access to yearly estimates). For example, national percent cleared by arrest or exceptional means in 2017 was 29.1% (https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/tables/table-25); KPD robberies cleared by arrest or exceptional means in 2017 was 35.9%

2. Examining the duration of investigations revealed that reported yearly averages dramatically decreased in the length of time investigations of robbery remained open from 2013-2017, with an average of over 268 days in 2013 to under 100 days in 2017. However, median values for the number of days that individual robbery cases remain open suggest that outlier cases skew these averages, with median scores ranging from 40 days in 2013 to 46 days in 2017.

3. Across all statistical models that included case-level and neighborhood-level predictors for clearance of individual robbery incidents, none appeared to be significantly associated with an increased likelihood that the individual robbery incident was cleared by arrest. For example, neither the availability of suspect description, the value of property stolen (USD), the involvement of a weapon, or the collection of AFIS-quality prints affected the likelihood of a case of robbery being cleared by an arrest. Similarly suspect and victim characteristics (i.e., race, sex) had no effects. Finally, neighborhood-level factors, including concentrated disadvantage and ethnic heterogeneity, had no impact on case clearance. These null effects are in contrast to previous literature, which identified several predictors of robbery clearance. These findings suggest that predictors of case clearance may be crime specific, with clearance by arrest significantly affected by the type and quality, as well as variation in the information available for the investigation of different types of crime. Of particular note, however, is the lack of the influence of individual victim or suspect race, or the level of concentrated disadvantage of the neighborhood, on the likelihood of robbery incidents being cleared by arrest. These null findings also suggest that other case-specific factors – unmeasured in these data – are likely predictors of case clearance rates. The small number of case characteristics included in the available data is a limitation of this study.

It is important to note that overall, these models are not substantively strong, leaving a large percentage of unexplained error. That is, the factors available for examination collectively do not provide a strong prediction of whether or not a case is cleared by an arrest. This suggests that there are other factors – unmeasured and therefore, not included in the statistical models within this study – that may be stronger predictors of case clearance rates. It is possible that the identification, measurement, and inclusion of these other factors would alter the findings presented above.

Implications

Findings indicating the significant impact of victim race on case clearance when other pertinent case- and neighborhood-level characteristics are controlled for present important implications for the Knoxville Police Department's investigatory process for cases of residential burglary. Specifically, the KPD should consider why residential burglary cases are less likely to be cleared by an arrest if they involve a Black victim. Further, it is important to consider that these same race effects are *not* found for robbery case clearance. Rather, for robbery incidents, the race and sex of both the suspect and the victim have no substantial predictive value in determining if the case is cleared by arrest. It is recommended that the KPD Command staff consider the potential differences involved in the investigatory responses given to both burglaries and robberies that might account for this differential impact of victims' race on the likelihood of identifying and arresting criminal suspects.

Based on previous studies, there was an expectation that the prevalence and strength of case solvability factors – that is, those case characteristics identified in the preliminary investigation that can lead to the identification of a suspect – would be significant predictors of subsequent

case clearance rates. Of interest was how these solvability factors could be used – in the form of a checklist – to help KPD personnel determine in a systematic, unbiased manner, the best use of their limited investigatory resources. The electronic data provided to the research team from the KPD, however, did not systematically identify *when* information was gathered by KPD personnel (that is, during the preliminary or follow-up investigation) or *how* it was used to inform the assignment and follow-up investigation of cases. Without systematically collecting this information, it is difficult to conduct a thorough examination of the investigatory process at the KPD or identify methods to enhance the percentage of cases cleared by an arrest.

It is possible that supplemental information key to understanding case characteristics and investigative efforts exist within hard copies of case files developed by KPD personnel. However, if this information is not connected electronically to other existing database, its utility in the examination of predictors of case clearance is depended upon a time-consuming and resource-intensive hand-coding of the details from the casefiles. Therefore, it is recommended that the KPD investigate the possibility of customizing its current processes for electronically collecting investigatory data, in an effort to improve the quantity and quality of data that is captured. Further it is recommended that once systematically gathered, routine analyses of these electronic data by KPD analysts should be conducted to promote the identification and enhanced use of solvability factors. This will likely increase the effectiveness and efficiency of investigators, resulting in increased case clearance rates.

Conclusion

Overall, this study provides a comprehensive review for case clearance of residential burglary and individual robbery incidents for the KPD and adding to the limited contemporary research on the topic of police investigations. Future research would benefit from integrating additional predictors than were available in this study, in an effort to create more holistic models. For example, future research should consider the impacts of case characteristics, investigative efforts, organizational context, and community characteristics on the effective investigation and resolution of crimes. Similar to the conclusions of other researchers, police executives, and policymakers, this study highlights the need to invest resources to better understand "what works" in police investigations to improve case clearance rates. Furthermore, it is critical for law enforcement agencies to document their investigative practices to better understand what is most effective for their agency. Law enforcement executives should also consider that what is effective in one jurisdiction may or may not be effective in their own, thus it is important to consider what influences investigations across crime types, ultimately enhancing the ability of law enforcement to apprehend offenders and improve public safety.

I. INTRODUCTION

In October 2017, the International Association of Chiefs of Police/University of Cincinnati (UC) Center for Police Research and Policy (the "Center") met with Command Staff from the Knoxville (TN) Police Department (KPD) to discuss the opportunity to collaborate in research. During this meeting, the topic of KPD's crime clearance rates emerged as a primary area of interest for exploration. KPD command staff observed that, despite significant technological advances in the investigation process over recent years, case clearance rates – that is, the percent of reported cases cleared by arrest – remained relatively unchanged over time. As later documented in a Memorandum of Understanding (MOU) and data sharing agreement, the Center research team developed a partnership with KPD to facilitate the empirical exploration of KPD's case clearance rates.

The Center research team initially proposed to identify and examine the impact of case solvability factors on the likelihood of cases of residential burglary and robbery of individuals being cleared by an arrest. Solvability factors refer to information elements collected within the preliminary investigation of a crime (e.g. collection of usable fingerprints, obtainment of suspect description or name) that enhance the likelihood of a case being cleared by an arrest (Greenberg et al., 1975). Cases of residential burglary and individual robbery were selected for examination in this study, as incident reports for these crimes generally offer the most detailed accounts of the crime event. Using a random sample of cases reported to the KPD across a five-year period (2013-2017), the proposed study planned to describe the origins of the KPD solvability factors in these cases, identify the rigor in which these factors are applied to the cases of residential burglary and individual robbery, highlight changes in the use of solvability factors over time, and potentially improve upon existing case solvability scoring instruments used by the KPD.

Upon further review of the available data, however, the research proposal was revised to examine trends in all reports of residential burglary and robbery of individuals from 2013 to 2017, identify case characteristics from the available information within full case reports, and examine the impact of case characteristics and neighborhood characteristics on the likelihood a case is cleared by an arrest. [1] To facilitate this examination, descriptive statistics and multivariate analyses are employed – providing a comprehensive description of residential burglary and individual robbery trends from 2013 to 2017, as well as trends in case clearance rates, and factors associated with case clearance.

This report presents the findings from the IACP/UC Center's examination of KPD case clearance rates for residential burglaries and individual robberies. This report is organized into the following five remaining sections: **Section II** discusses extant research examining case clearance rates. **Section III** provides a description of the research methodology and statistical analyses employed to examine KPD's case clearance rates for residential burglaries and robberies of individuals across time (2013-2017). **Section IV** presents the results from this examination. This section is further divided into two subsections presenting the findings for (A) residential burglary and (B) individual robbery. Finally, this report concludes with **Section V**, which provides a discussion of the findings and summary remarks.

[1] Notably, this varies from the original proposal of research, which focused on the examination of information elements collected in the *preliminary investigation* only.

II. EXAMINING CASE CLEARANCE

The investigation and resolution of crimes is a primary function of law enforcement in the United States. Indeed, the ability of law enforcement agencies to effectively apprehend criminal offenders in their jurisdiction is a key expectation among citizens. In the past 50 years, there has been significant technological advancement in the area of criminal investigations. The systematic use of computer databases for case documentation and processing, the incorporation of crime analysts in investigative work, and enhancements to forensic technologies and techniques (e.g. automated fingerprint identification systems, DNA profiling, ballistics imaging technologies) are only a few examples of efforts to improve the efficiency and effectiveness of the investigative process.

Despite the availability of this new technology, case clearance rates in the United States are relatively low. For example, the FBI's Uniform Crime Report shows that in 2017 there were over 1.1 million violent crimes known to the police, of which only 45.6% were cleared by arrest or exceptional means. This included 29.7% of the almost 300,000 robberies reported that year. Additionally, only 17.6% of approximately 7 million property crime offenses known to the police were cleared by arrest or exceptional means, including 13.5% of the 1,281,083 reported burglary offenses.[2] Research also suggests that crime clearance rates have remained relatively stable across crime types over many years (Braga et al., 2011; Scott et al., 2019). A recent study of yearly clearances for the United States from 1981 to 2013 found that clearance rates for aggravated assaults consistently fell around 60%, robbery clearance remained within the 32-38% range, and burglary clearance rates remained stable around 15% (Lum et al., 2016). Furthermore, clearance rates for both vehicle theft and larceny fluctuated around 20% during this period, while homicide clearances have been on the decline from the 1960s for all police agencies nationwide (Lum et al., 2016).

This consistency in crime clearance rates across time for American police agencies has brought renewed attention to the process of police investigation. Questions regarding the origins of these clearance rates and efforts that could be made to improve them have become more prevalent. Current research in this area, however, is limited (Braga & MacDonald, 2019). Instead, much of what we know about the police investigation process is a product of research published in the 1970s and early 1980s. During this time, concern over the ability of police investigations to impact crime led many researchers to examine ways to improve criminal investigations. These studies consistently suggested that the greatest predictor of case clearance was the amount and quality of information obtained by patrol officers in the preliminary investigation of a case, particularly the collection of information facilitating the identification and description of the suspect (Chaiken et al., 1977; Eck, 1979; Gaines et al., 1983; Greenberg et al., 1975; Greenwood, 1970; Greenwood et al., 1975). Commonly referred to as "solvability factors," researchers demonstrated the ability of these critical pieces of information to predict investigative outcomes (Greenberg et al., 1975). Following these findings, effective investigative models within police agencies were typically characterized as those that prioritize the investigation of cases with the greatest number of solvability factors (i.e., cases with the greatest likelihood of being solved) (Chaiken et al., 1977; Greenwood et al., 1975).

[2] See Crime in the United States-2017, at https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/topic-pages/clearances.

Findings produced from later research examining police investigations provide a more optimistic view of the role of investigation in the clearance of cases by arrest. For example, in an examination of the process of burglary and robbery investigation in three jurisdictions, Eck (1983) found that both the information collected within the preliminary investigation and the activities of detectives were significant predictors of arrest for certain cases across the jurisdictions. To explain this finding, Eck (1983) created the "triage hypothesis," proposing the existence of three types of cases: (1) cases that are virtually impossible to solve due to a lack of information, (2) cases solved by circumstances (e.g. when the witness names the suspect), and (3) cases that have some useful information and might be solved if investigated (Eck, 1992). Subsequent research has supported Eck's (1983) hypothesis (see, e.g., Brandl & Frank, 1994; Cook et al., 2019), highlighting the importance of considering both the circumstances of each case (i.e., solvability factors) and efforts by detectives in understanding case outcomes.

Recent empirical examinations of police investigations and case clearance have focused upon homicide clearance rates in the United States and predictors of homicide case clearance. Similar to prior research examining predictors of case clearance for crimes of robbery and burglary, findings from the homicide literature provide two primary perspectives regarding the likelihood of case clearance. The first perspective suggests that crime-related factors (e.g. the victim-offender relationship, victim characteristics, type of weapon used, availability of physical evidence) play the most important role in determining whether a homicide case is cleared by arrest or not (e.g. Addington, 2006; Jarvis et al., 2016; Litwin, 2004; Litwin & Xu, 2007; Maguire et al., 2010; Ousey & Lee, 2010; Puckett & Lundman, 2008; Xu, 2008). In contrast, the second perspective points to the importance of organizational factors (e.g. investigative effort, caseload, staffing, availability of training and technology for patrol officers and detectives) and community factors (e.g. community trust, political environment) in the prediction of case clearance (Carter & Carter, 2016; Davies, 2007; Keel et al., 2009; Wellford et al., 2019; Worrall, 2016).

In sum, while the examination of the productivity and effectiveness of police investigations in solving crime was given attention in the 1970s and 1980s, limited current research has examined predictors of case clearance or effective models for police investigations. The substantial technological and policy innovations occurring in police agencies since the 1980s makes it reasonable to expect case clearance rates would have increased. However, many police agencies, like KPD, suggest that their clearance rates have remained stable over time. More research is needed to assess the practice of police investigatory work and the predictors of case clearance. Indeed, this research will facilitate the development of a body of scientific evidence and practical experience highlighting new approaches to improving police effectiveness to ensure justice through the apprehension of offenders by arrest (Braga & MacDonald, 2019; Eck & Rossmo, 2019).

III. METHODOLOGY

This section of the report details the methodology used by the IACP/UC Center research team to examine four primary research questions regarding incidents of residential burglary and individual robbery reported to the Knoxville Police Department from 2013 to 2017. These research questions include:

(1) What are the trends in reports of residential burglary/individual robbery to the Knoxville Police Department over time?

(2) What are the characteristics of cases of residential burglary/individual robbery reported to the Knoxville Police Department?

(3) What case-level characteristics predict whether a case of residential burglary/individual robbery is cleared by an arrest?

(4) What community-level characteristics predict whether a case of residential burglary/individual robbery is cleared by an arrest?

Accordingly, the present study sought to explore (1) the trends in incidents of residential burglary and individual robbery reported to the KPD from 2013 to 2017, (2) trends in case clearance rates of these reported crimes during this time period, (3) the association between case characteristics and case clearance, and (4) the impact of community-level factors on case clearance rates. The sources of data for the study and scope of analysis within the present report are described in greater detail below.

A. DATA SOURCES

The examination of case clearance was completed in collaboration with Knoxville Police Department (KPD) located in Knoxville, Tennessee. Led by Chief Eve Thomas, the KPD is comprised of 383 sworn officers serving an estimated population of 187,500 residents (Knoxville Police Department, 2018; United States Census Bureau, 2018).[3]

The current project sought to examine case clearance by the KPD for reported incidents of residentially burglary and robbery of individuals. The research team focused on robbery and burglary cases because incident reports for these crimes often offer the most detailed account of events compared to other reported crimes. The KPD provided the research team multiple electronic datasets detailing the available information related to cases of residential burglary and individual robbery across five years: 2013-2017. These data included records pertaining to calls for service, case characteristics (e.g. modus operandi for crime, persons involved in crime, vehicle and forensic information, supplemental information), and case clearance status. An

[3] It should be noted that the work described in this report began prior to Chief Eve Thomas' appointment as Chief of Police in June 2018. As such, the proposed research was reviewed and approved by former Chief of Police David B. Rausch (now Director of the Tennessee Bureau of Investigations), former Mayor of Knoxville, Madeline Rogero, and the Law Director of the City of Knoxville Law Department, Charles Swanson.

outline of the available datasets and a description of the data preparation process can be found in Appendix A.

To facilitate the examination of community-level characteristics on case clearance rates in Knoxville, additional data were obtained from the United States Census Bureau. Specifically, the 2017 American Community Survey 5-Year Estimates were extracted online by means of the American Fact-Finder search tool at the block-level. The details for the sample size, data quality measures, accuracy, and statistical testing of these estimates can be found online at the American Community Survey website (see https://www.census.gov/programs-surveys/acs).

B. SCOPE OF ANALYSIS

The findings from the assessment of KPD's case clearance rates for cases of residential burglary and robbery of individuals are produced from statistical analyses completed within Microsoft Excel, SPSS 26, and HLM software (version 6.0, Bernoulli Distribution). Specifically, descriptive statistics pertaining to trends in residential burglary incidents and individual robbery incidents reported to the KPD are presented. The characteristics of the cases of residential burglary and robbery of individuals are also considered, and trends in case clearance rates for residential burglary and robbery of individuals are presented.

Multivariate analyses are also conducted to examine the association between certain case characteristics and the likelihood that a case is cleared by arrest. Specifically, logistic regression models are estimated to calculate the difference in the effect of case characteristics while accounting or "controlling" for the influence of others. Finally, the unique and combined impacts of case-level characteristics and neighborhood-level (i.e., census block-level) characteristics on case clearance by the KPD are examined using hierarchical linear modeling (HLM). Multilevel modeling has become a standard approach when individual units of analysis are nested within neighborhoods (Raudenbush & Bryk, 2002).[4] We include both Level-1 (case-level) and Level-2 (neighborhood-level) predictors to create conditional models. In each conditional model, the data are partitioned into a Level-1 regression-based equation (i.e., logistic regression), and a Level-2 model estimating Level-1 intercepts as the outcomes. All models were generated using a fixed-slope, random intercept technique (Raudenbush & Bryk, 2002).

[4] Traditional analytic approaches such as ordinary least squares (OLS) regression estimation assume independence among Level-1 (i.e., case-level) observations, which can lead to downwardly-biased standard errors when the data have a nested structure, such as is the case with crime incidents occurring across different neighborhoods. Case-level observations are, therefore, not independent, violating a crucial assumption of OLS and other regression approaches.

IV. FINDINGS

This section of the report describes the results from the examination of trends in residential burglary and individual robbery reported to the KPD over five years (2013-2017). Trends in case clearance for these reported crimes are also presented. Additionally, predictors of case clearance for residential burglary and individual robbery are examined. The findings specific to residential burglary cases and cases of robbery of individuals are presented separately in the sections below.

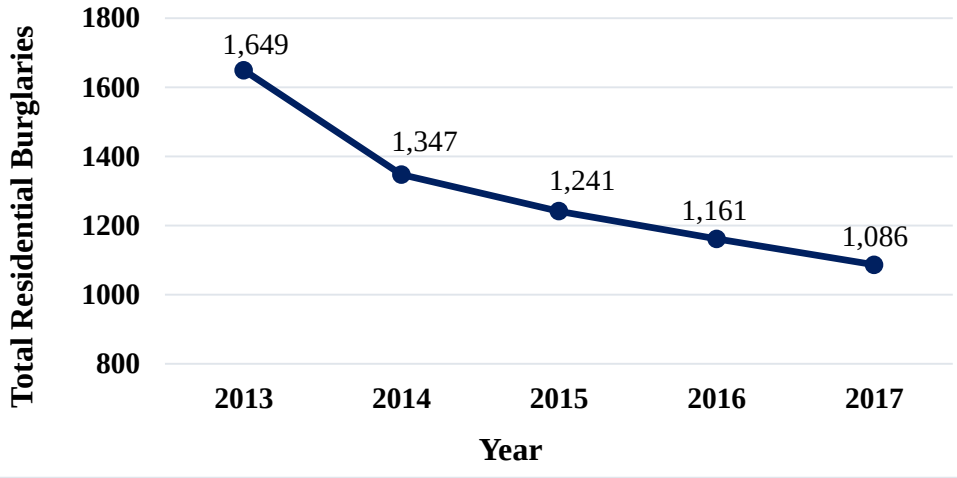
A. RESIDENTIAL BURGLARY, 2013-2017

Burglary refers to the unlawful entry into a building or other structure with the intent to commit a felony or theft (National Incident-Based Reporting System, 2012). The present study focuses upon trends in residential burglary reported to the KPD; that is, those burglaries that involve the unlawful entry into a residence with the intent to commit a felony or theft. This section presents findings produced from descriptive and multivariate analyses, providing a description of the frequency by which residential burglaries are reported to the KPD and the characteristics of those cases, as well as information on trends in case clearance rates by the KPD and factors that influence whether a case of residential burglary is cleared by an arrest.

1. Trends in Residential Burglary

From 2013 to 2017, a total of 6,484 residential burglaries were reported to the KPD. Figure 1 presents the number of residential burglaries reported to the KPD each year across this five-year time span. As shown in Figure 1, reports of residential burglaries to the KPD declined steadily within this timeframe, with reports reduced by approximately 34% from 2013 (n = 1,649) to 2017 (n = 1,086).

Figure 1. Residential Burglary Incidents, 2013-2017 (N = 6,484)



Continuing the examination of reports of residential burglary to the KPD across time, Figure 2 displays the number of reported burglary incidents by month across the years of 2013-2017 (N = 6,484). As shown in Figure 2, reported incidents of residential burglary appear to vary across

different months of the year, with a higher number of incidents reported in the summer months (May to August). Additionally, during this time period (2013-2017) the number of burglary incidents reported to the KPD varied by day of the week. As seen in Figure 3, reported incidents of residential burglaries increased to just over 1,000 incidents on Mondays and Fridays, while the fewest number of burglary incidents were reported on Sundays.

Figure 2. Residential Burglary Incidents by Month, 2013-2017 (N = 6,484)

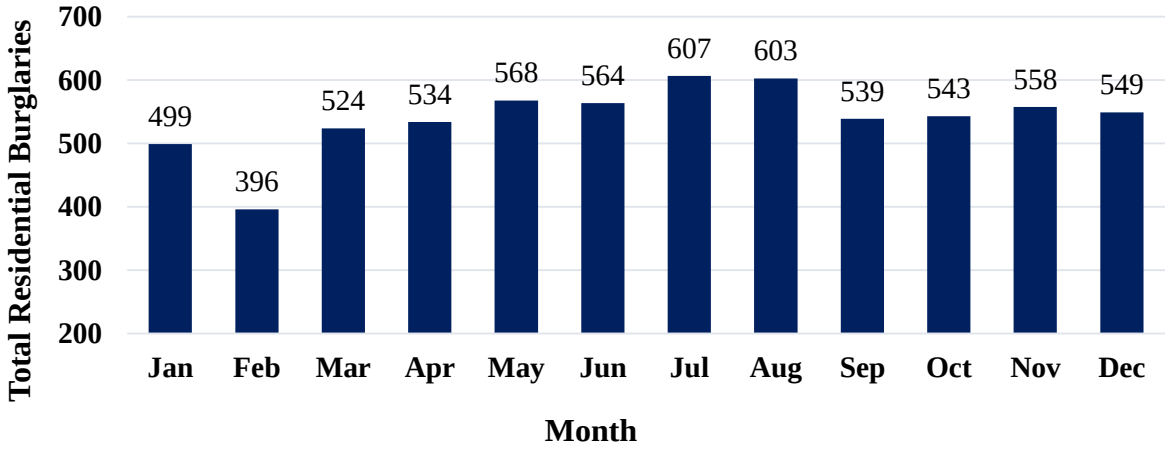
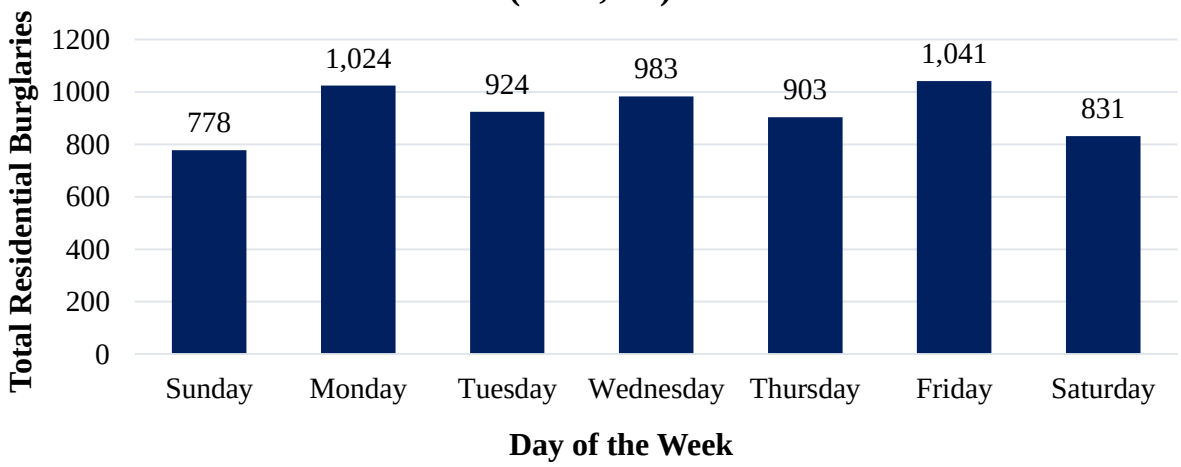


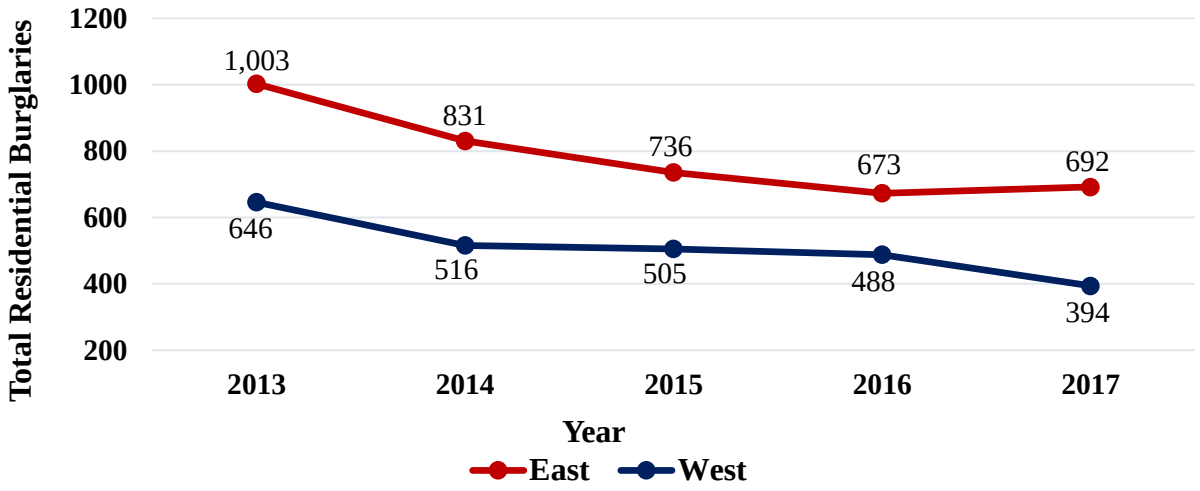
Figure 3. Residential Burglary Incidents by Weekday, 2013-2017 (N = 6,484)



The available data allow for the examination of variation in residential burglaries reported to the KPD by reporting district. Geographically, KPD's jurisdiction consists of an East District and West District. The dividing line between these districts is Interstate 75/Interstate 275. The East District is comprised of 12 reporting districts, while the West District is comprised of 11

reporting districts.[5] Figure 4 displays residential burglary incidents reported to KPD from 2013 to 2017 within these districts. As shown in Figure 4, consistently fewer residential burglary incidents were reported within the West reporting district (N = 2,549) compared to the East District (N = 3,935) during this time period. Consistent with the aggregate trends in reports of residential burglary (see Figure 1 above), between 2013 and 2017, both the East and West Districts in Knoxville experienced an overall decline in reports of residential burglary incidents, with reports reduced by approximately 31% from 2013 (n = 1,003) to 2017 (n = 692) in the East reporting district and by approximately 39% from 2013 (n = 646) to 2017 (n = 394) in the West reporting district.

Figure 4. Residential Burglaries by Reporting District, 2013-2017 (N = 6,484)

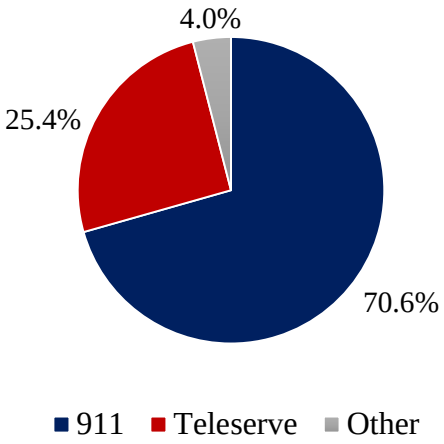


2. Residential Burglary Case Characteristics

Figure 5 shows the origin of calls for service for residential burglaries between 2013 and 2017. Calls for service related to residential burglaries appear to originate from two primary sources: 911 (70.6%; n = 4,577) and KPD's Teleserve Unit (25.4%; n = 1,650).[6] A smaller number of calls for service originate from "other" sources (4.0%; n = 257). "Other" sources for calls for service include, although are not limited to, alarm calls, citizen walk-ins, officer-initiated incidents, officers flagged down by citizens, and referrals from other agencies.

[5] The West District contains many of the larger public venues within Knoxville, including the University of Tennessee campus, West Town Mall, and Turkey Creek business districts (Knoxville Police Department, 2018).
[6] Knoxville Police Department's Teleserve Unit facilitates calls for service/reporting from the general public as well as investigations related to property crimes, referrals, and citizen complaints. The Teleserve Unit is staffed 24-hours a day seven-days a week. For more information, see http://knoxvilletn.gov/government/city_departments_offices/police_department/patrol_division/teleserve_unit.

Figure 5. Origin of Call for Service for Residential Burglary Incidents, 2013-2017 (N = 6,484)



The KPD records information related to the time of crime and officer activities (e.g. arrival on scene, time call cleared) that allows for the estimation of a timeline related to the preliminary investigation of reported residential burglary incidents. Additionally, several pertinent pieces of information are collected and recorded by the KPD through the course of the preliminary and follow-up investigations of reported incidents of residential burglary, including data related to the nature of the crime, evidence collected at the scene of the crime, description of property lost, and details related to the suspects and victims associated with each case. The descriptive statistics for these various case characteristics can be found in Table 1, below.

For incidents of residential burglary, the average estimated time between the recorded time of crime and the arrival of a KPD officer at the scene of the crime is 76.42 minutes, with a median time of 54 minutes between the time of crime and officer arrival to the scene (n = 3,092). The amount of time spent on the preliminary investigation – that is, the investigation conducted by the first officer on the scene – is calculated using the time of officer arrival on the scene and the time the call for service was cleared from the system. On average, officers appear to spend 28.27 minutes conducting preliminary investigations for incidents of residential burglary, with a median time of 24 minutes spent on the preliminary investigation of these crimes (n = 3,029).

In the majority of residential burglary cases reported to the KPD, burglary was the only crime associated with the case (n = 6,185; 95.4%). Only one case reported the presence of a witness to the crime. The majority of residential burglaries brought to the attention of the KPD were not reported to involve a weapon in the commission of the crime (n = 6,447; 99.4%). Fingerprints were collected from the residence in approximately one-fourth of the residential burglary cases (n = 1,287; 19.8%). Importantly, however, a much smaller percentage of AFIS (automated fingerprint identification system) quality fingerprints were collected, with only 107 (1.7%) cases suggesting the collection of fingerprints suitable for the use of this biometric identification methodology. The dollar value of property lost as a result of a residential burglary ranged from $0 to just over $200,000.00, with an average value of $2,141.56 lost and a median of $580.00.

In just over one-third of residential burglary cases (36.1%; n = 2,341) the KPD identified at least one point of description for a suspect of the crime. Points of description can include the name, date of birth, sex, and race of the suspect. Physical descriptions, including height, weight, body build, hair color/length, facial hair, eye color, speech, and other personal information (e.g., presence of tattoos) may also be included. Information pertaining to the race and sex of suspects of residential burglary can be found in Table 1 below. As shown in Table 1, suspect race was identified in approximately one-third of the residential burglary cases (34.7%, n = 2,253). Within those cases, 32.9% (n = 742) of suspects were identified as Black. Suspect sex was identified in 35.9% (n = 2,329) of residential burglary cases, with 71.9% of those suspects identified as male. Victim information, including the race and sex of victims, was recorded in 6,475 cases of residential burglary (99.8% of cases), with a total of 7,287 victims of residential burglary identified. As shown in Table 1, 22.2% (n = 1,424) of identified residential burglary victims were Black and 45.0% (n = 2,921) of victims were male.

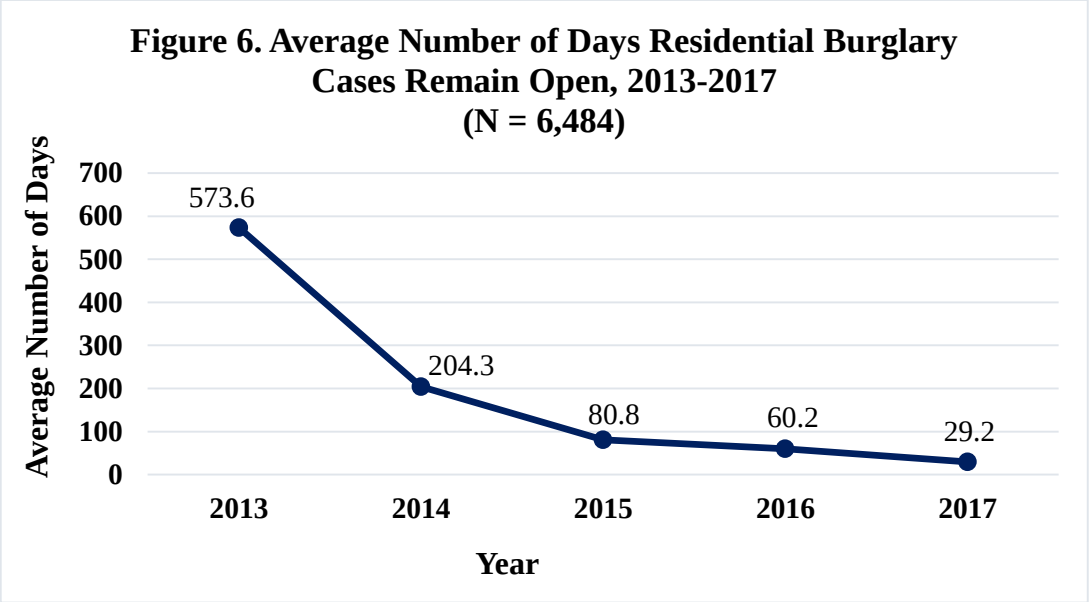
Table 1. Descriptive Statistics of Residential Burglary Case Characteristics (N = 6,484)*

Characteristic	Mean	Valid % (n)	Valid N	% Missing
Time of Police Arrival (minutes)	76.42	----	3,092	52.3%
Time Spent on Preliminary Investigation (minutes)	28.27	----	3,029	53.3%
Multiple Crimes Associated with Ccase	----	4.6% (299)	6,484	0.0%
Weapon Involved	----	0.6% (37)	6,484	0.0%
Fingerprints Collected	----	19.8% (1,287)	6,484	0.0%
AFIS Quality Prints Collected	----	1.7% (107)	6,484	0.0%
Average Value of Property Lost (USD)	$2,141.56	----	6,484	0.0%
Suspect Name/Description Available	----	36.1% (2,341)	6,484	0.0%
Suspect Black	----	32.9% (742)	2,253	65.3%
Suspect Male	----	25.8% (1,676)	2,329	64.1%
Victim Black	----	22.2% (1,424)	6,426	0.9%
Victim Male	----	45.0% (2,921)	6,473	0.2%
Case Cleared by Arrest		8.4% (547)	6,484	0.0%

*Percentages may be affected by rounding

3. Trends in Residential Burglary Case Clearance

This section provides a description of trends in case status and case clearance for residential burglaries reported to the KPD between the years of 2013 to 2017. Figure 6 displays the average number of days that cases for residential burglary remained opened, across the years 2013 to 2017 (N = 6,484).



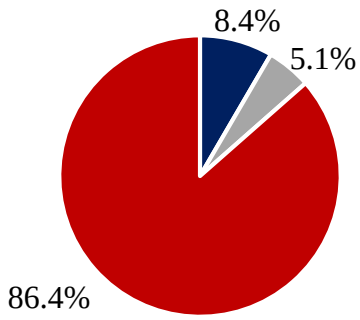
Reported yearly averages indicate a dramatic decrease in the length of time investigations of residential burglary remained open from 2013-2017, with an average of over 570 days in 2013 to under 30 days in 2017. However, median values for the number of days that residential burglary cases remain open suggest that outlier cases skew these averages. As shown in Table 2, the median number of days a case of residential burglary remained open during the period from 2013 to 2017 range from 10 to 23 days, with a decrease from 23 days in 2013 to 11 days in 2017.

Table 2. Number of Days Residential Burglary Cases Remain Open, 2013-2017

Year	Average	Median
2013	573.6	23
2014	204.3	10
2015	80.8	15
2016	60.2	14
2017	29.2	11
Full Sample (2013-2017)	219.5	14

Figure 7 presents the most recent case status for incidents of residential burglary reported to the KPD between 2013 and 2017. Case status is broken down into three primary categories: cleared by arrest, exceptional clearance, and not cleared. “Cleared by arrest” refers to the closure of a case because someone was arrested for the offense, someone was charged with the commission of the offense, and the case was accepted for prosecution. “Exceptional clearance” refers to the closure of a residential burglary case by means other than arrest by the KPD, including, but not limited to, determination that the case is unfounded, the death of the offender, the victim’s refusal to cooperate, the identification of a juvenile offender, or prosecution being declined. “Not cleared” includes those cases that have not been closed by an arrest by KPD or by other exceptional means. As shown in Figure 7, the majority of residential burglary cases reported to the KPD between 2013 and 2017 have not been cleared (n = 5,604). A much smaller fraction have been cleared by arrest (8.4%; n = 547) or exceptional means (5.1%; n = 333).

Figure 7. Case Status of Residential Burglaries, 2013-2017 (N = 6,484)



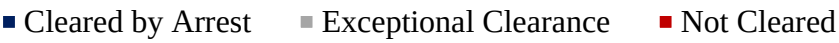
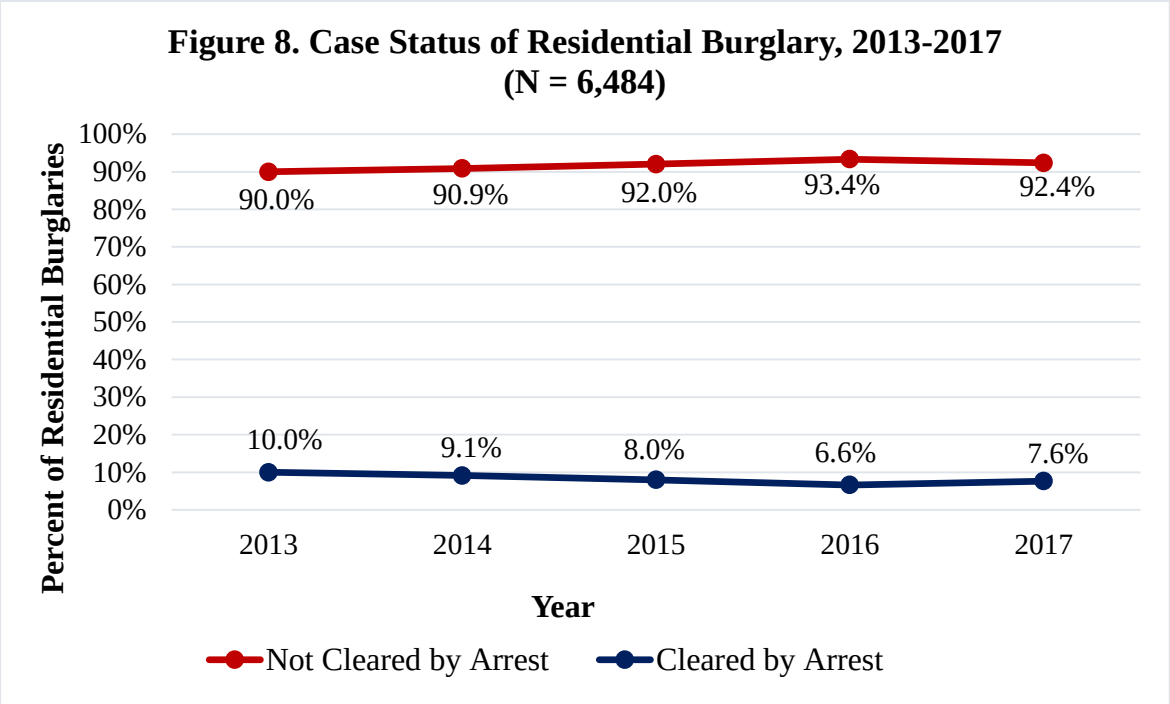


Figure 8 displays the percentage of residential burglaries cleared by arrest compared to those not cleared by an arrest (including "not cleared" and "exceptional clearance" categories from 2013-2017; N = 6,484). Overall, during this time, the percentage of residential burglaries cleared by arrest experienced a slight decrease, with 10% of residential burglary cases being cleared by arrest in 2013 to 7.6% of cases being cleared by arrest in 2017. However, as shown in Figure 8, clearance rates for residential burglary were not in consistent decline during this time period. Instead, the percent of residential burglary cases cleared by arrest declined slightly, but steadily from 2013 to 2016. In turn, clearance rates for cases of residential burglary increased slightly from 2016 to 2017.

Similar to the overall trends in residential burglaries reported to the KPD, we are able to examine variation in case clearance for residential burglary across the East and West reporting districts during the time period of study (2013-2017). The percent of cases cleared by arrest varies only slightly across these reporting districts. Specifically, over the five-year period, the East District is found to have 8.4% of residential burglary cases cleared by an arrest (n = 329), while 5.6% (n = 220) were cleared by exceptional means, and 86.0% (n = 3,386) were not cleared. In comparison, 8.5% (n = 218) of residential burglary cases were cleared by arrest in the West District, with 4.4% of cases cleared by exceptional means (n = 113), and the remaining 87% not cleared (n = 2,218).



Figures 9 and 10 display the percentage of residential burglaries cleared by arrest compared to those not cleared by an arrest (including "not cleared" and "exceptional clearance" categories; N = 6,484) in the East and West reporting districts from 2013 to 2017. Consistent with the overall trends in Knoxville, the percentage of residential burglary cases cleared by arrest decreased in both the East and West reporting districts during this time. In the East District the percentage of residential burglary cases cleared by arrest decrease from 9.7% of case in 2013 to 8.1% of cases in 2017. Similarly, the West District decreased from 10.5% cases cleared by arrest in 2013 to 6.9% of cases in 2017. However, as shown in Figures 9 and 10, clearance rates for residential burglary in the East and West reporting districts were not in consistent decline during this time period. Instead, the percent of residential burglary cases cleared by arrest declined slightly, but steadily from 2013 to 2016. In turn, clearance rates for cases of residential burglary increased slightly from 2016 to 2017.

Figure 9. Case Status of Residential Burglaries in East Reporting District, 2013-2017 (N = 3,935)

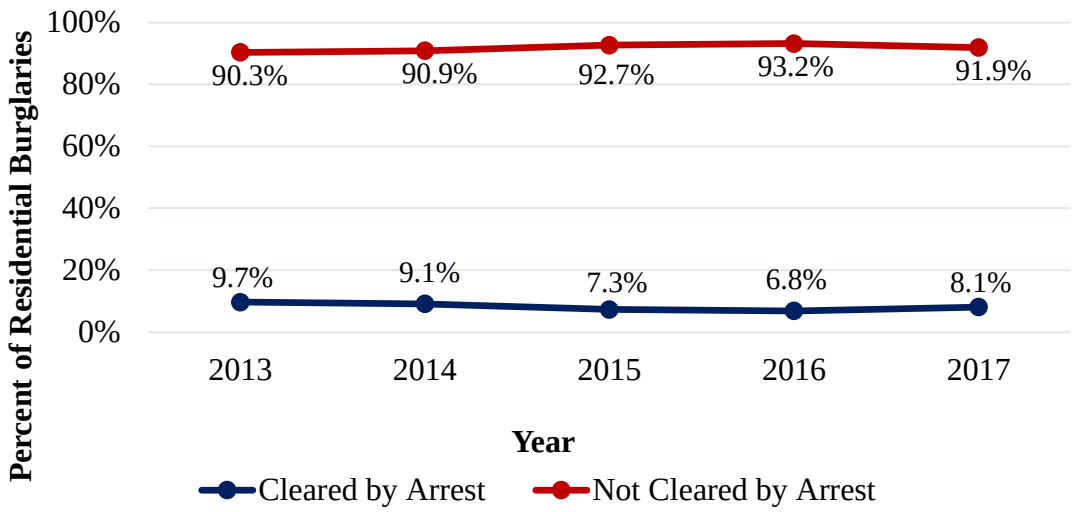
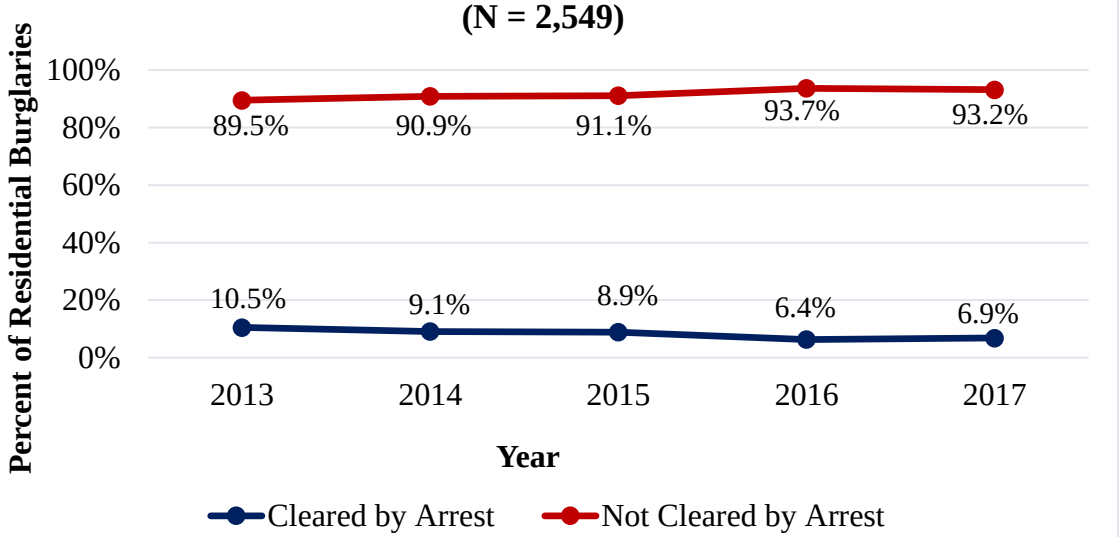


Figure 10. Case Clearance of Residential Burglary in West Reporting District, 2013-2017 (N = 2,549)



4. Predictors of Case Clearance for Residential Burglary

This section presents the findings from multivariate analyses conducted to examine the impact of specific case characteristics (i.e., incident-level) and neighborhood characteristics (i.e., census block-level) on the likelihood that a case of residential burglary is cleared by arrest. Specifically, a logistic regression model is estimated to examine the effects of case characteristics while accounting or "controlling" for the influence of others. The case characteristics under examination include: the victim's race and sex, the identification of a suspect name or description, the value (USD) of property stolen during the residential burglary, the involvement of a weapon in the commission of the offense, and the collection of AFIS quality prints at the scene of the residential burglary.

Next, the unique and combined effects of case characteristics and neighborhood characteristics on case clearance for residential burglary are examined using hierarchical linear modeling. The neighborhood characteristics considered in these models include a concentrated disadvantage (% female headed household, % public assistance, % Black, % below poverty, % unemployed, % less than high school education) and ethnic heterogeneity (% foreign born, % Hispanic, % speaks limited English). All analyses include controls for variation in reports of residential burglary across days of the week (using Monday as the reference day), as well as seasonal variations in reports captured by monthly dummy variables (using January as the reference month).

Table 3. Predictors of Residential Burglary Case Clearance, 2013-2017
(Unstandardized coefficients reported; Standard errors in parentheses)

	Logistic Regression (N = 6,426)	Hierarchical Linear Modeling (Level 1 N = 6,478) (Level 2 N = 141)	
	Model 1	Model 2	Model 3
Incident-Level Measures			
Intercept	-7.853** (1.793)	-3.165* (.210)	-3.160 (.210)
Suspect Description	2.333** (.118)	2.32** (.118)	2.18** (.120)
Stolen Property Value	.001* (.000)	.001* (.000)	.001* (.000)
Weapon Involved	1.645** (.348)	1.62** (.346)	1.62**(.345)
AFIS Quality Prints	.330 (.323)	.290 (.320)	.289 (.320)
Victim Black	-.383** (.123)	-.345** (.135)	-.345** (.135)
Victim Male	.059 (.097)	.066 (.089)	.066 (.089)
Neighborhood-Level Measures			
Concentrated Disadvantage	----	-.138** (.047)	-.480** (.12)
Ethnic Heterogeneity	----	-.028 (.056)	-.024 (.050)
X-Level Interaction (Suspect Desc* Disadvantage)	----	----	.404**(.136)
Pseudo R-Square	.117	.098	--

+ Findings reported were produced controlling for weekday and monthly variation in reports of residential burglary. Tables presenting the full findings from these models can be found in Appendix B.
** p < .01; *p < .05

Table 3 presents the findings from the examination of predictors of case clearance for residential burglary. As seen in this Table, across the case-level analysis (Model 1, logistic regression) and HLM analyses (Models 2 and 3), stolen property value had a significant, positive effect on the probability of residential burglary case clearance, demonstrating that cases involving the theft of more valuable property in the commission of the crime are more likely to be cleared by an arrest. The presence of a weapon was also a significant, positive correlate with case clearance by arrest across all levels of analysis for residential burglary. Additionally, the presence of a Black victim was a significant negative correlate of case clearances for burglaries – in that burglaries where a victim was Black were less likely to be cleared. This negative effect on case clearance was maintained across the Models, even with the inclusion of pertinent neighborhood-level factors. Finally, the identification of a suspect description or name was by far the strongest case-level predictor (odds ratio = 10.3) for clearance of residential burglary cases by the KPD.[7]

Model 2 presents the first set of HLM analyses examining the unique and combined effects of case characteristics and neighborhood characteristics on case clearance for residential burglary. Findings from this Model demonstrate that residential burglaries had a significantly lower probability of being cleared by an arrest if the offense occurred within a neighborhood characterized by concentrated disadvantage. To expand upon this finding, Model 3 includes a cross-level interaction designed to capture the moderating effect between concentrated disadvantage and the identification of a suspect name or description. Combined with Model 2, the results clearly show the following association: Although disadvantaged neighborhoods are less likely to have cases of residential burglaries cleared by an arrest (as evidenced by the retained direct negative effect of disadvantage on case clearance in Model 3), within disadvantaged communities where a suspect name or description is known to police, case clearance for residential burglary was significantly higher (as indicated by the positive cross-level interaction in Model 3). Thus, enhanced police intelligence for cases of residential burglary within disadvantaged communities were more beneficial in clearing burglaries than in other communities. That is, when police are aware of an offenders' name or description in disadvantaged communities, residential burglaries are more likely to be cleared within these communities. This finding highlights the importance of strong police-community relationships, which can lead to obtainable and usable information sharing to inform police of offenders within the area.

B. ROBBERY OF INDIVIDUALS, 2013-2017

Robbery refers to the taking, or attempting to take, of anything of value under confrontational circumstances from the control, custody, or care of another person by force or threat of force or

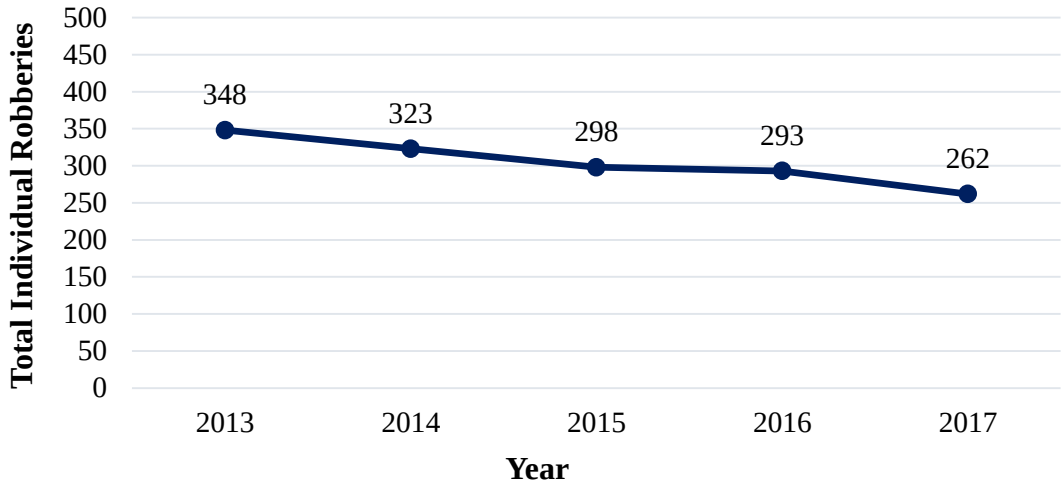
[7] Within Appendix B, we also include Model 1B (which contains suspect race and sex information, where available). These results were excluded in the main findings because roughly 66% of the cases were excluded due to missing data. The main finding of the suspect-inclusive analysis is that the presence of a weapon was the sole statistically significant correlate of case clearances for burglaries.

violence and/or by putting the victim in fear of immediate harm (National Incident-Based Reporting System, 2012). The present study focuses upon trends in individual robberies reported to the KPD; that is, those robberies that involve the taking, or attempting to take, anything of value under confrontational circumstances from the control, custody, or care of individual persons by force or threat of force or violence. This section presents findings produced from descriptive and multivariate analyses, providing a description of the frequency by which incidents of individual robbery are reported to the KPD and the characteristics of those cases, as well as information on trends in case clearance rates by the KPD and factors that influence whether a robbery case is cleared by an arrest.

1. *Trends in Robbery of Individuals*

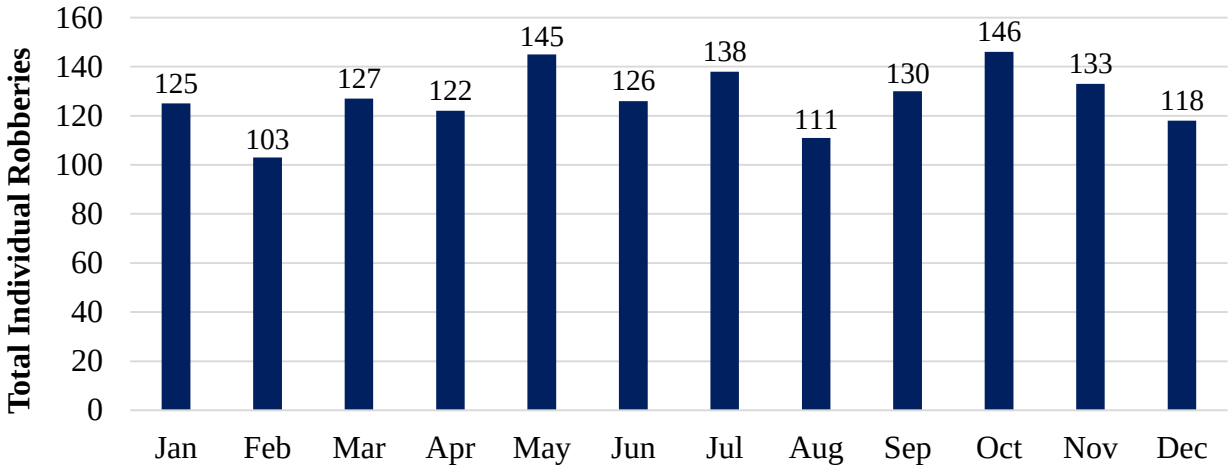
From 2013 to 2017, a total of 1,524 incidents of individual robbery reported to KPD. Figure 11 presents the number of robberies reported to KPD each year across this five-year time span. As shown in Figured 11, reports of individual robberies to the KPD declined within this timeframe, with reports reduced by approximately 24.7% from 2013 (n = 348) to 2017 (n = 262).

Figure 11. Robbery of Individuals, 2013-2017 (N = 1,524)



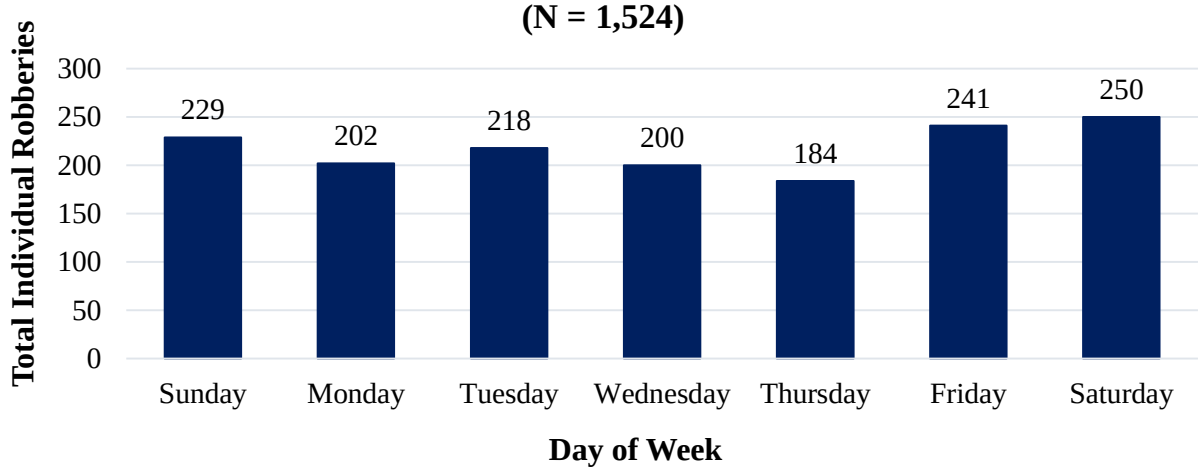
Continuing the examination of reports of individual robbery to the KPD across time, Figure 12 displays the number of reported robberies by month across the years of 2013-2017 (N = 1,524). As shown in Figure 12, reported incidents of individual robbery vary across different months of the year, with the highest number of incidents reported in May and October and the lowest number of incidents reported in February and August.

Figure 12. Individual Robbery Incidents by Month, 2013-2017 (N = 1,524)



Additionally, during this time period (2013-2017) the number of robbery incidents reported to the KPD varied by day of the week. As seen in Figure 13, reported incidents of individual robbery were highest on weekend days (Friday, Saturday, and Sunday), while reports declined during weekdays (Monday, Tuesday, Wednesday, Thursday).

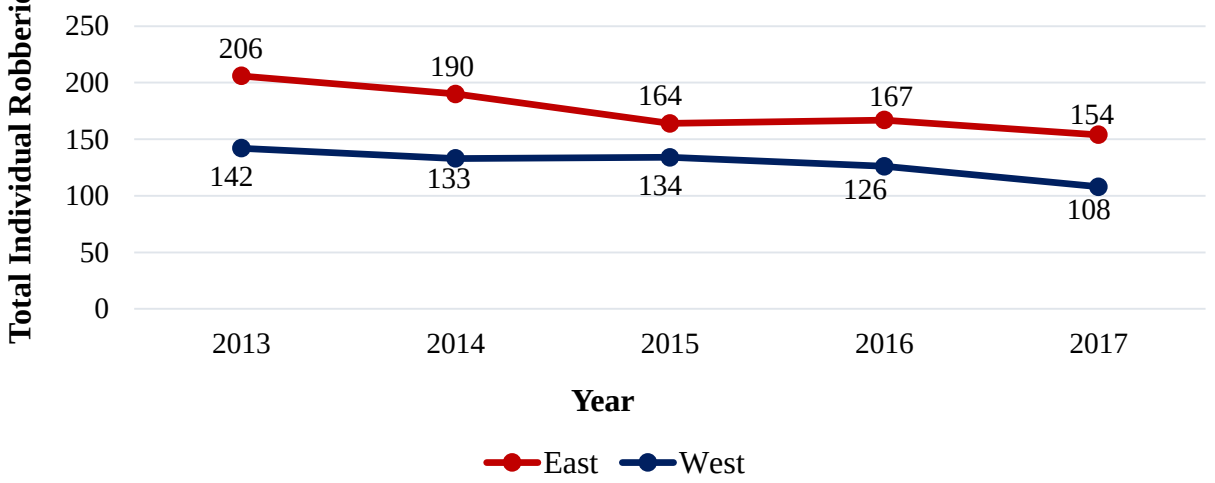
Figure 13. Individual Robbery Incidents by Weekday, 2013-2017 (N = 1,524)



As mentioned previously, KPD's jurisdiction consists of an East District and West District. Figure 14 displays individual robbery incidents reported to the KPD from 2013 to 2017 within these districts. As shown in Figure 14, consistently fewer robbery incidents were reported within the West reporting district (N = 643) compared to the East District (N = 881) during this time

period. Consistent with the aggregate trends in reports of individual robbery incidents (see Figure 13 above), between 2013 and 2017, both the East and West Districts in Knoxville experienced an overall decline in reports of robbery incidents, with reports reduced by approximately 25.2% from 2013 (n = 206) to 2017 (n = 154) in the East reporting district and by approximately 23.9% from 2013 (n = 142) to 2017 (n = 108) in the West reporting district.

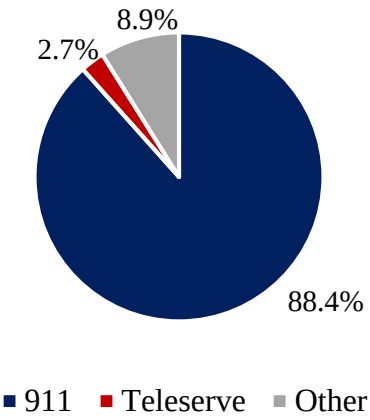
Figure 14. Individual Robbery Incidents by Reporting District, 2013-2017 (N = 1,524)



2. Individual Robbery Case Characteristics

Figure 15 shows the origin of calls for service for individual robberies reported to the KPD between 2013 and 2017. Calls for service related to robberies originate primarily from 911 calls to the KPD (88.4%; n = 1,347). A smaller number of calls for service originated from other sources (8.9%; n = 136), including, although not limited to citizen walk-ins, officer-initiated incidents, officers flagged down by citizens, and referrals from other agencies. The least amount of calls for service for robbery incidents originated from KPD's Teleserve Unit (2.7%; n = 41).

Figure 15. Origin of Call for Service for Individual Robbery Incidents, 2013-2017 (N = 1,524)



KPD records information related to the time of crime and officer activities (e.g. arrival on scene, time call cleared) that allows for the estimation of a timeline related to the preliminary investigation of reported residential burglary incidents. Additionally, several pertinent pieces of information are collected and recorded by the KPD through the course of the preliminary and follow-up investigations of reported incidents of robberies of individuals, including data related to the nature of the crime, evidence collected at the scene of the crime, description of property lost, and details related to the suspects and victims associated with each case. The descriptive statistics for these case characteristics can be found in Table 4, below.

For incidents of individual robbery, the average estimated time between the recorded time of crime and the arrival of a KPD officer at the scene of the crime is 94.75 minutes, with a median time of 47 minutes between the time of crime and officer arrival to the scene (n = 356). The amount of time spent on the preliminary investigation – that is, the investigation conducted by the first officer on the scene – is calculated using the time of officer arrival on the scene and the time the call for service was cleared from the system. On average, officers appear to spend 25.61 minutes conducting preliminary investigations for incidents of robberies of individuals, with a median time of 17 minutes spent on the preliminary investigation of these crimes (n = 341).

In the majority of robbery of individual cases reported to the KPD, robbery was the only crime associated with the case (n = 1,450; 95.1%). Only three cases reported the presence of a witness to the crime. Approximately one-third of robberies brought to the attention of the KPD were reported to involve a weapon in the commission of the crime (n = 514; 33.7%). Only 71 (4.7%) of individual robbery cases indicated latent fingerprints were collected at the scene of the crime. A much smaller percentage of those fingerprints were AFIS (automated fingerprint identification system) quality, with only 7 (0.5%) cases suggesting the collection of fingerprints suitable for the use of this biometric identification methodology. The dollar value of property lost as a result of a

robbery ranged from $0 to just over $165,000.00, with an average value of $993.81 lost and a median of $150.00.

Table 4. Descriptive Statistics of Individual Robbery Case Characteristics (N = 1,524)*

Characteristic	Mean	Valid % (n)	Valid N	% Missing
Time of Police Arrival (minutes)	94.75	----	356	76.6%
Time Spent on Preliminary Investigation (minutes)	25.61	----	341	77.6%
Multiple crimes associated with case	----	4.9% (74)	1,524	0.0%
Weapon Involved	----	33.7% (514)	1,524	0.0%
Fingerprints Collected	----	4.7% (71)	1,524	0.0%
AFIS Quality Prints Collected	----	0.5% (7)	1,524	0.0%
Average Value of Property Lost (USD)	$993.81	----	1,524	0.0%
Suspect Name/Description Available	----	97.0% (1,479)	1,524	0.0%
Suspect Black	----	52.2% (795)	1,524	0.0%
Suspect Male	----	80.1% (1,180)	1,474	3.3%
Victim Black	----	18.7% (282)	1,511	0.9%
Victim Male	----	62.3% (949)	1,523	0.1%
Case Cleared by Arrest	----	13.9% (212)	1,524	0.0%

*Percentages may be affected by rounding

In the vast majority of individual robbery cases (97.0%; n = 1,479) the KPD identified at least one point of description for a suspect of the crime. Points of description can include the name, date of birth, sex, and race of the suspect. Physical descriptions, including height, weight, body build, hair color/length, facial hair, eye color, speech, and other personal information (e.g. presence of tattoos) may also be included. As shown in Table 4, the suspect of the individual robbery was identified as Black in 52.2% (n = 795) of cases reported to the KPD. Additionally, suspects were identified as male in the majority of cases (62.3%). Victim information was recorded in 1,523 cases of individual robbery (99.9% of cases), with a total of 1,850 victims of robbery identified. As shown in Table 4, robbery victims were identified as Black in less than 20% of cases (18.7%, n = 282) while the victims were identified as male in the majority of individual robbery cases (62.3%, n = 949).

3. Trends in Robbery of Individuals Case Clearance

This section provides a description of trends in case status and case clearance for individual robberies reported to the KPD between the years of 2013 to 2017. Figure 16 displays the average number of days that cases for individual robbery remained opened, across the years 2013 to 2017 (N = 1,524). Reported yearly averages indicate a dramatic decrease in the length of time investigations of robbery remained open from 2013-2017, with over an average of 268 days in 2013 to under 100 days in 2017. However, median values for the number of days that individual robbery cases remain open suggest that outlier cases skew these averages. As shown in Table 5,

the median number of days a case of individual robbery remained open range from 37 to 54 days, with a slight increase from 40 days in 2013 to 46 days in 2017.

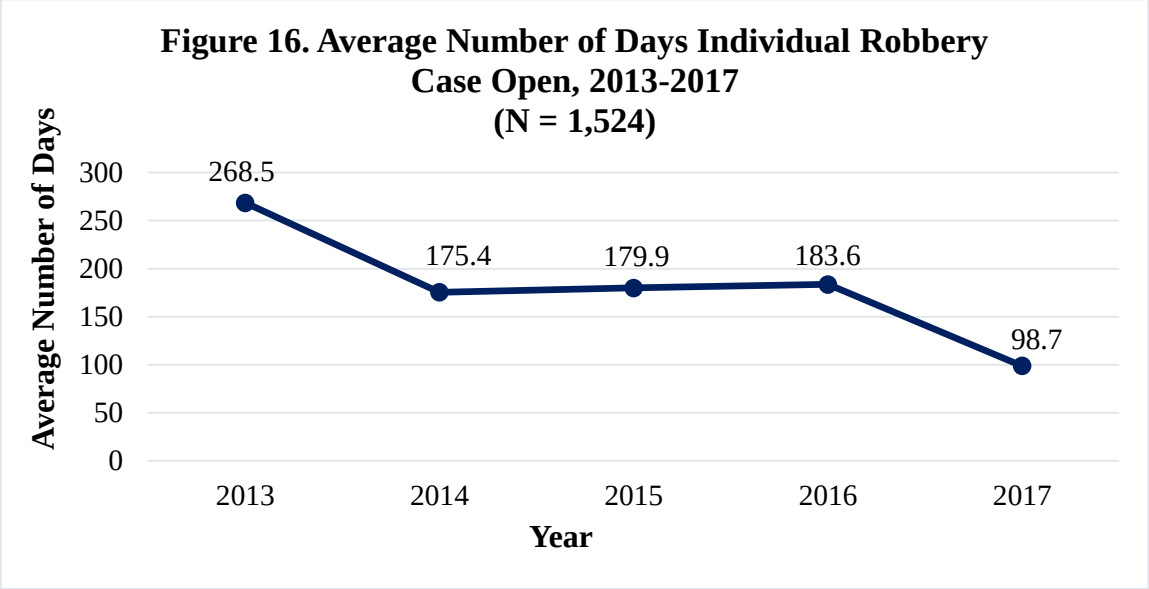


Table 5. Number of Days Robbery of Individual Cases Remain Open, 2013-2017

Year	Average	Median
2013	268.5	40
2014	175.4	37
2015	179.9	37
2016	183.6	54
2017	98.7	46
Full Sample (2013-2017)	185.8	42

Figure 17 presents the most recent case status for incidents of individual robbery reported to the KPD between 2013 and 2017. Case status is broken down into three primary categories: cleared by arrest, exceptional clearance, and not cleared. “Cleared by arrest” refers to the closure of a case because someone was arrested for the offense, someone was charged with the commission of the offense, and the case was accepted for prosecution. “Exceptional clearance” refers to the closure of a robbery case by means other than arrest by the KPD, including, but not limited to, determination that the case is unfounded, the death of the offender, the victim’s refusal to cooperate, the identification of a juvenile offender, or prosecution being declined. “Not cleared” includes those cases that have not been closed by an arrest by KPD or by other exceptional means. As shown in Figure 17, the majority of individual robbery cases reported to the KPD between 2013 and 2017 have not been cleared (68.2%; n = 1,040). A much smaller fraction has been cleared by arrest (13.9%; n = 212) or exceptional means (17.8%; n = 272).

Figure 17. Case Status of Robberies of Individual, 2013-2017 (N = 1,524)

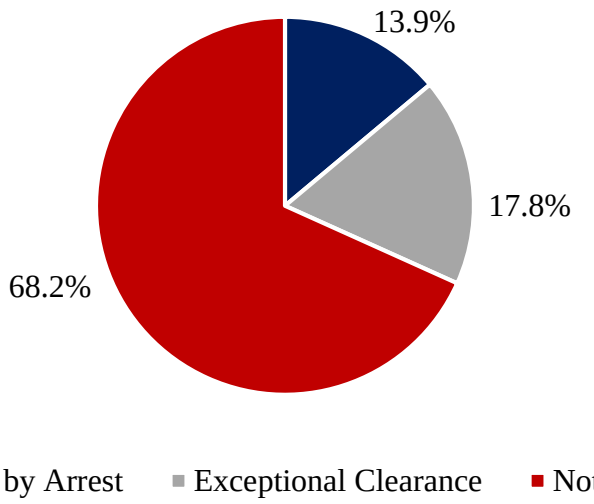
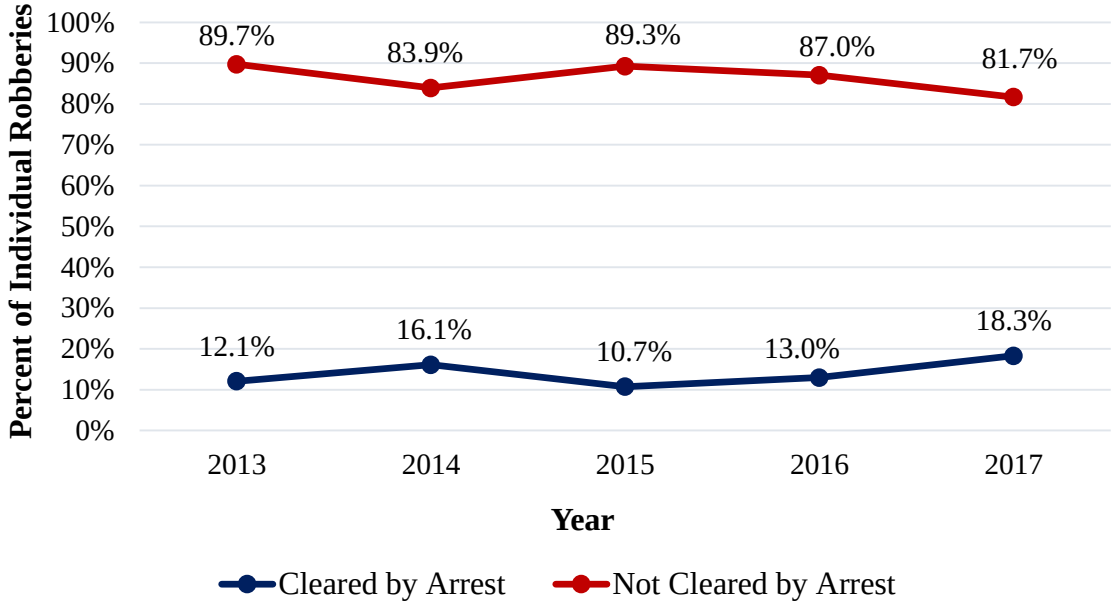


Figure 18 displays the percentage of individual robberies cleared by arrest compared to those not cleared by an arrest (including "not cleared" and "exceptional clearance" categories from 2013-2017; N = 1,524). During this time, the percentage of individual robberies cleared by arrest experienced a slight increase, with 12.1% of individual robbery cases being cleared by arrest in 2013 and 18.3% of cases being cleared by arrest in 2017. However, as shown in Figure 18, clearance rates for individual robbery did not increase consistently from year to year.

Figure 18. Case Status of Individual Robbery, 2013-2017 (N = 1,524)



Similar to the overall trends in robbery of individuals reported to the KPD, we are able to examine variation in case clearance for individual robbery across the East and West reporting districts during the time period of study (2013-2017). The percent of cases cleared by arrest varies only slightly across the reporting districts. Specifically, over the five-year period, the East District is found to have 13.8% of robbery cases cleared by an arrest (n = 122), while 17.7% (n = 156) were cleared by exceptional means, and 68.4% (n = 603) were not cleared. In comparison, 14.0% (n = 90) of robbery cases were cleared by an arrest in the West District, with 18.0% of cases cleared by exceptional means (n = 115), and the remaining 68.0% not cleared (n = 437).

Figures 19 and 20 display the percentage of individual robberies cleared by arrest compared to those not cleared by an arrest (including "not cleared" and "exceptional clearance" categories; N = 1,524) in the East and West reporting districts from 2013 to 2017. Consistent with the overall trends in Knoxville, the percentage of individual robbery cases cleared by arrest increased in both the East and West reporting districts during this time. In the East District the percentage of robbery cases cleared by arrest increased from 12.6% of cases in 2013 to 16.9% of cases in 2017. The West District experiences a slightly higher increase from 11.3% cases cleared by arrest in 2013 to 20.4% of cases in 2017. However, as shown in Figures 19 and 20, clearance rates for individual robbery in the East and West reporting districts did not increase consistently from year to year during this time period. Instead, within the East District, the percent of individual robbery cases cleared by arrest declined slightly from previous years in both 2015 and 2016. Similarly, the West District experienced a decline in the percentage of cases cleared by arrest in 2015.

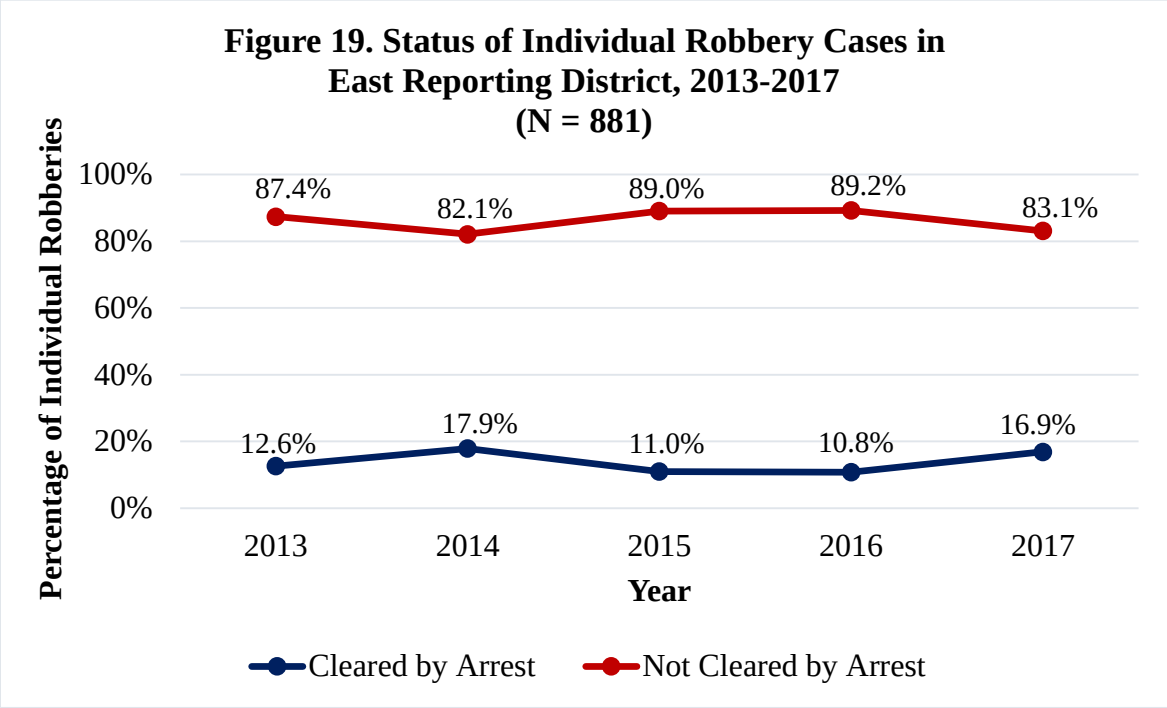


Figure 19. Status of Individual Robbery Cases in East Reporting District, 2013-2017 (N = 881)
Percentage of Individual Robberies
100%
80%
60%
40%
20%
0%
87.4%
82.1%
89.0%
89.2%
83.1%
12.6%
17.9%
11.0%
10.8%
16.9%
2013
2014
2015
2016
2017
Year
Cleared by Arrest
Not Cleared by Arrest

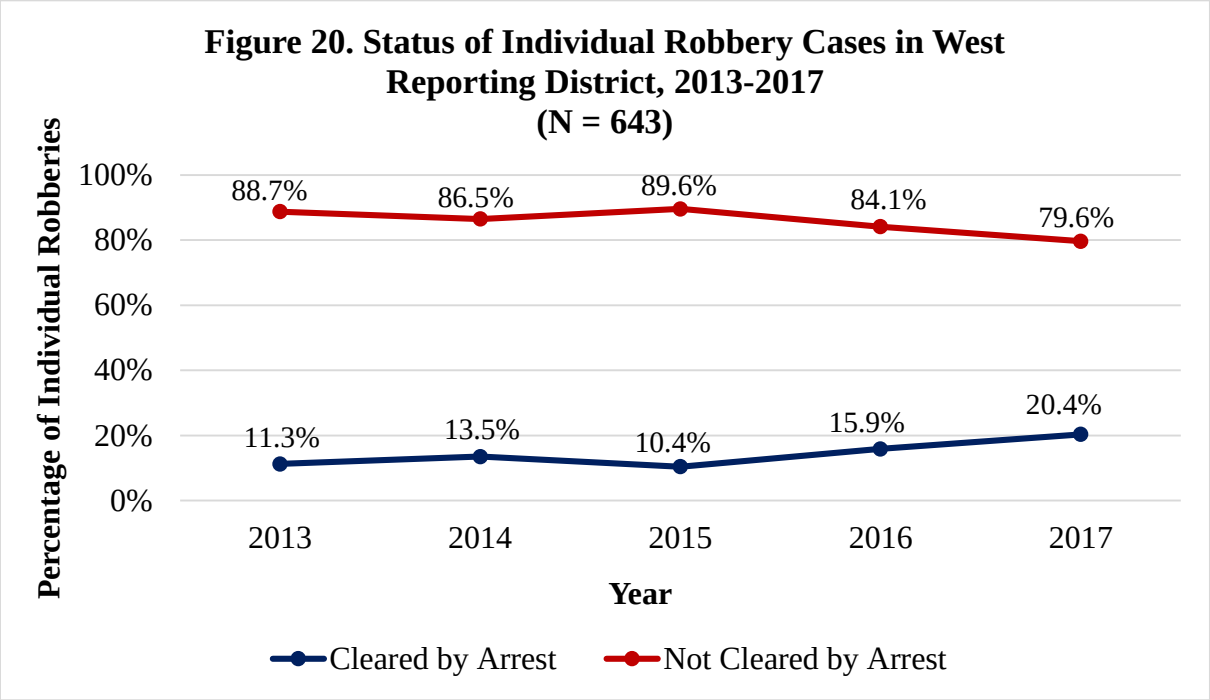


Figure 20. Status of Individual Robbery Cases in West Reporting District, 2013-2017 (N = 643)
Percentage of Individual Robberies
100%
80%
60%
40%
20%
0%
88.7%
86.5%
89.6%
84.1%
79.6%
11.3%
13.5%
10.4%
15.9%
20.4%
2013
2014
2015
2016
2017
Year
Cleared by Arrest
Not Cleared by Arrest

4. Predictors of Case Clearance for Robbery of Individuals

This section presents the findings from multivariate analyses conducted to examine the impact of specific case characteristics (i.e., incident-level) and neighborhood characteristics (i.e., census block-level) on the likelihood that a case of individual robbery is cleared by arrest. Specifically, a logistic regression model is estimated to examine the effects of case characteristics while accounting or "controlling" for the influence of others. As with residential burglary, the case characteristics under examination include: the identification of a suspect name or description, the value (USD) of property stolen during the robbery, the involvement of a weapon in the commission of the offense, and the collection of AFIS quality prints at the scene of the robbery.

Next, the unique and combined effects of case characteristics and neighborhood characteristics on case clearance for individual robbery are examined using hierarchical linear modeling. The neighborhood characteristics considered in these models include a concentrated disadvantage (% female headed household, % public assistance, % Black, % below poverty, % unemployed, % less than high school education) and ethnic heterogeneity (% foreign born, % Hispanic, % speaks limited English). All analyses include controls for variation in reports of individual robbery across days of the week (using Monday as the reference day), as well as seasonal variations in reports captured by monthly dummy variables (using January as the reference month).

Table 8. Predictors of Individual Robbery Case Clearance, Full Models
(Unstandardized coefficients reported; Standard errors in parentheses)

	Logistic Regression (N = 1,510)	Logistic Regression (N = 1,428)	Hierarchical Linear Modeling (Level 1 N = 1,510) (Level 2 N = 141)
	Model 1	Model 2	Model 3
Incident-Level Measures			
Intercept	-21.10 (59.28)	-1.402 (.405)	-29.26 (21.56)
Suspect Description	19.47 (59.28)	----	27.48 (21.52)
Stolen Property Value	.000 (.000)	.000 (.000)	.000 (.000)
Weapon Involved	.263 (.159)	.255 (.159)	.249 (.170)
AFIS Quality Prints	.884 (.934)	.862 (.929)	.840 (.945)
Victim Black	-.172 (.191)	-.172 (.199)	-.160 (.200)
Victim Male	-.231 (.161)	-.205 (.164)	-.254 (.195)
Suspect Black		-.036 (.168)	----
Suspect Male		-.228 (.232)	----
Neighborhood-Level Measures			
Concentrated Disadvantage	----		.003 (.071)
Ethnic Heterogeneity	----		.063 (.080)
Pseudo R-Square	.089	.067	--

+ Findings reported were produced controlling for weekday and monthly variation in reports of residential burglary. Tables presenting the full findings from these models can be found in Appendix C.

** p < .01; *p < .05

Table 8 presents the findings from the examination of predictors of case clearance for individual robbery. As seen in this Table, across the case-level (Model 1, logistic regression) and HLM analyses (Model 2), there were no significant case- or neighborhood-level factors found to impact the likelihood of case clearance for individual robbery. Indeed, most robberies involved the use of a weapon, had information pertaining to the suspects name or description available, and involved the theft of property similar in value. Furthermore, the neighborhood-level factors added no additional predictability to robbery clearance rates. In short, there is little variability in robberies that corresponded with differential clearance rates across all units of analysis.

Of these null findings, it is most important to highlight that offender and victim characteristics (sex and race) do not significantly predict to case clearance rates. That is, controlling for other potentially relevant factors, the race and sex of the suspect, along with the race and sex of the victim, do not impact the likelihood that KPD robbery incidents are cleared by an arrest.

V. DISCUSSION

This report outlined the findings from the IACP/UC Center's examination of case clearance rates for residential burglaries and individual robberies by the Knoxville (TN) Police Department. Within this report, trends in residential burglary incidents and individual robbery incidents reported to the KPD from 2013 to 2017 were presented. The characteristics of the cases of residential burglary and robbery of individuals were also considered, and trends in case clearance rates for residential burglary and robbery of individuals examined. Multivariate analyses were conducted to explore the association between certain case characteristics and the likelihood that a case is cleared by arrest. Finally, the unique and combined impacts of case-level characteristics and neighborhood-level characteristics on case clearance by the KPD were explored. The findings produced within this report demonstrate variation in trends, case characteristics, and predictors of case clearance for cases of residential burglary and individual robbery. For this reason, the discussion and implications related to case clearance for these crimes will be considered separately.

Residential Burglary

Beginning with residential burglary, descriptive analyses reveal a total of 6,484 residential burglaries were reported to KPD between 2013-2017. Broken down by year, the total number of reported residential burglaries are found to decline during this time period, demonstrating a 34% decrease in the number of reported incidents from 2013 to 2017. Examination of case clearance rates for residential burglary show that majority of reported burglaries were not cleared by an arrest by the KPD, with only 8.4% of cases cleared by an arrest during this time. Notably, the percentage of residential burglary cases cleared by an arrest varied over time, with 10% of cases cleared by arrest in 2013 compared to 7.6% of cases in 2017. Although this variation illustrates an overall decrease in KPD's clearance of residential burglary cases by an arrest, when the percentage of residential burglary cases cleared by arrest *or* exceptional means from 2013 to 2017 is considered, we find that trends in residential burglary case clearance by the KPD are largely consistent with national trends for case clearance of burglary (see https://ucr.fbi.gov/crime-in-the-u.s for access to yearly estimates).

Findings from multivariate analyses conducted to examine the impact of specific case characteristics (i.e., victim sex and race, suspect description, stolen property value, weapon involved, collection of AFIS quality prints) and neighborhood characteristics (i.e., concentrated disadvantage, ethnic heterogeneity) on the likelihood that a case of residential burglary is cleared by arrest demonstrate that the identification of a suspect description or name is, unsurprisingly, the strongest case-level predictor that a residential burglary will be cleared by an arrest. The involvement of a weapon in the commission of the crime and higher values of property stolen during the commission of the crime are also found to have significant positive effects on the probability of residential burglary case clearance. These findings are consistent with prior research suggesting that case characteristics, particularly the availability of information on the suspect of the reported crime, impact the probability that a residential burglary case is cleared by an arrest (Braga et al., 2011; Eck, 1979; Greenberg et al., 1975; Greenwood et al., 1975).

Notably, victim race was found to be a significant predictor of clearance for cases of residential burglary. Specifically, residential burglary cases involving Black victims were less likely to be cleared by an arrest. This statistically significant, negative impact on residential burglary case clearance was maintained when pertinent neighborhood-level factors – concentrated disadvantage and ethnic heterogeneity – were controlled for. This finding of racially disparate outcomes in case clearance is not unique, with previous studies examining different types of crimes suggesting the impact of victim characteristics (see, e.g., Litwin & Xu, 2007; Puckett & Lundman, 2003; Roberts & Lyons, 2011). Still, the consistent effect of victim race on clearance by arrest for cases of residential burglary warrants additional consideration by the KPD. Given that these statistical models are substantively weak we cannot rule out the possibility that other unmeasured factors account for these differences.

The examination of the impact of neighborhood-level characteristics on case clearance suggests cases of residential burglary are less likely to be cleared by an arrest if the burglary occurred in a neighborhood characterized by concentrated disadvantage. This finding is also not altogether unexpected. Research suggests substantial difficulties facing police investigative work in communities where public confidence or trust in police is more tenuous (Braga & MacDonald, 2019). Indeed, residents of disadvantaged neighborhood are often observed to possess greater legal cynicism – that is, perceptions of law and its enforcers as illegitimate, unresponsive, or ill equipped to ensure public safety (Kirk & Papachristos, 2011; Skogan, 1990). As such, residents may be less willing to assist the police in their investigation of crimes, limiting the information available for the successful identification and arrest of a suspect.

Further examination of a the cross-level interaction between concentrated disadvantage and the identification of a suspect name or description reveals that, although disadvantaged neighborhoods are less likely to have cases of residential burglaries cleared by an arrest, clearance by arrest is *more* likely for cases occurring in disadvantaged communities where a suspect name or description is known to police. This finding further highlights the importance of strong police-community relationships that facilitate information sharing to inform police of offenders within the area. Indeed, policing researchers and practitioners have long recognized the importance of the public in determining the outcomes of a case (Chaiken et al., 1977). As such, law enforcement agencies should prioritize community-engagement efforts to encourage victim and witness cooperation in the investigation of crimes.

Individual Robbery

In the examination of individual robberies, descriptive statistics identify 1,524 incidents of individual robbery reported to KPD from 2013 to 2017. When examined by year, reports of individual robberies to the KPD declined by approximately 24.7% from 2013 to 2017. Similar to cases of residential burglary, the majority of individual robbery cases reported to the KPD during this time period had not been cleared, with only 13.9% cleared by an arrest. In contrast to cases of residential burglary, however, case clearance rates for individual robbery reported to the KPD experienced a slight increase during the five-year period under examination, with 12.2% of robbery cases cleared by arrest in 2013 and 18.3% of cases cleared by arrest in 2017. When the percentage of individual robbery cases cleared by arrest *or* exceptional means from 2013 to 2017

is considered, we find that KPD's case clearance for individual robbery is higher than national trends for robbery case clearance by arrest or exceptional means (see https://ucr.fbi.gov/crime-in-the-u.s for access to yearly estimates).

Findings from multivariate analyses conducted to examine the impact of specific case characteristics and neighborhood characteristics on the likelihood that a case of individual robbery is cleared by arrest did not identify any significant predictors of case clearance at the case- or neighborhood-level. These null effects contrast the conclusions drawn from the examination of residential burglary presented above – which identified several factors that impact the likelihood that a case is cleared by an arrest. These findings suggest that predictors of case clearance may be crime specific, with clearance by arrest significantly affected by the type and quality, as well as variation in the information available for the investigation of different types of crime. For example, individual robberies involve human interaction for the commission of the crime, lending law enforcement agencies greater ability for information gathering via victim or witness accounts. Indeed, KPD identified at least one point of description for the suspect in 97% of individual robbery cases. In contrast, residential burglary is more likely to occur in the absence of witnesses or victims, making the availability of a suspect description infrequent (i.e., 36.1% of residential burglary cases reported a suspect description) and fundamentally more valuable for the successful investigation of the crime. Similar comparisons in the availability/value of information for investigations across these crimes can be made in consideration of other significant case characteristics (i.e., involvement of a weapon, dollar value of property stolen).[8] Collectively, these findings encourage the development of crime-specific models for case clearance that consider the variation in the predictive power of different case-level characteristics on case clearance by arrest for distinct crimes.

The absence of neighborhood-level effects within the individual robbery analyses present additional points for consideration. Indeed, the null effects contradict findings produced in the examination of predictors of case clearance for residential burglary, which indicated a lower probability of cases being cleared by arrest when the offense occurs in a disadvantaged neighborhood. The observed difference in neighborhood-level predictors of case clearance across these crimes is not entirely without base. The available empirical evidence regarding the impact of neighborhood characteristics on case clearance is inconsistent, with findings demonstrating positive, negative, and null effects for neighborhood-level factors (Borg & Parker, 2001; Sullivan, 1985; Worrall, 2016). These findings are further convoluted by observations of variation in neighborhood effects on crime clearance for different types of crime (Paré et al., 2007) – as seen in the present study.

Explanations provided in the extant literature for these differences are somewhat limited. However, recent research has primarily suggested that variation in clearance rates across communities is a product of police-community relationships and community attitudes toward police that either facilitate or impede public cooperation in the investigation of crimes by the

[8] The majority of residential burglary cases (99.4%) were not reported to involve a weapon. Therefore, when a weapon is identified in the process of investigation, this information provides a significant lead absent from most investigations. In comparison, 33.7% of individual robbery cases were reported to involve a weapon. Furthermore, the average dollar value of property stolen during a residential burglary was found to be more than twice that of property stolen during an individual robbery ($2,141.56 compared to $993.81).

police (Brunson & Wade, 2019; Carter & Carter, 2016). Using this framework, it is possible that residents within disadvantaged neighborhoods – due to lack of trust in police or lack of confidence in the ability of police to apprehend burglary offenders – are less motivated to cooperate with the police in the investigation of property crimes, decreasing the availability of information leading to the identification of the offender. In contrast, the seriousness and relative infrequence of robbery incidents could make residents more inclined to provide information leading to the identification of suspects.

It is important to recognize that the lack of findings produced from the multivariate analyses of predictors of case clearance does not suggest there are no factors that might impact the likelihood of individual robbery cases being cleared by arrest by the KPD. Instead, the absence of findings is more likely a product of the limitations of the study. Specifically, the present study examines a more limited model for case clearance relying upon the predictive power of case characteristics found in electronic datasets prepared by the agency, as well as neighborhood contexts. It is possible other pertinent factors, such as investigative efforts expended upon the case and organization context may impact the probability of cases of individual robbery being cleared by arrest. Future research should consider the exploration of a more holistic model of case clearance that takes case characteristics, investigative efforts, as well as organizational and community contexts into consideration (Wellford et al., 2019).

Implications

Findings indicating the significant impact of victim race on case clearance when other pertinent case- and neighborhood-level characteristics are controlled for present important implications for the Knoxville Police Department's investigatory process for cases of residential burglary. Specifically, the KPD should consider why residential burglary cases are less likely to be cleared by an arrest if they involve a Black victim. It is possible the impact of victim race on the clearance of these crimes may be produced by similar underlying factors (discussed above) causing the association between neighborhood concentrated disadvantage and lower clearance rates. That is, variation in case clearance rates could be a product of police-community relationships and victim attitudes toward the KPD that may impede their cooperation in the investigation of residential burglary. Given this possibility, KPD may consider greater allocation of resources in the investigation of residential burglary cases occurring in neighborhoods characterized by concentrated disadvantage. Indeed, finding that identification of suspect within these neighborhoods significantly increases the likelihood of case clearance highlights the potential utility of community and victim engagement efforts to encourage victims and witnesses to come forward with information related to these cases.

Further, it is important to consider that these same race effects are *not* found for robbery case clearance. Rather, for robbery incidents, the race and sex of both the suspect and the victim have no substantial predictive value in determining if the case is cleared by arrest. It is recommended that the KPD Command staff consider the potential differences involved in the investigatory responses given to both burglaries and robberies that might account for this differential impact of victims' race on the likelihood of identifying and arresting criminal suspects.

Finally, it is important to note that overall, these models are not substantively strong, leaving a large percentage of unexplained error. That is, the factors available for examination collectively do not provide a strong prediction of whether or not a case is cleared by an arrest. This suggests that there are other factors – unmeasured and therefore, not included in these statistical models – that may be stronger predictors of case clearance rates. It is possible that the identification, measurement, and inclusion of these other factors would alter the findings presented above.

Based on previous studies, there was an expectation that the prevalence and strength of case solvability factors – that is, those case characteristics identified in the preliminary investigation that can lead to the identification of a suspect – would be significant predictors of subsequent case clearance rates. Of interest was how these solvability factors could be used – in the form of a checklist – to help KPD personnel determine in a systematic, unbiased manner, the best use of their limited investigatory resources. Police agencies that systematically record solvability factors as quantifiable measures can later use these data to determine the relative importance of each solvability factor. Agencies could use this type of information to implement processes and procedures that will enhance investigatory effectiveness and efficiency. That is, given the limited resources of police agencies, a systematic examination of what specific factors best solve crimes could assist the agency in developing processes to prioritize their work; cases with the highest initial likelihood of solvability would receive additional investigatory resources, while those with lower probability of being solved would receive less resources.

The electronic data provided to the research team from the KPD, however, did not systematically identify *when* information was gathered by KPD personnel (that is, during the preliminary or follow-up investigation) or *how* it was used to inform the assignment and follow-up investigation of cases. Without systematically collecting this information, it is difficult to conduct a thorough examination of the investigatory process at the KPD or identify methods to enhance the percentage of cases cleared by an arrest. Although we know there are specific solvability factors that impact case clearance, unless the KPD creates a process for the systematic collection of electronic records of the factors identified in the preliminary investigation of cases, the influence of these factors on case clearance rates cannot be reliably determined.

It is possible that supplemental information key to understanding case characteristics and investigative efforts exist within hard copies of case files developed by KPD personnel. However, if this information is not connected electronically to other existing database, its utility in the examination of predictors of case clearance is depended upon a time-consuming and resource-intensive hand-coding of the details from the casefiles. Therefore, it is recommended that the KPD investigate the possibility of customizing its current processes for electronically collecting investigatory data, in an effort to improve the quantity and quality of data that is captured. Further it is recommended that once systematically gathered, routine analyses of these electronic data by KPD analysts should be conducted to promote the identification and enhanced use of solvability factors. This will likely increase the effectiveness and efficiency of investigators, resulting in increased case clearance rates.

Conclusion

This report presented findings from the examination of KPD case clearance rates for residential burglaries and individual robberies. Although not without limitations, this study represents a concerted effort to add to the limited contemporary research on the police investigations and predictors of case clearance. Echoing recent calls for research, this study highlights the need to invest resources in the empirical exploration of "what works" in investigative practices to enhance clearance rates by law enforcement agencies across the United States. While the present study identified important effects of case- and neighborhood-level factors on case clearance rates for residential burglary, future research should consider the examination of a holistic model for case clearance, considering the impacts of case characteristics, investigative efforts, organizational context, and community characteristics on the effective investigation and resolution of crimes. Notably, a significant source of information regarding effective models for case clearance can come from the law enforcement agencies actively investigating crimes across the United States. Now is the time for agencies to take special care in documenting their investigative practices, highlighting factors that appear to enhance case clearance rates within their respective jurisdictions. This work can answer questions pertaining to effective practices in police investigations, as well as identify key predictors of case clearance, providing guidance for organizational improvement in investigative practices. Ultimately, the development of empirical knowledge and practical implications in this area can augment our understanding of investigation models across crime types and law enforcement organizations, enhancing the ability of law enforcement to apprehend offenders.

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VII. APPENDIX A: DATA DESCRIPTION

Knoxville Police Department provided the IACP/UC Center electronic data files pertaining to cases of residential burglary and robbery of individuals reported to their agency between the years of 2013 and 2017. These data included records labeled Calls for Service, Case Clearance, Modus Operandi, Persons, Actions, Functions, Vehicle, Supplements, and Memo. The number of records available within these files varied. For example:

- "Calls for Service" data included 8,797 records. Among these, 7,610 were unique records, 6,333 of which were unique cases of residential burglary or robbery of individuals.

- "Persons" data included 24,522 records. These records include information pertaining to suspects (11,909 total records; 9,757 unique records; 8,399 unique records pertaining to residential burglary and individual robbery), victims (11,540 total records; 9,757 unique records; 8,399 unique records pertaining to residential burglary and individual robbery), arrestees (1,059 total records; 865 unique records; 703 unique records pertaining to residential burglary and individual robbery), Complainants (6 total records; 6 unique records; 2 unique records pertaining to residential burglary and individual robbery), witnesses (6 total records; 6 unique records; 4 unique records pertaining to residential burglary and individual robbery), and other (2 total records; 2 unique records; 2 unique records pertaining to residential burglary and individual robbery) complainants, witnesses, and "other".

- "Modus Operandi" data included 10,770 records. Among these 9,768 were unique records, 8,418 of which were unique cases of residential burglary and robbery of individuals.

- "Case Clearance" data included 10,570 records. Among these, 9,610 were unique records, 4,848 of which were unique cases of residential burglary or robbery of individuals.

- "Actions" data included 5,141 records. Among these, 4,099 were unique records, 3,457 of which were unique cases of residential burglary or robbery of individuals. These data were used to identify information on the collection of latent fingerprints at the scene of a crime, as well as to estimate the timing of various officer activities (e.g., arrival on scene).

- "Functions" data included 4,676 records. Among these, 4,204 were unique records, 3,505 of which were unique cases of residential burglary or robbery of individuals. These data were used to identify the estimated time of crime occurrence in cases of residential burglary and individual robbery.

- "Vehicle" data included 334 records. Among these, 185 were unique records, 88 of which were unique cases of residential burglary or robbery of individuals. Due to the small number of cases with available vehicle information and the inability to identify the owner

of the vehicle from which information was recorded, these data were not used in the analyses presented within this report.

- "Supplements" data included 9,342 records. Among these, 5,559 were unique records, 4,394 of which were unique cases of residential burglary or robbery of individuals. This data file included case narratives for reported incidents of residential burglary and individual robbery. This information was not used in the quantitative analyses presented within this report.

- "Memo" data included 3,131 records. Among these, 2,581 were unique records, 2,222 of which were unique cases of residential burglary or robbery of individuals. This data file included memos or notes for cases of residential burglary and individual robbery. This information was not used in the quantitative analyses presented within this report.

The Modus Operandi (MO) data file was used as the starting point for the development of a comprehensive list of reported cases of residential burglary and individual robbery between 2013 and 2017. This file was selected because it provided the highest count of possible unique cases for burglary and robbery incidents. Researchers queried the MO data using "class" and "crime" fields. To select (filter) residential burglary cases, "burglary residential" criteria were used in the "class" field and "burglary residential and breaking and entering" criteria were used in the "crime" field. To select (filter) individual robbery cases, "robbery individual" criteria were used in the "class" field and "robbery and robbery individual" criteria were used in the "crime" field. This selection process resulted in the identification of 6,767 cases of residential burglary and 1,651 cases of individual robbery. Further analyses using available data on crime victims were conducted to verify the inclusion of the selected cases in the study sample. These analyses revealed several MO data incidents to have no victim data or to include victims of commercial burglary and commercial robbery. These cases were eliminated from the sample, creating a final count of 6,484 cases of residential burglary and 1,524 cases of individual robbery.

VIII. APPENDIX B. PREDICTORS OF CASE CLEARANCE, FULL MODELS

Table 9. Predictors of Residential Burglary Case Clearance, Full Models
(Unstandardized coefficients reported, Standard errors reported in Parentheses)

	Logistic Regression (N = 6,426)	Logistic Regression (N = 2,231)	Hierarchical Linear Modeling (Level 1 N = 6,426) (Level 2 N = 140)	
	Model 1	Model 1B	Model 2	Model 3
Incident-Level Measures				
Intercept	-7.853** (1.793)	-6.298** (2.016)	-3.165* (.210)	-3.160* (.210)
Suspect Description	2.333** (.118)	----	2.32** (.118)	2.18** (.120)
Stolen Property Value	.001* (.000)	.001 (.001)	.001* (.000)	.001* (.000)
Weapon Involved	1.645** (.348)	1.652** (.360)	1.62** (.346)	1.62** (.345)
AFIS Quality Prints	.330 (.323)	.451 (.354)	.290 (.320)	.289 (.320)
Victim Male	.059 (.097)	-.042 (.112)	.066 (.089)	.066 (.089)
Victim Black	-.383** (.123)	-.166 (.153)	-.345* (.135)	-.345* (.135)
Suspect Male	----	.237 (.126)	----	----
Suspect Black	----	-.183 (.132)	----	----
Neighborhood-Level Measures				
Concentrated Disadvantage	----	----	-.138** (.047)	-.480** (.124)
Ethnic Heterogeneity	----	----	-.028 (.056)	-.024 (.050)
X-Level Interaction (Suspect Desc*Disadvantage)	----	----	----	.404** (.136)
Control Measures				
Tuesday	.037 (.163)	.287 (.190)	.029 (.163)	.030 (.162)
Wednesday	.266 (.168)	.052 (.193)	.260 (.167)	.247 (.167)
Thursday	-.005 (.164)	.298 (.193)	-.000 (.164)	.005 (.164)
Friday	-.266 (.169)	-.016 (.200)	-.255 (.169)	-.249 (.169)
Saturday	-.622* (.192)	-.405 (.223)	-.596* (.192)	-.591* (.192)
Sunday	-.274 (.178)	-.079 (.210)	-.265 (.178)	-.259 (.178)
February	.163 (.234)	.010 (.268)	.149 (.234)	.132 (.234)
March	-.387 (.243)	.772* (.286)	-.409 (.242)	-.431 (.242)
April	-.351 (.233)	.635* (.268)	-.371 (.233)	-.384 (.233)

May	-.291 (.227)	.549* (.257)	-.300 (.227)	-.310 (.227)
June	.308 (.222)	.226 (.243)	-.150 (.218)	-.158 (.218)
July	-.641 (.245)	.667* (.260)	-.301 (.223)	-.305 (.221)
August	-.308 (.222)	.639* (.254)	-.344 (.221)	-.358 (.221)
September	-.641* (.245)	.760* (.270)	-.682** (.244)	-.684** (.244)
October	-.181 (.224)	.224 (.251)	-.169 (.224)	-.174 (.224)
November	-.363 (.230)	.475 (.256)	-.385 (.229)	-.379 (.229)
December	-.292 (.178)	.381 (.254)	-.321 (.227)	.326 (.227)
Pseudo R-Square	.117	.098	--	--

** p < .01; *p < .05 (Monday and January are the excluded categories).

Table 10. Predictors of Individual Robbery Case Clearance, Full Models
(Unstandardized coefficients reported; Standard errors in parentheses)

	Logistic Regression (N = 1,510)	Logistic Regression (N = 1,428)	Hierarchical Linear Modeling (Level 1 N = 1,510) (Level 2 N = 141)
	Model 1	Model 2	Model 3
Incident-Level Measures			
Intercept	-21.10 (59.28)	-1.402 (.405)	-29.26 (21.56)
Suspect Description	19.47 (59.28)	----	27.48 (21.52)
Stolen Property Value	.000 (.000)	.000 (.000)	.000 (.000)
Weapon Involved	.263 (.159)	.255 (.159)	.249 (.170)
AFIS Quality Prints	.884 (.934)	.862 (.929)	.840 (.945)
Victim Black	-.172 (.191)	-.172 (.199)	-.160 (.200)
Victim Male	-.231 (.161)	-.205 (.164)	-.254 (.195)
Suspect Black		-.036 (.168)	----
Suspect Male		-.228 (.232)	----
Neighborhood-Level Measures			
Concentrated Disadvantage	----	----	.003 (.071)
Ethnic Heterogeneity	----	----	.063 (.080)
Control Measures			
Tuesday	-.035 (.279)	-.006 (.281)	-.024 (.277)
Wednesday	-.156 (.293)	-.158 (.294)	-.199 (.291)
Thursday	-.274 (.279)	.250 (.279)	.238 (.278)
Friday	-.239 (.280)	-.242 (.284)	-.287 (.281)
Saturday	-.385 (.290)	-.381 (.292)	-.436 (.288)
Sunday	-.167 (.282)	-.149 (.283)	-.224 (.280)
February	-.043 (.392)	-.006 (.394)	-.060 (.389)
March	.413 (.351)	.410 (.352)	.372 (.348)
April	-.065 (.377)	-.117 (.384)	-.089 (.378)
May	.130 (.351)	.137 (.351)	.099 (.346)
June	.123 (.369)	.143 (.370)	.104 (.366)
July	-.022 (.365)	.016 (.365)	-.027 (.361)
August	-.559 (.438)	-.544 (.439)	-.608 (.436)
September	-.227 (.389)	-.222 (.390)	-.297 (.386)
October	.600 (.338)	.623 (.339)	.542 (.334)
November	-.559 (.438)	-.470 (.404)	-.503 (.400)
December	-.146 (.385)	-.121 (.386)	-.164 (.385)
Pseudo R-Square	.089	.067	--

** p < .01; *p < .05 (Monday and January are the excluded categories).